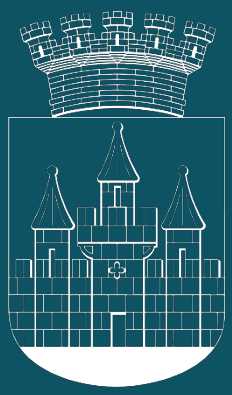
NET ZERO CITIES

EU MISSION PLATFORM | CLIMATE NEUTRAL AND SMART CITIES

Climate City Contract

2030 Climate Neutrality Action Plan

2030 Climate Neutrality Action Plan of the City of Lund



CITY OF LUND

Table of Contents

Summary

Textual element
The City of Lund has been an early pioneer in environmental work since becoming a pilot fossil-fuel free municipality programme in the 1990s. Considerable work has been carried out since then to decarbonise the energy system and increase active mobility. Lund is the city with the highest share of cycling per-capita in Sweden and one of the highest in the world and it has made recent major investment in tram infrastructure to link a major new research, business and residential district in the north-east of the city to the city centre and its bus and rail infrastructure. Lund is one of the 23 Swedish Viable Cities and with this Climate City Contract it strengthens its ties to the European Union and Net Zero Cities. As such, the work to complete the journey to climate neutrality by 2030 builds on strong foundations and organisational capacity. This does not make the transition any less challenging. Lund has committed to tackle its emissions full on by including through traffic on the motorway and trunk roads as well as significant emissions from agriculture and land-use from its large rural area within the municipal boundaries. It is also committed to working with Scope 3 reductions although on a longer timescale. This document details the policy framework, governance structure, partnership approach and innovation capacity of the Lund transition process as well as providing baseline data and analyses underpinning the strategic fields of action and their respective action plans focusing on: Transportation and mobility Agriculture and sustainable land-use Circular economy and sustainable consumption Net zero construction Energy Carbon sinks To tackle these areas Lund needs to increase its partnership approach and further develop codesign processes with communities to identify solutions that will meet their needs. A large proportion of the emissions reductions will be dependent on up-take of sustainable mobility choices, low-carbon agricultural practices, circular business models and lifestyles and commitment from property owners and developers. These are all areas where the mandate of the city is limited to implement change, but where it must work strategically with the tools, partnerships, incentives and regulations available to it, and to work in a more joined-up way at a regional and national level to support the transition. There are also major capital projects being planned for increased renewable combined heat and power and biogas production and the construction of a biochar production plant is under consideration. Through the Climate City Contract, the city is deepening this engagement whilst doubling down on its own investments and operations. It has established a core transition team and is strengthening this during 2024 with transition managers for each roadmap and a support team including financial expertise, citizen engagement skills and just transition perspectives. It is piloting new approaches to community-based codesign processes that serve to raise awareness and mobilise communities and to test solutions adapted to local needs that may vary in different parts of the city or the surrounding towns, villages and rural communities. This experimental approach can support an iterative development with community ownership and potential for significant impact in user-friendly scaleable solutions. This document, and supporting investment plan, constitute the first programme of works towards the 2030 climate neutrality target. There are still uncertainties around some actions, and many costings are still preliminary, but as the roadmaps develop in more detail and projects progress beyond the prestudy phases, then the clarity of the plan and the financing of it will become increasingly clear. The plan is hugely ambitious and will require extraordinary efforts from the city and its key partners in

order to facilitate a transition that does not require extraordinary efforts from its citizens but that can be seen as a pathway to improved quality of life both now and in the future that they can help shape and deliver.

List of figures

The list of figures **identifies the titles and locations** (page numbers) of **all visual elements:** figures, drawings, photos, maps, etc. used in the CCC Action Plan.

List of tables

The list of tables **identifies the titles and locations** (page numbers) of **all tables** used in the CCC Action Plan.

Abbreviations and acronyms

The list of abbreviations and acronyms **identifies the abbreviations** (a shortened form of a word used in place of the full word) **and acronyms** (a word formed from the first letters of each of the words in a phrase of name) used in the CCC Action Plan.

Abbreviations and acronyms	Definition
LKF	Lunds kommuns fastighets AB, Municipal housing company
LRV	Lunds renhållningsverk, Municipal waste company
BAU	Business as usual
BATNEEC	Best Available Technology Not Entailing Excessive Cost
SMED	Svenska MiljöEmissionsData, a collaboration involving several Swedish organizations, that collects, processes, and reports environmental emissions data in Sweden.

SMHI	Swedish Meteorological and Hydrological Institute

1 Introduction

The introduction outlines the local geographic and policy context in which the city´s 2030 Climate Neutrality Action Plan is being developed and describes the gap it addresses in broad terms. It includes:

- The administrative territories included in the city´s 2030 climate neutrality target. Where applicable, any districts or emission sources within these administrative boundaries that are excluded from the target of climate neutrality by 2030[1]. Table I-1.1 summarizes this narrative in a snapshot.
- Key data on the administrative and political organisation of the city, its demographic and socio-economic characteristics, and climate-relevant sectors.
- A clear description of the relationship of this CCC Action Plan with existing climate policies and strategies (further detailed in Module A-2), and how it builds on them to address the gap (if any) to climate neutrality.
- Background information on the work process of developing the city's CCC Action Plan, highlighting its connection with the other Climate City Contract components (2030 Climate Neutrality Commitments and 2030 Climate Neutrality Investment Plan).
- A description of future steps, planned timeline and milestones for future iterations for the continuous development of the CCC Action Plan.

Introduction

Lund – a modern and historical centre of knowledge and innovation

The city of Lund is one of the oldest in Scandinavia and home to one of its leading universities. It has a population of about 130 000 covering the urban centre of Lund and a number of smaller towns and villages in the surrounding countryside. Lund is well connected via Malmö to Copenhagen and is a key part in the knowledge intensive and innovative economy of the dynamic Öresund region. The importance of the university to Lund's development cannot be overstated, with many local industries, start-ups and organisations growing out of, or thriving from, collaboration with the university. Academic programmes span various disciplines, including science, engineering, humanities, medicine, and social sciences.

New investment in the European Spalliation Source and related Max IV Lab are amongst knowledge intensive development in the city that are driving growth. Lund is home to major global companies such as TetraPak, Axis and Alfa Laval, but also has many small businesses, not least in the Ideon Science Park and Medicon Village with over 13000 jobs in 580 innovative businesses in tech and life science.

The population is expected to reach 140000 before 2030 and major new urban development projects are underway on brownfield sites near the city centre and a major greenfield development on the edge of the city. The City has a target to build 26 000 new homes by 2040 and the priority is for more

[1] By default, the participating city would commit the whole city or entity to become climate-neutral. However, where duly justified, the city may propose to exclude one or more district(s) or sources of emissions from the 2030 deadline, but in this case should commit to a strategy of climate neutrality for these districts as soon as possible, and of course no later than 2050. In this context, districts will be considered as neighbourhoods or zones of special interest of a city administered or governed by some type of "district council".

compact development based around active mobility. The proportion of young residents is rising, while the share of older individuals is also growing. Specifically, the number of school-age children is expected to increase in the coming years, but proportionally, it is the population over 85 years old that is growing the most. These demographic changes will pose challenges for the municipality, particularly economically, as more people will require welfare services while fewer are of working age and thus supporting a larger population.

The 2030 Target & Policy Framework

Lund has made the political commitment to be climate neutral by 2030 with an 80% reduction in GHG emissions by 2030 from 2010 levels and an interim target of 65% by 2025. By 2045 the city will be climate positive and emissions close to zero. Emissions from the transport sector will be reduced by at least 90% between 2010 and 2030. There is also a Scope 3 ambition to reach a target of 1 tonne / capita by 2050 and to establish clear 2030 targets in the near future. The targets cover the entire administrative territory of the city including the rural area and villages and apply to all emissions including those from agriculture.

Lund's Programme for Ecologically Sustainable Development 2021-2030 (LundaEko III), contains the overall goal for the municipality's climate and environmental work and is based on national environmental quality objectives, Agenda 2030 and Lund's vision. The Programme provides the overarching policy framework with more detailed targets and action programmes outlined in other strategic documents related to more specific areas of work such as mobility, energy and waste. Together this builds a coherent governance framework for climate action across the city administration and city-owned or co-owned businesses and utilities in housing, energy, waste and water.

The CCC is supporting the implementation of this framework by providing additional focus on the challenges and gaps in operationalising the ambitious targets and ensuring that the gap between policy and action is addressed. As such, the CCC process creates additional political and organisational focus on delivery, engaging actively outside of the normal sphere of operations of local government and actively working internally for a more joined-up approach.

There is the potential for significant co-benefits from climate action and reducing reliance on fossil fuels. Firstly, many mitigation efforts, such as the preservation and increase of green and natural areas, are simultaneously beneficial for climate adaption and increased resilience towards the adverse consequences of climate change. The severity and impact of e.g., heat waves, extreme water flows and droughts can be decreased. Health benefits related to climate action for the City of Lund’s inhabitants will include e.g., cleaner air, healthier modes of transportation, calmer and greener village and city centres. The transition to a carbon neutral economy also offers many business and work opportunities and the potential for Lund’s knowledge intensive economy to flourish and develop to meet the climate challenge and other major societal issues.

It is, however, important for the city to establish structured plans for co-benefit development and realisation as it cannot always be assumed that the benefits arise without active support and actions. The integration of social and economic development actions within or linked to climate actions will be essential to these added values and highly important activities. They also help ensure strong public and organisational support for climate transition work. A more collaborative approach with citizens, communities and community organisations will be an important element of this work. Whilst there is a professional skills base in the city on community development and partnership working, it has as yet not been a core focus of the work with climate change and a more joined-up approach within the city will be necessary for a strategic and operational approach to co-creation, social inclusion, co-benefit development and a just transition.

Partnerships and key stakeholders

Lund has long been committed to working collaboratively within the city, with academia, business and community organisations, but also engaging nationally and internationally with other cities and organisations committed to driving the sustainability agenda. Many of the opportunities and challenges faced by Lund are shared by other cities, not least of which is the limited mandate of local government which necessitates strong collaborative approaches.

Lund is very much a city of knowledge with the University at its core and a strong cluster of knowledge intensive businesses in areas such as IT, pharmaceuticals, packaging and engineering. Most recently Lund has become home to the cutting-edge R&I European Spallation Source and adjacent Max IV synchroton light facility. The combination of large multinational business and small knowledge-intensive start-ups has been a driver of the local economy and increasingly there is a focus on climate and wider sustainability issues at the heart of economic development.

One key agent of change in the climate transition to date has been the publicly owned energy utility Kraftringen whose strategic investments over two decades has transformed the energy system in the city. Further work remains, however, to complete the decarbonisation process and Kraftringen will be a key player in continued action, and a strong partner able to demonstrate the business case of climate action.

The business-led Climate Alliance has been operating since 2010, providing an important arena for market leaders in the city. More recently, the partnership approach has been strengthened by the development Future by Lund innovation platform to engage business partners and other organisations in innovation for a more sustainable city.

Future by Lund has a wide portfolio of innovation partnership projects including areas such as IoT, Mobility and Future Living where many projects have a focus on climate-related issues such as development of IoT and AI solutions for low-carbon agriculture, smart mobility or new business models for photovoltaics. Many of the projects engage public, private and academic partners and some also work actively with community organisations and end users.

Lund, home to one of Europe's leading universities, was the first municipality in Sweden to adopt an independent Climate Policy Council consisting of a team of researchers from Lund University and the nearby Swedish University of Agricultural Sciences who carry out an annual review of progress on climate change action in the city and provide recommendations based on their findings, current scientific knowledge and state of the art in other cities across the world. The Climate Policy Council has focused on key challenges in each report and in 2024 had particular focus on land use issues as an area with significant impact, limited strategic focus from a climate perspective, and which is currently in focus due to the revision of the comprehensive spatial plan.

Lund is a signatory of the Global Covenant of Mayors and has been active in numerous Swedish local government partnerships for climate action. Lund was also one of the founding members of the Swedish Viable Cities partnership of 23 municipalities and additional government agencies committed to climate neutrality by 2030. Viable Cities has become a strong arena for knowledge sharing and has the potential to be an increasingly influential arena to drive a more joined up multi-level governance approach to the climate transition with positive impacts across the entire country. Lund has similar hopes and expectations for the Net Zero Cities partnership – that it can be an arena for shared learning and action, but also an arena to drive climate governance and climate finance at a European and national level.

One of the priorities for Lund's work in the current Viable Cities programme is increased community engagement in areas such as mobility, circular economy and community safety. Whilst Lund has a

long tradition of communicative work with communities on sustainable mobility, there is a recognition of the need for stronger and deeper engagement with communities, organisations and citizens in parallel with technical investments and change to drive the uptake of more sustainable options within the municipality, but also as part of efforts to decrease highly challenging Scope 3 emissions. Stronger community engagement can also inform policy development and support needs-focussed actions that can be co-designed to meet the needs of local people. Formal arenas such as the youth council or student council can have a role to play alongside more thematic or geographical arenas in which informal engagement and a partnership approach with local community organisations can broaden participation of under-represented groups. A wider approach to change-making with hard-to-reach communities will be an important element of Lunds work to maximise co-benefits to ensure a just transition.

It is clear that as the city administration grapples with challenges over which it has limited mandate, that the need for more collaborative and empowering processes is key to enabling action at both a political and personal level. The choices of individual citizens and businesses are key to reach the 2030 target and there is an important role for the City to better understand barriers to low-carbon decision-making at this level.

This is not least the case in the field of Agriculture and Land-use that Lund has chosen to prioritise as it is responsible for such a significant proportion of emissions in the municipality. The City has very limited experience of engaging with the agricultural sector and needs to work actively and openly to engage local farmers, land-owners and their professional bodies, together with academia and thought leaders to explore how the climate action can support a more resilient and economically viable development.

The need to accelerate the transition

Despite many positive developments, the transition towards climate neutrality in Lund must speed up. The challenge of reaching climate neutrality by 2030 must not be understated. At the current trajectory, it is unlikely that Lund will be able to reach the goals of decreasing emissions by 65 percent by 2025 compared to 2010, and by 80 percent by 2030, reaching climate positivity and close to zero emissions by 2045. The low-hanging fruit have largely been picked and the city is now in the next phase of development in which we need to maximise the use of the toolbox available within the local government mandate and work more actively with other stakeholders to drive their investments, actions, business models and behavioural changes in order to reach the 2030 goals. There has been a significant investment in the city budget to support climate transition work to increase momentum, action and delivery on the ground, so whilst the challenges are significant, so is the commitment and engagement from the city, its citizens, NGOs and wider business community.

Developing a Climate City Contract is an opportunity for Lund to take concrete action to improve an already ambitious climate policy by developing strategies that can increase impact. The Climate City Contract will increase local focus on an ambitious mission and help mobilise knowledge, technical and financial resources to accelerate the transition process in the city.

The CCC can also help support action to achieve social and economic co-benefits in the climate transition. These may be closely related to environmental outputs such as improved public health through emissions reduction, increased active mobility or more sustainable diets, or issues such as economic development in cleantech and climate technologies, new employment opportunities or increased community engagement and community cohesion.

There is a strong climate awareness and commitment in the community, but it is important for a strengthened mandate and increased engagement that co-benefits are visible for politicians, local people and business leaders. A key area of focus will be developing work around community engagement and social innovation to create stronger co-design processes in which social justice and

equity will be important issues to ensure that the climate neutral city is a city for all. The local climate transition can be an economic driver, can increase quality of life, can support community cohesion and can inspire other municipalities in Sweden or further afield that the climate challenge is also an opportunity to seize.

Challenges for the next iteration of the Action Plan

Climate transition action planning is at different stages of maturity for different fields of action. For example, the Energy transition has progressed a long way and there is a clear understanding of actions needed to address remaining issues. For Transport and mobility there are significant challenges remaining, but a well-established action plan encompassing infrastructure investment, mobility management and behavioural change with the potential for significant impact. The details of this plan, in particular with regard to behavioural change, will need to be updated in coming iterations.

Net Zero Construction includes actions with a significant impact, but there is a constant development process on-going here which will be identifying additional measures over time. It is in Agriculture and Land-use and Circular Economy and sustainable consumption, where the most significant gaps remain. Circularity builds on existing policies and practices around materials recycling and recovery which needs to be broadened to wider circularity approaches, and to both drive development in Lund, and also respond to development at a national or international level. In the case of Agriculture and Land-use there is a limited policy framework and weak organisational experience and capacity to work with strategic development and innovation outside of the planning and urban development spheres. A collaborative approach with key stakeholders in the coming period will therefore be necessary to start a clearer identification of actions that can both contribute to the 2030 ambitions and be realistic under current market conditions. Future iterations of the action plan will provide more details of how the emissions in these areas will be tackled.

Stakeholders involved in developing the CCC

A large group of internal stakeholders have participated in developing the CCC for the City of Lund. Staff from the City office (Environmental strategic unit, social sustainability, business office, external affairs and digitalization) have co-operated with the Technical department (Mobility unit), Financial department and Service management. In addition, the municipal housing company LKF, the municipal waste company LRV, and the municipal energy company Kraftringen contributed valuable information.

Table I-1.1: Climate Neutrality Target by 2030

Sectors	Scope 1	Scope 2	Scope 3
Stationary energy	Included	Included	Optional information
			Optional information
Transport	Included	Included	Optional information
		Only rail included here. Other use was not possible to separate from stationary energy.	Optional information
Waste/wastewater	Included	N/A	Included

	N/A	N/A	N/A
IPPU	Included	Not applicable	Optional information
	Only product use reported under IPPU, emissions from Industrial Processes are reported under stationary energy	Not applicable	Optional information
AFOLU	Included	Not applicable	Optional information
	Forestry excluded	Not applicable	Optional information
Other?	No	No	No
Geographical boundary	**Same as city administrative boundary**	**Smaller than city administrative boundary**	**Larger than city administrative boundary**
(Tick correct option)			**X**
Specify excluded/additional areas	N/A	N/A	Additional areas: Emissions from production of electricity used within administrative boundary (scope 2) Emissions from district heating production in Eslöv-Lomma that is used in Lund (scope 2) and emissions from the handling of Lunds municipal waste from waste management in Malmö are included (scope 3)
Map			

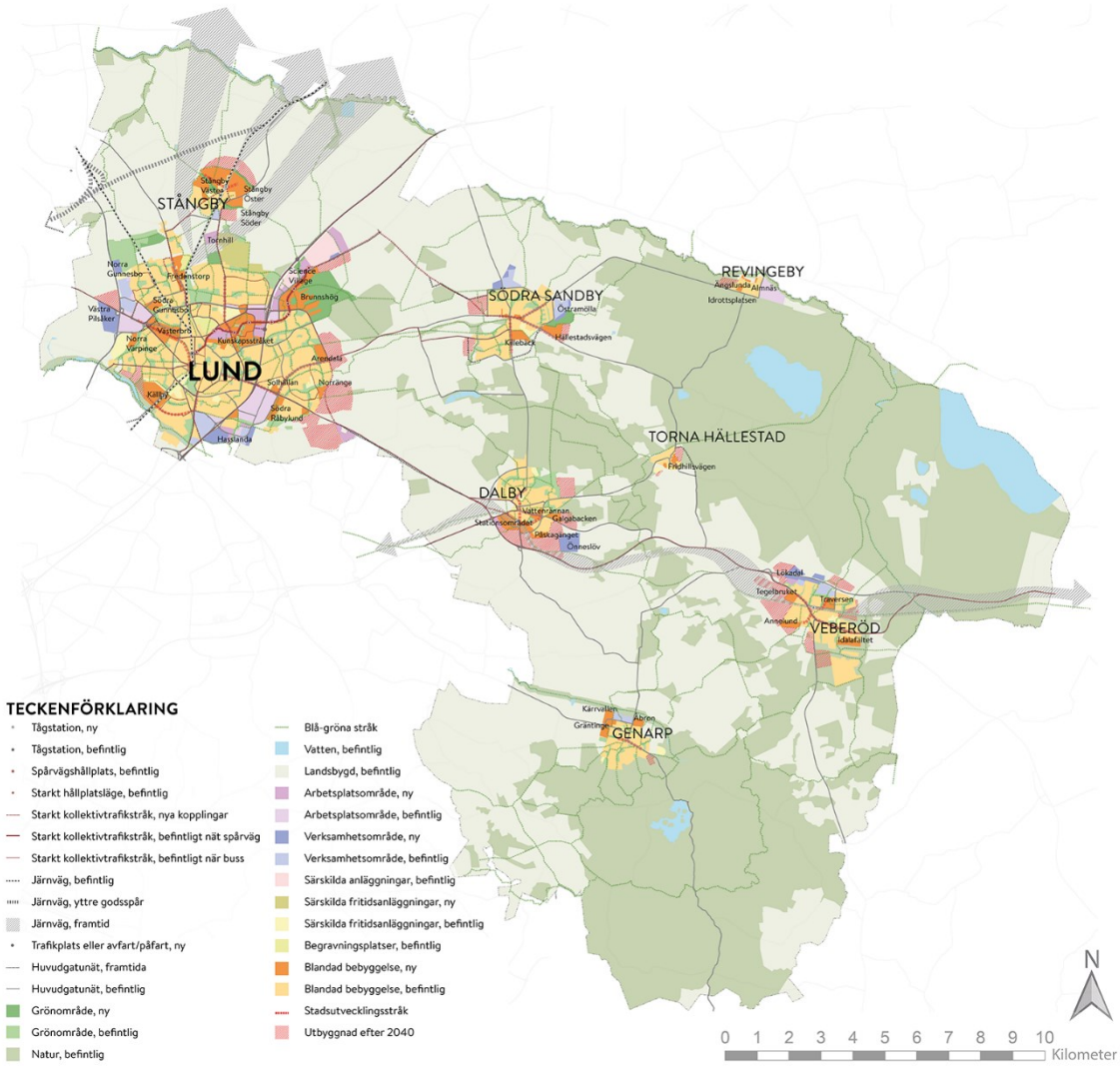


Figure 1: Map of the municipal borders. Lund City Centre is located in the north-west. The municipality also has eight villages: two located just north of the city centre, Stångby and Valkärra (the latter not marked on this map), and further east Södra Sandby, Revingeby, Dalby, Torna Hällestad, Veberöd and Genarp.

2 Part A – Current State of Climate Action

Part A "Current State of Climate Action" describes the point of departure of the city towards climate neutrality, including commitments and strategies of key local businesses, and informs the subsequent modules and the outlined pathways to accelerated climate action.

2.1 Module A-1 Greenhouse Gas Emissions Baseline Inventory

Module A-1 "Greenhouse Gas Emissions Baseline Inventory" details and describes the latest GHG inventory, where available from 2018 or more recent, referring to a clearly stated geographic boundary. The aim of this section is to establish the emission baseline and to establish the emissions gap to 2030 climate neutrality according to the inventory specifications defined in the Cities Mission's *Info Kit for Cities*[2] and the process outlined in the CCC Action Plan Guidance and Explanations. It includes:

- Definition of geographic boundary of the GHG inventory and, if applicable, excluded areas, sectors, scopes, sources, gases.
- An explanation of any (current) mismatch between the boundary of the GHG inventory and the climate-neutrality target, including actions planned to address the mismatch.
- Key data and visualisation of the latest GHG inventory (ideally not older than 2018), according to the coverage (source sectors, scopes, and gases) specified in the Mission's "Info Kit for Cities" to establish the emission baseline. If additional inventories are used in the CNAP, the same information should be provided for all inventories.
- Descriptive assessment of current GHG inventory, including a description of the current state of each emitting sector.
- Where a BAU scenario is used as baseline, a description of methodology and assumptions (for instance, which sectors/sources/gases are actually modelled; locally specific input variables vs. national or default data, etc.).

GhG Emissions Baseline inventory

Lund reported a GHG emission inventory in CDP based on the accounting year 2021. The coverage of the inventory is in line with the climate-neutrality target, and the inventory meets the requirements set forth in the Cities Mission's Info Kit for Cities.

A-1.1: Final energy use by source sectors	
Base year	2019 (SCB-data)
Unit	MWh

[2] European Commission, 2021, *Info Kit for Cities*, European Commission. Further guidance is available also in: NZC, 2023, *Guidance on target setting and emissions inventories for the Climate-neutral and Smart Cities Mission*, NetZeroCities https://netzerocities.app/resource-3814

	Scope 1	Scope 2	Scope 3
Buildings	86654	1614472	NA
Fuels	Domestic heating oil, pellet fuels, wood, natural gas, diesel oil	District heating, electricity	NA
Transport	546138	1580	NA
Fuels	Gasoline, diesel oil, biodiesels	Electricity	NA
Waste	N/A	N/A	N/A
(Fuel type/ energy used)			
Industrial Process and ProductUse (IPPU)	No local or national data for energy use, only for emissions	No local or national data for energy use, only for emissions	NA
Agricultural, Forestry and Land Use (AFOLU)	No local or national data for energy use, only for emissions	No local or national data for energy use, only for emissions	NA

A-1.2: Emission factors applied

(Please specify for primary energy type and GHG emission factor according to methodology used).

For calculation in t or MWh of primary energy

(Please indicate method used, e.g., GPC, IPCC, CRF, national etc.)

Emission factor for electricity

For electricity, an emission factor for the Nordic electricity is used. The GHG Protocol provides guidance on how to choose emission factors and offers calculation tools with integrated emission factors for electricity. The GHG Protocol recommends primarily using marked-based electricity figures. Sweden is connected to the European Energy Certificate System AIB, and it is possible to use the market-based method and thereby account for, for example, wind or solar power. IVL (Swedish Environmental Institute) has on behalf of the Swedish Environmental Protection Agency, developed emission factors for the Nordic electricity mix, taking into account import and export, where a breakdown of direct and indirect emissions is also presented to facilitate reporting according to the GHG Protocol's scope

Primary energy/ energy source	Carbon Dioxide (CO_2) **CO2e***	Methane (CH_4)	Nitrous Oxide (N_2O)	F-gases (hydrofluorocarbons and perfluorocarbons)	Sulphur hexafluoride (SF_6)	Nitrogen trifluoride (NF_3)
Electricity	90.4 g/kWh	*	*	*	*	*

District Heating	10 g/kWh (local value from the energy company)					
Biogas (CH4)	570 kg/kWh					
Diesel	342 kg/kWh					
Domestic heating oil	3036 kg/kWh					
Municipal waste (bio + fuel)	487 kg/tonne					
Biodiesel (HVO)	66.7 kg/kWh					
Gasoline (4.4% ethanol)	3,212.78 kg/kWh					
Gasoline (100%)	336 kg/kWh					
Solid biofuels (wood and wood waste)	234 kg/kWh					
Natural gas	231 kg/kWh					
Ethanol	14.16 kg/kWh					
Diesel oil (27.7% HVOm 72.3% diesel)	2,657.42 kg/kWh					
Landfill gas	2,710,000 kg/tonne					
Solid waste recycling	21,317 kg/tonne					
Marine oil	2,848.4 kg/kWh					

Emissions statistics in Lund are monitored in CO2 equivalents rather than separated in different component gases

A-1.3: GHG emissions by source sectors					
Base year	2019				
Unit	t CO_2 equivalent/year				
	Scope 1	Scope 2	Scope 3	Total	% of total
Transport	90897	N/A	N/A	90897	38%
Buildings & Heating	10636	N/A	N/A	10636	4%
Electricity	N/A	16644	N/A	16644	7%
Waste*	N/A	N/A	8530	8530	4%

Other(incl. IPPU & AFOLU		110337			110337	47%
Total		211870	16644	8530	237044	100%

** Includes Scope 1 Waste emissions (produced and processed in the city) and Scope 3 (produced by the city but processed outside the city border) - solid waste only; wastewater falls under "Other" sector*

A-1.4: Activity (energy) by source sectors.			
Base year: 2019			
	Scope 1	Scope 2	Scope 3
Sector: Buildings			
Residential buildings: småhus, flerbostadshus, fritidshus	55,647	818,139	N/A
Commercial and Institutional Buildings and Facilities	21,879	953,147	NA
Manufacturing Industries and Construction	61,505	270,758	NA
Agriculture, Forestry and Fishing	20,082	29,677	NA
Sector: Transport			
On-road transportation	TBC	TBC	NA
Railways	TBC	TBC	NA
Off-road transportation	TBC	TBC	NA
Waterbourne navigation	NA	NA	NA
Sector: Waste			
Solid waste disposal	NA	NA	NA
Biological Treatment of Waste			NA
Sector: Industrial Process and Product Use (IPPU)	No local or national data for energy use, only for emissions	No local or national data for energy use, only for emissions	NA
(Activity) NA			
Sector: Agricultural, Forestry and Land Use (AFOLU)	No local or national data for energy use, only for emissions	No local or national data for energy use, only for emissions	NA
(Activity)			

A-1.5: Graphics and charts

Territorial emissions in Lund are decreasing, although not fast enough

Since 2010, which has been politically decided as Lund's base year for emissions, territorial emissions have decreased in Lund. This has been, to a big part, due to the ambitious work of several city departments. As Figure 2 displays, there was a drastic drop in emissions between 2010 and 2015, and a slower but steady progression down since. However, with the current emissions reduction pace, Lund will not reach the 2030 target of reducing emissions by 80 percent compared to 2010 levels.

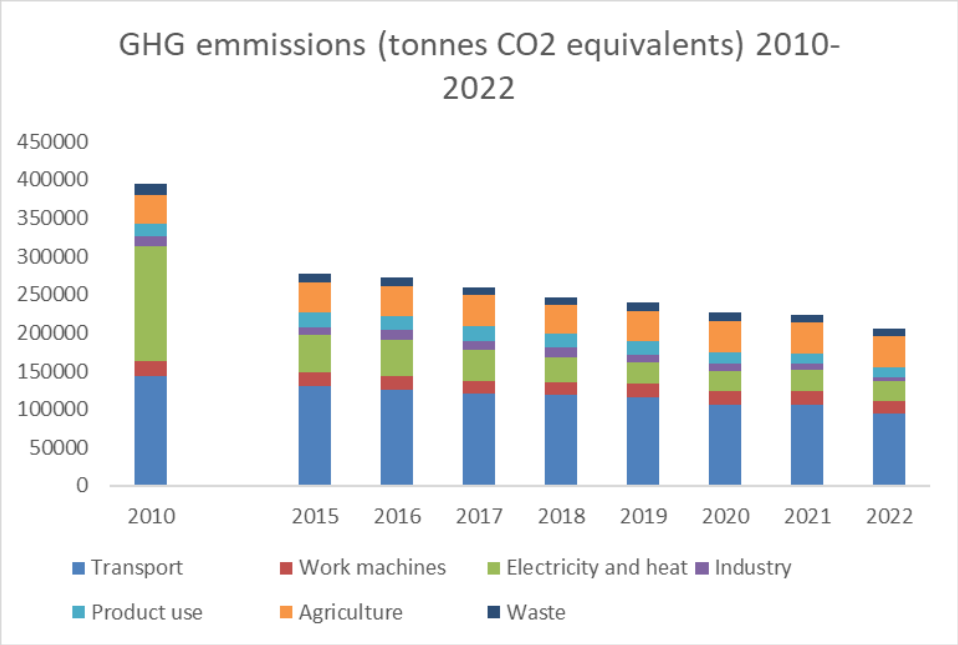


Figure 2: Lund's emissions (scope 1 and 2) from 2010 to 2022

In 2022, Lund's GHG emissions were 204,910 tons CO2e, down from 395,307 in 2010.

As shown by Figure 2, almost 50 percent of GHG emissions in Lund are caused by transport. The second biggest sector in producing GHG emissions is agriculture, causing approximately 20 percent of emissions. Emissions from electricity and heat only make up a fraction of emissions today, mainly due to big changes in district heating between 2010 and 2018.

Figure 3 illustrates possible trajectories of future emissions. The white line shows Lund's territorial emissions reported as of 2021. The red line represents the development of emissions were the strategic environmental work to cease and current policies not implemented in the future. As such, the red line does not represent a likely future development, but it shows that inaction would cause emissions to increase and reach 250,000 tonnes CO2e by 2030. The green line shows the trajectory that is needed in order to reach an 80 percent reduction in emissions compared to 2010 levels, reaching emission levels of 69,000 tonnes CO2e in 2030. Missing in the figure is a line demonstrating the emission trajectory that would follow in a BAU-scenario where current policies are kept in place and ambition levels remain the same. The CCC work gives Lund the opportunity to analyse the effectiveness of current policies and operations.

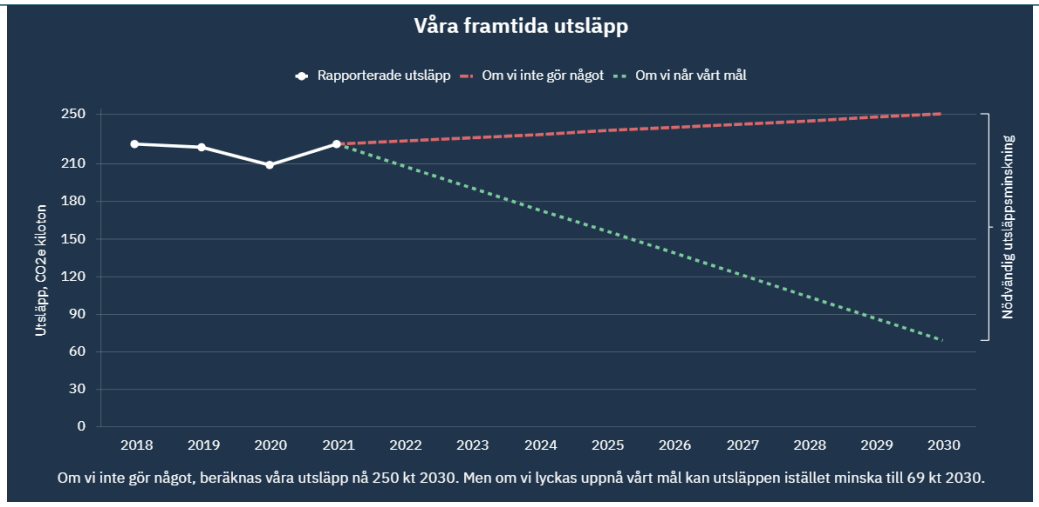


Figure 3: Our future emissions

Transport and machinery

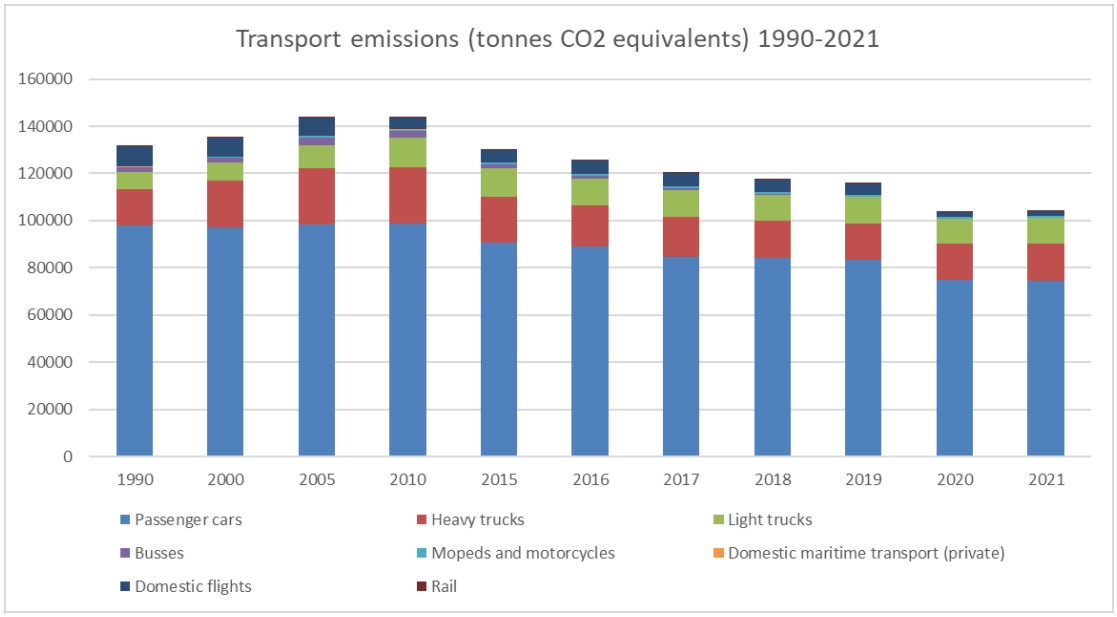


Figure 4: Transport emissions from 1990-2021

Figure 4 shows the development of transport emissions from 1990 to 2021, divided by subsectors. Since 2010, transport emissions have followed a downward trend. 2021's transport emissions were 28 percent lower compared to 2010 levels. The reduction can be attributed to several factors, including fuel transitions in public transport. Today, public transport in Lund and the whole region of Skåne is fossil-free, which shows in the miniscule emissions from rail and buses. Since 2018, all public buses (operated by Skåne's public transport company *Skånetrafiken)* run on biogas, renewable electricity or bio diesel. Rail traffic, including Lund's new tram, runs on renewable electricity.

In Lund today, passenger cars are the biggest cause of emissions, followed by heavy and light trucks. All three subsectors have seen a decrease in emissions. Emissions from heavy trucks (red in the figure) have decreased significantly (almost 35 percent since 2010), while emissions from light trucks (green) have only seen about a 10 percent decrease, Emissions from passenger cars decreased with around 25 percent during the same period, explained by decreased car traffic, a higher percentage of electric,

energy-efficient and otherwise more environmentally friendly vehicles in the fleet, and the introduction of the reduction obligation mandate in Sweden 2018 that obliges fuel distributors to mix biofuel into petrol and fossil diesel.

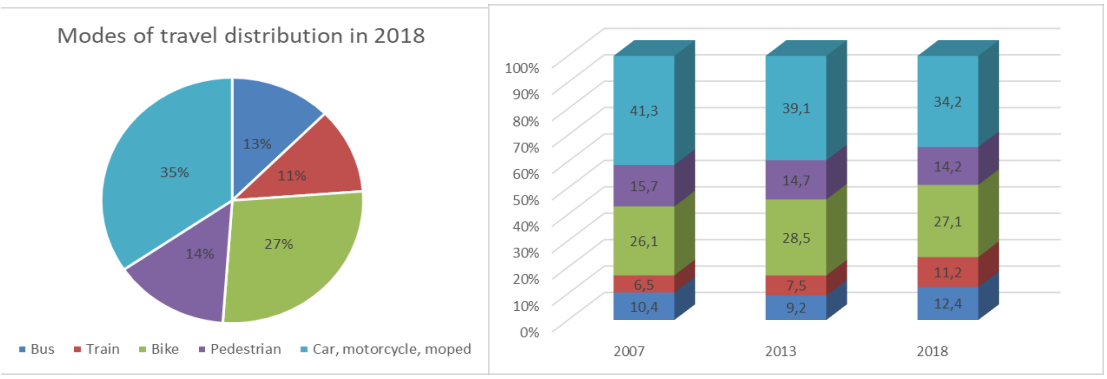


Figure 5: Distribution of travel modes in Lund. The data comes from an analysis made by Region Skåne in 2018.

Development in transport modes among Lund's citizens

As Figure 5 shows, there has been a shift to public transport (both buses and trains) from the other modes of travel. This development is mainly due to the large investments in public transport that have taken place both in Lund and in the whole region of Skåne. These include Lund's tramway that was inaugurated in late 2020, the new train stations for Skåne's train service *Pågatågen* in Lund as well as in neighboring municipalities and other initiatives that have led to more people using public transport. Public transport use is increasing in the whole region, so Lund follows the bigger overall trend.

While public transport in Lund has mainly grown by reducing the share of people travelling by private motor vehicles, there is also a small but significant trend of reduced pedestrians and cyclists. The trend of decreased biking can be seen more among youths, which could be partly explained by more students traveling from the villages of Lund to the city to attend an inner-city school. Making biking an attractive form of travel is highly prioritised in *LundaMats* (The Transport and mobility strategy) and has been so for a long time. Historically, walking has not been as highly prioritized. However, in recent years walking has been given more resources, reflecting its importance in the portfolio of sustainable transport modes.

Strategic work with sustainable mobility

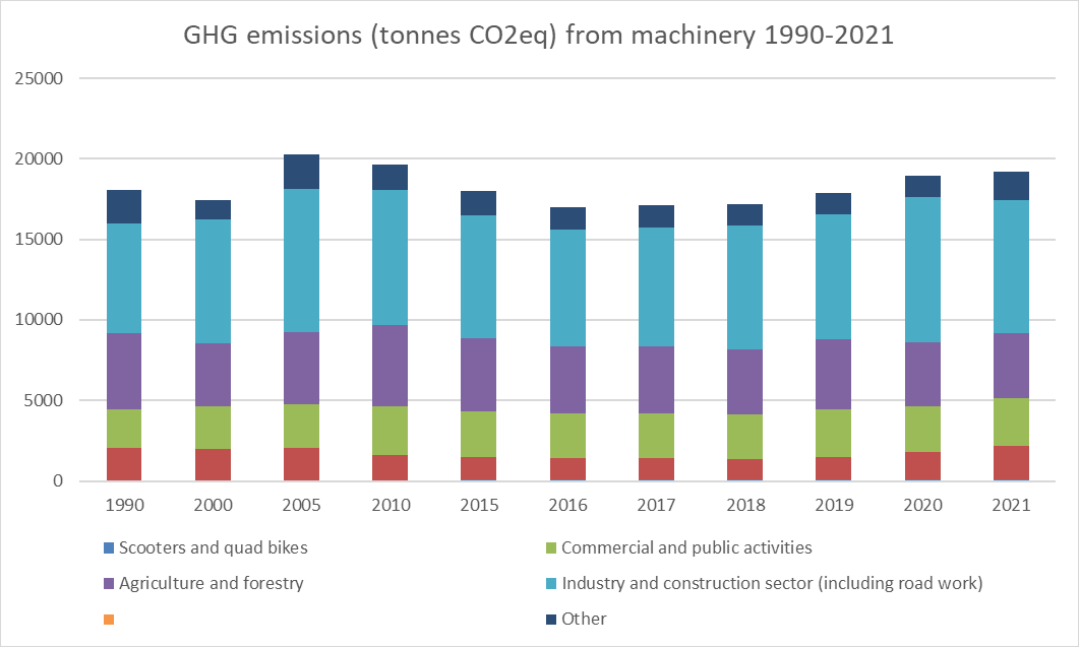


Figure 6: Emissions from machinery 1990-2021

During the years, emissions from machinery have not followed a downward trend but have fluctuated, rather. Industry and construction sector machinery are the biggest emitters, followed by machinery in the agricultural and forestry sector and machinery in the commercial and public sectors.

Previous projects and accomplishments in decarbonising machinery and municipal vehicle fleet

Testing fossil-free work machines in Cleancon project
The City of Lund is involved in a project to increase electrification of construction machinery called *Cleancon* (Clean Construction Machinery). Cleancon is a project in the Öresund-, Kattegatt- and Skagerrak region involving both public and private stakeholders. The aim of the project is to reduce fossil fuel use in construction by adopting common incentives and procurement processes in Sweden, Norway and Denmark that promote electric and hydrogen-run machinery. One of the main results jn *Cleancon I* was the testing of an electrical loader that performed beyond expectations. The machine was more powerful than expected and fully comparable to a diesel driven machine. Cleancon II, the second part of the project will run until the autumn of 2025. The activities here are described later in the Action Plan Part B.

In 2022, Lund closed a double project – *Fossilbränslefria kommuner i Skåne* (Fossil fuel-free municipalities in Skåne) and *Fossilbränslefria kommuner 2.0* – after 3+3 years of arrangements aiming at reducing fossil fuel use from transportation, heating and electricity. Together with other projects and initiatives, such as *The mobility project*, Lund has reached distinct results within transportation, including the following working methods that are now in use in order to continually keep emissions down:
- Well-structured and centralized vehicle procurement and management, focusing on low emission vehicles. The vehicles run on biogas, electricity or HVO (Hydrotreated Vegetable Oil), depending on the expected use of the vehicle, as the different types meet different needs. All 448 vehicles that The City of Lund's mobility unit operates now run on renewables: 71% of them run on biogas, 9% on HVO and 20% are electric vehicles.
- Cooperation over internal administrative borders to share both working machines/tools and knowledge about them from a climate-, environmental and work health perspective.
- Well-developed charging infrastructure for the municipality vehicles.
- Internal vehicle leasing system and payment methods.
- Digital driving journals and a smart booking system that provides alternatives to the planned car trip, thereby encouraging the user to choose more environmentally friendly modes of transport, such as

bike or bus. The new system has created solutions for the sharing of vehicles between departments, allowing for a reduction of the number of vehicles needed.

The City of Lund is also working to reduce emissions from transport contractors and employee duty travel with external modes of transport:
-School transport contractors as well as contractors of taxi service for the disabled are obliged to be fossil free.
-City employees' duty trips are booked via a travel agency which is obliged to suggest train before other modes of travel.

Agriculture

After transport, agriculture is the second biggest cause of emissions in Lund. Here, emissions do not follow a (downward) trend, but rather fluctuate between 1990 and 2021. It should also be noted that there are big uncertainties in these emissions, since emissions originating from land use are difficult to estimate. As shown by Figures 7 & 8, Animals' digestion causes the biggest emissions, followed by artificial fertilizer use and then emissions related to the cultivation of soils (including indirect nitrous oxide emissions and liming).

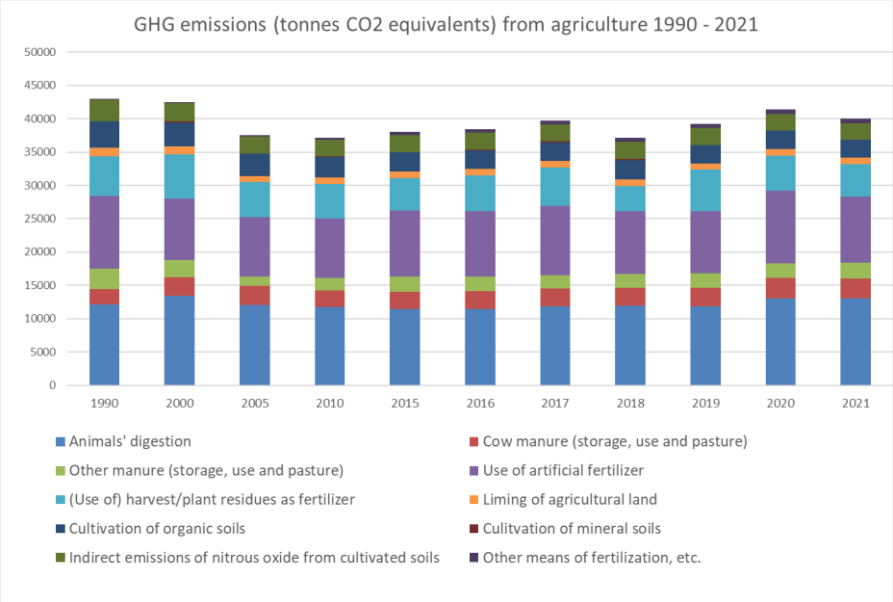


Figure 7: GHG emissions from agriculture (energy and transport not included) in Lund 1990-2021

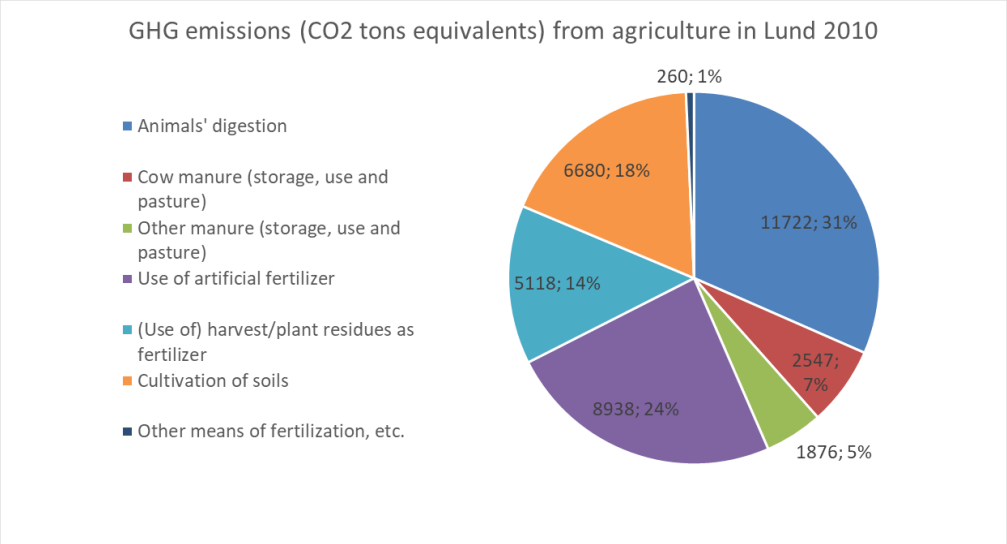


Figure 8: GHG emissions from agriculture (energy and transport not included) in Lund 2010

Construction emissions

We have limited or incomplete data over local construction emissions, but some national estimates are available. Available figures related to construction only cover territorial emissions from worksites and transport and are primarily national estimates broken down to the local level and are attributed to other sectors, energy and transportation.

Looking at national data: In 2021, the construction and real estate sector accounted for domestic greenhouse gas emissions of approximately 11.1 million tonnes of carbon dioxide equivalents, which corresponded to 21.7 percent of Sweden's total greenhouse gas emissions. The sector also contributes to large emissions abroad through imported goods. These emissions amounted to approximately 7.8 million tonnes of carbon dioxide equivalents. The total emissions of greenhouse gases were 18.9 million tonnes of carbon dioxide equivalents. During the period 2008–2021, emissions of greenhouse gases have decreased by 6 percent, which is a positive development.

Evenly distributed national numbers would mean around 231.000 tons for the inhabitants of Lund 2021. But these numbers and the national numbers above include heating (25%) and other property management related emissions primarily electricity use (24%), and these are covered by the energy related emission. That leaves around 118.000 tonnes of emissions related to new construction (22%) and from renovation, reconstruction or extension (29%), covering all buildings and infrastructure. These numbers also include a part of all national infrastructure projects and its hard to say if that's representative for the local setting. Lund is a growing Municipality like most other larger Cities and Municipalities, so it's not unlikely that these numbers are higher for expanding areas, other areas are more in a state of "shrinking" and would most likely carry a lower percentage.

Our own approximations for the local construction sector for all new buildings (based on average square meter new builds over recent years, 2018-2023), and their emissions is around 35.000-40.000 tonnes CO2e per year, indicating that renovation, reconstruction or extension could add 45.000-53.000 tonnes, if we use the same percentage as the national figures. The numbers include worksite and material transport related emissions attributed to the construction. Our estimate is that the municipal organisation (municipal companies excluded) stands for around 10 percent of this, but that the internal numbers vary a lot from year to year.

We lack data on local infrastructure related emissions but if we compare our own calculations with the

breakdown of national numbers that would leave around 25.000-38.000 tonnes for infrastructure. We have an indication that the emissions from the municipal organisation (municipal companies excluded) could be around 10 percent of this, around 2000-4000 tonnes annually, but these numbers are still preliminary.

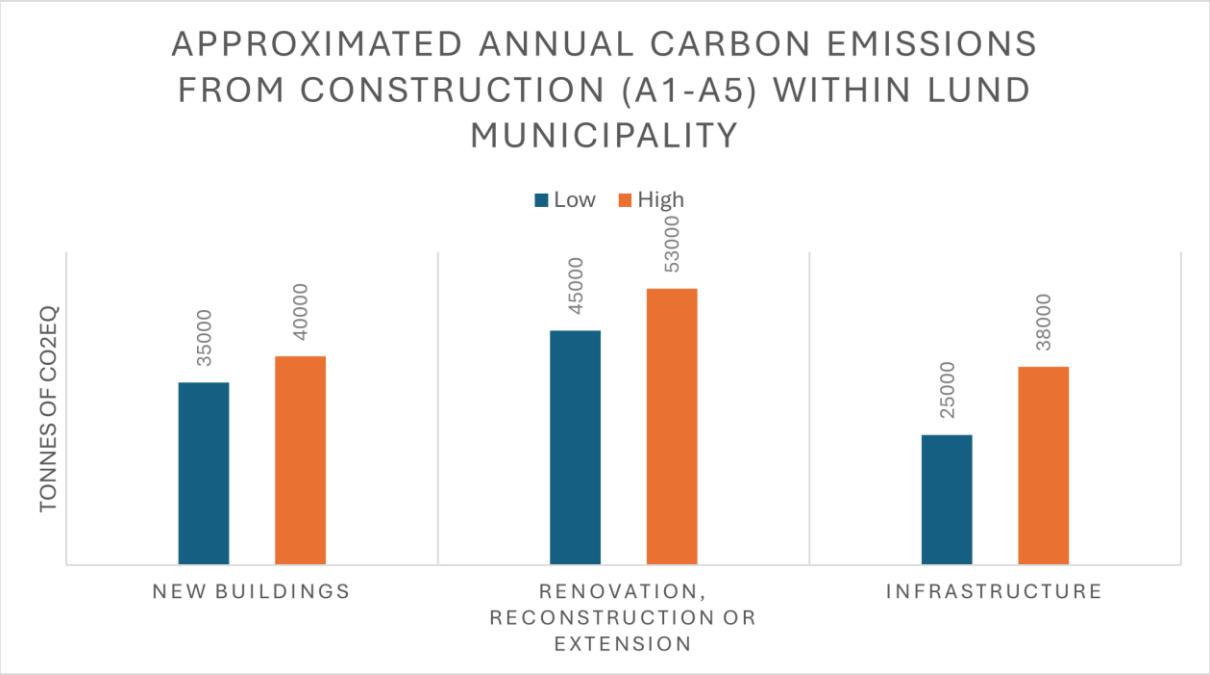


Figure 9: Approximated GHG emissions from construction in Lund Municipality

To better understand the local levels and the municipality's internal construction related emissions we need to better examine local conditions, recalculate our initial approximations and increase our knowledge of the local sector and the municipal organisation's part.

Energy

Emissions from electricity and district heating have decreased significantly since 2010. *Kraftringen*, the energy utility company that The City of Lund owns together with three other neighbouring municipalities, now has 100% fossil-free electricity and district heating production.

Switching to a 100 percent fossil-free DH system
In Lund, most buildings are connected to district heating (DH). In 2010 the main sources of energy for DH were natural gas and geothermic energy. In 2018, DH produced by Kraftringen became 100% fossil-free. The natural gas was replaced by residual heat from energy-intensive facilities like MAX IV, and by a CHP fuelled mainly by residual wood, secondary wood and some biogas. This resulted in emission reductions of 84 000 tons CO2 per year compared to 2010. As of 2024, around 87 percent of Lund's households are connected to the DH grid. The work to connect more households to the DH grid is on-going. Households not currently covered mainly use biogas, other biofuels and heat pumps for heating.

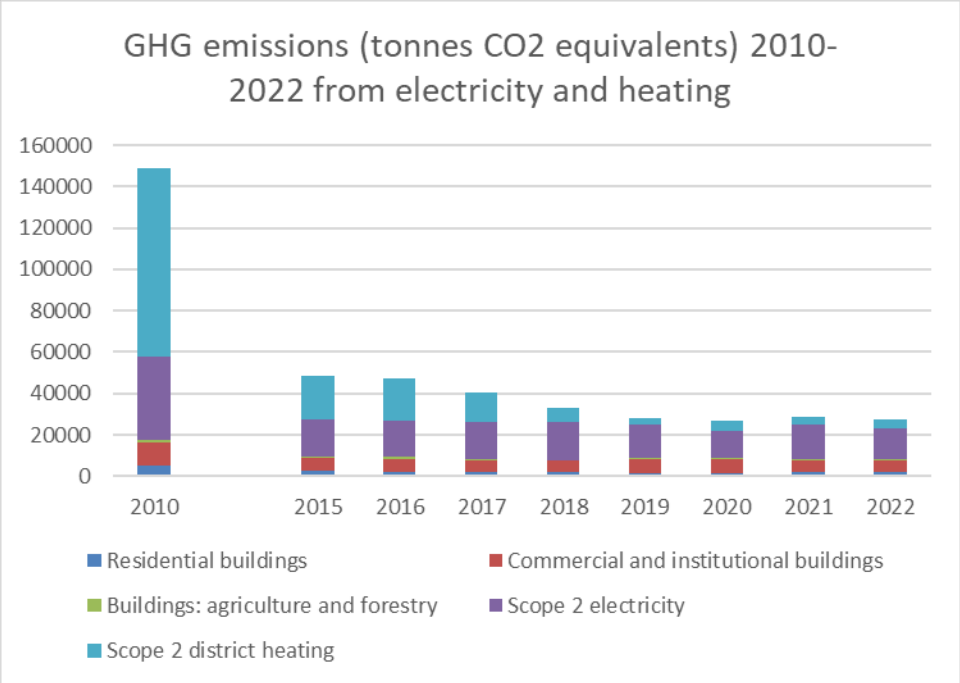


Figure 10: Emissions from electricity and heating in Lund from 2010 to 2022: emissions from district heating/cooling, and emissions from electricity and other heating sources in residential buildings, commercial and institutional buildings and buildings in the agriculture and forestry industry

Development and expansion of low-temperature district heating and cooling

Parallel to the work connecting more households to the conventional DH grid, there has been a substantial development of low-temperature DH in the new area of Brunnshög the north-east of Lund. Brunnshög, which in the future will have up to 40 000 people living and working there and hosts the two research facilities of MAX IV and ESS, both generating large quantities of excess heat. Early development of low temp DH in Brunnshög was largely connected to a project called COOL DH (project time 2017-2022). COOL DH was funded by Horizon 2020 and had the objective to support cities in their endeavor to plan and deploy new, efficient district heating and cooling (DHC) systems, and extend and refurbish existing ones to higher standards. In Lund's case, the project resulted in the world's largest low-temperature DH system being set in operation.

Kraftringen operates a cooling system for both MAXIV and ESS. The low-grade surplus heat (30-50 degrees C) amounting from the cooling process is upgraded to 65 degrees C before inserted in the low temp grid. This ensures that the water is free from legionella and safe to use as domestic hot water. Using low-temperature DH is beneficial since plastic piping can be used instead of steel (which has a higher LCA impact). Furthermore, the low temperature DH-piping does not require as much digging as conventional piping, thus decreasing environmental impact in installation.

MAX IV covers most of Brunnshög district's DH needs. The DH resulting from ESS will therefore be used in the conventional DH system (after the water has been heated to match the regular DH temperatures). In 2025, it is expected that MAXIV and ESS together will generate around 46 MW (ESS 160 GWh/år, Max IV 28 GWh/år enligt Kraftrigen) of low-grade residual heat. If used for low temperature DH, this means gaining over 250 GWh energy per year. The work to expand the low-temperature DH in Brunnshög is ongoing, following the construction developments in the area.

Replacing natural gas with biogas

In September of 2021 Kraftringen switched from selling natural gas to 100% biogas to business customers, leading to emission reductions of 6,000 tons CO2 per year. Private customers already received biogas since 2018.

Electricity production

Renewable electricity production has been on the rise in Lund since 2012 when the first wind power was installed. In recent years especially solar power has increased significantly due to both private and municipal investments. The goals set in the Energy plan and Environmental Sustainability Plan are to increase wind and solar energy production to 100 GWh in 2025 and 150 GWh in 2030. The latter goal is expected to be reached, as explained later in the Action Plan.

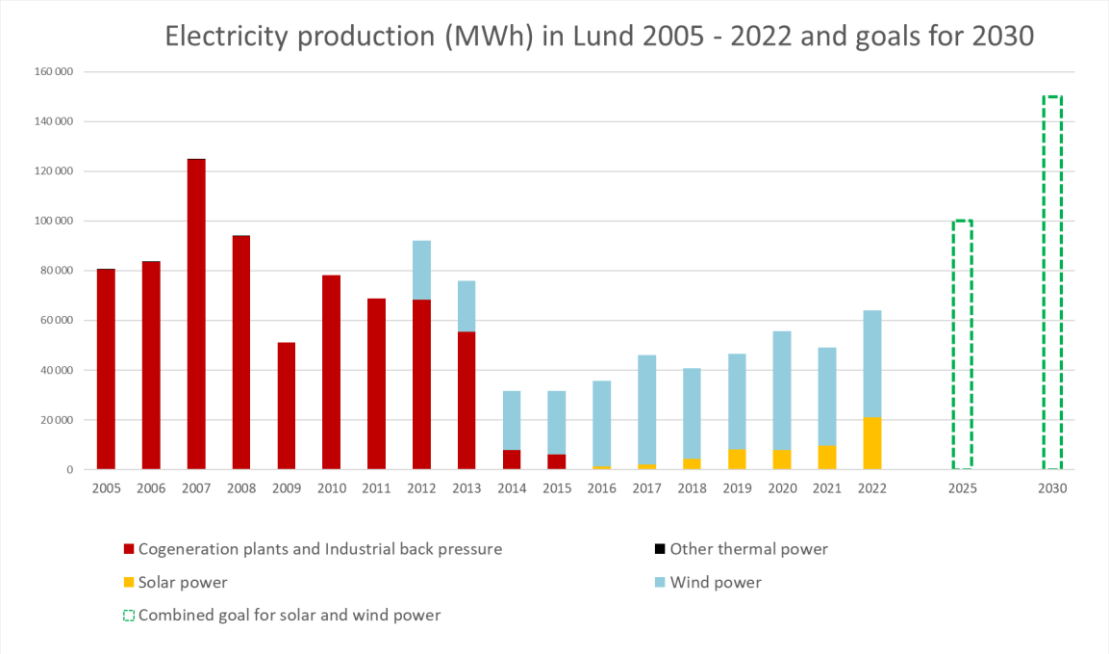


Figure 11: Electricity production in Lund from 2005 to 2022 and goals for 2025 and 2030.

Waste

Lunds Renhållningsverk, LRV, is the municipal company in charge of waste collection in Lund. In Lund, there are various types of collection systems. For single-family households, you can have a subscription for either two- or four-compartment bins. The four-compartment bins make it easy for villa customers to sort both food and residual waste, as well as six fractions of packaging waste directly outside their doors. This system was developed in Lund and was introduced as a project in 2001. Ten years later, all single-family households were offered the opportunity to join the system. It's a voluntary system, and approximately 80% of villa households are now connected. People living in multi-family households sort their waste either in bins placed in environmental rooms, containers with multiple compartments for different types of packaging waste, or underground containers. Generally, sorting opportunities in Lund are good, which also results in relatively low levels of residual waste – ca 160 kg per citizen and year (figure from 2021). In Lund, the proportion of fossil-derived waste in total residual waste is 45 percent.

bilagor-1-7-till-avfallsplanen-med-markerade-forandringar-efter-samradsremisserpdf (lund.se)

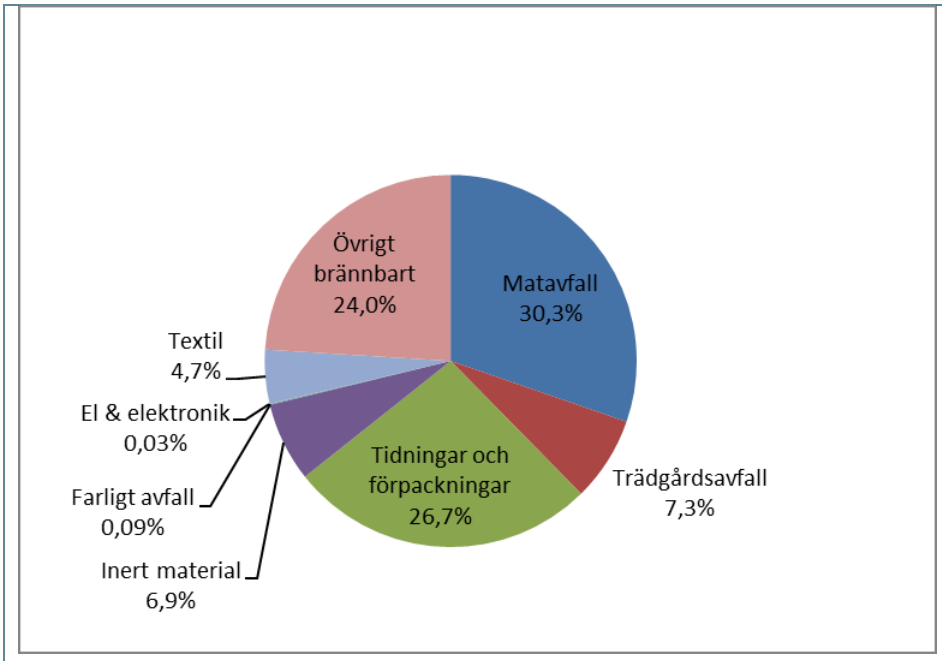


Figure 12: House hold waste 2021. Matavfall=foodwaste, Trädgårdsavfall=Garden waste, Tidningar och förpackningar=Newspapers and packaging, Farligt avfall=hazardous waste, El och elektronik=electricity and electronics, Övrigt brännbart= Otherwise combustible

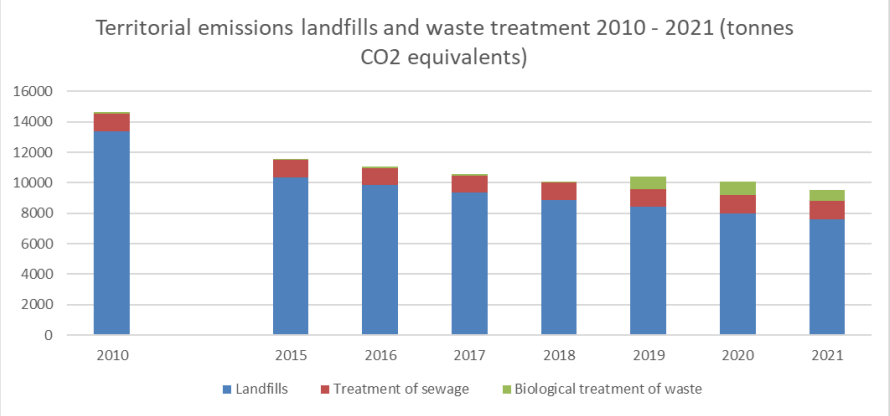


Figure 13: Territorial waste emissions in Lund between 2010 and 2021

Territorial waste-related emissions have seen a slow but steady decline since 2010 due to reduced emissions from landfills. Landfill emissions have a downward trend due to decomposition reducing the share of organic materials every year, and due to the implementation of *Klimatfönster* ("Climate windows") at Rögle landfill, an investment completed in 2017. These contribute to decreased emissions by allowing for aerobic decomposition. In 2030 landfill emissions are expected to drop to 4800 tons CO2eq., a 64 percent reduction compared to 2010 levels.

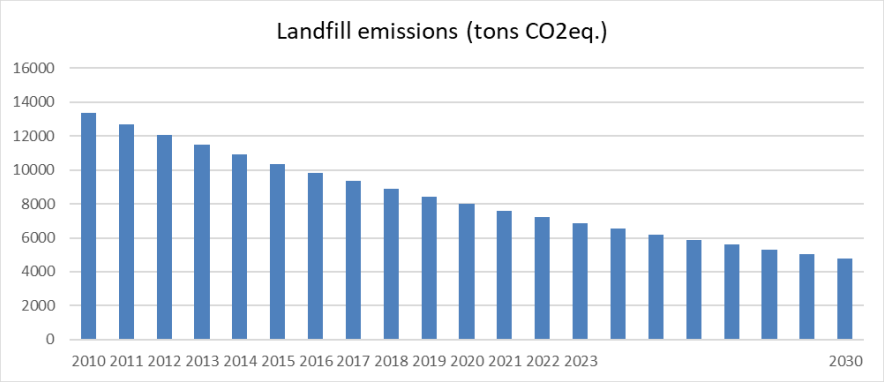


Figure 14: Landfill emissions 2010-2030

Important to note, Figure15 does not accurately portray waste-related emissions since all of Lund's solid municipal waste is handled in Malmö by the municipal energy company SYSAV. SYSAV is a company that Lund co-owns with several other municipalities. Every year, around 20,000 tonnes of residual waste is generated in Lund and sent to SYSAV for incineration. In 2019, the Swedish average for emissions per tonne of residual waste 0,45 tonnes CO2. Assuming that SYSAV is close to the national average, the residual waste generated in Lund causes around 9,000 tonnes of CO2 per year

In 2019, the solid residual waste incineration (in Malmö) caused approximately 46 percent of total waste-related emissions in Lund. Thus, the emissions are bigger or equal to the emissions originating from landfills.

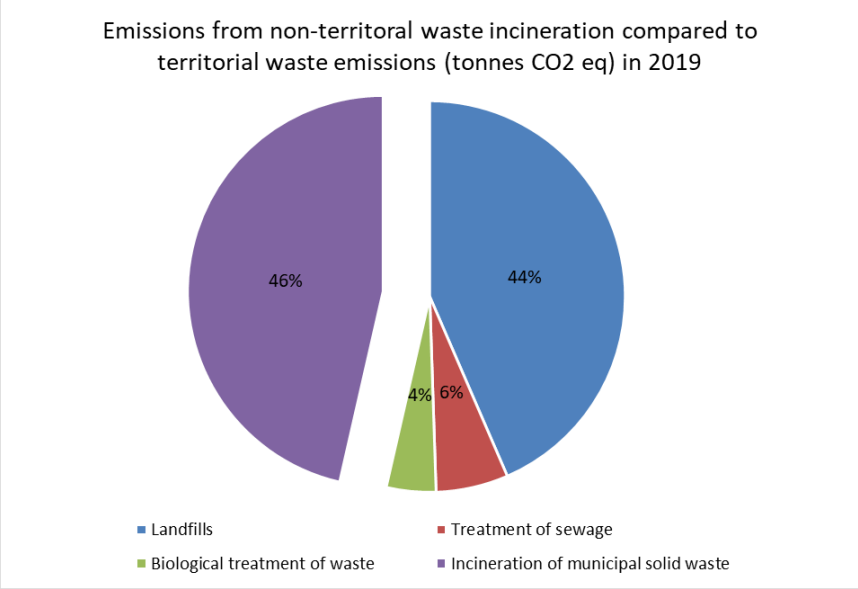


Figure 15: Emissions from non-territorial waste incineration compared to territorial waste emissions in 2019.

Industry

Emissions from industry have decreased since 1990 and 2010, mainly due to a reduction of the number of number of manufacturing businesses operating in Lund.

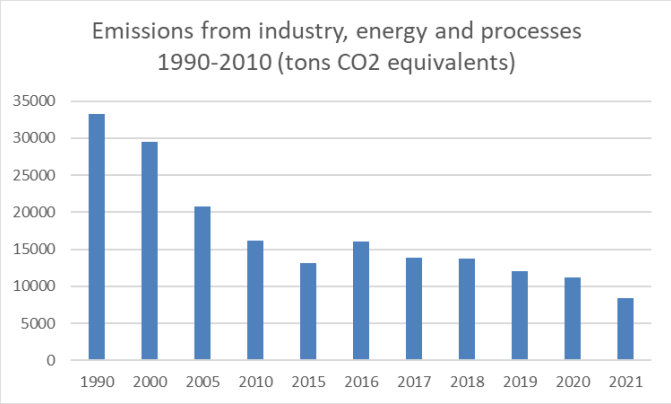


Figure 16: Emissions from industry, energy and processes 1990-2010

The trend for emissions from product use shows a different trajectory with emissions peaking in 2016. This is due to the use of fluorinated gases that rose greatly in the 2000's and 2010's, but they have since then been regulated and will be continuously regulated so that product use emissions will continue to decrease.

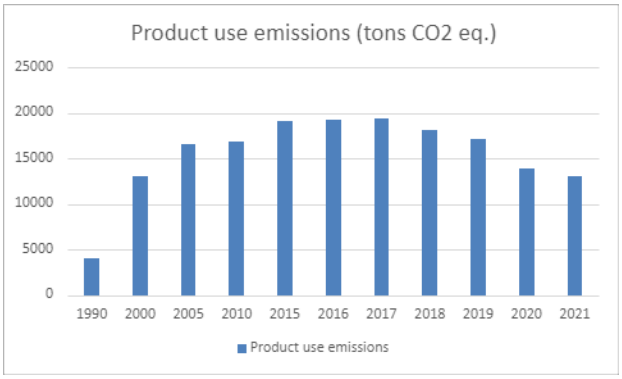


Figure 17: Product use emissions 1990-2021 (including emissions from paints, lubricants, paraffin wax, urea for catalysts, nitrous oxide from product use and use of fluorinated gases

Consumption-based emissions

LundaEko, Lund's Environmental Program, states that the annual consumption-based greenhouse gas emissions per inhabitant in Lund should decrease, and that per capita comsumption-based emissions originating from municipal activities (public procurement) should be a maximum of 0,3 tons.

As mentioned above, the per capita consumption-based emissions originating from municipal activities (public procurement) should be a maximum of 0,3 tons by 2030. To be able to measure these emissions, the city is currently working with an environmental spend analysis. There is still a lot of work to be done, but a rough first estimate shows an emission level of approx. 180 000 tons CO2e in 2023, which equals to approx. 1,4 ton per per capita. This indicates that there is quite a challenge to reach the goal and that there is a need to work with both procurement criteria lowering the associated emissions as well as reducing the total volume of services and goods consumed by the city.

The city is part of the project SCOPE, in which seven municipalities in Skåne will work together to elaborate the environmental spend analysis methods, choose a few areas to focus on where emissions can be decreased through procurement criteria, have dialogues with the market within these focus areas and also work with behavioral change within the municipality.

Data for consumption-based emissions is more limited than for territorial emissions. The Swedish Environmental Research Institute (SEI) has produced new statistics on household consumption-based emissions. In total, these are estimated to 746,471 tons CO2 equivalents for all of Lund's households. This gives per capita emissions of 6.17 tons CO2 equivalents, somewhat lower than the Swedish national average of 6.27 tons CO2

equivalents per capita. Compared to territorial greenhouse gas emissions in 2019 (223,174 tons CO2 equivalents), consumption-based emissions are more than three times as high.

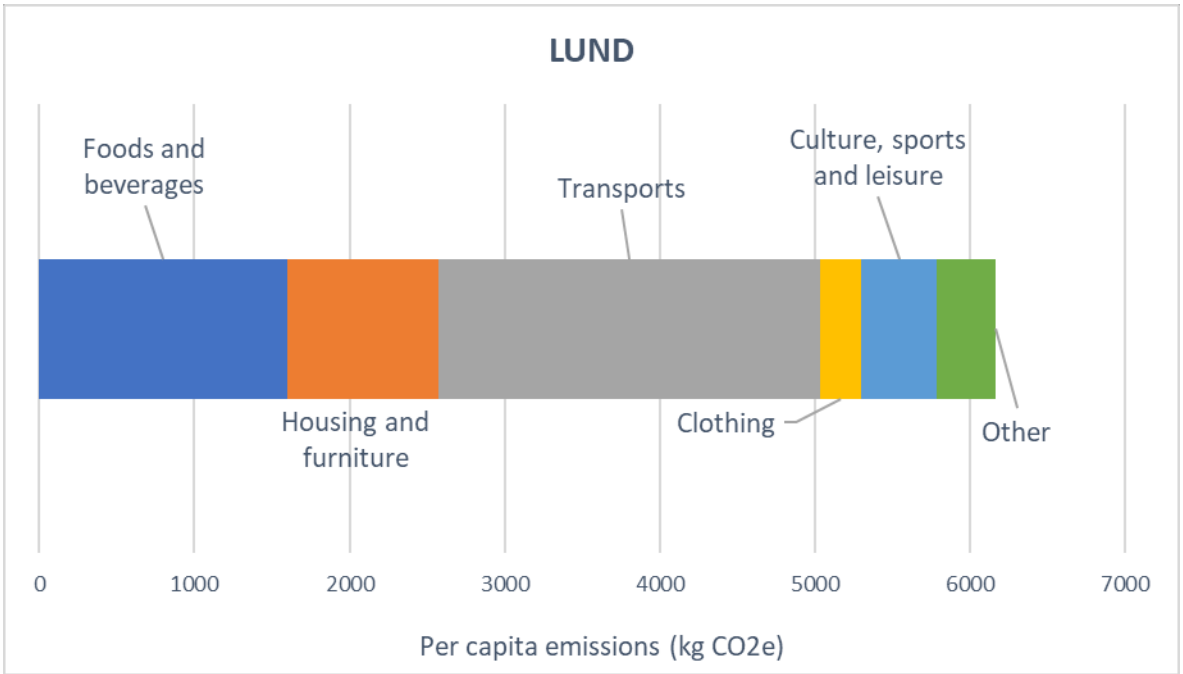


Figure 18: Per capita emissions from Lund's residents, divided into the five most emitting categories (transport, foods and beverages, housing and furniture, culture, sports and leisure and clothing) and "other" (minor emission posts)

While Lund's consumption-based per capita emissions are 6.17 tons CO2 equivalents, it can be noted that emissions are skewed, with higher per capita emissions in more affluent areas. This is a key challenge to be considered from a just transition perspective. It is clear that the global climate footprint disparity between hogh and low-income countries, is reflected locally between high and low income communities and households. A key challenge to be addressed in a just transition is increasing standard of living for those on the lowest incomes whilst helping them maintain a low carbon footprint, whilst simultaneously significantly decreasing the footprint of those on higher incomes without a perceived loss of quality of life. This is a core challenge that will continue beyond 2030 for Scope 3 emissions across the entire population of Lund.

2.2 Module A-2 Current Policies and Strategies Assessment

Module A-2 "Current Policies and Strategies" lists and assesses existing policies, strategies, initiatives, or regulation from local, regional, and national level, relevant to the city's climate neutrality transition. This assessment contributes to identifying the gap (if any) between the emissions reduction due to existing initiatives and the city´s 2030 climate neutrality target. Filling this gap by identifying additional actions and levers to achieve the city´s emission reduction target is the focus of this Action Plan. The assessment of current policies and strategies offers hence a starting point for exploring the impact pathways (See Part C). The module includes:

- Comprehensive list of local relevant policies, strategies, concepts, as well as of regional and national legislation that impact local climate action.
- Descriptive assessment of the current climate-relevant policy context, summarising the objectives and implementation concepts, addressing e.g., spatial planning, energy, local economy, circular/bioeconomy, waste, transport, housing, urban greening/nature-based solutions).

- Quantification of the emissions gap (i.e., emissions reduction target minus reductions already addressed through existing climate action plans).

A-2.1: Description & assessments of policies				
Level	**Name/Title**	**Description (inkl Type)**	**Relevance**	**Need for action**
Local	*Lund City Budget 2024 (Ekonomi- och verksamhetsplan med budget för 2024)*	Investment and operational plan for Lund 2024	Main strategic document. Announces sustainable development and the Agenda 2030 goals as integral parts of city governance.	Annually renewed document
Local	*Lund's Comprehensive plan (Lunds översiktsplan)*	A strategic document showing the municipality's long-term planning of land, water and the built environment. Consists of strategies, maps with planning guidelines, and environmental impact assessments.	The plan establishes the municipality's vision for the future and lays out a guideline for planning policies, but it is not legally binding.	The current plan is under revision and a new plan is expected to be adopted in 2025.
Local	*Economic Development Program for the City of Lund 2022-2030*	A municipality-wide steering document that sets a common direction for economic development, establishes the long-term priorities and provides a common platform for the work.	A good business climate contributes to jobs, to safe and vibrant neighbour-hoods and to a more inclusive society. Sets the goals for Lund to be a place that offers good opportunities to start businesses, for existing companies to stay and grow, as well as for new establishments, a breeding ground for innovations that promote sustainable development and facilitate the green transition.	Sets goals but does not include execution or methods.
Local	*Living Lund Territorial Strategy (Levande Lund – territoriell strategi)*	The purpose of Levande Lund is to foster collaboration for climate-neutral urban development by uniting stakeholders to address key challenges related to a dense and sustainable city. The strategy focuses on resource-efficient urban development, sustainable transportation, social cohesion, and	A challenge for both the municipality and the city's other actors is to coordinate and take advantage of the results that are generated through projects and initiatives. Within the framework of the EU's mission Climate Neutral	Enables partial funding from ERDF (European Regional Development Fund), with open calls twice a year between 2024–2027

		maintaining the city's attractiveness for residents and businesses.	and Smart City, work is underway to create a clearer transition arena, collaboration and learning structures. With Living Lund, there is potential to build on this initiative to promote joint learning as well as replication and upscaling between development areas.	
Local	*Plan for Lund's community partnerships 2021-2024 (Samverkansplan för Lunds överenskommelse 2021-2024)*	The purpose of the plan is to increase collaboration and participation between local associations and Lund Municipality in order to live up to the principles and commitments of the Agreement. The aim is also to jointly develop Lund as a healthy thriving city for all. The collaboration plan is an important part of Lund's sustainability work, which is based on human rights, the national public health goals and the UN's sustainability goals welfare	The plan has an environmental dimension with the aim of developing, promoting and strengthening existing sustainability initiatives that take place in Lund. Aims to develop forms of collaboration between the parties that promote climate-smart solutions, with focus on housing, urban farming, consumption and travel, as well as education and learning.	Bi annual conferences held to share learnings.
Local	*LundaEko – Lunds programme for ecologically sustainable development 2021-2030* *(Lundaeko: Lunds kommuns program för ekologisk hållbar utveckling 2021-2030)*	The overarching environmental policy. The program aims to create a resource-efficient society where ecosystems and their functions are preserved long-term, and the planet's boundaries are not exceeded. It prioritises six areas with goals and sub-goals: -Consumption and production -Hazardous substances -Climate and energy -Housing and local environment -Biodiversity and ecosystem services -Surface and groundwater LundaEko encompasses both the municipal organisation and Lund as a geographical area, based on Agenda 2030 and Sweden's	Acts as the "umbrella policy document" for ecological sustainability in Lund. Sets priorities for the documents detailing energy, waste, construction, etc.	The program's progress is reported in an annual sustainability report.

		environmental quality objectives.		
Local	*Social sustainability programme* *(Lunds kommuns program för social hållbarhet)*	Social sustainability programme The purpose of the program is to create equal living conditions and realise human rights for everyone living and working in Lund – A Lund for All. The social sustainability program prioritises six areas with goals and sub-goals: -Education and learning Living habits -Work and employment -Housing and local environment -Equality		The Sustainability Programme and LundaEko's goal fulfilment are reported in a joint annual sustainability report.
Local	*Energy Plan for City of Lund 2019–2026 (Energiplan för Lunds kommun)*	The energy plan covers the municipality of Lund as a geographical area, i.e. in addition to the municipal organization, the municipality's residents, companies, universities, etc. The overall climate goals cover the geographical area. The measures in the action plan only concern the municipal organisation. However, a number of measures are aimed at residents, businesses, etc. The energy plan has been delimited so that only reduced climate impact and climate adaptation linked to the energy system are included. The action part of the energy plan consists of four sub-areas: - Energy-efficient transport and renewable fuels. -Engage more people in the energy transition. -Energy-efficient properties and contracts.	Aimed at those working in the City organisation and city-owned businesses working with energy issues, the governing politicians of the city, partner organisations and local energy producers	The energy plan's measures will be followed up annually during the implementation period and coordinated with the follow-up of LundaEko. In addition, there are roughly forty indicators that are followed up annually and reported in a municipal digital system. The follow-up is summarized in the municipality's environmental reporting

		-Increased self-sufficiency in renewable energy with circular flows.		
Local	*LundaMats III Sustainable Transport Plan*	Municipal transport plan	Details goals and measures for transport, the most challenging sector for reaching climate neutrality	
Local	*Plan for Climate Neutral Construction* *(Plan för klimatneutralt byggande)*	Municipality plan for Net zero construction	Lays out key priorities and strategic areas in reaching net zero in construction	
Local	*Waste Management Pla 2022-2026 (Avfallsplan för Lunds kommun 2022-2026)*	Municipal waste/resource management plan	Details Lund's strategic resource- and waste management, guiding the work towards increased circularity	
Local	*Lund municipality's climate policy council Reports 2019-24 (Lunds kommuns klimatpolitiska råd)*	The council's mission is to review the municipality's efforts to reduce climate impact and adapt to climate change. It also proposes improvements to help the municipality achieve its climate goals, culminating in an annual report	Annual report with recommendations to improve and speed up actions to become climate neutral	Implement the recommendations when and where it's possible
Regional	*A Climate-neutral and fossil-free Skåne: Climate and energy strategy for Skåne (Ett klimatneutralt Och fossilbränslefritt Skåne: Klimat- och energistrategi för Skåne)*	Regional strategy with climate goals concerning energy, transport, construction industry, agriculture,	Supports development targets in Lund, and provides framework for increased regional cooperation	Close practical working not least on regional mobility and electricity supply, but more action needed
Regional	*Skåne's Innovation Strategy*	Identifies sustainable urban development and climate change as key areas for innovation and economic development	Links climate transition into regional economic development	
Regional	*Regional transportation infrastructure for Skåne 2022-2033 (Regional Transportinfrastruktur för Skåne 2022-2033)*	Regional Transport planning document for major infrastructure investments	Important strategic document for development of a coherent regional public transport and cycling infrastructure and to address road transport challenges	
National	*Miljöbalken*	The purpose of the Environmental Code is to promote sustainable	Supports sustainability targets in Lund,	

	The Swedish environmental code	development. Several laws are linked to and need to refer to provisions in the Environmental Code, e.g. the Forest Protection Act, The Aviation Act and the Road Act.	and provides framework for increased national cooperation	
National	*Planning and Building Act (Plan- och bygglagen)*	Regulations covering planning and construction in which climate neutrality targets need a stronger representation	Circularity and Net zero in construction would benefit if the Planning and Building Act should be amended to increase its relevance in the climate transition	
National	*Environmental objectives (Regeringens 16 nationella miljökvalitetsmål)*	Environmental objectives decided by the Swedish government. The objectives describe the quality of environment that Sweden wishes to achieve. There are 16 objectives in total, including an objective stating that climate impact should be limited	Supports the environmental targets in Lund, and provides framework for increased national cooperation	
National	*National Strategy for Circular Economy (Cirkulär ekonomi - strategi för omställningen i Sverige)*	National circular economy strategy. Details the transition towards a circular economy considering design, consumption, reuse and recycling and economic development	Support sustainability targets in Lund, and provides a framework for increased national cooperation	
National	*Digital strategy for climate-neutral cities*	Strategy for digitalisation and digital tools for the transition to climate neutral cities, written by Viable Cities and Ramböll. Includes three strategic alignments: -Focus digitalization on priority areas -Stregthen the organization for digitalization. -Enable support in data management and infrastructure	The document provides a basis for the continued development work with Climate contract within Viable Cities	
EU	*Circular economy action plan (2020)*	Focus on sustainable products, empowering consumers, on product regulation and a strategy on sustainable textiles	Supports sustainability targets in Lund, and provides framework for increased national cooperation	
EU	*Eco-design directive*	Regulations governing energy use and energy-related products	Supports sustainability targets in Lund, and provides framework for increased national cooperation	

EU	*Fit for 55*	The European legislative programme with rules on climate, energy and transport	Supports sustainability targets in Lund	

In addition, there is a draft to an action plan developed to reach climate neutrality, that has been used in identifying relevant actions for the CCC: *Climate Neutral Lund Action plan* (*Klimatneutrala Lund: Att göra-lista).* The plan consist of short term actions, with estimated cost and reduced emissions potential

A-2.1: Description & assessment of policies

Lund's high level Sustainability Policy (2020) sets out the City's approach to the UN SDGs including climate change. The primary sustainability strategy is laid out in the third Programme for Sustainable Development 2021-2030 (LundaEko III) that sets the primary objectives for a broad sustainability agenda including climate change. More specific targets and policies within thematic areas are then set in additional documents such as the Strategy for an Environmentally Adapted Transport System (LundaMaTs), the Energy Plan, the Waste Plan and the Plan for Net zero Construction. These plans and strategies together are the basis from which to tackle a significant share of the climate impact in Lund. In addition there are numerous other important strategies, plans and programmes such as the Comprehensive Development Plan that are guided by sustainable development and climate neutrality principles on a broad but important level. As such, there is a high level of policy coherence across local government, although conflicts of interest and policy gaps still exist.

One such policy gap is in the area of land-use and agriculture which has not been a key focus of climate work in the city. However, as identified above, agriculture and land-use is the second largest net contributor to climate emissions within the council boundaries. The city's climate action plan therefore seeks to begin addressing land-use-based emissions outside of the current strategic framework. As yet there is no target for these emissions and it is unlikely that an 80% reduction will be feasible by 2030 as there is limited mandate and limited momentum in this area. There is also some uncertainty in some climate calculations regarding baseline statistics and the potential to decrease emissions. Current calculations would suggest that it may be possible to reduce emissions by around 46% by 2030 but this is far from a reliable figure.

The actions included in the action plan are therefore largely based on actions and targets that have already been adopted in high-level strategies, plans and programmes in the City. However, the Action Plan has a higher level of detail than can be found in these strategic documents, and also includes measures and areas that are not reflected in current strategies, primarily in the case of agriculture and land-use.

A significant challenge for Lund, along with other cities, is the interdependency with other local, regional and national bodies, policies and strategies. The Strategy for an Environmentally Adapted Transport System for example has ambitious plans for sustainability mobility within the boundaries of the municipality, but Lund is at the heart of a wider travel-to-work and travel-for-leisure region in which many journeys take place across municipal borders. A more joined-up regional approach is essential to address mobility more coherently. Similarly, transport emissions in Lund are impacted by national government decisions regarding issues such as national infrastructure investment, incentive programmes for electrification, requirements to increase renewable fuel mixes in conventional fuels etc. Changes in national government policy and practice can therefore have a significant impact at a local level.

Issues such as these create a complex web of interdependencies which will be a key element of the strategic work of the transition team in the coming years. There is a need to drive direct actions within the remit of the City administration to meet the climate neutrality targets that the city has a high level of ownership of. Simultaneously, it is important to deepen regional and national partnerships to address wider system challenges beyond the remit of individual cities. Even Net Zero Cities is an important arena to ensure alignment of policies and support mechanisms at a European level that can facilitate national and local action.

Policies to decrease climate impact are based on available climate science and an analysis of the measure needed to meet the targets. At a strategic level there is therefore an understanding of the impact that is needed in different policies to meet the objectives, but impact calculations are carried out at an action level where it is more feasible to calculate emissions reductions.

Another important challenge for the city is a more joined up approach between work on social sustainability and environmental sustainability, addressed in different policy documents and operationalised in different parts of the organisation. Whilst there are strong interlinkages in some parts of operations and individual initiatives and projects, there is a need for a more strategic approach to address a just transition. This should identify risks where the climate transition may exacerbate socio-economic, gender or other disparities, and opportunities for the climate transition to bridge some of these gaps. Areas such as mobility already have a strong understanding of some of these issues incorporated in their approach, but there are still significant challenges remaining. Car dependent families who choose an electric vehicle for example may have hugely varying charging costs depending whether they live in single family housing with their own charge point, or are dependent on commercial charge points. Awareness of social justice issues in other areas of the transition are less understood and need to be explored further both at a strategic level, and through active co-design processes in which local people may be able to help the city identify concerns, risks and opportunities and ways to address them.

Current policies are in place to drive the climate transition to 2030, but some strategies and actions are yet to be detailed, particularly in the field of agriculture where there is no strong history of previous work on which to build. Emissions reductions calculations have not been carried out for individual policies unless they are specifically included in the policy document. Instead, the policies detail the focus in specific areas for action to decrease emissions, or vehicle numbers or other relevant indicators.

Calculations of climate emission reductions show that the current action plan will reduce emissions to 78% of 2010 levels. Lund has actively chosen to include all emissions within the municipality in its target and actions in order to demonstrate true commitment to tackle the climate transition head-on in all of its complexity and to put pressure on major systems that are well beyond the ability of Lund to address alone through its policies and actions. Through traffic on the motorway and other trunk roads are therefore included in the emissions target as are emissions from agriculture. Together these constitute a major share of the city's overall emissions. Solving these challenges will entail active work beyond the policy reach of the city in partnership with national government agencies and branch organisations and can help drive change elsewhere in the country and EU.

A-2.1: Emissions Gap (kt CO2e)

	Baseline Emissions (2010)	Emissions Reduction Resulting from CNAP		Remaining Emissions		Residual Emissions Offsetting[1]		Emissions Gap (amount necessary to achieve net-zero)	
	(Absolute value)	(Absolute value)	(% of BAU 2030)	(Absolute value)	(% of BAU 2030)	(Absolute value)	(% of BAU 2030)	(Absolute value)	(% of BAU 2030)
Transport	144	122	85%	22	15%	22	15%	0	0%
Buildings & Heating	154	154	100%	-	0%	-	0%	0	0%
Electricity	40	23	58%	17	43%	13	32%	4	11%
Waste	15	7	47%	8	53%	3	20%	5	33%
Other (incl. IPPU & AFOLU)[2]	55	11	20%	44	80%	44	80%	0	0%
Total	408	317	78%	91	22%	82	20%	9	2%

[1] *Residual emissions consist of those emissions which can't be reduced through climate action and are being offset. Residual emissions may amount to a maximum of 20 % as stated by the Mission Info Kit.*

[2] *Emissions reduction target percentage for "Other" sector is assumed to be the same as for the other 4 main sectors unless updated by city. Activities and commitments to reduce these emissions are documented in the Climate Neutrality Action Plan.*

2.3 Module A-3 Systemic Barriers and Opportunities to 2030 Climate Neutrality

This module aims to document the conclusions of a systems and stakeholder mapping aimed at identifying systemic barriers and opportunities. In conjunction with the GHG inventory and the policy baseline analysis in the previous two modules of Part A, the analysis reported here serves as a basis for designing actions that address these barriers or exploit the underutilised opportunities in Part C. The results of this analysis as provided here include:

- A description of the main systems related to the city´s GHG emission domains, e.g., technological/infrastructural, institutional/ regulatory, organisational, financial, political, social and behavioural systems.
- A description of barriers and opportunities for each of the systems above. This includes gaps (infrastructural/ technological, institutional/ regulatory, organisational, political, financial, behavioural or social) as well as an evaluation of unexploited resources (e.g., renewable energy sources, digital technologies, etc) or circumstances.
- A map of stakeholders involved for each of the systems above. This includes relevant actors per systemic element at different levels of governance throughout the whole policy cycle, such as local, regional, national, and EU/supranational administrative bodies and agencies, civil society, non-governmental organisations (NGOs), academia, community-based organisations, social movements, steering groups, private sector actors etc.

A-3.1: Description of urban systems, systemic barriers, and opportunities

General description of systems

There are many systemic challenges to the climate transition that are particularly apparent at the local level with a 2030 timeframe. Whilst climate change is accepted as a major societal challenge to be addressed with a transformational approach, there is nevertheless an incremental development paradigm that is difficult to shift. Political targets that stretch into the 2040's or to 2050 become distant and less able to drive transformational approaches. Whilst a long-term perspective is critical to support major investment decisions and generate a broad mobilisation, there is also a risk of engendering an expectation that new solutions will arise in the future, or that future leaders can make the more difficult decisions. A key challenge therefore for Net Zero Cities is that cities are driving for transformational action within a broader incremental development system. Unless the NZCs become an integrated testbed for wider transformation, then regulatory, financial and market barriers will be more difficult to challenge.

Even at a local level, the shift from incremental development to transformation is extremely challenging in often conservative public sector organisations. Whilst Lund has a strong and committed political leadership, and a history of being a leader in urban sustainability, the city is now in a new phase of development. A centralised approach where a few stakeholders are able to have a large impact on emissions has proved highly successful in the first phase, but now the challenge is engaging beyond the mandate and operations of local government to engage a large number of stakeholders who individually have a smaller impact on emissions, but whose collective action is essential to meet the 2030 target. As such the focus is shifting.

A wider collaboration across sectors and levels of government is essential to tackle the complexity of inter-related systems barriers and to take a whole society approach to the climate transition. Whilst there has been significant progress in some sectors such as energy and construction, there is still a need for a wider mobilisation across other business sectors. The same can be said for multi-level governance and the challenges of an ambitious climate action agenda that permeates all activity at local, regional, national and European level.

There is a need for stronger engagement at a national or European level to develop incentives, redesign systems and update regulations to help shift behaviour, investment and action utilising the full toolbox of innovation and partnerships to drive development and raise the ceiling, incentives to start mainstreaming implementation, and regulation to raise the floor. There is a need to work with the local level in this process, to identify tangible barriers in technology, markets, regulations, organisational capacity and behavioural change. By working in hands-on situations with challenges that can be recognised at a local level throughout the country, the challenges of the climate transition become more apparent. Lund and the other NZCs and Viable Cities have a crucial role to play in driving this transformational approach with local businesses and communities, but a more joined up approach at a national and European level will be essential to overcoming many of the more significant barriers.

The following section provides a number of examples of barriers and opportunities for Lund in the climate transition. This is far from a comprehensive representation of all systems challenges, but it gives an indication of some of the high level systemic barriers that need to be addressed where Viable Cities and NZC could help drive more systemic change at a national or European level. Many of the challenges outlined below lie beyond the direct mandate of the City of Lund and entail a longer term develop process. Progress monitoring at a systems level will therefore primarily be documentation of measures undertaken and progress made. Where specific projects or programmes are put in place to address specific barriers or opportunities, these will be monitored as separate actions incorporated in future iterations of the action plan.

Field of actions	**Transportation & mobility**
System	**Barriers**
Technological/ infrastructure	Lack of the whole journey or first/last mile perspective in strategic and transport planning. • Regional commuting infrastructure only on arterial routes and not linked into fast and efficient last mile mobility options • Private car transport only option or most efficient option for some commuters in region especially outside of urban area
	Opportunities
	Opportunity to work with other NZC/Viable Cities in region with Region Skåne and Skånetrafiken and potentially micro-mobility providers and Trafikverket to develop whole journey concept
Stakeholders involved	Malmö, Helsingborg, Kristianstad, Region Skåne, Skånetrafiken, Trafikverket, Micromobility solutions providers
Role	Joined-up regional approach to tackling whole journey system over municipal boundaries to provide door-to-door alternatives to private car-use for commuting and leisure travel.
System	**Barriers**
Political/regulatory	Lack of active national long-term policy to drive decarbonisation of transport sector • Strategy for fossil fuel free freight needed nationally

	• National transport infrastructure investment based on growth forecasts rather than decarbonisation targets • Slow transition to electric vehicles due to long life for vehicles, large investment costs and lack of incentives to change to electric cars and trucks • Decrease of reduction obligation for fossil fuels • Legal barriers to municipality offering vehicles as public pool • Lack of coordination of charging infrastructure
	Opportunities
	Potential for national pilot in Skåne with target-based investment
Stakeholder involved	Trafikverket (national authority), Region Skåne, Skånetrafiken (regional stakeholders), municipalities in Skåne
Role	Develop regional project as national pilot to use national transport infrastructure investment to maximise mobility and minimise emissions
System	**Barriers**
Organisational	Lack of sense of urgency and slow decision-making processes within the municipality • Uncertain/inadequate forecasts and calculations of outcomes of new solutions create disagreement among decision-makers
	Opportunities
	More streamlined focus on transition and willingness to use iterative solutions to test and scale
Stakeholders involved	City of Lund technical departments
Role	Production of clearer decision cases for solutions showing impacts, co-benefits and risks, and the opportunity for small-scale pilots to minimise risk and increase certainty on impacts and co-benefits
System	**Barriers**
Financial	Lack of investment in railway infrastructure and maintenance makes rail travel less reliable and attractive • Regular delays in train operations due largely to poor maintenance makes transition to public transport more challenging. National maintenance dept for railway: 75 billion SEK
Stakeholders involved	Trafikverket, Department of Finance, Viable cities
Role	Act with other Viable Cities partners to engage with national agencies to ensure efficient and well-managed infrastructure for relivable transport
System	**Barriers**
Social & behavioural system	Public transport not seen as attractive options for some journeys, purposes or people • Private car seen as only option for some to deal with “life puzzle” of commute, school run, shop, leisure • National policy decreasing fuel costs and regional policy increasing public transport costs send wrong signals

Stakeholders involved	National government, Region Skåne
	Opportunities
	Co-operation with local communities, Viable Cities and national government to trial policy and investment to support sustainable mobility choices
Stakeholders involved	Citizens, behavioural scientists, Skånetrafiken, Viable Cities, national government
Field of actions	**Agriculture and land-use**
System	**Barriers**
Technological/ infrastructure	Climate impacts of investment in re-flooding or creating new wetlands take a long time to develop • Investments through until 2030 will not reach full climate potential for many years or even decades
	Difficulty in accurately measuring emissions from land-use • Creates uncertainty about changes in practice and their impacts in short and long term
	Opportunities
	Engagement with researchers and experts to develop science and business cases of land-use related emissions calculation, monitoring and cost impact.
Stakeholders involved	City departments, Researchers at SLU Agricultural University / Lund University
System	**Barriers**
Organisational	Lack of capacity/network for cooperation and dialogue between City and farms • City land ownership traditionally passive land-banking for development • No established strategic work with farming community. Need to build relations, trust and network and understand issues of farming community
	Opportunities
	To build network with local farming community, organisations and researchers to better understand local issues, potential and win-win solutions with climate and financial benefits for farming.
	Develop partnerships with retailers and communities to support diversification for local market
Stakeholders involved	City departments, SLU Agricultural University, Hushållningssällskapet, LRF Lund, farmers and other major land-owners (diocese etc), food retailers, consumer groups such as COOP members
Field of actions	**Circular Economy**
System	**Barriers**
Technological/ infrastructure	Lack of infrastructure for easy access to reusable materials
	Opportunities
	Create physical and digital infrastructure for reusable materials
Stakeholders involved	LRV, LKF, property companies, civil society, retailers - organisations with significant role in waste flows who can engage in re-use systems.
System	**Barriers**
Financial	Cost of repair high in relation to cost of replacement

	• High labour costs make repair uncompetitive in many cases
	Market focus at best on more sustainable products and not on fewer products • Consumption-based economy drives focus on volume increase instead of decrease. Lack of scaleable alternative economic models
	Opportunities
	Development of repair cafes and circular hubs
	Partnership approach with University and retailers to explore alternative business models
Stakeholders involved	Lunds University, retailers, community organisations
Field of actions	**Net Zero Construction**
System	**Barriers**
Technological/ infrastructure	Limited access to climate neutral products on emerging market • Quality standards make re-use challenging for some product groups • Procurement and planning becomes more complex and costly
	Opportunities
	Potential for joint innovation procurement between cities and construction industry to drive market development
Stakeholders involved	Construction industry, city-owned businesses and departments with construction, development and property management
System	**Barriers**
Financial	Market focus on new build and not on renovation and operations and maintenance
	Opportunities
	Work with City and LKF to take lead on renovation and OM of public buildings and public housing.
Stakeholders involved	LKF, city property division & + Construction industry partners, LU
Field of actions	**Energy**
System	**Barriers**
Technological/ infrastructure	Electricity infrastructure insufficient for region with high demand and low production impacts business investment and potential impact on electrification
	Opportunities
	Current regional process trying to address challenge
Stakeholders involved	Cities, Region Skåne, energy companies, National Energy Agency, Svenska Kraftnät
System	**Barriers**
Political & regulatory	Slow and complicated permit processes for all renewable energy, including wind, solar, biogas and hydrogen
	Lack of clear policies and incentives to promote renewable energy adoption. • Change in biogas and biopropane taxation, they are now taxed in the same way as natural gas and propane, reducing incentives to invest in biogas.
	Opportunities
	Development of prioritised planning and legislative framework to accelerate and broaden major climate investments and streamline policy to maximise impact.

Stakeholders involved	Länsstyrelsen, The Swedish Energy Agency (Energimyndigheten), national government
Field of actions	**Carbon Sinks**
System	**Barriers**
Technological/ infrastructure, Financial	Current lack of infrastructure for large scale sequestration, high investment cost and uncertain market.
	Opportunities
	Biochar as a carbon sink is an existing technology with competitive pricing and is increasing in volume. Construction of small biochar production plants is a mature technology. The municipality has the raw material, the capacity and ability to invest in a biochar production plant. CCS is a new technology which has the ability to sequester large quantities of CO2. Sysav is currently studying if it is feasible to invest in a CCS facility at their waste incineration plant.
Stakeholders involved	Sysav, Kraftringen, VA Syd other municipalities - operators of or potential investors in new biochar production capacity

A-3.2: Systems & stakeholder mapping			
System	Stakeholders	Influence on the city´s climate neutrality ambition	Interest in the city´s climate neutrality ambition
Technological/ Infrastructure	Network: Fossil free Sweden (Fossilfritt Sverige) 22 different industries such as agriculture, aviation, construction and civil engineering, electricity, heating, recycling etc.	Initiative by the Swedish Government to increase the pace of climate transition. The goal is to build a strong industrial sector and to create more jobs and export opportunities by going fossil-free. 22 different industries have produced their own roadmaps to show how they can enhance their competitiveness.	Accelerate the climate transition
	The Swedish Transport Administration (Trafikverket)	Responsible for long-term planning of the transport system for all types of traffic, as well as for building, operating and maintaining public roads and railways.	Collaboration on public transport development and financing.
	Skånetrafiken	Manages public transportation in Lund, including buses, trains, and trams	Collaboration on public transport development and planning
	Lund's sanitation authority (LRV- Lunds Renhållsningsverk)	Manages waste collection and recycling in Lund. LRV handles household and some business waste, operate recycling stations, and ensure environmentally friendly waste management practices	Collaborations to increase reuse, increase recycling and decrease waste generation

	Lund's municipal housing company (LKF- Lunds Kommuns Fastighets AB)	LKF manages rental properties, maintain buildings, and ensure quality living conditions for residents	Collaborations on sustainable renovation practices, reuse, energy efficiency measures and green areas/carbon sinks
Political/ Regulatory	County Administrative Board in Skåne (Länsstyrelsen Skåne)	Regional arm of national government, chairs strategic environmental network	Close partnership approach and conflict resolution needed.
	Region Skåne (Regional Authority)	Collaboration on public transport development and financing. Strategic partner in economic development. Hospital and health care service with significant presence and impact in Lund	Strategic and operational delivery
	The Swedish Energy Agency (Energimyndigheten)	The Swedish Energy Agency is a government agency responsible for matters of the supply and use of energy in Sweden. The Agency is in many aspects leading Sweden's transition to a sustainable energy system.	Supports Swedish municipalities' climate ambitions by promoting different initiatives, including CCC. Provides funding, innovation support, and coordination to help cities achieve climate goals by 2030
Organisational			
	City of Lund, departments	Capacity in different departments to contribute to climate neutrality target through measures to decrease operational emissions but also to mobilise around co-benefit development	High level of interest but need for improved co-ordination to maximise potential
	Partnerskap Alnarp	Regional partnership for agriculture and land-use led by Agricultural University bringing together business, academia and public sector	Strong interest and research base in sustainability and potential to mobilise resources to support transition process
	Biosfärsområdet Storkriket, Biogas Syd, LU-Land, Hushållningssällskapet, Vattenråden, Axfood Foundation.	Various stakeholders in land-use and agriculture and food with influence on various parts of supply chain	Contributing to decreased emissions and increased biodiversity etc
	Future by Lund	An arena for collaboration and co-creation between universities, municipalities, organisations, business and creative individuals. FBL has a mission to catalyse Lund as a global innovation district with the capacity to solve complex and shared challenges.	Through FbL's events and workshops, the businesses can have exchanges with universities, businesses and associations in areas such as the smart city and innovation.

Capacities	Network: Viable Cities 23 Swedish municipalities, 6 government agencies	One of 17 strategic Innovation programmes supported in a joint initiative by Vinnova, the Swedish Energy Agency and Formas with the mission Climate Neutral Cities 2030 with a good life for all within planetary boundaries.	A catalyst for new forms of cooperation between cities, industry, academia, research institutes and civil society. To mobilise change in line with national, environmental and climate goals as well as international commitments linked to the Global Sustainability Goals and the Paris Agreement.
	Network: Climate Municipalities (Klimatkommunerna). 50 municipalities and one region	An association of cities and regions in Sweden. Their members are frontrunners in the transition towards a fossil free future with a good quality of life for their inhabitants .	Communicating inspiring examples of effective local climate action with positive synergies. Highlight gaps in national climate policy and ideas for improvement.
	The Council for Sustainable Cities (Rådet för hållbara städer)	A collaboration forum with 13 members who work to strengthen municipalities' conditions for developing living and sustainable cities	Strategic role to address urban sustainability Issues across government agencies, streamline policy and support local delivery
	Open Academy (Öppen Akademi)	Collaboration and support platform for Skåne's mission cities Malmö, Helsingborg and Lund.	Strengthen knowledge based, transformative and coordinated processes for a transition to climate-neutral cities in 2030.
	DigIT Hub Sweden	European Digital Innovation Hub in south Sweden. Helps the city increase its digital capacity.	Special focus on contributing to lower energy consumption and low carbon dioxide emissions.
	Universities and research organisations: University of Lund, including MAX IV and ESS Malmö University, SLU Alnarp, RISE	Create new solutions in sustainable urban development and agriculture, evaluate ongoing city and societal activities	Developing and implementing sustainability solutions in Lund and the region. Participate in development and research projects
Alliances	CoAction Lund	A scalable and innovative initiative to achieve climate neutrality in energy and mobility by 2030. The CoAction Lund initiative brings together 25 stakeholders from the energy, IT, industrial and real estate industries together with authorities, academia.	Through CoAction Lund, Lund can test ideas and collaborate with other actors in particular in areas beyond the mandate and control of the City. CoAction Lund is one of Vinnova's two "system demonstrators" within climate-neutral cities that will show the way and inspire others in Sweden and the world.
	The Climate Alliance (Klimatalliansen)	A network of companies that works actively with climate change and sustainable development. They share knowledge and	The Climate Alliance is a network for engaging local businesses in the climate transition. Since the network consists of

		experiences to find solutions that benefit both climate and business.	companies of varying sizes and sectors, the municipality, through the network, can easily reach a wide range of companies.
	Collaboration Mission Cities in the Öresund Area	Since 2023, the Municipality of Copenhagen, the Municipality of Lund, the City of Malmö and the City of Helsingborg have a joint forum for management and transition teams. The group meets about 2-3 times a year.	Purpose to promote exchange of experiences, learning, joint advocacy work around a climate-neutral city.
	UTM Mission	UTM is a global initiative that mobilises decision-makers at all levels of government to prioritise climate-neutral and net-zero pathways through clean energy and systemic innovation in all sectors and in urban governance. Supports cities in developing their ability to implement climate-neutral solutions.	Through UTM, the municipality can take part in joint trainings, presentations and workshops on various topics that are of great importance for achieving a climate-neutral city.
Financial systems	National funds such as Vinnova, Energimyndigheten, Formas, Naturvårdsverket (Swedish Environmental Protection Agency), EU-funding such as ERDF, Climate-KIC, EUI (European Urban Initiative), Horizon Europe	Enables the cities through grants and mainstream budgets	Accelerate and financing climate transition.
	National Finance Ministry	Potential for finance to support scaling solutions prior to mainstreaming	Accelerate and financing climate transition.
	Retailers	The retail sector is a significant part of Lund's economy with many shops, restaurants, and service providers	Increased climate ambitions can increase retailers' sustainability image, attract eco-conscious customers, and reduce costs through energy efficiency.
Social/behavioural systems	Citizens of Lund	Lund's citizens' consumption has a big climate impact, by they also contribute to the climate transition by participating in local initiatives, supporting sustainable practices, and engaging in community projects. They contribute	Citizens' interest and stakes in the climate transition are manifold

		through actions like reducing waste, using public transport, and supporting green businesses.	
	Behavioural scientists	The city has limited mandate to influence many of the choices made by local citizens, commuters, businesses and employers and a scientific approach to understanding behavioural drivers can be crucial in developing tools to maximise potential. There is an imperative to ensure that the climate transition in Lund at least does not exacerbate socio-economic, gender and ither disparities, and where possible actively contributes to a more equitable development in the city.	Behavioural change will be a decisive factor in the climate transition in Lund and a better understanding of methods to bring about constructive change and socio-economic c-benefits will be crucial to gain the buy-in necessary for an ambitious transition.
	National government	Supports Lund's climate ambitions through funding, policy guidance, and collaborative initiatives, largely via Energy Agency	Strong involvement and commitment to climate transition via Viable Cities and other operational programmes
Civil society sector	Climate alliance Lund, "Lunds agreement with the idea-based sector", The Umbrella organization for civil society organisations in Lund	Lund is the municipality in Sweden with the most civil organizations per capita. There are organisations working specifically with climate and circular economy as well as a multitude working with social issues, recreation, sports and culture. The city has agreements for cooperation with NGO:s and also work directly with individual NGO:s and umbrella organization to engage citizens.	The civil society sector in Lund is very engaged in the climate transition and participate in projects and cooperations with the city and the private sector.

3 Part B – Pathways towards Climate Neutrality by 2030

Part B represents the core of the CCC Action Plan, shaped by local authorities, local businesses, and stakeholders, comprising of the most essential elements: scenarios, strategic objectives, impacts, action portfolios and indicators for monitoring, evaluation, and learning.

3.1 Module B-1 Climate Neutrality Scenarios and Impact Pathways

Module B-1 "Climate Neutrality Scenarios and Impact Pathways" lists and describes impact pathways, early and late outcomes and direct and indirect impacts (co-benefits) according to and adapted from the NetZeroCities Theory of Change and the CCC Action Plan Guidance – clustered by fields of action.

- List of impact pathways, selected from or inspired by the NetZeroCities Theory of Change, including early and late outcomes (strategic objectives) and levers of change structured along the fields of action.
- Descriptions of the impact pathways, summarising their relationship with key priorities and strategic interventions and with the analysis developed in Part A

B-1.1: Impact Pathways					
Fields of action	Systemic levers	Early changes (1-2 years)	Late outcomes (3-4 years)	Direct impacts (Emission reductions	Indirect impacts (co-benefits)
Transport and mobility	Governance & policy	#1 Mobility transition team in place #2 Process for implementation, evaluation, learning, and financing of mobility action plan in place #3 Established a close collaboration both within and outside the municipality's organisation, with private, research and civil society	#1 Evaluation and reassessment of mobility action plan, investment and resource needs to meet 90% reduction of Co2 emissions in 2030 (baseline 2010).	TBD	#1 Enables and magnifies all transport and mobility actions listed in the Action plan

	Social innovation, Finance & funding	#1 Prototyping "living streets" #2 Collaboration project with youth organisations to implement sustainable travel to sport and leisure activities #3 Creation of mobility management fund #4 several car streets have been converted into bus streets	#1 Design of new transport structures in planning that support the new sustainable travel #2 Highlight successes and create the will of everyone to be included in them #3 several car streets have been converted into bicycle streets	TBD	#1 improved public health #2 Improved air quality #3 reduced congestion #4 reduced noise pollution
	Technology & Infrastructure	#1 Better bus service between city centre and the village of Genarp #2 New parking spaces for cargo bikes #3 Develop bicycle parking with charging at work places #4 Finalisation and implementation of bicycle parking strategy #5 Revision of walking/pedestrian strategy #6 Investigation into use of detectors to facilitate bike transports and actions to achieve increased availability for cyclists with disabilities #7 26 km super bike lanes finalised	#1 Finalised investigation into (and possible implementation of): free public transport for children under 14 years, for commuters from car parks and for those living in car free zones #2 Evaluate possibility of new bikelane in a west-eastly direction through the city center #3 creased maintenance and safety of walk lanes #4 Finalisation of super bike lanes: 55km	TBD	#1 Improved public health #2 Improved air quality #3 Reduced congestion #4 Reduced noise pollution

	Governance & policy, Learning & capability	#1 Mobility management Integrate to an increasing extent in city planning processes, reducing the need to travel by car by planning for proximity, density and functional mix #2 Pilots of "car-soft" areas	#1 Villages are to a greater extent transformed to support more sustainable transport patterns.	1-5 percentage reduction in transport need, biggest effect reached after 2030	#1 Improved social inclusion #2 Improved public health #3 Improved air quality #4 Eeduced congestion #5 Reduced noise pollution
	Governance & policy	#1 Reduced parking needs and reduced requirements #2 Tests for car-free pedestrian street finalized #3 Temporary regulation of "summer streets" investigated	#1 Reduced speed in larger parts of Lund have been partially implemented	TBD	#1 Improved public health #2 Improved air quality #3 Eeduced congestion #4 Reduced noise pollution
	Social innovation, Technology & Infrastructure	#1 Full-scale trials within CoAction Lund of mobility hubs #2 Research and mapping of shared vehicles, such as carpools #3 Investigations and decisions ready for the introduction of a fossil-free zone for the entire city of Lund	#1 Investigate subsidies for shared mobility in the villages.	TBD	#1 Enables people to go car-free #2 Reduced congestion #3 Improved air quality #4 Economical and social advantages
	Technology & Infrastructure	#1 Service department installs 100 charging points by public buildings #2 LKF installs 192 charging points	#1 Approximately 900 new charging points installed by the city and municipal companies until 2030	TBD	#1 Improved air quality #2 Reduced noise pollution
	Technology & Intrastructure, Social innovation	#1 Within CoAction, many opportunities to reduce fossil-fuelled traffic in business trips are tested and evaluated #2 Several full-scale trials will be conducted #3 The municipality continues its work in collaboration with selected companies #4 Implementation of "green travel plan" at CoAction's 25 parties, including parts of the	#1 Continued implementation of the "green travel plan" with further new parties within CoActions, as well as the remaining parts of the municipality's employees	TBD	#1 Improved public health #2 mproved work performances and reduced stress levels #3 Improved air quality #4 Reduced congestion #5 Reduced noise pollution

		municipality's employees			
	Technology & Infrastructure, Governance and Policy, Learning and Capabilities	Within CoAction project: #1 Report emission reduction potential #2 Test delivery coordination tools #3 Finilization and implementation of new procurement demands on embedded transports	#1 Completion of hydrogen production and storage facility with 12-14 tons of hydrogen gas (200-400 MWh depending on the size of the facility)	20 percent reduction electrification. Biogas - 120 GWh (assume e.g. 70% use for transport)	#1 Improved air quality #2 Reduced congestion #3 Reduced noise pollution
	Technology & Infrastructure	#1 Mass strategy for Technical department finalized and implemented which may be expanded to encompass the entire municipal organisation #2 Implementation of common environmental demands for all building contractors used by the different municipal departments, also allowing for control of mass transports	#1 Logistical solutions to reduce number of transports is mainstream and used by all larger sites within the city	650 tonnes CO2e Reduction of approx 50-80% of short distance transports within the cities to building sites.	#1 Increased resource efficiency #2 Decreased scope 3 emissions from materials mproved air quality, reduced congestion, reduced noise pollution
	Technology & Infrastructure	#1 Evaluation of Cleancon Landmower project and decision regarding technology implementation #2 Arrange fair for fossil fuel free agricultural machinery to allow farmers to learn about biogas-driven and electric machinery	#1 Evaluation of Cleancon emission free construction project	TBD	#1 Improved air quality #2 Reduced noise pollution #3 Better working conditions
Fields of action	Systemic levers	Early changes (1-2 years)	Late outcomes (3-4 years)	Direct impacts (Emission reductions	Indirect impacts (co-benefits)
Agriculture and sustainable land use	Learning & capabilities, Finance & funding	#1 Hire an agricultural strategist	#1 Systematic monitoring and learning processes in place	15 100 tonnes CO2e (change in landuse) + 450 tonnes CO2e (artifical fertilizer reduction)	#1 Increased and more secure incomes for farmers #2 improved biodiversity and ecosystem services to counteract climate change

					#3 Better soil health
		#2 Dialogue and possible project with farmers' organisation Hushållningssällskapet	TBD	TBD	TBD
	Learning & capabilities, Finance & funding	#1 Process for dialogue, collaboration and campaigns in place	#1 Systematic monitoring and learning processes in place	TBD	#1 Enables changes in agricultural practices
	Learning & capabilities, Finance & funding	#1 Support structures to facilitate for companies with climate smart solutions to join procurements	#1 New procurment processes in place	TBD	TBD
	Governance & policy	#1 Research how the scheme (Requirements for tenants on municipal land to farm sustainably and with low emissions) could be implemented and what the requirements should entail	#1 Implement scheme	2300 tonnes of CO2e if all the land is used	#1 Increased and more secure incomes for farmers #2 mproved biodiversity and ecosystem services to counteract climate change #3 Better soil health
Fields of action	Systemic levers	Early changes (1-2 years)	Late outcomes (3-4 years)	Direct impacts (Emission reductions)	Indirect impacts (co-benefits)
Circular economy and sustainable consumtion	Social innovation, Democracy & Participation	#1 Fritidsbanken tests pop-up services #2 Investigation into local sharing hubs #3 Reuse-Mall in place	#1 Fritidsbanken has expanded its reach from 10% to 20% percent of Lund's citizens #2 Fixa till Linero has expanded to reach appr. 4900 visitors/users per year (20% increase) #3 Reuse mall is well established and is replicated in the villages	TBD	#1 Increased health and wellbeing #2 Increased access to sport participation #3 Strengthens the local community #4 Decreased amount of waste
	Learning & capabilities	1) Accelerate LRV's (municipal waste handling organisation) work to influence citizens in	Significantly less plastic and increased sourse separation	TBD	#1 Reduced microplastic pollution

		better plastics sorting and reducing plastics use 2) Collaborate with and learn from Region Skåne about how plastics can be reduced in procurement processes 3) Within procurement projects SCOPE and Circular Minds, translate gained knowledge to work with reducing plastics			
	Learning & capabilities, Governance & Policy	#1 Conduct and finalise environmental spend analysis #2 Market dialogues with companies and building of support systems to facilitate for companies with climate smart solutions to join procurements #3 Form activities to influence buying behaviour of employees #4 Cost benefit analysis for measures #5 Prioritisation of product groups	TBD Based on the early changes	TBD	#1 Savings from better resource management within the municipal organisation
	Learning & capabilities, Finance & funding	#1 Process in action on how to support and attract circular businesses	#1 Process established on how to support and attract circular businesses. Process in action on how to support and attract NGO´s and other civic initatieves Systematic monitoring and learning processes in place	10% reduction	#1 Strengthens the local business community #2 Job opportunities #3 Social cohesion
		#2 Process in action on how to support and attract NGO´s and other civic initatieves	TBD	TBD	TBD
		#3 Influence national development of incentives			
	Social innovation, Democracy & Participation	#1 Neighbourhood-based sustainable action programme in motion	TBD	TBD	#1 Strenghtens the local community

					#2 Improved public health #3 Social cohesion
Fields of action	Systemic levers	Early changes (1-2 years)	Late outcomes (3-4 years)	Direct impacts (Emission reductions	Indirect impacts (co-benefits)
Net Zero Contruction	Technology & infrastructure , Governance & Policy	#1 Ongoing process, evaluated, finetuned and replicated #2 Evaluating options to formalize ambition levels in the contract, not legally binding at the moment.	#1 Adjusted and optimized new standard of process for land allocations, climate impact an aspects that is always evaluated. Certain level of ambition required to have a good chance of getting a contract. Climate ambitions formalized in binding contract	Potential reduction of current trial is approx 1500-2000tons CO2e compared to previous Busuness as Usual Scenario. Around the same numbers per year on average. Can vary a lot from year to year	#1 Creation of biogenic carbon sinks in construction materials
	Technology & infrastructure , Governance & Policy	#1 Process/plan for internal reuse in place, with storage and handling organized #2 Local private actor established reuse/logistical centre #3 Study and decision made about reusehub/centre	#1 All parts up and running #2 Reuse a normal part of both municipal and private building process #3 Demolition minimized, reuse of frames/foundations optimized, most building materials reused	TBD but keeping a building foundation and frame will reduce carbon footprint by approx 60-75% dependeing on how extensive the remodeling will be and how much the building frame needs to be reinforced.	#1 Preservation of cultural and historic values by "vintage" materials"
	Technology & infrastructure , Governance & Policy Learning & capabilities	#1 Internal roadmaps for departments/municipal companies #2 Normalization of new land use agreement process with high climate ambitions always included #3 Creation of platform/contract for target ambition and knowledge exchange	#1 Expansion to smaller private sector actors and private citizens, dialogue and information primariy #2 Municipality and local private sector meeting BATNEEC levels and beyond	Approx 10000 tons of CO2eq reduced per year if all new builds meet BATNEEC levels. National legislation likely to come, but less ambitious. Reduction levels for construction (infrastructur, parks etc) TBD, data still missing.	TBD
	Technology & infrastructure Learning & capabilities	#1 Baselines/reference values created for most common internal standard actions, identifying both normal CO2 levels per action, possible reductions potential and cost	Expanding to genereal common actions, syncing with national/regional compentence/knowledge centers. Develop tool for carbon and cost valuation of different actions or	Potential, reduction around 5000 tons of CO2eq/year.	TBD

			multiple actions, decicion making tools		
	Governance & Policy Learning & capabilities	#1 Established process for municipal climate- and energy advisors' work to influence SMEs, tenant owners' associations and individuals in energy saving	TBD	10% reduction in energy use	#1 Cost savings #2 Iimproved indoor climate
	Learning & capabilities Governance & Policy Technology & infrastructur	#1 Selection and list of groundwork materials (with a smaller climate footprint)	TBD	TBD	#1 Cost savings #2 Greener and more liveable city #3 Climate adapatation and reduced sensitivity to extreme weather events
Fields of action	Systemic levers	Early changes (1-2 years)	Late outcomes (3-4 years)	Direct impacts (Emission reductions)	Indirect impacts (co-benefits)
Energy	Technology & infrastructure	#1 Shortend permitting process for new wind and solar project #2 Identified suitable areas for solar and wind power production #3 Municipal housing company LKF installs 500 KwP solar panels/ year from 2024	#1 Increased local production of renewable electricity #2 Municipal housing company LKF will have installed 4000 kWp solar panels in 2027	Adding of 86 GWh solar and wind power until 2030	#1 Provides a more secure energy supply #2 Increased job opportunities
	Technology & infrastructure Governance & Policy	#1 Finalisation of network development plan in collaboration with Kraftringen #2 Demonstrate how the internetified grid will work, including business models and financing from infrastructure funds	TBD	TBD	#1 Enables development of renewable energy and the electrification of industry and transport
	Technology & infrastructure	#1 New digital platform in place for trade and control of district heating #2 District cooling and power to stabilise and increase flexibility in the energy system	#1 Completion of 2-3 pilot hydrogen production and storage facilites (100 kW-1 MW) for backup power	Energy savings of 10-15 percent? Battery capacity 2030 - electric cars – work in progress	#1 Provides a more secure energy supply #2 nables development of renewable energy

	Technology & infrastructure	#1 Plan for new lines	#1 60 - 80 km of line will probably be built within Lund, historically 100 new (switchboards) have been connected per year, the forecast is also forward	TBD	#1 Enables more efficient use of electricity- and gas supply, e.g. in transport and industry
	Technology & infrastructure	#1 Building of the new CHP plant starts	#1 The plant is finalised and put into operation.	Reduction of 15 000 tonnes CO2e/year	#1 Provides a more secure energy supply
	Technology & infrastructure Finance & funding	#1 Securing of private financing of biogas plant	#1 Plant is finalized	Removes manure: 300,000 – 400,000 tonnes/year. - emission reduction: 41kg co2e /ton	#1 Provides a more secure energy supply #2 Reduced emissions from manure storage
Carbon sinks	Learning & capabilities Technology & infrastructure	#1 Investigate possibilities for aew municipal biochar facility, using residues from parks and green areas (capacity of 2000 tonnes CO2e/year)	# 1 Increased production and usage	Carbon sink of at least 2000 tones CO2e/year. Could be expanded to a maximum of 130 000 tonnes CO2e/year if other waste sources are used	#1 Job opportunities i#2 Improved soil health
	Technology & infrastructure	#1 Plan for contruction and re-establishing of xx ha wetland	TBD	2000 tonnes CO2e/year	Increased nutrion and water retention, increased biodiversity, recreational values
	Learning & capabilities Governance & Policy	#1 Create an action plan to enable implementation of the focus areas identified in Tree strategy	TBD	TBD	#1 Increased nutrion and water retention, increased biodiversity #2 Recreational values

B-1.2: Description of impact pathways

Section A1 describes the current emissions in the city and trends over recent years and clearly identifies areas of particular challenge. The strategic priorities are shaped based on the key challenges and form the basis of the impact pathways. System barriers and opportunities for each impact pathway are described in Section A. Many of them are reflected in the action plan, although there are some challenges and opportunities yet to be addressed. Future iterations of the action

plan may tackle these issues. By far the most significant sources of emissions are transport and agriculture. Below is a short rationale for each of the impact pathways;

1. Transport & mobility
The transport and mobility challenge is not by far unique for Lund, although the proportion of emissions may be higher than in many cities due to significant reduction of emissions from energy. There is a well-established programme of works but impact must increase significantly to meet the 2030 target. There is therefore a strong need for significant action and impact in transportation and mobility in the short term as well as continued long term planning and development. Due to the long lead times for major infrastructure investment, some actions, such as redevelopment of the station area, may not have been completed by 2030 and even if completed, will not have realised its full impact until several years later. Major investment in rail infrastructure similarly is likely to take place beyond the 2030 target date. Innovative approaches to co-design with citizens and stakeholders and partnership approaches will be essential to support the uptake of low-carbon solutions.

2. Agriculture and sustainable land use
Due to the relative size of agricultural emissions, the City has decided that a net zero target that does not include agricultural is difficult to justify. This poses significant challenges as there is no background of strategic climate work in this field in Lund, very limited ownership of the issue and limited existing networks through which to work. The key strategic priorities have therefore become the framework for developing the impact pathways ensuring a simple and streamlined approach between priorities and actions. The decision to include agriculture and land-use is also the strong links to climate adaptation and the potential for nature-based solutions to play an increasingly important role in mitigation and especially adaptation. The work with agriculture and land-use should therefore be seen as the start of a far longer term process of sustainable land use, mitigation, adaptation and sequestration. Innovative approaches to building relationships with farmers and co-designing solutions will be essential to support the uptake of low-carbon solutions.

3. Circular economy and sustainable consumption
Materials and resource use has long been primarily addressed as an issue of waste management and waste separation with a focus on materials recycling. A more strategic approach to reduction of resource use through appropriate design, construction, procurement, repair, reuse and repurposing addresses a far broader perspective that can contribute to a more sustainable economic development model. Resource use is an important element of other strategic priority areas such as energy, construction, agriculture and transport and provides a strategic framework to drive a wider economic development transformation towards a more sustainable economy. The shift towards the circular economy should therefore be seen as consisting of a short-term experimental development within a much longer term societal transformation. Lund can in this way contribute to development that can help accelerate the transition at a national level by being an early adopter and testbed.

4. Net zero construction
Lund is in a period of strong growth and the climate impact of new development is significant as is the impact of renovation and operations and maintenance in the property sector. Climate neutral construction and property management is strongly linked to transport and mobility, land-use, materials use and to energy demand and therefore functions as a cross-cutting theme linking to the other strategic priorities. There is a strong movement in the construction industry in the region to be climate neutral by 2030 and climate positive by 2035. These are extremely ambitious targets but they open the possibility that co-ordinated work over a ten year period can provide truly transformational results which are already inspiring other sectors.

5. Energy
The trend in emissions from the energy system is clearly shown, and whilst dramatic progress has been made since 2010, measures are still needed to decrease emissions further and ensure supply security. Furthermore, renewable electricity supply is essential to drive down emissions from transport, industry and construction. New renewable energy infrastructure is being planned and large parts of this are expected to be completed by 2030, although there may be investments that are not commissioned until beyond 2030. Unlike the delay with mobility infrastructure, however, new renewable energy capacity or extended district heating systems will give a more immediate effect.

6. Carbon sinks
Managing residual emissions will be an important element of the 2030 target for Lund, although the intention is that work to continue emissions reductions will continue past 2030 where scope 3 emissions will become increasingly important to address. Working with carbon sinks is a new field of work in which some progress has been made in recent years, but where significant additional work is needed to be able to maximise the potential for carbon sequestration within the city's boundaries. It is expected that work with carbon sinks will be a long-term development process in which the period to 2030 will be one of infrastructure development and scaling of some solutions that can have a greater impact over time.

3.2 Module B-2 Climate Neutrality Portfolio Design

Module B-2 "Climate Neutrality Portfolio Design" contains a project description for **each action planned** in the CCC Action Plan. This includes interventions targeted at creating/enhancing carbon sinks to address residual emissions.

- A table of planned interventions grouped per field of action, including interventions by local businesses and industry (B-2.1).
- An outline of each action. The table contains all information for implementation (e.g., topic, kind of intervention, emission sector, scope, allocation, responsible actors, GHG reduction by gases and estimated costs), including interventions aimed at addressing residual emissions (incl. carbon sinks) (B-2.2).
- A summary of the actions and impact planned to address residual emissions (B-2.3).

B-2.1: Description of action portfolios - textual or visual		
Fields of action	Portfolio description	
	List of actions	Descriptions
Transport and mobility		
	1. Strengthen organisational capacity for large scale mobility shift	Appoint a Mobility Transition Leader, supported by a larger team with expertise in process management, communication, and finance. Develop new projects, ensure learning and scaling, and prepare political discussions and decisions. Collaboration is essential within the municipality and with external partners from the private sector, research, and civil society. An efficient organization with the right resources is key for successful execution.
	2. Decrease car travel by shift to public transport and active mobility through mobility management	1) Continue and develop campaigns and communication efforts to promote sustainable and active mobility (public transport, biking, walking), including work to envision and visualise results 2) Promote sustainable and active mobility for children and youths through collaborations with sport clubs and schools, by e.g. "walking school buses", gamification and conditional financing for organisations 3) Explore new solutions to increase active mobility, with a focus on walking, in EU project Active Cities 4) Create a mobility management fund and implement mobility management in city planning
	3. Decrease car travel by shift to public transport and	1) Increase availability and accessibility, including service frequence and safety, of public transport through collaboration with *Skånetrafiken* and The Transport Administration

	active mobility through infrastructure investments.	2) Increase maintenance and signage of bicycle and pedestrian paths, including better winter maintenance 3) Increase and improve bicycle parking spots, including spots for cargo bikes and parking for electric bikes at work places to enable commuting 4) Improve bicycle and pedestrian infrastructure by means of road developments and management, increased safety of routes, detectors, etc. 5) Construction of 7 super bicycle routes in and to/from Lund to villages and nearby paths to enable increased sustainable commuting (in total 81 km). 6) Planning of new central station that is expected to allow for extensive transition to public transport. 7) Establish mobility hubs in villages to enable transition to public transport and active mobility 8) Conversion of car streets into bus streets or bicycle streets.
	4. Decrease need for transport by creating attractive and dense city centre and villages	1) Integrate mobility management to an increasing extent in city planning processes, reducing the need to travel by car by planning for proximity, density and functional mix and develop "car-soft" areas. 2) Investigate scenarios for decreased car traffic and increase of sustainable transport modes in neighbourhoods 3) Develop and coordinate planning processes and activities with key partners and forums such as "Citysamverkan" and city departments. 4) Develop qualities for walking, to get more people to walk more.
	5. Improve road safety, air quality and use of streetscape by traffic management measures	1) Change local regulations of parking spots: including taxes, zoning and reviewing of parking mandates 2) Collaboration with 25 private actors (in CoAction Lund) to increase parking taxes and decrease parking spaces at workplaces 3) Investigate car free zones and car free streets, including circulation plan around city centre. 4) Investigate reduced speed for cars
	6. Promote shared mobility to enable transition to sustainable transport modes and electric vehicles	1) Investigate mobility hubs around the city centre 2) CoAction Lund project for shared mobility at workplaces 3) Promote use of carpools by creating carpool map. 4) Promote mobility as a service
	7. Support transition of private vehicles from fossil fuels to electric and renewable fuels	1) Create smart sharing solutions for apartments w/o parking spots: could entail granting access to public parking spots and garages in the night time 2) Install public and residential charging posts, approx. a total of 220 public charge points by the municipal org, 500 points by municipal parking company LKP and 192 points by municipal housing company LKF until 2030, amounting to ca 900 points 3) Establish mobility hubs in Lund's villages to enable transition to electricity 4) Guide individuals in the shift to EVs and renewable fuels by support from municipal energy consultants
	8. On-duty travel: Decrease, decarbonise and switch transport modes (internally and in cooperation with private employers)	1) Collaborate with employers in Lund to decrease travels through two CoAction Lund projects with the aim to a) Keep and develop the digital work meeting culture and b) Implement flexible work hours, 2) Collaborate with employers to decarbonize and switch transport mode through increased work to get more workplaces to become "Bike friendly workplaces", and by two CoAction Lund projects aimed at c) Developing company transport policies and d) Implementing company bikes, 3) Decrease, decarbonize and switch transport modes in the municipal organisation (including travel with private car), including work to change behaviour in driving, choosing transport modes and flying.

		4) Make the entire city of Lund a zone only for completely fossil-free transport, through strict regulation and control.
	9. Decrease and decarbonise freight transport	1) Collaborate with ESS, Tetra Pak, Alfa Laval, Lund university, MAX IV, Medicon Village and the municipality freight operators in CoAction Lund project to research how empty transports can be avoided, optimizing routes, reducing express transports, establishing common requirements for suppliers, and feasibility of shared charging stations and/or refuelling stations 2) Develop the work to make goods deliveries to municipal operations more efficient: coordination of e.g. laundry and mail in-house to decrease number of delivery occasions. 3) In procurement of products, develop demands to increasingly require fossil fuel-free embedded transports. 4) Investigation into if current environmental zone, covering inner city, can be expanded 5) Work to increase access to fossil-free fuels and electrification (liquid biogas, electricity and hydrogen) for heavy transport in collaboration with neighbouring municipalities. 6) Establish hydrogen production for freight transports
	10. Decrease construction-related freight transport	1) Promote optimized logistical solutions for building and construction projects internally, including logistical checkpoints with pooling, reloading, storage etc., to reduce mass transportation needs. 2) Influence all larger building or construction projects within the municipality to adopt smarter mass handling and transport solutions, including private actors 3) Work with awareness spreading within the city and among private actors to prioritize reduced mass generation in architectural stage and planning 4) Cooperate with other municipalities that have come longer in mass handling, such as Helsingborg, to exchange knowledge and create common solutions
	11. Accelerate decarbonisation of work machines	1) Testing and evaluation of emissions-free battery-run robot land mowers in Cleancon project, to possibly replace HVO-run land mowers. The robot land mowers are also expected to reduce transport needs 2) Testing and evaluation of emissions free construction machines in Cleancon project 3) Continued and increased work in Service Department to replace remaining gasoline-powered machines used in maintenance of green areas (including lawnmowers), to electric, gas driven or HVO-powered machines. 4) Change fuel to HVO and biogas in municipal machinery fleet where electric machines are not viable. 5) Put higher demands on contractors in using electric and HVO machines. 6) In expansion areas, offer charging opportunities and green fuels to private actors 7) Establish collaboration with machine pools to influence them in increasing the offer of electric, gas driven or HVO-powered machines 8) Establish strategic work to increase electrification and shift to biofuels in agricultural machines

Agriculture		
	12. Promote changes in agricultural practices to reduce emissions and	1) Encourage and incentivise change in land use practices 2) Encourage and incentivise improved manure handling practices and reduction of manure storage through integration with biogas plant

	support farmers in their sustainability transition	3) Encourage and incentivise reduce in overall use of artificial fertilizers, to reach a 5 percent reduction in emissions compared to 2010 levels 4) Take an active role in promoting knowledge exchange among farmers, researchers and organisations to enable the implementation of sustainable farming practices 5) Collaborate with external stakeholders to develop economically sustainable business models and funding schemes to finance more sustainable farming practices and land use 6) Build internal capacity
	13. Work to influence consumers and food retailers	1) Communicate with (and launch campaigns towards) Lund's citizens to increase awareness of local and more sustainably produced food 2) Hold dialogue with food retailers and farmers' interest groups to explore collaboration possibilities and ways in which local and sustainable farming can be supported
	14. Review public procurement practices to promote local and sustainable producers	1) There are a number of barriers when it comes to promoting local and sustainable producers. For exampel, these producers can't always accomodate the needs of a large buyer in terms of volumes or quality. There is also the matter of transports, where it is hard for a municipality to set demands. A product may be locally produced but then shipped off to Asia for processing before it is sent back. The economical situation in Sweden has also made it more difficult to buy for example ecologically or locally produced food. The decrease in demand in the society in general has decreased the supply. Often, there are also many factors to take into account when choosing among products, often with insufficient data to support the decisionmaking. One possible way to move forward towards promoting local and sustainable producers could be to use more of the city´s land for food production, possibly in the form of service concessions. From a procurement perspective it is desireable that national regulation is not too regulating, since it can prevent the city from developing new solutions together with the market. 2) Within SCOPE (a sustainable procurement project, mentioned later in Circular Economy and Sustainable Consumption) three focus areas will be selected, and one is expected to be food. The project will entail: a) market dialogues with (food) companies, b) building of support structures to facilitate for companies with climate smart solutions to join procurements, and c) activities to influence buying behaviour of company employees.
	15. Requirements for tenants on municipal land to farm sustainably and with low emissions	The city owns around 5 percent of the agricultural land in Lund, amounting to 891 hectares. This is agricultural land that can be leased out to farmers and the city has direct influence to reduce emissions by demanding certain agricultural practices. 1) Explore possible agreements and leases 2) Evaluate the outcome
Circular economy and sustainable consumption		
	16. Promote sustainable consumption and increase recycling	1) Increase sharing of sport equipment through: "Fritidsbanken" e.g. by relocating to places closer to its main users (youths, children and low-income families) 2) Increase recycling of clothes and home appliances: Fixa till Linero is a free recycling and crafts workshop, e.g. repair of clothes, gadgets and bicycles, located in the neighbourhood Linero. 3) Recycling-hub (Återbruksgalleria). Municipality of Lund in collaboration with NGO´s and circular initiatives/actors/businesses develop a concept for the hub. 4) Increase sharing through mobile recycling containers

		5) Collection of cooking fat and textiles.6) Cooperate (Influence national development of incentives) with other municipalities and stakeholders on circularity 7) Campaigns to raise awareness, to reduce waste and increase circularity
	17. Decrease plastics use and increase source separation	1) Accelerate LRV's (municipal waste handling organisation) work to influence citizens in better plastics sorting and reducing plastics use 2) Collaborate with and learn from Region Skåne about how plastics can be reduced in procurement processes 3) Within procurement projects SCOPE and Circular Minds, translate gained knowledge to work with reducing plastics
	18. Develop innovative procurement processes to support circular businesses and minimise waste	1) Analysis of procurement and planned coming procurement to identify key areas with high climate impact, large volume and potential for change. 2) Implement Net Zero requirements on a pilot basis to identify challenges and learning needs. 3) Develop criteria and evaluation methods for different procurement types, particular focus on circular products and services. 4) Consider innovation procurement models to shift market or open for innovative solutions. 5) Cooperation and shared learning through ongoing projects, Circular minds and Scope. 6) Make Plocket (Municipal internal sharing hub) the first choice for all departments.
	19. Promote circular businesses	1) Support talent attraction for circular busineses by involvement in IUC Syd project "Young talents to Skåne's industry to promote circular growth" (UTSICT) 2) Continue and expand efforts to connect companies with Almi, an organisation that guides companies in developing their sustainability work. 3) Continued support of Sustainalink, a non-profit that connects students and companies in sustainability collaboration projects 4) Continue and develop support of circular business models and civic initiatives for circular and sustainable consumption through grants and free premises. 5) Develop outreach work to companies, with a focus on the commerce sector, to promote the implementation of circular business models 6) Investigate further ways to highlight and promote circular businesses and initiatives in Lund, e.g. in collaboration with Visit Lund 7) Collaborate with Circle Centre (student-led organisation) to make Lund an environment where circular businesses and initiatives thrive 8) Cooperate with other municipalities and stakeholders on circularity, e.g. about recycling malls 9) Advocacy work towards national authorities
	20. Develop and design of support systems and services for low carbon lifestyles	1) Development of lifestyle tool for raising knowledge and inspiration for behavioural change, implementation partnerships on thematic areas such as food, fashion, travel. 2) Neighbourhood-based sustainable action programme. 3) Collaborate and learn from other cities and platforms/networks
Net zero construction		
	21. Incorporate Net Zero requirements in contracts	Test new process for reducing embodied carbon in new buildings through municipal land lease agreements: In the process, a low carbon footprint is set as a one of the standard

	for development on public land	evaluation factors. Every interested participant has to describe a strategy to meet a target below a certain level of CO2e/m2 to be considered for a contract in land sales.
	22. Facilitate reuse of building materials, elements and frames.	Lead, support and promote reuse to minimize extraction of carbon intensive virgin materials. Focus areas are to avoid demolishing and instead remodel, reusing structural parts/frames, reusing existing foundation and reusing dismantled building materials. Means of achieving increased reuse: 1) Within the municipal organisation, continue and develop new workflow and support structures for reuse (identify, dismantle, categorize, store and reintroduce). 2) Improve dialogue and facilitating work towards big private actors 3) Establish reuse hub for smaller private actors
	23. Reduce embodied carbon from new buildings and construction	1) Accelerate work within municipal organisation and municipal companies to achieve the goal of new buildings and infrastructure to meet at least BATNEEC level of reduced embodied carbon (the best available technology not entailing excessive costs). 2) Increase dialogue and communicative efforts with private actors to influence toward BATNEEC 3) Increase the percentage of biobased materials and materials with high levels of stored biogenic CO2 through both internal efforts and stakeholder outreach
	24. Reduce embodied carbon from renovation, refurbishment and maintenance	1) Expanded dialogue with relevant actors. 2) Externally funded project likely to start within the Municipality 2025 focusing on calculating CO2 from common renovation actions, identifying reduction potential and keeping tabs on cost. 3) Created practical tools/methods for decision making.
	25. Optimize climate performance in operations and maintenance of public buildings	1) Work with *Lundafastigheter* and municipal companies LKF and LKP to optimize energy use in apartments and public buildings through both technical and behavioural measures, setting a positive example for private property owners. 2) Continue and strengthen municipal climate- and energy advisors' work to influence SMEs, tenant owners' associations and individuals in energy saving 3) Expand work to reach Lund's citizens with information about energy efficiency in buildings, e.g. through events.
	26. Sustainable civil engineering and groundworks	1) Plan groundworks to achieve less material use (asphalt, rock, concrete) 2) Select groundwork materials with a smaller climate footprint 3) In groundworks, plan for more greenery and especially trees to achieve a better microclimate, thus reducing the need for cooling in summer and heating in winter, avoiding energy use and material use originating from technical solutions
Energy		
	27. Increase solar and wind power production	1) Speed up permitting processes for new wind and solar projects 2) Identify suitable areas for solar power production 3) Increased work by energy consultants to support property owners, energy companies, etc., in installing solar power on buildings 4) Set a clear overall target in GWh of how much solar power the City of Lund should install 5) Increase solar energy production in municipal organisation 6) Support in increasing the capacity of existing wind power plants through better physical planning and hosting workshops for wind power stakeholders

	28. Increase capacity in electricity distribution system	1) Participation in consultations via Energy Commission Skåne regarding network development plans 2) Close dialogue with municipal energy company Kraftringen to ensure that the city's development plans are taken into account when planning local and regional networks. 3) Development of a network development plan in collaboration with Kraftringen 4) Further cooperation with energy companies in enabling the development of regional electricity production and distribution, e.g. by facilitating power grids within the municipal territory 5) Development of an "internetified" or smart grid within CoAction Lund to enable increased production of rooftop solar power and increased local electricity storage
	29. Develop flexible energy systems with increased energy storage capacity	1) Continue participation in existing electricity pricing models/markets and collaborate to promote the incorporation of smaller energy sources such as heat pumps 2) Within the E-flex project part 2 (a part of CoAction Lund), develop a new digital platform for trade and control of district heating, district cooling and power to stabilise and increase flexibility in the energy system. 3) Collaborate with Kraftringen, housing companies and other stakeholders in planning for and promoting increased energy storage and flexibility through batteries and car batteries 4) Collaborate with Kraftringen to enable local and sustainable hydrogen production and storage within the municipality.
	30. Expand reach of district heating and district cooling	1) Expand reach of district heating into areas served by gas network 2) Expand the reach of cool district heating network in Brunnshög, and introduce cooler temperatures in the regular district heating grid 3) Expand district cooling network
	31. Enhance CHP (Combined Heat and Power) capacity	Kraftringen is building a new CHP plant in Örtofta (outside municipal territory) that will be in full operation before 2030. The plant (75 MW district heating, 25 MW electricity) is replacing district heating from older and less efficient plants that are to be de-commissioned and adds an extra 25 MW in electricity. A consultancy report estimated the net climate impact considering the construction of the plant and the emissions avoided from alternative production plants if a new CHP is not built
	32. Increase biogas production	Kraftringen and the city participate as a third party in the development of a biogas plant by identifying suitable locations and bringing together stakeholders with landowners. The expected production from the biogas plant is 120 GWh per year from mixed substrate, mainly manure.
Carbon sinks		
	33. Establish biochar production and increase biochar use	1) Increase biochar production, using residues from parks and green areas 2) Increase use of biochar on municipally owned agricultural land, parks and other areas 3) Encourage biochar use among farmers by communicating benefit of use for soil health
	34. Rewet and construction of new wetlands	In Lund there are currently around 150 hectares of constructed and re-established wetlands, the result of a long work by the city in collaboration with Water councils (organisations consisting of municipalities and other stakeholders in

		connection to rivers and an interest in their preservation). Until 2030, another TBD hectares of wetland will be constructed.
	35. Integrate carbon capture potential in city planning	1) Continue and increase efforts to make trees and green areas a key priority in City Planning 2) Continue development of work processes to safeguard and preserve trees in groundwork projects 3) Communicate with homeowners and private landlords about the necessity of trees.
Cross-cutting		
	36. Transition Team management	Overall management and co-ordination of transition process, partnership development, political interaction, community engagement, climate impact calculation, review and updating of CAP & CIP and reporting.
	37. Advocacy work	Advocacy work aimed at national decision makers or branch organisations or other bodies of critical influence to address issues beyond the mandate of the City

B-2.2: Individual action outlines		
Action outline	Action name	**1. Strengthen organisational capacity for large scale mobility shift**
	Action type	Management
	Action description	Appoint a Mobility Transition Leader, supported by a larger team with expertise in process management, communication, and finance. Develop new projects, ensure learning and scaling, and prepare political discussions and decisions. Collaboration is essential within the municipality and with external partners from the private sector, research, and civil society. An efficient organization with the right resources is key for successful execution.
Reference to impact pathway	Field of action	Transport and mobility
	Systemic lever	Governance and policy
	Outcome (according to module B-1.1)	*Early outcomes:* #1 Mobility transition team in place, #2 Process for implementation, evaluation, learning, and financing of mobility action plan in place. #3 Established a close collaboration both within and outside the municipality's organisation, with private, research and civil society *Late outcomes*: #1 Evaluation and reassessment of mobility action plan, investment and resource needs to meet 90% reduction of Co2 emissions in 2030 (baseline 2010).
Implementation	Responsible bodies/person for implementation	City of Lund
	Action scale & addressed entities	City-wide
	Involved stakeholders	City of Lund (various departments) private, research and civil society
	Comments on implementation – consider mentioning resources, timelines, milestones	Pre-implementation stage Timeline: 2025–2030
Impact & cost	Generated renewable energy (if applicable)	N/A
	Removed/substituted energy, volume, or fuel type	N/A

	GHG emissions reduction estimate (total) per emission source sector	N/A
	GHG emissions compensated (natural or technological sinks)	N/A
	Total costs and costs by CO2e unit	TBD

B-2.2: Individual action outlines		
Action outline	Action name	**2. Decrease car travel by shift to public transport and active mobility through mobility management**
	Action type	Awareness raising
	Action description	1) Continue and develop campaigns and communication efforts to promote sustainable and active mobility (public transport, biking, walking), including work to envision and visualise results 2) Promote sustainable and active mobility for children and youths through collaborations with sport clubs and schools, by e.g. "walking school buses", gamification and conditional financing for organisations 3) Explore new solutions to increase active mobility, with a focus on walking, in EU project Active Cities 4) Create a mobility management fund and implement mobility management in city planning
Reference to impact pathway	Field of action	Transport and mobility
	Systemic lever	Social innovation, Finance and funding
	Outcome (according to module B-1.1)	*Early outcomes:* #1 Prototyping of "living streets", #2 Collaboration project with youth organisations to implement sustainable travel to sport and leisure activities, #3 Creation of mobility management fund #4 several car streets have been converted into bus streets *Late outcomes:* *#1* Design of new transport structures in planning that support the new sustainable travel. #2 Highlight successes and create the will of everyone to be included in them. #3 several car streets have been converted into bicycle streets
Implementation	Responsible bodies/person for implementation	City of Lund, Technical department
	Action scale & addressed entities	City-wide
	Involved stakeholders	Youth sport clubs and organisations, schools, participants in *Active Cities,* Future by Lund
	Comments on implementation – consider mentioning resources, timelines, milestones	Parts of action already under implementation, others in pre-implementation Timeline: 2024–2030
Impact & cost	Generated renewable energy (if applicable)	N/A
	Removed/substituted energy, volume, or fuel type	N/A
	GHG emissions reduction estimate (total) per emission source sector	TBD

	GHG emissions compensated (natural or technological sinks)	N/A
	Total costs and costs by CO2e unit	622 800 EUR Costs by co2e unit: TBD

B-2.2: Individual action outlines		
Action outline	Action name	**3. Decrease car travel by shift to public transport and active mobility through infrastructure investments**
	Action type	Technical development
	Action description	1) Increase availability and accessibility, including service frequence and safety, of public transport through collaboration with *Skånetrafiken* and The Transport Administration 2) Increase maintenance and signage of bicycle and pedestrian paths, including better winter maintenance 3) Increase and improve bicycle parking spots, including spots for cargo bikes and parking for electric bikes at work places to enable commuting 4) Improve bicycle and pedestrian infrastructure by means of road developments and management, increased safety of routes, detectors, etc. 5) Construction of 7 super bicycle routes in and to/from Lund to villages and nearby paths to enable increased sustainable commuting (in total 81 km). 6) Planning of new central station that is expected to allow for extensive transition to public transport. 7) Establish mobility hubs in villages to enable transition to public transport and active mobility 8) Conversion of car streets into bus streets or bicycle streets.
Reference to impact pathway	Field of action	Transport and mobility
	Systemic lever	Technology & infrastructure

	Outcome (according to module B-1.1)	*Early outcomes:* #1 Better bus service between city centre and the village of Genarp, #2 New parking spaces for cargo bikes, #3 Bicycle parking with charging at work places, #4 Finalisation and implementation of bicycle parking strategy, #5 Revision of walking/pedestrian strategy, #6 Investigation into use of detectors to facilitate bike transports and actions to achieve increased availability for cyclists with disabilities, #7 26 km super bike lanes finalised (Lund-Dalby, 11 km; Lund-Lomma, 10 km, Lund-Stångby, 5 km) *Late outcomes:* *#1* Finalised investigation into (and possible implementation of) free public transport for children under 14 years, for commuters from car parks and for those living in car free zones #2 Feasibility of new bikelane in a west-eastly direction through the city centre investigated, #3 Increased maintenance and safety of walk lanes achieved #4 Finalisation of super bike lanes: Lund-Kävlinge (2026, 13 km), Lund-Malmö (2027, 22 km) Lund-Staffanstorp(2027, 7 km), Lund-Bjärred (2030, 13 km)
Implementation	Responsible bodies/person for implementation	City of Lund, Technical department and Mobility Team Timeline: 2024-2030
	Action scale & addressed entities	City-wide
	Involved stakeholders	Skånetrafiken, The Transport Administration, Region Skåne
	Comments on implementation – consider mentioning resources, timelines, milestones	Parts of action already under implementation, others in pre-implementation
Impact & cost	Generated renewable energy (if applicable)	N/A
	Removed/substituted energy, volume, or fuel type	N/A
	GHG emissions reduction estimate (total) per emission source sector	TBD
	GHG emissions compensated (natural or technological sinks)	N/A
	Total costs and costs by CO2e unit	TBD

B-2.2: Individual action outlines		
Action outline	Action name	**4. Decrease need for transport by creating attractive and dense city centre and villages**
	Action type	City planning
	Action description	1) Integrate mobility management to an increasing extent in city planning processes, reducing the need to travel by car by planning for proximity, density and functional mix and develop "car-soft" areas. 2) Investigate scenarios for decreased car traffic

		and increase of sustainable transport modes in neighbourhoods 3) Develop and coordinate planning processes and activities with key partners and forums such as "Citysamverkan" and city departments.
Reference to impact pathway	Field of action	Transport and mobility
	Systemic lever	Governance and policy, Learning and Capability
	Outcome (according to module B-1.1)	Early outcome: #1 Mobility management is integrated in the city centre development plan. #2 Villages are to a greater extent transformed to support more sustainable transport patterns.
Implementation	Responsible bodies/person for implementation	City of Lund, Planning department, Technical department
	Action scale & addressed entities	City-wide
	Involved stakeholders	Citysamverkan (collaboration between Trade assosiation, property owners and the municipality),
	Comments on implementation – consider mentioning resources, timelines, milestones	Partly under implementation (mobility management is already considered in City Comprehensive Plan) Timeline: 2024-2030
Impact & cost	Generated renewable energy (if applicable)	N/A
	Removed/substituted energy, volume, or fuel type	N/A
	GHG emissions reduction estimate (total) per emission source sector	TBD
	GHG emissions compensated (natural or technological sinks)	N/A
	Total costs and costs by CO2e unit	Within ordinary operations

B-2.2: Individual action outlines		
Action outline	Action name	**5. Improve road safety, air quality and use of streetscape by traffic management measures**
	Action type	Regulatory
	Action description	1) Change local regulations of parking spots: including taxes, zoning and reviewing of parking mandates 2) Collaboration with 25 private actors (in CoAction) to increase parking taxes and decrease parking spaces at workplaces 3) Investigate car free zones and car free streets, including circulation plan around city centre. 4) Investigate reduced speed for cars
Reference to impact pathway	Field of action	Transport and mobility
	Systemic lever	Governance and policy
	Outcome (according to module B-1.1)	*Early outcomes* #1 Reduced parking needs and reduced requirements. #2 Tests for car-free pedestrian street finalised, #3 Temporary regulation of "summer streets" investigated. *Late outcomes* #1 Reduced speed in larger parts of Lund have been partially implemented.

Implementation	Responsible bodies/person for implementation	City of Lund – Mobility team and Technical department, CoAction Lund Timeline: 2024-2030
	Action scale & addressed entities	City-wide
	Involved stakeholders	Companies in CoAction, Transport Administration
	Comments on implementation – consider mentioning resources, timelines, milestones	Pre-implementation
Impact & cost	Generated renewable energy (if applicable)	N/A
	Removed/substituted energy, volume, or fuel type	N/A
	GHG emissions reduction estimate (total) per emission source sector	TBD
	GHG emissions compensated (natural or technological sinks)	N/A
	Total costs and costs by CO2e unit	TBD

B-2.2: Individual action outlines		
Action outline	Action name	**6. Promote shared mobility to enable transition to sustainable transport modes and electric vehicles**
	Action type	Awareness raising
	Action description	1) Investigate mobility hubs around the city centre 2) CoAction Lund project for shared mobility at workplaces 3) Promote use of carpools by creating carpool map. 4) Promote mobility as a service 5) Make the entire city of Lund a zone only for completely fossil-free transport, through strict regulation and control
Reference to impact pathway	Field of action	Transport and mobility
	Systemic lever	Technology/infrastructure, Social innovation
	Outcome (according to module B-1.1)	*Early outcomes* #1 Full-scale trials within CoAction Lund of mobility hubs. #2 Research and mapping of shared vehicles, such as carpools. #3 Investigations and decisions ready for the introduction of a fossil-free zone for the entire city of Lund *Late outcomes* #1 Investigation of subsidies for shared mobility in the villages finalised. #2 Fossil-free zone for the entire city of Lund will be introduced in January 2027
Implementation	Responsible bodies/person for implementation	City of Lund – Mobility team, Technincal department, City office Timeline: 2024-2030

	Action scale & addressed entities	City-wide
	Involved stakeholders	CoAction Lund companies, carpools
	Comments on implementation – consider mentioning resources, timelines, milestones	Pre-implementation
Impact & cost	Generated renewable energy (if applicable)	N/A
	Removed/substituted energy, volume, or fuel type	N/A
	GHG emissions reduction estimate (total) per emission source sector	TBD
	GHG emissions compensated (natural or technological sinks)	N/A
	Total costs and costs by CO2e unit	Work in progress Mobility hubs are funded by CoAction Lund and its partners. Mapping is done within ordinary operations. Development of shared mobility takes place primarily with developers of digital systems, with the support of the municipality's regular operations.

B-2.2: Individual action outlines		
Action outline	Action name	**7. Support transition of private vehicles from fossil fuels to electric and renewable fuels**
	Action type	Technical development
	Action description	1) Create smart sharing solutions for apartments w/o parking spots: could entail granting access to public parking spots and garages in the night time 2) Installation of public and residential charging posts by municipal organisation and municipal companies 3) Establish mobility hubs in Lund's villages to enable transition to electricity 4) Guide individuals in the shift to EVs and renewable fuels by support from municipal energy consultants
Reference to impact pathway	Field of action	Transport and mobility
	Systemic lever	Technology/infrastructure
	Outcome (according to module B-1.1)	*Early outcomes* #1 Service department installs 100 charging points by public buildings, #2 LKF installs 192 charging points *Late outcomes* #1 Around 900 new charging points installed by the city and municipal companies until 2030
Implementation	Responsible bodies/person for implementation	City of Lund, Service Department and Mobility Team, Technincal department
	Action scale & addressed entities	City-wide
	Involved stakeholders	Municipal companies LKF, LKP and Kraftringen
	Comments on implementation – consider mentioning resources, timelines, milestones	Partly under implementation Timeline: 2024-2030
Impact & cost	Generated renewable energy (if applicable)	N/A
	Removed/substituted energy, volume, or fuel type	N/A

	GHG emissions reduction estimate (total) per emission source sector	TBD
	GHG emissions compensated (natural or technological sinks)	N/A
	Total costs and costs by CO2e unit	TBD

B-2.2: Individual action outlines		
Action outline	Action name	**8. On-duty travel: Decrease, decarbonise and switch transport modes (internally and in cooperation with private employers)**
	Action type	Company policy work
	Action description	1) Collaborate with employers in Lund to decrease travels through two CoAction Lund sub-projects with the aim to a) Keep and develop the digital work meeting culture and b) Implement flexible work hours, 2) Collaborate with employers to decarbonize and switch transport mode through increased work to get more work places to become "Bike friendly work places", and by two CoAction Lund sub-projects aimed at c) Developing company transport policies and d) Implementing company bikes, 3) Decrease, decarbonize and switch transport modes in the municipal organisation (including travel with private car), including work to change behaviour in driving, choosing transport modes and flying.
Reference to impact pathway	Field of action	Transport and mobility
	Systemic lever	Technology/infrastructure, Social innovation
	Outcome (according to module B-1.1)	*Early outcomes* #1 Within CoAction Lund, full-scale trials into reducing fossil-fueled traffic in business trips are evaluated. #2 Implementation of "green travel plan" at CoAction Lund's 25 parties, including parts of the municipality's employees. *Late outcomes* #1 Continued implementation of the "green travel plan" with further new parties within CoAction Lunds, as well as the remaining parts of the municipality's employees.
Implementation	Responsible bodies/person for implementation	City of Lund, Mobility Team, Technincal department, CoAction Lund
	Action scale & addressed entities	City-wide
	Involved stakeholders	CoAction Lund companies
	Comments on implementation – consider mentioning resources, timelines, milestones	Partly under implementation Timeline: 2024–2030
Impact & cost	Generated renewable energy (if applicable)	N/A
	Removed/substituted energy, volume, or fuel type	N/A
	GHG emissions reduction estimate (total) per emission source sector	TBD
	GHG emissions compensated (natural or technological sinks)	N/A

	Total costs and costs by CO2e unit	TBD

B-2.2: Individual action outlines		
Action outline	Action name	**9. Decrease and decarbonise freight transport**
	Action type	Highly diversified: technical, organisational and logistical
	Action description	1) Collaborate with ESS, Tetra Pak, Alfa Laval, Lund university, MAX IV, Medicon Village and the municipality freight operators in CoAction Lund project to research how empty transports can be avoided, optimizing routes, reducing express transports, establishing common requirements for suppliers, and feasibility of shared charging stations and/or refueling stations 2) Develop the work to make goods deliveries to municipal operations more efficient: coordination of e.g. laundry and mail in-house to decrease number of delivery occasions. 3) In procurement of products, develop demands to increasingly require fossil fuel-free embedded transports. 4) Investigation into if current environmental zone, covering inner city, can be expanded 5) Work to increase access to fossil-free fuels and electrification (liquid biogas, electricity and hydrogen) for freight transport in collaboration with neighboring municipalities. 6) Establish hydrogen production for freight transports (Kraftringen)
Reference to impact pathway	Field of action	Transport and mobility
	Systemic lever	Technology/infrastructure, Governance and Policy, Learning and Capabilities
	Outcome (according to module B-1.1)	*Early outcomes* #1 Within CoAction Lund project: Report emission reduction potential. #2 Test delivery coordination tools. #3 Finalisation and implementation of new procurement demands on embedded transports *Late outcomes* #1 Completion of hydrogen production and storage facility with 12-14 tons of hydrogen gas (200-400 MWh depending on the size of the facility)
Implementation	Responsible bodies/person for implementation	City of Lund Technical Department, Service Department, City office, municipal company Kraftringen
	Action scale & addressed entities	City-wide
	Involved stakeholders	CoAction Lund companies, neighbouring municipalities, municipal company Kraftringen, ESS, Tetra Pak, Alfa Laval, Lund university, MAX IV, Medicon Village and the municipality freight operators in CoAction Lund
	Comments on implementation – consider mentioning resources, timelines, milestones	Partly under implementation Timeline: 2024–2030
Impact & cost	Generated renewable energy (if applicable)	N/A
	Removed/substituted energy, volume, or fuel type	N/A

	GHG emissions reduction estimate (total) per emission source sector	TBD
	GHG emissions compensated (natural or technological sinks)	N/A
	Total costs and costs by CO2e unit	TBD (hydrogen plant: 17,8-26,7 MEUR)

B-2.2: Individual action outlines		
Action outline	Action name	**10. Decrease construction related freight transports**
	Action type	Technical development
	Action description	1) Promote optimized logistical solutions for building and construction projects internally, including logistical checkpoints with pooling, reloading, storage etc., to reduce mass transportation needs. 2) Influence all larger building or construction projects within the municipality to adopt smarter mass handling and transport solutions, including private actors 3) Work with awareness spreading within the city and among private actors to prioritize reduced mass generation in architectural stage and planning 4) Cooperate with other municipalities that have come longer in mass handling, such as Helsingborg, to exchange knowledge and create common solutions
Reference to impact pathway	Field of action	Transport and mobility
	Systemic lever	Technology/infrastructure
	Outcome (according to module B-1.1)	*Early outcomes* #1 Mass strategy for Technical department finalized and implemented, which may be expanded to encompass the entire municipal organisation #2 Implementation of common environmental demands for all building contractors used by the different municipal departments, also allowing for control of mass transports *Late outcomes* #1 Logistical solutions to reduce number of transports is mainstream and used by all larger sites within the city.
Implementation	Responsible bodies/person for implementation	City of Lund Technical Department, Planning Department
	Action scale & addressed entities	City-wide
	Involved stakeholders	Expert consultants, other municipalities
	Comments on implementation – consider mentioning resources, timelines, milestones	Partly under implementation Timeline: 2024–2030
Impact & cost	Generated renewable energy (if applicable)	N/A
	Removed/substituted energy, volume, or fuel type	N/A

	GHG emissions reduction estimate (total) per emission source sector	TBD
	GHG emissions compensated (natural or technological sinks)	N/A
	Total costs and costs by CO2e unit	TBD

B-2.2: Individual action outlines		
Action outline	Action name	**11. Accelerate decarbonisation of work machines**
	Action type	Technical development
	Action description	#1 Testing and evaluation of emissions-free battery-run robot lawn mowers in Cleancon project, to possibly replace HVO-run lawn mowers. The robot lawn mowers are also expected to reduce transport needs. #2 Testing and evaluation of emission free construction machines in Cleancon project #3 Continued and increased work in Service Department to replace remaining gasoline-powered machines used in maintenance of green areas (including lawnmowers), to electric, gas driven or HVO-powered machines. #4 Change fuel to HVO and biogas in municipal machinery fleet where electric machines are not viable. #5 Put higher demands on contractors in using electric and HVO machines. #6 In expansion areas, offer charging opportunities and green fuels to private actors. #7 Establish collaboration with machine pools to influence them in increasing the offer of electric, gas driven or HVO-powered machines #8 Establish strategic work to increase electrification and shift to biofuels in agricultural machines
Reference to impact pathway	Field of action	Transport and mobility
	Systemic lever	Technology/infrastructure
	Outcome (according to module B-1.1)	*Early outcomes* #1 Evaluation of Cleancon Lawn mower project and decision regarding technology implementation; #2 Arrange fair for fossil fuel free agricultural machinery to allow farmers to learn about biogas-driven and electric machinery *Late outcomes* TBD
Implementation	Responsible bodies/person for implementation	City of Lund Technical Department, Service Department
	Action scale & addressed entities	City-wide
	Involved stakeholders	Cleancon project participants
	Comments on implementation – consider mentioning resources, timelines, milestones	Partly under implementation Timeline: 2024–2030
Impact & cost	Generated renewable energy (if applicable)	N/A
	Removed/substituted energy, volume, or fuel type	TBD

	GHG emissions reduction estimate (total) per emission source sector	TBD
	GHG emissions compensated (natural or technological sinks)	N/A
	Total costs and costs by CO2e unit	TBD

B-2.2: Individual action outlines		
Action outline	Action name	**12. Promote changes in agricultural practices to reduce emissions and support farmers in their sustainability transition**
	Action type	Awareness raising
	Action description	#1 Encourage and incentivise change in land use practices #2 Encourage and incentivise improved manure handling practices and reduction of manure storage through integration with biogas plant #3 Encourage and incentivise reduce in overall use of artificial fertilizers, to reach a 5 percent reduction in emissions compared to 2010 levels #4 Take an active role in promoting knowledge exchange among farmers, researchers and organisations to enable the implementation of sustainable farming practices #5 Collaborate with external stakeholders to develop economically sustainable business models and funding schemes to finance more sustainable farming practices and land use
Reference to impact pathway	Field of action	Agriculture and sustainable land use
	Systemic lever	Learning and capabilities, Finance and funding
	Outcome (according to module B-1.1)	*Early outcomes:* #1 Dialogue and possible project with farmers' organisation Hushållningssällskapet *Late outcomes:* TBD
Implementation	Responsible bodies/person for implementation	City of Lund Municipal Office – Environmental Department
	Action scale & addressed entities	City-wide
	Involved stakeholders	Farmers organisations, Lund University, Agricultural University, Future by Lund
	Comments on implementation – consider mentioning resources, timelines, milestones	Pre-implementation Timeline: 2024–2030
Impact & cost	Generated renewable energy (if applicable)	N/A
	Removed/substituted energy, volume, or fuel type	N/A
	GHG emissions reduction estimate (total) per emission source sector	15,000 tones CO2/year
	GHG emissions compensated (natural or technological sinks)	N/A
	Total costs and costs by CO2e unit	TBD

B-2.2: Individual action outlines		
Action outline	Action name	**13. Work to influence consumers and food retailers**
	Action type	Awareness raising
	Action description	1) Communicate with (and launch campaigns towards) Lund's citizens to increase awareness of local and more sustainably produced food 2) Hold dialogue with food retailers and farmers' interest groups to explore collaboration possibilities and ways in which local and sustainable farming can be supported
Reference to impact pathway	Field of action	Agriculture and sustainable land use
	Systemic lever	Learning and capabilities, Finance and funding
	Outcome (according to module B-1.1)	*Early outcomes* TBD *Late outcomes* TBD
Implementation	Responsible bodies/person for implementation	City of Lund Municipal Office – Environmental Department
	Action scale & addressed entities	City-wide
	Involved stakeholders	Farmers organisations, Lund University, Agricultural University, citizens
	Comments on implementation – consider mentioning resources, timelines, milestones	Pre-implementation Timeline: 2024–2030
Impact & cost	Generated renewable energy (if applicable)	N/A
	Removed/substituted energy, volume, or fuel type	N/A
	GHG emissions reduction estimate (total) per emission source sector	TBD
	GHG emissions compensated (natural or technological sinks)	N/A
	Total costs and costs by CO2e unit	TBD

B-2.2: Individual action outlines		
Action outline	Action name	**14. Review public procurement practices to promote local and sustainable producers**
	Action type	Regulatory, Management
	Action description	Within SCOPE (a sustainable procurement project, mentioned later in Circular Economy and Sustainable Consumption) three focus areas will be selected, and one is expected to be food. The project will entail: a) market dialogues with (food) companies, b) building of support structures to facilitate for companies with climate smart solutions to join procurements, and c) activities to influence buying behaviour of municipal employees.

Reference to impact pathway	Field of action	Agriculture and sustainable land use
	Systemic lever	Governance & policy
	Outcome (according to module B-1.1)	*Early outcomes* TBD *Late outcomes* TBD
Implementation	Responsible bodies/person for implementation	City of Lund Municipal Office – Environmental Department, City office
	Action scale & addressed entities	City-wide
	Involved stakeholders	Municipal administration, SCOPE project partners
	Comments on implementation – consider mentioning resources, timelines, milestones	Pre-implementation Timeline: 2024–2030
Impact & cost	Generated renewable energy (if applicable)	N/A
	Removed/substituted energy, volume, or fuel type	N/A
	GHG emissions reduction estimate (total) per emission source sector	TBD
	GHG emissions compensated (natural or technological sinks)	N/A
	Total costs and costs by CO2e unit	TBD

B-2.2: Individual action outlines		
Action outline	Action name	**15. Requirements for tenants on municipal land to farm sustainably and with low emissions**
	Action type	Regulatory, Management
	Action description	The city owns around 5 percent of the agricultural land in Lund, amounting to 891 hectares. This is agricultural land that can be leased out to farmers and the city has direct influence to reduce emissions by demanding certain agricultural practices.
Reference to impact pathway	Field of action	Agriculture and sustainable land use
	Systemic lever	Governance & policy
	Outcome (according to module B-1.1)	*Early outcomes* Research how the scheme could be implemented and what the demands should be *Late outcomes* Implement scheme
Implementation	Responsible bodies/person for implementation	City of Lund Planning department, Municipal Office – Environmental Department
	Action scale & addressed entities	City-wide
	Involved stakeholders	Land tenants

	Comments on implementation – consider mentioning resources, timelines, milestones	Pre-implementation Timeline: 2024–2030
Impact & cost	Generated renewable energy (if applicable)	N/A
	Removed/substituted energy, volume, or fuel type	N/A
	GHG emissions reduction estimate (total) per emission source sector	2300 tonnes CO2e
	GHG emissions compensated (natural or technological sinks)	N/A
	Total costs and costs by CO2e unit	TBD

B-2.2: Individual action outlines		
Action outline	Action name	**16. Promote sustainable consumption and increase recycling**
	Action type	Awareness raising
	Action description	1) Increase sharing of sport equipment through: "Fritidsbanken" e.g. by relocating to places closer to its main users (youths, children and low income families) 2) Increase recycling of clothes and home appliances: Fixa till Linero is a free recycling and crafts workshop, e.g. repair of clothes, gadgets and bicycles, located in the neighbourhood Linero. 3) Recycling-hub (Återbruksgalleria). Municipality of Lund in collaboration with NGO´s and circular initiatives/actors/businesses develop a concept for the hub. 4) Cooperate (Influence national development of incentives) with other municipalities and stakeholders on circularity 5) Campaigns to raise awareness, to reduce waste and increase circularity
Reference to impact pathway	Field of action	Circular economy and sustainable consumption
	Systemic lever	Social innovation, Democracy/Participation
	Outcome (according to module B-1.1)	*Early outcomes* 1 Fritidsbanken tests pop-up services, 2 Investigation into use of satellite offices in new neighbourhoods and co-location with sport and culture associations by Fritidsbanken 3 Recycling-hub (Återbruksgalleria). Municipality of Lund in collaboration with NGO´s and circular initiatives/actors/businesses develop a concept for the hub. *Late outcomes* Fritidsbanken has expanded its reach from 10% to 20% percent of Lund's citizens (with 1 borrowed object/year) , Fixa till Linero has expanded to reach appr. 4900 visitors/users per year (20% increase) Recycling hub is established.
Implementation	Responsible bodies/person for implementation	City of Lund Municipal Office – Environmental Department and Social Sustainability Department; Municipal waste management (LRV), Cultural & Leisure department
	Action scale & addressed entities	City-wide

	Involved stakeholders	Fixa till, Fritidsbanken, NGO´s
	Comments on implementation – consider mentioning resources, timelines, milestones	Partly under implementation Timeline: 2024–2030
Impact & cost	Generated renewable energy (if applicable)	N/A
	Removed/substituted energy, volume, or fuel type	N/A
	GHG emissions reduction estimate (total) per emission source sector	TBD
	GHG emissions compensated (natural or technological sinks)	N/A
	Total costs and costs by CO2e unit	TBD

B-2.2: Individual action outlines		
Action outline	Action name	**17. Decrease plastics use and increase source separation**
	Action type	Awareness raising
	Action description	1) Accelerate LRV's (municipal waste handling organisation) work to influence citizens in better plastics sorting and reducing plastics use 2) Collaborate with and learn from Region Skåne about how plastics can be reduced in procurement processes 3) Within procurement projects SCOPE and Circular Minds, translate gained knowledge to work with reducing plastics
Reference to impact pathway	Field of action	Circular economy and sustainable consumption
	Systemic lever	Learning & capabilities
	Outcome (according to module B-1.1)	*Early outcomes* TBD *Late outcomes* TBD
Implementation	Responsible bodies/person for implementation	City of Lund Municipal Office – Environmental Department; Municipal waste management (LRV)
	Action scale & addressed entities	City-wide
	Involved stakeholders	Municipal companies, citizens, SCOPE and Circular Minds partners, Region Skåne
	Comments on implementation – consider mentioning resources, timelines, milestones	Partly under implementation Timeline: 2024–2030
Impact & cost	Generated renewable energy (if applicable)	N/A
	Removed/substituted energy, volume, or fuel type	N/A
	GHG emissions reduction estimate (total) per emission source sector	TBD
	GHG emissions compensated (natural or technological sinks)	N/A
	Total costs and costs by CO2e unit	TBD

B-2.2: Individual action outlines		
Action outline	Action name	**18. Develop innovative procurement processes to support circular business and minimise waste**

	Action type	Regulatory, Management
	Action description	1) Analysis of procurement and planned coming procurement to identify key areas with high climate impact, large volume and potential for change. 2) Implement Net Zero requirements on a pilot basis to identify challenges and learning needs. 3) Develop criteria and evaluation methods for different procurement types, particular focus on circular products and services. 4) Consider innovation procurement models to shift market or open for innovative solutions. 5) Cooperation and shared learning through ongoing projects, Circular minds and Scope. 6) Make Plocket (Municipal internal sharing hub) the first choise for all departments.
Reference to impact pathway	Field of action	Circular economy and sustainable consumption
	Systemic lever	Learning & capabilities, Governance & Policy
	Outcome (according to module B-1.1)	*Early outcomes* 1) Conduct and finalise environmental spend analysis 2) Market dialogues with companies and building of support systems to facilitate for companies with climate smart solutions to join procurements 3) Form activities to influence buying behaviour of employees 4) Cost benefit analysis for measures 5) prioritisation of product groups *Late outcomes* TBD
Implementation	Responsible bodies/person for implementation	City of Lund Municipal Office – Environmental Department, Procurement Department
	Action scale & addressed entities	City-wide
	Involved stakeholders	Municipal departments and companies, SCOPE and Circular Minds partners
	Comments on implementation – consider mentioning resources, timelines, milestones	Partly under implementation Timeline: 2024-2026
Impact & cost	Generated renewable energy (if applicable)	N/A
	Removed/substituted energy, volume, or fuel type	N/A
	GHG emissions reduction estimate (total) per emission source sector	TBD
	GHG emissions compensated (natural or technological sinks)	N/A
	Total costs and costs by CO2e unit	TBD

B-2.2: Individual action outlines		
Action outline	Action name	**19. Promote circular businesses**
	Action type	Business innovation support
	Action description	1) Support talent attraction for circular businesses by involvement in IUC Syd project "Young talents to Skåne's industry to promote circular growth" (UTSICT)

		2) Continue and expand efforts to connect companies with Almi, an organisation that guides companies in developing their sustainability work. 3) Continued support of Sustainalink, a non-profit that connects students and companies in sustainability collaboration projects 4) Continue and develop support of circular business models and civic initiatives for circular and sustainable consumption through grants and free premises. 5) Develop outreach work to companies, with a focus on the commerce sector, to promote the implementation of circular business models 6) Investigate further ways to highlight and promote circular businesses and initiatives in Lund, e.g. in collaboration with Visit Lund 7) Collaborate with Circle Centre (NGO) to make Lund an environment where circular businesses and initiatives thrive 8) Cooperate with other municipalities and stakeholders on circularity, e.g. about recycling malls
Reference to impact pathway	Field of action	Circular economy and sustainable consumption
	Systemic lever	Learning & capabilities, Finance & funding
	Outcome (according to module B-1.1)	*Early outcomes* TBD *Late outcomes* TBD
Implementation	Responsible bodies/person for implementation	City of Lund Municipal Office – Environmental Department, Business Unit
	Action scale & addressed entities	City-wide
	Involved stakeholders	Municipal departments and companies, NGOs, Almi, Nyföretagarcentrum, Visit Lund, Sustainalink
	Comments on implementation – consider mentioning resources, timelines, milestones	Partly under implementation Timeline: 2024–2030
Impact & cost	Generated renewable energy (if applicable)	N/A
	Removed/substituted energy, volume, or fuel type	N/A
	GHG emissions reduction estimate (total) per emission source sector	TBD
	GHG emissions compensated (natural or technological sinks)	N/A
	Total costs and costs by CO2e unit	TBD

B-2.2: Individual action outlines		
Action outline	Action name	**20. Develop and design of support systems and services for low carbon lifestyles**
	Action type	Awareness raising
	Action description	1) Development of lifestyle tool for raising knowledge and inspiration for behavioural change, implementation partnerships on thematic areas such as food, fashion, travel.

		2) Neighbourhood-based sustainable action programme.
Reference to impact pathway	Field of action	Circular economy and sustainable consumption
	Systemic lever	Social innovation, Democracy & Participation
	Outcome (according to module B-1.1)	*Early outcomes* TBD *Late outcomes* TBD
Implementation	Responsible bodies/person for implementation	City of Lund Municipal Office – Environmental Department and Social Sustainability Department
	Action scale & addressed entities	City-wide
	Involved stakeholders	Municipal departments and companies, citizens
	Comments on implementation – consider mentioning resources, timelines, milestones	Pre implementation Timeline: 2024–2030
Impact & cost	Generated renewable energy (if applicable)	N/A
	Removed/substituted energy, volume, or fuel type	N/A
	GHG emissions reduction estimate (total) per emission source sector	TBD
	GHG emissions compensated (natural or technological sinks)	N/A
	Total costs and costs by CO2e unit	TBD

B-2.2: Individual action outlines		
Action outline	Action name	**21. Incorporate low embodied carbon levels in municipal land allocation agrements**
	Action type	Technical development
	Action description	Test new process for reducing embodied carbon in new buildings through municipal land allocation agreements: In the process, a low carbon footprint is set as a one of the standard evaluation factors. Every interested participant has to describe a strategy to meet a target below a certain level of CO2e/m2 to be considered for a contract in land sales.
Reference to impact pathway	Field of action	Net Zero Construction
	Systemic lever	Technology/infrastructure, Governance and Policy
	Outcome (according to module B-1.1)	*Early outcomes:* First process ongoing at the moment, evaluation, finetuning and replication next couple of years. Evaluating options to formalize ambition levels in the contract, not legally binding at the moment. *Late outcomes:* Adjusted and optimized new standard of process for land allocations, climate impact an aspect that is always evaluated. Certain level of ambition required to have a good chance of getting a contract. Climate ambitions formalized in binding contract.

Implementation	Responsible bodies/person for implementation	City of Lund Technical Department
	Action scale & addressed entities	City-wide (Municipality)
	Involved stakeholders	Property developers, Builders
	Comments on implementation – consider mentioning resources, timelines, milestones	Pre-implementation Timeline: 2024–2030
Impact & cost	Generated renewable energy (if applicable)	N/A
	Removed/substituted energy, volume, or fuel type	N/A
	GHG emissions reduction estimate (total) per emission source sector	1500-2000 tons CO2e/year
	GHG emissions compensated (natural or technological sinks)	N/A
	Total costs and costs by CO2e unit	Total: 0,5-1,6 MEUR

B-2.2: Individual action outlines		
Action outline	Action name	**22. Facilitate and promote reuse of building materials, elements and frames**
	Action type	Technical development, Awareness Raising
	Action description	Lead, support and promote reuse to minimize extraction of carbon intensive virgin materials. Focus areas are to avoid demolishing and instead remodel, reusing structural parts/frames, reusing existing foundation and reusing dismantled building materials. Means of achieving increased reuse: 1) Within the municipal organisation, continue and develop new workflow and support structures for reuse (identify, dismantle, categorize, store and reintroduce). 2) Improve dialogue and facilitating work towards big private actors 3) Establish reuse hub for smaller private actors
Reference to impact pathway	Field of action	Net Zero Construction
	Systemic lever	Technology/infrastructure, Governance and Policy
	Outcome (according to module B-1.1)	*Early outcomes* #1 Process/plan for internal reuse in place, with storage and handling organized. #2 Local private actor established reuse/logistical centre. #3 Study and decision made about reusehub/centre. *Late outcomes* #1 Reuse centres up and running #2 Reuse is integral part of both municipal and private building process with most building materials reused (in municipal building processes? #3 Demolition minimized #4 Reuse of frames/foundations optimized
Implementation	Responsible bodies/person for implementation	City of Lund Planning department, Environmental Department, Service Department, Technical Department and municipal companies.
	Action scale & addressed entities	City-wide
	Involved stakeholders	Builders

	Comments on implementation – consider mentioning resources, timelines, milestones	Partly under implementation Timeline: 2024–2030
Impact & cost	Generated renewable energy (if applicable)	N/A
	Removed/substituted energy, volume, or fuel type	N/A
	GHG emissions reduction estimate (total) per emission source sector	TBD
	GHG emissions compensated (natural or technological sinks)	N/A
	Total costs and costs by CO2e unit	TBD

B-2.2: Individual action outlines		
Action outline	Action name	**23. Reducing embodied carbon from new buildings and construction**
	Action type	Technical development, Awareness Raising
	Action description	1) Accelerate work within municipal organisation and municipal companies to achieve the goal of new buildings and infrastructure to meet at least BATNEEC level of reduced embodied carbon (the best available technology not entailing excessive costs). 2) Increase dialogue and communicative efforts with private actors to influence toward BATNEEC 3) Increase the percentage of biobased materials and materials with high levels of stored biogenic CO2 through both internal efforts and stakeholder outreach
Reference to impact pathway	Field of action	Net Zero Construction
	Systemic lever	Technology/infrastructure, Governance and Policy
	Outcome (according to module B-1.1)	Early outcomes Internal roadmaps for departments/municipal companies. Normalization of new land use agreement process with high climate ambitions always included. Creation of platform/contract for target ambition and knowledge exchange. Late outcomes Expansion to smaller private sector actors and private citizens, dialogue and information primarily. Municipality and local private sector meeting BATNEEC levels and beyond.
Implementation	Responsible bodies/person for implementation	City of Lund Planning department, Environmental Department, Service Department, Technical Department and municipal companies.
	Action scale & addressed entities	City-wide
	Involved stakeholders	Property developers, architects, design engineers, construction entrepreneurs.
	Comments on implementation – consider mentioning resources, timelines, milestones	Partly under implementation Timeline: 2024–2030
Impact & cost	Generated renewable energy (if applicable)	N/A
	Removed/substituted energy, volume, or fuel type	N/A

	GHG emissions reduction estimate (total) per emission source sector	Approx 10000 tonnes of CO2eq reduced per year if all new builds meet BATNEEC levels.
	GHG emissions compensated (natural or technological sinks)	N/A
	Total costs and costs by CO2e unit	133 450-177 940 EUR per year (covers full time position and budget for activities)

B-2.2: Individual action outlines		
Action outline	Action name	**24. Reducing embodied carbon from renovation, refurbishment and maintenance**
	Action type	Technical development, Awareness Raising
	Action description	Build knowledge, tools and collaborations to reduce embodied carbon from renovations, refurbishments and maintenance, internally and with the private sector. Expanded dialogue witch relevant actors needed. Externally funded project likely to start within the Municipality 2025 focusing on calculating CO2 from common renovation actions, identifying reduction potential and keeping tabs on cost. Practical tools for decision making need to be created.
Reference to impact pathway	Field of action	Net Zero Construction
	Systemic lever	Technology/infrastructure, Governance and Policy
	Outcome (according to module B-1.1)	Early outcomes Baselines/reference values created for most common internal standard actions, identifying both normal CO2 levels per action, possible reductions potential and cost. Late outcomes Expanding to general common actions, syncing with national/regional competence/knowledge centers. Develop tool for carbon and cost valuation of different actions or multiple actions, decision making tools
Implementation	Responsible bodies/person for implementation	City of Lund Planning department, Environmental Department, Service Department, Technical Department and municipal companies.
	Action scale & addressed entities	City-wide
	Involved stakeholders	Builders
	Comments on implementation – consider mentioning resources, timelines, milestones	Partly under implementation Timeline: 2024–2030
Impact & cost	Generated renewable energy (if applicable)	N/A
	Removed/substituted energy, volume, or fuel type	N/A
	GHG emissions reduction estimate (total) per emission source sector	Potential reduction around 5000 tons of CO2eq/year.
	GHG emissions compensated (natural or technological sinks)	N/A
	Total costs and costs by CO2e unit	TBD

B-2.2: Individual action outlines		
Action outline	Action name	**25. Optimising climate performance in operations and maintenance of public buildings**
	Action type	Technical development, Awareness Raising
	Action description	1) Work with Lundafastigheter and municipal companies LKF and LKP to optimize energy use in apartments and public buildings through both technical and behavioural measures, setting a positive example for private property owners. 2) Continue and strengthen municipal climate- and energy advisors' work to influence SMEs, tenant owners' associations and individuals in energy saving 3) Expand work to reach Lund's citizens with information about energy efficiency in buildings, e.g. through events.
Reference to impact pathway	Field of action	Net Zero Construction
	Systemic lever	Technology/infrastructure
	Outcome (according to module B-1.1)	Early outcomes TBD Late outcomes TBD
Implementation	Responsible bodies/person for implementation	City of Lund Service Department, Environmental Department and municipal companies.
	Action scale & addressed entities	City-wide
	Involved stakeholders	Municipal companies, companies, tenant owners' associations, citizens
	Comments on implementation – consider mentioning resources, timelines, milestones	Partly under implementation Timeline: 2024–2030
Impact & cost	Generated renewable energy (if applicable)	N/A
	Removed/substituted energy, volume, or fuel type	N/A
	GHG emissions reduction estimate (total) per emission source sector	TBD
	GHG emissions compensated (natural or technological sinks)	N/A
	Total costs and costs by CO2e unit	TBD

B-2.2: Individual action outlines		
Action outline	Action name	**26. Sustainable civil engineering and groundworks**
	Action type	Technical development, Planning
	Action description	1) Plan groundworks to achieve less material use (asphalt, rock, concrete) 2) Select groundwork materials with a smaller climate footprint 3) In groundworks, plan for more greenery and especially trees to achieve a better microclimate, thus reducing the need for cooling in summer and heating in winter, avoiding energy use and material use originating from technical solutions

Reference to impact pathway	Field of action	Net Zero Construction
	Systemic lever	Technology/infrastructure
	Outcome (according to module B-1.1)	Early outcomes TBD Late outcomes TBD
Implementation	Responsible bodies/person for implementation	City of Lund Technical Department, Municipal Office – Environmental Department, Planning Department
	Action scale & addressed entities	City-wide
	Involved stakeholders	Builders, Municipal Companies
	Comments on implementation – consider mentioning resources, timelines, milestones	Partly under implementation Timeline: 2024–2030
Impact & cost	Generated renewable energy (if applicable)	N/A
	Removed/substituted energy, volume, or fuel type	N/A
	GHG emissions reduction estimate (total) per emission source sector	TBD
	GHG emissions compensated (natural or technological sinks)	N/A
	Total costs and costs by CO2e unit	TBD

B-2.2: Individual action outlines		
Action outline	Action name	**27. Increase solar and wind power production**
	Action type	Technical development
	Action description	1) Speed up permitting processes for new wind and solar projects 2) Identify suitable areas for solar power production 3) Increased work by energy consultants to support property owners, energy companies, etc., in installing solar power on buildings 4) Increase solar energy production in municipal organisation 5) Support in increasing the capacity of existing wind power plants through better physical planning and hosting workshops for wind power stakeholders
Reference to impact pathway	Field of action	Energy
	Systemic lever	Technology/infrastructure
	Outcome (according to module B-1.1)	*Early outcomes* Municipal housing company LKF installs 500 kWp solar panels/ year from 2024. *Late outcomes* Municipal housing company LKF will have installed 4000 kWp solar panels in 2027
Implementation	Responsible bodies/person for implementation	Municipal Office – Environmental Department, Planning Department

	Action scale & addressed entities	City-wide
	Involved stakeholders	House owners, wind power owners, municipal energy company Kraftringen, energy consultants
	Comments on implementation – consider mentioning resources, timelines, milestones	Partly under implementation Timeline: 2024–2030
Impact & cost	Generated renewable energy (if applicable)	Adding of 86 GWh solar and wind power until 2030
	Removed/substituted energy, volume, or fuel type	TBD
	GHG emissions reduction estimate (total) per emission source sector	TBD
	GHG emissions compensated (natural or technological sinks)	N/A
	Total costs and costs by CO2e unit	TBD

B-2.2: Individual action outlines		
Action outline	Action name	**28. Increase capacity in electricity distribution system**
	Action type	Technical development, Planning
	Action description	1) Participation in consultations via Energy Commission Skåne regarding network development plans 2) Close dialogue with municipal energy company Kraftringen to ensure that the city's development plans are taken into account when planning local and regional networks. 3) Development of a network development plan in collaboration with Kraftringen 4) Further cooperation with energy companies in enabling the development of regional electricity production and distribution, e.g. by facilitating power grid within the municipal territory 5) Development of a local distributed and digitally steered "internetified" electricity grid within CoAction Lund to enable a large increased production of solar power and increased local electricity storage.
Reference to impact pathway	Field of action	Energy
	Systemic lever	Technology/infrastructure
	Outcome (according to module B-1.1)	*Early outcomes* Finalisation of network development plan (3), Demonstrate how the internetified grid will work, including business models and financing from infrastructure funds (5) *Late outcomes* Implementation of a distributed and “internetified” electricity grid at district level.
Implementation	Responsible bodies/person for implementation	Municipal Office – Environmental Department, Technical Department,
	Action scale & addressed entities	City-wide
	Involved stakeholders	CoAction Lund partners, Municipal companies

	Comments on implementation – consider mentioning resources, timelines, milestones	Partly under implementation Timeline: 2024–2030
Impact & cost	Generated renewable energy (if applicable)	N/A
	Removed/substituted energy, volume, or fuel type	N/A
	GHG emissions reduction estimate (total) per emission source sector	TBD
	GHG emissions compensated (natural or technological sinks)	N/A
	Total costs and costs by CO2e unit	TBD

B-2.2: Individual action outlines		
Action outline	Action name	**29. Develop flexible energy systems with increased energy storage capacity**
	Action type	Technical development, Planning
	Action description	1) Continue participation in existing electricity pricing models/markets and collaborate to promote the incorporation of smaller energy sources such as heat pumps. 2) Within the E-flex project part 2 (a part of CoAction Lund), develop a new digital platform for trade and control of district heating, district cooling and power to stabilise and increase flexibility in the energy system. 3) Collaborate with Kraftringen, housing companies, property owners and other stakeholders in planning for and promoting increased energy storage and flexibility through batteries and car batteries. 4) Collaborate with Kraftringen to enable local and sustainable hydrogen production and storage within the municipality.
Reference to impact pathway	Field of action	Energy
	Systemic lever	Technology/infrastructure
	Outcome (according to module B-1.1)	*Early outcomes* Property owners are starting to invest in batteries. *Late outcomes* Completion of 2-3 pilot hydrogen production and storage facilites (100 kW-1 MW) for backup power. Car batteries can be used to stabalise the energy grid
Implementation	Responsible bodies/person for implementation	City of Lund Municipal Office – Environmental Department
	Action scale & addressed entities	City-wide
	Involved stakeholders	Municipal company Kraftringen, CoAction Lund partners, property owners
	Comments on implementation – consider mentioning resources, timelines, milestones	Partly under implementation Timeline: 2024–2030
Impact & cost	Generated renewable energy (if applicable)	N/A
	Removed/substituted energy, volume, or fuel type	N/A

	GHG emissions reduction estimate (total) per emission source sector	TBD
	GHG emissions compensated (natural or technological sinks)	N/A
	Total costs and costs by CO2e unit	TBD

B-2.2: Individual action outlines		
Action outline	Action name	**30. Expand reach of district heating and district cooling**
	Action type	Technical development
	Action description	1) Expand reach of district heating into areas served by gas network 2) Expand the reach of cool district heating network in Brunnshög, and introduce cooler temperatures in the regular district heating grid 3) Expand district cooling network
Reference to impact pathway	Field of action	Energy
	Systemic lever	Technology/infrastructure
	Outcome (according to module B-1.1)	*Early outcomes* #1 Connection of 100 new customers per year 2025 and 2026 *Late outcomes* *#1* Connection of 100 new customers per year 2027 and 2028 #2 Completion of around 60-80 km DH grid until 2030
Implementation	Responsible bodies/person for implementation	Municipal company Kraftringen
	Action scale & addressed entities	City-wide
	Involved stakeholders	Research facilities MAX IV and ESS
	Comments on implementation – consider mentioning resources, timelines, milestones	Partly under implementation Timeline: 2024–2030
Impact & cost	Generated renewable energy (if applicable)	N/A
	Removed/substituted energy, volume, or fuel type	TBD
	GHG emissions reduction estimate (total) per emission source sector	TBD
	GHG emissions compensated (natural or technological sinks)	N/A
	Total costs and costs by CO2e unit	CAPEX to 2028: 356 MEUR

B-2.2: Individual action outlines		
Action outline	Action name	**31. Enhance CHP (Combined Heat and Power) capacity**
	Action type	Technical development
	Action description	Kraftringen is building a new CHP plant in Örtofta (outside municipal territory) that will be in full

		operation before 2030. The plant (75 MW district heating, 25 MW electricity) is replacing district heating from older and less efficient plants that are to be de-commissioned and adds an extra 25 MW in electricity. A consultancy report estimated the net climate impact considering the construction of the plant and the emissions avoided from alternative production plants if a new CHP is not built
Reference to impact pathway	Field of action	Energy
	Systemic lever	Technology/infrastructure
	Outcome (according to module B-1.1)	*Early outcomes* #1 Building of the plant starts *Late outcomes* #1 The plant is finalised and put into operation.
Implementation	Responsible bodies/person for implementation	Municipal company Kraftringen
	Action scale & addressed entities	City-wide
	Involved stakeholders	Öresundskraft, Landskrona Energi, Nordic Sugar, municipality of Lund, Eslöv, Lomma and Höör
	Comments on implementation – consider mentioning resources, timelines, milestones	Partly under implementation Timeline: 2024–2030 -Final investment decision in Q2 2025 -Taking over Q2 2028
Impact & cost	Generated renewable energy (if applicable)	25 MW electricity
	Removed/substituted energy, volume, or fuel type	Mainly natural gas (process industry) and electricity (domestic heat pumps)
	GHG emissions reduction estimate (total) per emission source sector	15,000 tons CO2e/year
	GHG emissions compensated (natural or technological sinks)	N/A
	Total costs and costs by CO2e unit	213,5 MEUR

B-2.2: Individual action outlines		
Action outline	Action name	**32. Increase biogas production**
	Action type	Technical development
	Action description	Kraftringen and the city participate as a third party in the development of biogas plant by identifying suitable locations and bringing together stakeholders with landowners. The expected production from the biogas plant is 120 GWh per year from mixed substrate, mainly manure.
Reference to impact pathway	Field of action	Energy
	Systemic lever	Technology/infrastructure
	Outcome (according to module B-1.1)	*Early outcomes:* #1 Securing of private financing of plant *Late outcomes:* #1 The plant is finalised and put into operation.

Implementation	Responsible bodies/person for implementation	City of Lund and Municipal company Kraftringen
	Action scale & addressed entities	City-wide
	Involved stakeholders	Biogas entrepreneurs, landowners
	Comments on implementation – consider mentioning resources, timelines, milestones	Partly under implementation Timeline: 2024–2030
Impact & cost	Generated renewable energy (if applicable)	120 GWh/year
	Removed/substituted energy, volume, or fuel type	TBD
	GHG emissions reduction estimate (total) per emission source sector	TBD
	GHG emissions compensated (natural or technological sinks)	N/A
	Total costs and costs by CO2e unit	Investment cost 62,3-71,2 MEUR

B-2.2: Individual action outlines		
Action outline	Action name	**33. Establish biochar production and increase biochar use**
	Action type	Technological
	Action description	1) Increase biochar production, using residues from parks and green areas 2) Increase use of biochar on municipally owned agricultural land, parks and other areas 3) Encourage biochar use among farmers by communicating benefit of use for soil health
Reference to impact pathway	Field of action	Carbon sinks
	Systemic lever	Technology/infrastructure
	Outcome (according to module B-1.1)	*Early outcomes* *1)* New municipal biochar facility finalised, using residues from parks and green areas (capacity of 2000 tonnes CO2e/year) *Late outcomes* TBD New business models make farmers to accept biochar on their fields and new private production sites for 10 000 ton CO2e/y are established
Implementation	Responsible bodies/person for implementation	City of Lund Municipal Office – Environmental Department, Technical Department
	Action scale & addressed entities	City-wide
	Involved stakeholders	Biochar entrepreneurs, farmers
	Comments on implementation – consider mentioning resources, timelines, milestones	Pre-implementation Timeline: 2024–2030
Impact & cost	Generated renewable energy (if applicable)	N/A
	Removed/substituted energy, volume, or fuel type	N/A
	GHG emissions reduction estimate (total) per emission source sector	N/A

	GHG emissions compensated (natural or technological sinks)	2000 tons CO2e/year for the early outcome. , Theoretical maximum when using residual products: 63 000 tons/year. 10 000 ton CO2e/y late outcome
	Total costs and costs by CO2e unit	1,6 MEUR for the early outcome. TBD for late outcome

B-2.2: Individual action outlines		
Action outline	Action name	**34. Rewetting and construction of new wetlands**
	Action type	Technical development
	Action description	In Lund there are currently around 150 hectares of constructed and re-established wetlands, the result of a long work by the city in collaboration with Water councils (organisations consisting of municipalities and other stakeholders in connection to rivers and an interest in their preservation). Until 2030, another (TBD) hectares of wetland will be constructed.
Reference to impact pathway	Field of action	Carbon sinks
	Systemic lever	Technology/infrastructure
	Outcome (according to module B-1.1)	*Early outcomes:* *TBD* *Late outcomes:* *TBD*
Implementation	Responsible bodies/person for implementation	City of Lund Municipal Office – Environmental Department, Technical Department
	Action scale & addressed entities	City-wide
	Involved stakeholders	Water councils, farmers and other land owners
	Comments on implementation – consider mentioning resources, timelines, milestones	Partly implemented Timeline: 2024–2030
Impact & cost	Generated renewable energy (if applicable)	N/A
	Removed/substituted energy, volume, or fuel type	N/A
	GHG emissions reduction estimate (total) per emission source sector	N/A
	GHG emissions compensated (natural or technological sinks)	2000 tonnes CO2e/year
	Total costs and costs by CO2e unit	TBD

B-2.2: Individual action outlines		
Action outline	Action name	**35. Integrate carbon capture potential in city planning**
	Action type	Technical development
	Action description	1) Continue and increase efforts to make trees and green areas a key priority in City Planning 2) Continue development of work processes to safeguard and preserve trees in groundwork projects 3) Communicate with homeowners and private landlords about the necessity of trees

Reference to impact pathway	Field of action	Carbon sinks
	Systemic lever	Technology/infrastructure, Governance and Policy, Awareness Raising
	Outcome (according to module B-1.1)	*Early outcomes:* Tree strategist at Technical Department produces an action plan to enable implementation of the focus areas identified in Tree strategy *Late outcomes:* *TBD*
Implementation	Responsible bodies/person for implementation	City of Lund Municipal Office – Environmental Department, Technical Department, Planning Deparment Timeline: 2024–2030
	Action scale & addressed entities	City-wide
	Involved stakeholders	Citizens, landowners
	Comments on implementation – consider mentioning resources, timelines, milestones	Partly under implementation
Impact & cost	Generated renewable energy (if applicable)	N/A
	Removed/substituted energy, volume, or fuel type	N/A
	GHG emissions reduction estimate (total) per emission source sector	N/A
	GHG emissions compensated (natural or technological sinks)	TBD
	Total costs and costs by CO2e unit	TBD

B-2.2: Individual action outlines		
Action outline	Action name	**36. Transition Team management**
	Action type	Management
	Action description	Overall management and co-ordination of transition process, partnership development, political interaction, community engagement, climate impact calculation, review and updating of CAP & CIP and reporting.
Reference to impact pathway	Field of action	Cross-cutting action
	Systemic lever	Governance and Policy
	Outcome (according to module B-1.1)	*Early outcomes:* TBD *Late outcomes:* TBD
Implementation	Responsible bodies/person for implementation	City of Lund Municipal Office
	Action scale & addressed entities	City-wide
	Involved stakeholders	Internal stakeholders and external key stakeholders
	Comments on implementation – consider mentioning resources, timelines, milestones	Resources: 6 FTE Timeline: 2024–2030
Impact & cost	Generated renewable energy (if applicable)	N/A
	Removed/substituted energy, volume, or fuel type	N/A

	GHG emissions reduction estimate (total) per emission source sector	N/A
	GHG emissions compensated (natural or technological sinks)	N/A
	Total costs and costs by CO2e unit	640 570 EUR

B-2.2: Individual action outlines		
Action outline	Action name	**37. Lobbying and advocacy**
	Action type	Management
	Action description	Advocacy work aimed at national decision makers or branch organizations or other bodies of critical influence to address issues beyond the mandate of the City.
Reference to impact pathway	Field of action	Cross-cutting action
	Systemic lever	Governance and Policy¸ Awareness Raising
	Outcome (according to module B-1.1)	*Early outcomes:* Increased awareness of the municipalities' ambitions In the climate transition, joint plan for advocacy work among Mission Cities In Sweden Established international contacts and exchanges with a selection of 100 cities *Late outcomes:* Changed national policy with more ambitious climate goals, clearer policy instruments that align with the European climate goals and increased resources for climate action and climate adaptation
Implementation	Responsible bodies/person for implementation	City of Lund Municipal Office
	Action scale & addressed entities	City-wide
	Involved stakeholders	Other municipalities, national authorities, national government, lobbyist organisations
	Comments on implementation – consider mentioning resources, timelines, milestones	Timeline: 2024–2030
Impact & cost	Generated renewable energy (if applicable)	N/A
	Removed/substituted energy, volume, or fuel type	N/A
	GHG emissions reduction estimate (total) per emission source sector	N/A
	GHG emissions compensated (natural or technological sinks)	N/A
	Total costs and costs by CO2e unit	TBD

B-2.3: Summary strategy for residual emissions
Origin of residual emissions Emissions from the transport and mobility sector will be reduced greatly, but will not be eliminated, until 2030. Emissions stem from remaining fossil fuel vehicles and machinery.

Note to reader: We have yet to calculate emission reductions from actions, so the origin of residual emissions is not clear. However, residual emissions are expected from both agriculture and transport/mobility.

Strategy for residual emissions
Lund has yet to develop a comprehensive strategy for residual emissions and carbon sinks. In choosing carbon sinks for this CCC process, the priority has been natural carbon sinks with a long and secure storage time, i.e. permanence. Therefore, residual emissions will be compensated for with mainly biochar, and by wetlands and trees. Of these, biochar is the most permanent solution while the permanence of trees is more uncertain. For trees, it will be important to consider and explore several aspects in future work to ensure their integrity as carbon sinks: e.g., what percentage of planted trees should be expected to reach old age (100 yrs), and how trees should be monitored to ensure long term carbon capture. Only once potential for long-term reliable nature-based solutions are maximised will engineered solutions be considered.

There are five main criteria to consider when ensuring quality and feasibility of carbon sinks:

1. **Additionality**: Ensuring that measures undertaken are additional to existing carbon storage, i.e. existing forest areas should not be included.
2. **Permanence:** Long permanence is important to avoid greenwashing. Monitoring and follow-ups are necessary for solutions were the permanence is uncertain.
3. **Quantifiability**: The city's ambition is to use quantifiable and verified methods.
4. **Monitoring and Follow-up:** Important for credibility and transparency. Direct measurements can be costly, but indirect measurements can serve the same purpose.
5. **Leakage**: The project should be designed to minimise the risk of leakage and ensure that all clear leakage risks have been addressed.

3.3 Module B-3 Indicators for Monitoring, Evaluation and Learning

Module B-3 "Indicators for Monitoring, Evaluation and Learning" contains a selection of indicators to monitor and evaluate progress along the selected impacts pathways and fields of action described in Module B-1. as well as a monitoring and evaluation plan, i.e., metadata on each indicator selected, in addition to milestones and timeline. More specifically:

- An overview table listing the indicators selected per outcome and impact including targets and evaluation points (B-3.1);
- A metadata table for each indicator selected (B-3.2).

B-3.1: Impact Pathways							
Outcomes/ impacts addressed	Action/ project	**Indicator No.** (unique identified)	Indicator name		Target values		
					2025	2027	2030
(List early changes/ late outcomes and impacts to be	(List action/ pilot project if applicable)	(Indicate unique identifier)	(Insert indicator name)		(List one value per indicator)	(List one value per indicator)	(List one value per indicator)

evaluated by indicator)							
Transport & mobility							
See Table B-1.1. and B-1.2 for early and late changes	Strengthen organisational capacity for large scale mobility shift	1	GHG emissions from transportation/t CO2		reduce emissions to 57 000 t	reduce emission to 46 000 t	reduce emissions to 14 000 t
See Table B-1.1. and B-1.2 for early and late changes	Decrease car travel by shift to public transport and active mobility through mobility management	2	Travel distance by car		TBD	TBD	TBD
See Table B-1.1. and B-1.2 for early and late changes	Decrease car travel by shift to public transport and active mobility through infrastructure investments		Travel distance by car		TBD	TBD	TBD
See Table B-1.1. and B-1.2 for early and late changes	Promote shared mobility to enable transition to sustainable transport modes and electric vehicles	3	Travel distance by public transport		TBD	TBD	TBD
See Table B-1.1. and B-1.2 for early and late changes	Support transition of private vehicles from fossil fuels to electric and renewable fuels	4	Share of ev vehicles among private cars		16 % ev vehicles among private cars (TBC)	32% ev vehicles among private cars (TBC)	50 % ev vehicles among private cars (TBC)
See Table B-1.1. and B-1.2 for early and late changes	Decrease and decarbonise freight transport	5	GHG emissions from freight/		reduce emissions to 15 000 t (TBC)	reduce emissions to 12 000 t (TBC)	reduce emissions to 3700 t (TBC)
See Table B-1.1. and B-1.2 for early and late changes	Accelerate decarbonisation of work machines	6	GHG emissions from work machines/		reduce emissions to 8 000 t (TBC)	reduce emissions to 6 000 t (TBC)	reduce emissions to 2 000 t (TBC)
Agriculture							
See Table B-1.1. and B-1.2 for early and late changes	Promote changes in agricultural practices to reduce emissions and support farmers	7	GHG emission from AFOLU		TBD	TBD	TBD

	in their sustainability transition	8	Carbon Capturing crops		TBD	TBD	TBD
See Table B-1.1. and B-1.2 for early and late changes	Review public procurement practices to promote local and sustainable producers	9	Consumption based GHG-emission from food served by the municipality		TBD	TBD	TBC
Circular economy and sustainable consumption							
See Table B-1.1. and B-1.2 for early and late changes	Promote sustainable consumption and increase recycling	10	Consumption-based GHG emissions per person per year (t CO2 equivalent)		TBD	TBD	TBC
		11	Household waste		TBD	TBD	TBC
See Table B-1.1. and B-1.2 for early and late changes	Decrease plastics use and increase source separation	12	Plastic household waste		TBD	TBD	TBC
Energy							
See Table B-1.1. and B-1.2 for early and late changes	27. Increase solar and wind power production 28. Increase capacity in electricity distribution system 29. Develop flexible energy systems with increased energy storage capacity 30. Expand the reach of district heating and district cooling	13	GHG emission from stationary energy (t CO2 equivalent)		TBD	TBD	TBC
See Table B-1.1. and B-1.2 for early and late changes		14	Primary energy use in municipal buildings		TBD	TBD	TBC
See Table B-1.1. and B-1.2 for early and late changes		15	GHG emission from grid supplied energy (t CO2 equivalent)		TBD	TBD	TBC

	31. Enhance CHP (Combined Heat and Power) capacity 32. Increase biogas production						
Carbon sinks							
See Table B-1.1. and B-1.2 for early and late changes	33. Establish biochar production and increase biochar use	16	Amount of permanent sequestration of GHG within city boundary (t CO2 equivalent)		TBD	TBD	TBC
See Table B-1.1. and B-1.2 for early and late changes	34. Rewet and construct new wetlands	17	Negative emissions through natural sinks		TBD	TBD	TBC
Others							
	TBD	18	GHG emission from IPPU (t CO2 equivalent)		TBD	TBD	TBC

B-3.2: Indicator Metadata	
Indicator Name	**Greenhouse gas emissions from transportation**
Indicator Unit	Tonne CO2e
Definition	Emissions from all modes of transport on land
Calculation	SMED modelling
Indicator Context	
Does the indicator measure direct impacts (reduction in greenhouse gas emissions?)	Yes
If yes, which emission source sectors does it measure?	Transport sector
Does the indicator measure indirect impacts (i.e., co- benefits)?	No
If yes, which co-benefit does it measure?	
Is the indicator useful for monitoring the output/impact of action(s)?	Yes
If yes, which action and impact pathway is it relevant for?	Impact Pathways according to Module B-1: Transport & mobility
Is the indicator captured by the existing CDP/ SCIS/ Covenant of Mayors platforms?	Yes
Data requirements	
Expected data source	SMHI-SMED
Is the data source local or regional/national?	National
Expected availability	Annaully, lagging min 2 years
Suggested collection interval	Annaully
References	
Deliverables describing the indicator	
Other indicator systems using this indicator	

B-3.2: Indicator Metadata	
Indicator Name	**Travel distance by car**
Indicator Unit	Vehicle km with cars
Definition	Approximation of vehicle km within municipal boarders
Calculation	GPC bases on Google environmental explorer
Indicator Context	
Does the indicator measure direct impacts (reduction in greenhouse gas emissions?)	no
If yes, which emission source sectors does it measure?	
Does the indicator measure indirect impacts (i.e., co- benefits)?	yes
If yes, which co-benefit does it measure?	Congestion
Is the indicator useful for monitoring the output/impact of action(s)?	yes
If yes, which action and impact pathway is it relevant for?	Impact Pathways according to Module B-1: Transport & mobility
Is the indicator captured by the existing CDP/ SCIS/ Covenant of Mayors platforms?	no
Data requirements	
Expected data source	Google environmental explorer
Is the data source local or regional/national?	International
Expected availability	Continuosly
Suggested collection interval	Annually
References	
Deliverables describing the indicator	
Other indicator systems using this indicator	

B-3.2: Indicator Metadata	
Indicator Name	**Travel distance by public transport**
Indicator Unit	Passenger km by public transport
Definition	Approximation of passenger km within municipal boarders
Calculation	GPC bases on Google environmental explorer
Indicator Context	
Does the indicator measure direct impacts (reduction in greenhouse gas emissions?)	no
If yes, which emission source sectors does it measure?	
Does the indicator measure indirect impacts (i.e., co- benefits)?	no
If yes, which co-benefit does it measure?	
Is the indicator useful for monitoring the output/impact of action(s)?	yes
If yes, which action and impact pathway is it relevant for?	Impact Pathways according to Module B-1: Transport & mobility
Is the indicator captured by the existing CDP/ SCIS/ Covenant of Mayors platforms?	no
Data requirements	
Expected data source	Google environmental explorer
Is the data source local or regional/national?	International
Expected availability	Continuosly
Suggested collection interval	Annually
References	
Deliverables describing the indicator	

Other indicator systems using this indicator	

B-3.2: Indicator Metadata	
Indicator Name	**Share of ev vehicles among private cars**
Indicator Unit	% of ev vehicles among private cars
Definition	Share of cars owned by citizens of Lund municipality and local companies
Calculation	Number of cars registered in Lund minus cars owned by ALD automotive
Indicator Context	
Does the indicator measure direct impacts (reduction in greenhouse gas emissions?)	no
If yes, which emission source sectors does it measure?	
Does the indicator measure indirect impacts (i.e., co- benefits)?	no
If yes, which co-benefit does it measure?	
Is the indicator useful for monitoring the output/impact of action(s)?	yes
If yes, which action and impact pathway is it relevant for?	Impact Pathways according to Module B-1: Transport & mobility
Is the indicator captured by the existing CDP/ SCIS/ Covenant of Mayors platforms?	no
Data requirements	
Expected data source	Trafikanalys
Is the data source local or regional/national?	National
Expected availability	Continuosly
Suggested collection interval	Annually
References	
Deliverables describing the indicator	
Other indicator systems using this indicator	

B-3.2: Indicator Metadata	
Indicator Name	**Greenhouse gas emissions from freight**
Indicator Unit	Tonne CO2e
Definition	Emission from freight within municipal boarders
Calculation	SMED modelling
Indicator Context	
Does the indicator measure direct impacts (reduction in greenhouse gas emissions?)	yes
If yes, which emission source sectors does it measure?	Transport sector
Does the indicator measure indirect impacts (i.e., co- benefits)?	no
If yes, which co-benefit does it measure?	
Is the indicator useful for monitoring the output/impact of action(s)?	yes
If yes, which action and impact pathway is it relevant for?	Impact Pathways according to Module B-1:- Transport & mobility
Is the indicator captured by the existing CDP/ SCIS/ Covenant of Mayors platforms?	no
Data requirements	
Expected data source	SMHI SMED
Is the data source local or regional/national?	National
Expected availability	Annaully, lagging min 2 years
Suggested collection interval	Annually
References	
Deliverables describing the indicator	
Other indicator systems using this indicator	

B-3.2: Indicator Metadata	
Indicator Name	**Greenhouse gas emissions from work machines**
Indicator Unit	Tonne CO2e
Definition	Emission from work machines within municipal boarders
Calculation	SMED modelling
Indicator Context	
Does the indicator measure direct impacts (reduction in greenhouse gas emissions?)	yes
If yes, which emission source sectors does it measure?	Transport sector
Does the indicator measure indirect impacts (i.e., co- benefits)?	no
If yes, which co-benefit does it measure?	
Is the indicator useful for monitoring the output/impact of action(s)?	yes
If yes, which action and impact pathway is it relevant for?	Impact Pathways according to Module B-1: Transport & mobility
Is the indicator captured by the existing CDP/ SCIS/ Covenant of Mayors platforms?	no
Data requirements	
Expected data source	SMHI SMED
Is the data source local or regional/national?	National
Expected availability	Annually, lagging min 2 years
Suggested collection interval	Annually
References	
Deliverables describing the indicator	
Other indicator systems using this indicator	

Agriculture

B-3.2: Indicator Metadata	
Indicator Name	**GHG emission from AFOLU**
Indicator Unit	Tonne CO2e
Definition	Emission of laughing gas and methane from agriculture within municipal boarders
Calculation	SMED modelling
Indicator Context	
Does the indicator measure direct impacts (reduction in greenhouse gas emissions?)	yes
If yes, which emission source sectors does it measure?	agriculture
Does the indicator measure indirect impacts (i.e., co- benefits)?	no
If yes, which co-benefit does it measure?	
Is the indicator useful for monitoring the output/impact of action(s)?	yes
If yes, which action and impact pathway is it relevant for?	Impact Pathways according to Module B-1: Agriculture and sustainable land use
Is the indicator captured by the existing CDP/ SCIS/ Covenant of Mayors platforms?	yes
Data requirements	
Expected data source	SMED SMHI

Is the data source local or regional/national?	National
Expected availability	Annually, lagging approx. 2 years
Suggested collection interval	Annually
References	
Deliverables describing the indicator	
Other indicator systems using this indicator	

B-3.2: Indicator Metadata	
Indicator Name	**Carbon Capturing crops**
Indicator Unit	Carbon Capturing crops in Hectars
Definition	The number of Hectars using Carbon Capturing Crops
Calculation	Summirize data from Departement of Agriculture
Indicator Context	
Does the indicator measure direct impacts (reduction in greenhouse gas emissions?)	no
If yes, which emission source sectors does it measure?	
Does the indicator measure indirect impacts (i.e., co- benefits)?	yes
If yes, which co-benefit does it measure?	Soil fertility, increased biodiversity
Is the indicator useful for monitoring the output/impact of action(s)?	yes
If yes, which action and impact pathway is it relevant for?	Impact Pathways according to Module B-1: Agriculture and sustainable land use
Is the indicator captured by the existing CDP/ SCIS/ Covenant of Mayors platforms?	No
Data requirements	
Expected data source	Departement of Agriculture
Is the data source local or regional/national?	National
Expected availability	Annually
Suggested collection interval	Annually
References	
Deliverables describing the indicator	
Other indicator systems using this indicator	

B-3.2: Indicator Metadata	
Indicator Name	**Consumtion based GHG-emission from food served by the municipality**
Indicator Unit	Kilo CO2e/kilo food
Definition	Kilo of GHG emissions per kilo served food
Calculation	Municipal calculation
Indicator Context	
Does the indicator measure direct impacts (reduction in greenhouse gas emissions?)	yes
If yes, which emission source sectors does it measure?	Agriculture (consumption)
Does the indicator measure indirect impacts (i.e., co- benefits)?	no

If yes, which co-benefit does it measure?	
Is the indicator useful for monitoring the output/impact of action(s)?	yes
If yes, which action and impact pathway is it relevant for?	Impact Pathways according to Module B-1: Agriculture and sustainable land use
Is the indicator captured by the existing CDP/ SCIS/ Covenant of Mayors platforms?	no
Data requirements	
Expected data source	Municipal monitoring
Is the data source local or regional/national?	Local
Expected availability	Annually
Suggested collection interval	Annually
References	
Deliverables describing the indicator	
Other indicator systems using this indicator	

Circular economy and sustainable consumption

B-3.2: Indicator Metadata	
Indicator Name	**Household waste**
Indicator Unit	Kilo waste/inhabitant
Definition	Waste collected by Lunds Renhållningsverk
Calculation	Municipal calculation
Indicator Context	
Does the indicator measure direct impacts (reduction in greenhouse gas emissions?)	no
If yes, which emission source sectors does it measure?	
Does the indicator measure indirect impacts (i.e., co- benefits)?	yes
If yes, which co-benefit does it measure?	Resource efficancy
Is the indicator useful for monitoring the output/impact of action(s)?	yes
If yes, which action and impact pathway is it relevant for?	Impact Pathways according to Module B-1: Circular economy and sustainable consumption
Is the indicator captured by the existing CDP/ SCIS/ Covenant of Mayors platforms?	no
Data requirements	
Expected data source	Municipal monitoring
Is the data source local or regional/national?	Local
Expected availability	Annually
Suggested collection interval	Annually
References	
Deliverables describing the indicator	
Other indicator systems using this indicator	

B-3.2: Indicator Metadata	
Indicator Name	**Plastic household waste**

Indicator Unit	Kilo plastic waste/inhabitant
Definition	Waste collected by Lunds Renhållningsverk
Calculation	Municipal calculation
Indicator Context	
Does the indicator measure direct impacts (reduction in greenhouse gas emissions?)	no
If yes, which emission source sectors does it measure?	
Does the indicator measure indirect impacts (i.e., co- benefits)?	yes
If yes, which co-benefit does it measure?	Resource efficiency
Is the indicator useful for monitoring the output/impact of action(s)?	yes
If yes, which action and impact pathway is it relevant for?	Impact Pathways according to Module B-1: Circular economy and sustainable consumption
Is the indicator captured by the existing CDP/ SCIS/ Covenant of Mayors platforms?	no
Data requirements	
Expected data source	Municipal monitoring
Is the data source local or regional/national?	Local
Expected availability	Annually
Suggested collection interval	Annually
References	
Deliverables describing the indicator	
Other indicator systems using this indicator	

Note to reader: **GHG emission from waste** is not applicable for Lund.

Energy

B-3.2: Indicator Metadata	
Indicator Name	**GHG emission from grid supplied energy (t CO2 equivalent)**
Indicator Unit	KwH/square meters
Definition	A-temp normal year corrected
Calculation	Municipal calculation
Indicator Context	
Does the indicator measure direct impacts (reduction in greenhouse gas emissions?)	no
If yes, which emission source sectors does it measure?	
Does the indicator measure indirect impacts (i.e., co- benefits)?	yes
If yes, which co-benefit does it measure?	Energy efficancy
Is the indicator useful for monitoring the output/impact of action(s)?	yes
If yes, which action and impact pathway is it relevant for?	Impact Pathways according to Module B-1: Energy

Is the indicator captured by the existing CDP/ SCIS/ Covenant of Mayors platforms?	no
Data requirements	
Expected data source	Municipal monitoring
Is the data source local or regional/national?	Local
Expected availability	Annually
Suggested collection interval	Annually
References	
Deliverables describing the indicator	
Other indicator systems using this indicator	

B-3.2: Indicator Metadata	
Indicator Name	**Primary energy use in municipal buildings**
Indicator Unit	KwH/square meters
Definition	A-temp normal year corrected
Calculation	Municipal calculation
Indicator Context	
Does the indicator measure direct impacts (reduction in greenhouse gas emissions?)	no
If yes, which emission source sectors does it measure?	
Does the indicator measure indirect impacts (i.e., co- benefits)?	yes
If yes, which co-benefit does it measure?	Energy efficancy
Is the indicator useful for monitoring the output/impact of action(s)?	yes
If yes, which action and impact pathway is it relevant for?	Impact Pathways according to Module B-1: Energy
Is the indicator captured by the existing CDP/ SCIS/ Covenant of Mayors platforms?	no
Data requirements	
Expected data source	Municipal monitoring
Is the data source local or regional/national?	Local
Expected availability	Annually
Suggested collection interval	Annually
References	
Deliverables describing the indicator	
Other indicator systems using this indicator	

Carbon sinks

B-3.2: Indicator Metadata	
Indicator Name	**Amount of permanent sequestration of GHG within city boundary**
Indicator Unit	t CO2 equivalent
Definition	This indicator supports the reporting of carbon sequestration through “Technological sinks”, such as Biomass for Energy with Carbon Capture and Storage

	(BECCS) and Direct Air Carbon Capture and Storage (DACCS) technologies. This indicator can only be reported for Carbon Capture Project (CCP) applications which result in permanent sequestration of the CO2 (i.e., injected into geological structures)
Calculation	Direct reporting from Carbon Credit Projects (CCP) based on C40 guidance: C40 and NYC Mayor's Office of Sustainability, Defining Carbon Neutrality for Cities and Managing Residual Emissions. Cities' perspective, C40, 2019. Available here.
Indicator Context	
Does the indicator measure direct impacts (reduction in greenhouse gas emissions?)	Work in progress
If yes, which emission source sectors does it measure?	
Does the indicator measure indirect impacts (i.e., co- benefits)?	Work in progress
If yes, which co-benefit does it measure?	Work in progress
Is the indicator useful for monitoring the output/impact of action(s)?	Work in progress
If yes, which action and impact pathway is it relevant for?	Impact Pathways according to Module B-1: Carbon sinks
Is the indicator captured by the existing CDP/ SCIS/ Covenant of Mayors platforms?	Work in progress
Data requirements	
Expected data source	Work in progress
Is the data source local or regional/national?	Work in progress
Expected availability	Work in progress
Suggested collection interval	Work in progress
References	
Deliverables describing the indicator	

B-3.2: Indicator Metadata	
Indicator Name	**Negative emissions through natural sinks**
Indicator Unit	t CO2 equivalent
Definition	
Calculation	
Indicator Context	
Does the indicator measure direct impacts (reduction in greenhouse gas emissions?)	Work in progress
If yes, which emission source sectors does it measure?	
Does the indicator measure indirect impacts (i.e., co- benefits)?	Work in progress
If yes, which co-benefit does it measure?	Work in progress
Is the indicator useful for monitoring the output/impact of action(s)?	Work in progress
If yes, which action and impact pathway is it relevant for?	Impact Pathways according to Module B-1: Carbon sinks
Is the indicator captured by the existing CDP/ SCIS/ Covenant of Mayors platforms?	Work in progress
Data requirements	
Expected data source	Work in progress

Is the data source local or regional/national?	Work in progress
Expected availability	Work in progress
Suggested collection interval	Work in progress
References	
Deliverables describing the indicator	

Other

B-3.2: Indicator Metadata	
Indicator Name	**GHG emission from IPPU**
Indicator Unit	CO2 equivalent
Definition	Greenhouse gas emissions from industrial processes and product use within city boundary.
Calculation	GHG emission calculation methodology for the IPPU sector is described in detail in the 2014 IPCC Mitigation of Climate Change, chapter 10, page 746. City-level calculation and scoping methodology described in GPC, pages 109 onward.
Indicator Context	
Does the indicator measure direct impacts (reduction in greenhouse gas emissions?)	Work in progress
If yes, which emission source sectors does it measure?	
Does the indicator measure indirect impacts (i.e., co- benefits)?	Work in progress
If yes, which co-benefit does it measure?	Work in progress
Is the indicator useful for monitoring the output/impact of action(s)?	Work in progress
If yes, which action and impact pathway is it relevant for?	Impact Pathways according to Module B-1-TBD
Is the indicator captured by the existing CDP/ SCIS/ Covenant of Mayors platforms?	n Work in progress
Data requirements	
Expected data source	Work in progress
Is the data source local or regional/national?	Work in progress
Expected availability	Work in progress
Suggested collection interval	Work in progress
References	
Deliverables describing the indicator	

4 Part C – Enabling Climate Neutrality by 2030

Part C "Enabling Climate Neutrality by 2030" aims to outline any enabling interventions, i.e., regarding organizational setting or collaborative governance models or related to social innovations – designed to support the climate action portfolios (Module B-2) as well as aiming to achieve co-benefits outlined in the impact pathway (Module B-1). These interventions also address the identified opportunities, gaps and barriers identified Module A-2 and A-3.

4.1 Module C-1 Governance Innovation Interventions

This module details the city´s governance innovations for achieving city climate neutrality by 2030, describing innovations in institutional design, in leadership, and in collaborative and outreach processes, whether they are inter-organisational or internal to the key organisations responsible for the city´s climate neutrality target. It also describes expected outcomes, for example how these governance innovations enable climate actions and their co-benefits (outlined in Modules B-1 and B-2), and how they address the opportunities, gaps and barriers identified in Modules A-2 and A-3. This content aims to include:

- Descriptions or/and visualisations of a participatory / collaborative governance model to facilitate the city´s climate neutrality target, including institutional design (horizontal links among city institutions, vertical links to other levels of government, roles, responsibilities, ground rules, processes). Building on the systems and stakeholder mapping in module A-3, it highlights the relations and processes established or planned to facilitate joint climate action among stakeholders and systems at relevant levels (e.g., showcasing new organisations, partnerships, alliances, networks, or processes), as well as mechanisms of citizen involvement.
- Descriptions of how the governance innovations introduced or planned to reach climate neutrality address some (or all) systemic barriers and opportunities (Module A-3) and contribute to NZC impact pathways (Module B-1), e.g., through improving organisational settings and interorganisational models – horizontally within municipal administration and across local stakeholders in the city ecosystem, as well as vertically at regional and national levels.

C-1.1: Description or visualisation of the participatory governance model for climate neutrality

Organisation and governance of Lund's climate transition

Lund aims to be Sweden's leading municipality and an international role model in the transition to climate neutrality. The ambitious goals will be achieved through an effective climate policy and in collaboration with business, academia, public and non-profit sectors. By 2030, Lund will have expanded the circular economy, minimised the impact of substances that are hazardous to the environment and health, be climate-neutral and fossil fuel-free, have a rich biodiversity and well-functioning ecosystem services, and good ecological and chemical status for water. For Lund residents, it should be easy to do the right thing when it comes to taking responsibility for the climate and the environment.

To achieve the goal of becoming climate neutral by 2030, a concerted effort is required in which the entire municipality's organisation and the rest of society are engaged and contribute. There is a need for a continuous overview of what is being done to be able to make the right priorities in measures and projects. Coordination between the City administration and municipal companies is important, so that all resources in the municipal group are used efficiently and projects can be scaled up and spread.

There is a great need to dedicate resources to lead the transition work in the priority areas of climate work. Without dedicated resources, there is a lack of drive to maintain momentum in the organisation. Lund is therefore establishing a transition team and a city-wide transition arena to coordinate the city's climate actions and lead Lund towards the goal of becoming a climate-neutral city by 2030.

Transition arena and transition team

A permanent and interconnected transition arena is under development within Lund's project CoPilot and will be further developed through the work with Lund's transition team. The transition arena consists of both internal and external actors, “called transition agents”, who are implementing Lund's transition to a climate-neutral city by 2030. The transition arena is coordinated and facilitated by a transition team within the municipality organisation consisting of a number of key functions such as a transition manager for each prioritised area, a process and change manager, a coordinator for the mission, financial architect, climate justice and social justice specialists and more.

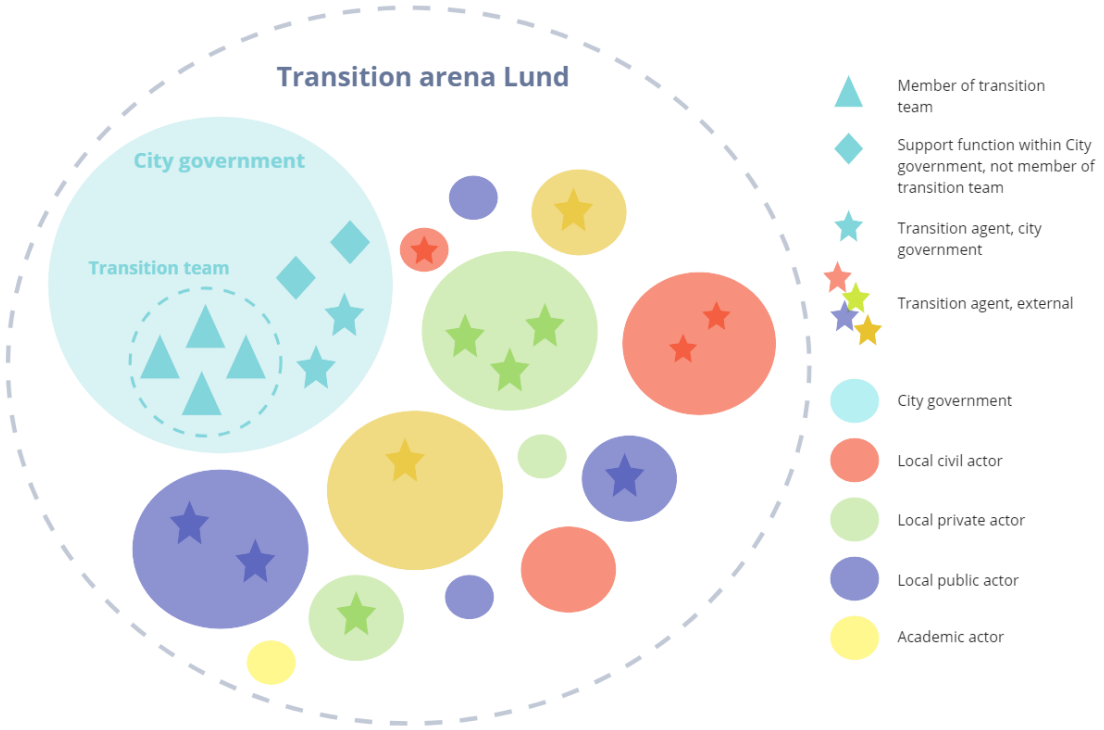


Figure 19: Illustration of transition arena Lund

Transition team

The overall management of the transition team consists of; a process and change manager and a coordinator.

The process and change manager run the transition team within the municipality and with external parties. The process manager coordinates work, supports transition managers, monitors the external development, applies for project funding and gears up existing efforts. Works with change management with a focus on creating commitment within and outside the municipality's organisation with the aim of engaging more residents and organisations in the city's work towards climate neutrality. 1 FTE (Full-time equivalent)

A coordinator works closely with the process and change manager with the overall coordination of the project portfolio for Climate-neutral Lund. The coordinator supports the process and change manager as well as the transition managers with follow-up of the transition plans and the updating of the city climate contract. 0,5-1 FTE

Project Portfolio owner is the head of the environmental strategy unit and chair of the steering group for the city's internal project portfolio. The PPO for short, is responsible for gathering resource owners within the city organization, strategic decision making, overall risk analysis and prioritization of resources. FTE 0,3-0,5 with the possibility to scale to FTE 1.

A financial architect is a new role that works with financing of the city's climate transition. Specific to the role is to look at forms of financing such as innovation funds, co-financing, crowd funding, venture capital and loans. The financial architect's goal is to engage private and public capital in investments that drive the climate transition. Most of the investments that is needed to reach the goal by 2030 lies in the private sector and because of this it's important for the city to fast-track those sectors investments in energy efficiency, green mobility and green energy. 1 FTE

Business developers support the transition team with contacts in various business and industry sectors, with the purpose of furthering project collaboration, advocacy work and with targeted communication measures. 0,5 FTE

Digitalisation strategist supports the transition team with expertise in digital tools and their possible uses. This can entail managing or participation in smart city projects. Overall the purpose of the support is to help the transition team with identifying possibilities, including advantages versus risks.

Strategic communicator supports the transition team with the design of communication measures to, among other things, involve different target groups in climate work, influence behavior and disseminate results. 1 FTE

Climate justice specialist supports transition managers and agents to integrate climate justice as part of the climate transition. Supports projects and activities with expertise and produces documentation for climate justice in the city's learning process. 1 FTE

Citizen engagement specialist who supports transition managers and agents to integrate citizen engagement as part of the climate transition. Supports projects and activities with expertise and produces documentation for social justice in the city's learning process. 1 FTE

External relations strategists support the transition team by providing decision-making data, monitoring of external funds, participation in collaboration arenas, outreach activities and advocacy work towards national and European decision-makers. 1 FTE

Transition managers are appointed to drive the transition process within a specific and prioritised area for climate-neutral Lund, both within the municipality and with external stakeholders. One transition manager will lead each transition area with a staff input of 0,5 to 1 FTE per priority area. Overall 4 FTE.

Transition agents

The transition agents are the ones who carry out the city's transition. These are employees and managers in the municipality as well as representatives from business, academia and the non-profit sector. They work in projects or within their organisation to implement the climate transition. They are engaged, supported and led by the transition team, to find solutions to our common challenges. They cooperate and share knowledge. The city can never have enough transition agents.

Supporting and coordinating resources

The supporting resources contribute to the transition team with their respective expertise. These resources are not a formal part of the transition team but are available and will be used regularly:

Project developer and external funding specialist supports the transition team with information about possible external funding for projects as well as with the coordination of applications for strategic projects.

Communication support is the production and distribution of communication material, online and physically. This support is also bought externally.

Public procurement expert supports the transition team with development of sustainable and innovative procurements. The expert is also a transition agent and works with development of public procurement methods within the city.

The project economist supports with follow-up and coordination of project finances, with the aim of having good regulatory compliance and to make efficient use of project funds.

The analyst supports with analyses of follow-up data from the projects to promote learning in the organisation.

Innovation leaders within the municipality support with process methods around, for example, service design, design sprints and workshops.

The above roles need to set aside about 20 to 40 percent of their regular position.

6 roadmaps to 2030

The city's transition process to reach climate-neutral city 2030 will be divided into 6 roadmaps based on this action plan and more. The roadmaps are created by the transition team with partners and relevant target groups such as business sectors, the civil society sector, public sector, academia and, most importantly, citizens. The process for the roadmaps has 7 steps -

a) an analysis of the current state

b) identification of actions, responsible actors and expected effect

c) summary of the actions, actors, effects in a communication friendly document,

d) implementation of roadmaps actions,

e) continues evaluation,

f) if needed, update of the roadmap,

g) communication of the results to target groups to further engagement.

The 6 roadmaps are:

1. Transport and mobility
2. Agriculture & sustainable land-use
3. Circular economy and sustainable consumption
4. Net Zero construction
5. Energy
6. Carbon sinks

The roadmaps actions will commonly, but not always, be different projects with the municipality as a partner or project coordinator. To handle the resource use in different projects the municipality will work with a project portfolio for climate-neutral Lund 2030.

Multi-Level and Multi-Stakeholder Governance

The climate transition process is built across departments in Lund and is formally managed by the city. Formal and informal partnership working is a key requirement for the city to be able to address emissions that are not within its own operations. This approach entails both a multi-level approach in the public sector and a multi-stakeholder approach with business, academia

and civil society. There is particular focus on strengthening work with civil society and citizens at a local level to seek new ways of engaging with communities, understanding their needs and perspectives and co-designing solutions that include equity and just transition dimensions.

At a multi-level approach, Lund is engaged in the Viable Cities programme and also the ERDF territorial programme, both of which provide direct access to national government agencies whose role is to support delivery at a local level. The Viable Cities arena involves 23 cities, and where there is a common understanding of need there is potential to use the forum to influence work at a national level. This and the national government ERDF partnership provide a platform to address policy conflicts, to synchronise or develop regulations and address need for national financial or technical support for delivery. Similarly Net Zero Cities provides an indirect contact to the European Commission and an opportunity to influence policy there.

Local work entails many stakeholders at different levels and part of the dynamic of the climate transition process in Lund is engaging on a strategic level through initiatives such as CoAction Lund and in individual innovation processes led by Future by Lund or other, in other development projects, or in the academia partnership Open Academy. The Climate Policy Advisory Council provides independent scientific reviews and proposals for the development of the transition process. A major focus in the climate transition process is the development of stronger collaborative processes with civil society groups, or communities of interest at a neighbourhood level or issue level, or other informal groupings. This is not a new area of work from a sustainable development perspective, but an area that needs to be further developed and systematically applied to open for a broader mobilisation and co-design processes to identify solutions that will meet local needs.

The Climate-neutral Lund project portfolio

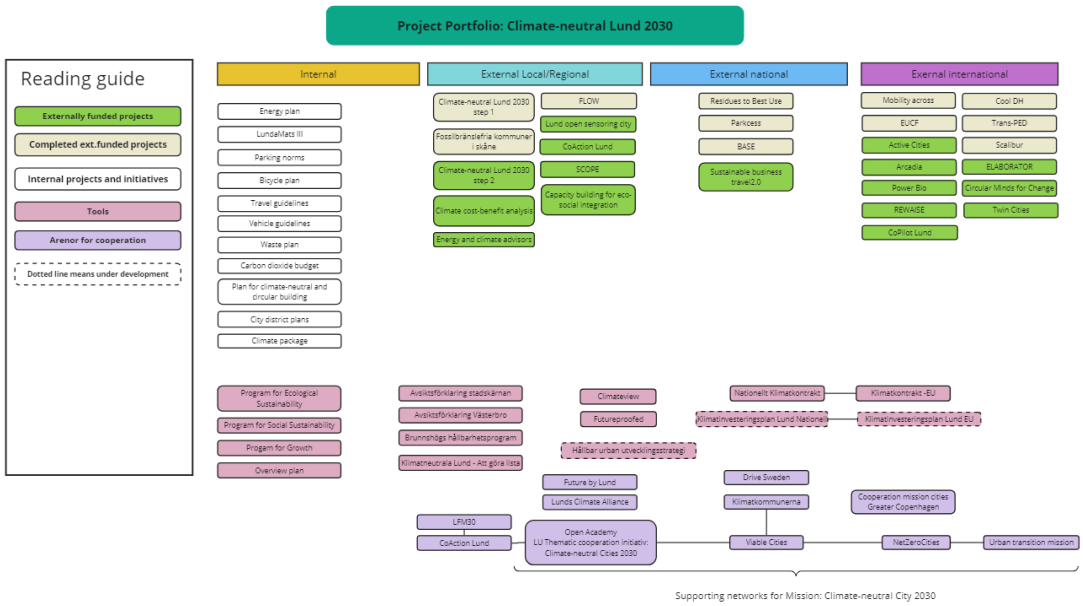


Figure 20: Project Portfolio Climate-neutral Lund 2030 with supporting tools and arenas for cooperation.

The Climate Neutral City portfolio consists of:

1. Externally funded development and innovation projects

2. Internal development and innovation projects and other activities
3. Tools, i.e. documents that give the municipality a mandate or demand for action. They are available in the form of programmes (steering documents), letters of intent, climate contracts and climate investment plans.
4. Arenas for collaboration such as Viable Cities, NetZeroCities, Urban transition mission and the Climate Alliance. Arenas used for projects, advocacy and learning.

All four parts are closely interconnected and interdependent. In addition to the portfolio directly managed by the climate transition team, there is a second portfolio under development within the Living Lund territorial strategy for sustainable urban development which is specifically designed for the ERDF programme and focuses on the climate transition and economic development and other co-benefits. The two portfolios are co-ordinated centrally to ensure optimal use of resources.

The purpose of portfolio coordination

Active portfolio coordination is required to strengthen a whole-organisation approach to:

- Follow up on ongoing projects, analyse success factors and shortcomings and integrate learning
- Prepare and prioritise new projects, applications and activities
- Prioritise resources between ongoing projects and efforts
- Handle strategic issues and major system challenges
- Promote coordination and learning between projects and activities.
- Communicate strategically both internally and externally
- Support projects with mainstreaming and dissemination of results.

Organisation Portfolio Coordination

The steering group for portfolio climate-neutral Lund has overarching responsibility and consists of resource owners (managers at department or unit level) and is chaired by the head of the environmental strategic unit.

Resource owners are line managers who hold resources to carry out projects and activities. It can be about resources in the form of funds, employees, machines or premises.

All administrations have at least one member in the steering group.

Partnership and portfolio development

The governance model is structured in three zones of collaboration, depending on the maturity stage and scope of collaboration– firstly, exploring new ideas and opportunities, secondly, creating strong projects and, finally, scaling up and executing new solutions within each organisation.

In the yellow zone ideas and opportunities are explored and analysed in dialogue between a multitude of stakeholders. This can be done in smaller or larger constellations and have various forms. By using the collective intelligence new and joint opportunities for solutions can be identified, as well as barriers and how to get past those. The result is a better understanding of what is, what can be, and how to move forward.

Building on this, the aim is to move promising ideas and stakeholder groups into the green zone, where ideas are conceptualised and formed into projects, and consortia start to build partnerships, and develop business models. It is also the zone where startups are formed out of ideas in the yellow zone and start to grow through partnerships or through different support mechanisms and early-stage funding.

In the blue zone the new solutions, that have passed proof-of-concept as well market introduction phase, are integrated in the different organisations' ordinary operations and normal business activities. It can be operations in companies, public sector or civic sector, depending on the ideas and ow they are integrated in different organisations.

Using the governance model has a number of advantages.

- It structures the dialogue and stakeholders, making it easier to understand where discussions and activities "sit", from early trends and ideas, all the way to core business activities.
- It offers a way for dialogue that make use of the collected intelligence in the system, and so creates a better basis for decisions.
- It offers opportunities to identify new ideas, but also identify gaps in the current solutions portfolios, markets or groups of stakeholders, gaps that can be explored to find new opportunities or stakeholders to invite.
- It offers a structure for creating solutions, partnerships and projects, and "move" them from the yellow exploring zone, through the green and into the blue zone. That is a process for speeding and scaling new solutions.

The way of working, the logic and the transparency, as well as the aspects of collaboration vary between the zones, but the model has shown to be very useful for structuring collaboration activities and stakeholders in the innovation ecosystem.

As this is a distributed system, exploring and collaborating can take different forms. The project team and Lund's transition team need to have an active outreach in order to create trust and engagement. In this form of open and dynamic process, we will work with two main engagement forms, bilateral meetings with stakeholders to explore interest in the climate transition and further participation on group activities, and workshops on certain thematic issues of the transition to analyse and identify new opportunities, project forming and consortium building. In this type of engagement dialogue, horizon scanning, ecosystem mapping and scenario analysis are examples of how we work. The results of this will be open for the stakeholders' prioritisation, but we also aim to explore two thematic sectors more actively – the intersection of energy and mobility, and the agricultural sector. The work on a new type of local climate contracts will cover all sectors.

Linking local climate contracts to the model creates a formal way for engagement. We aim to develop a model structured i four steps – engaging in dialogue, engaging in joint projects (where we can follow up impact and investments), engaging in own organisations commitment in own operations, and finally engaging in reporting of impact and investments in organisations' own operations (which we can't follow up today).

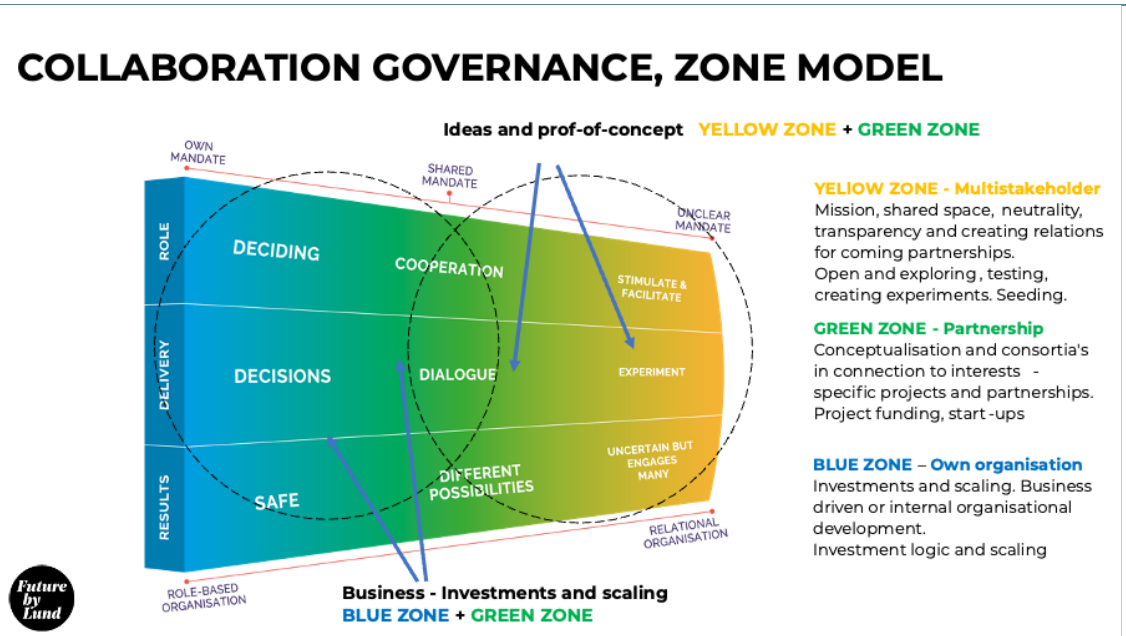


Figure 21: Collaboration governance, zone model

The governance model is future-oriented, focused on identifying and exploring new opportunities and partnerships. Our other major governance intervention project is our Pilot City Project on portfolio management and impact follow up on ecosystem level.

The PCP project uses a portfolio management model developed in collaboration with OECD's Observatory for Public Sector Innovation to map and analyse climate projects in Lund 2019-2023, understand impact and create a way to also analyse business models in the projects in order to understand success factor for speeding and scaling the transition. This looks at lessons from previous experience mainly within the municipality and municipal owned companies and combines this knowledge with a forward-looking governance model where new and better portfolios can be built i collaboration with external stakeholders, or even without the municipality involved as partner.

The portfolio management model work is structured in a four-step process:

First, a portfolio analysis of climate projects in the city, as well as planned projects in the system transition demonstrator, characterising each project according to OPSI's portfolio management model, complemented with Lund's collaboration playing field model, and adding a project stakeholder analysis. This gives an overall portfolio analysis, an understanding of portfolio gaps, and a strong model on portfolio management.

Then a corresponding analysis focusing on business models and financing models in the projects. The recently published "Mission Cities Paper - Funding and financing the zero emissions journey" reflects the challenges in this field.

We then identify gaps in our portfolio in the form of thematic projects, stakeholders, financing schemes or other aspects. Using Lund Innovation and Engagement Collaboration model we will

then identify resources and stakeholders needed to fill those gaps. Already we identified the financial sector's engagement as a gap and have initiated first discussions with banks.

Finally, we will use the Lund Innovation Ecosystem Project Tracking model to make an impact analysis on existing portfolio projects that give additional insight about effects on ecosystem level. In line with the second step, we will try to develop new functionality in the LIEPT model to identify impact related to business models and financing models used in the projects. The impact follow-up on system level is the basis for future project development, prioritisation and decision making.

The model is a combination of different existing tools, joined to one system, and then being further developed through practice. In our PCP project, we apply this to Lund's climate transition projects, and further develops the model. Below are some illustrations of the model, an overall illustration, a slide showing the link to the OPSI facets model and on showing how the model can aggregate and visualise results.

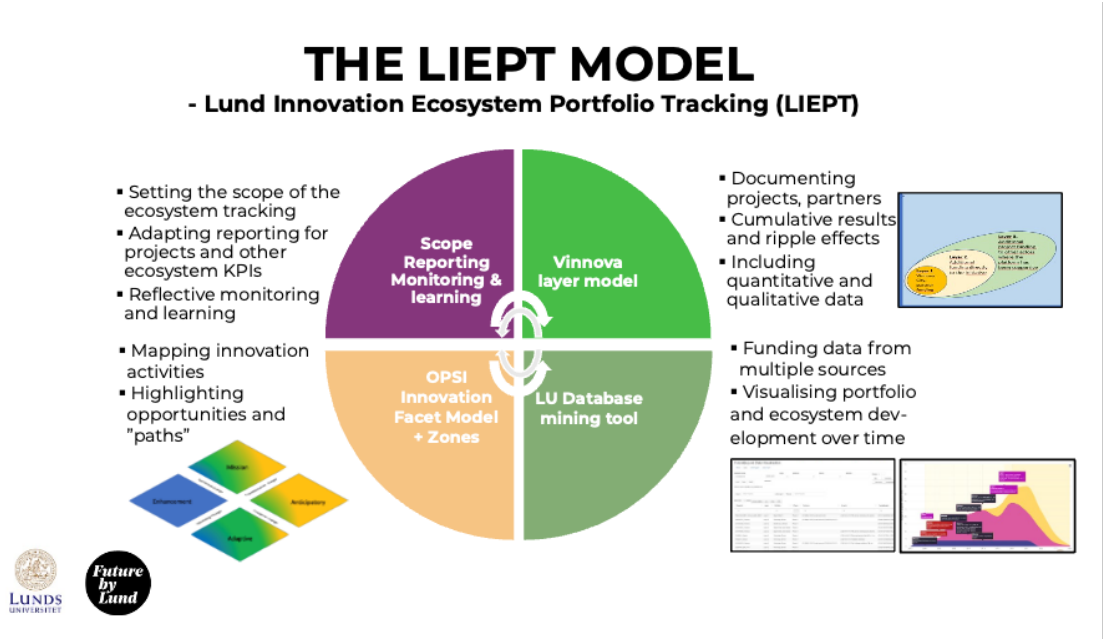


Figure 22: The LIEPT Model – Lund Innovation Ecosystem Portfolio Tracking

C.1.2: Sample Table: Relations between governance innovations, systems, and impact pathways

Intervention name	Description	Systemic barriers / opportunities addressed	Leadership and stakeholders involved	Enabling impact	Co-benefits
(Indicate name of intervention)	(Describe the substance of the intervention)	(Refer to barriers and opportunities identified in Module A-3)	(List leaders and all stakeholder involved and affected, referring to the stakeholders mapped in Module A3)	(Describe how intervention enables climate neutrality)	(Indicate how intervention helps achieve the impact listed in Module B-1)
Climate transition team Lund organisation	Cross departmental organisation to drive transition across local government departments	More joined up internal approach supports better analyses and faster decision making processes	Leadership: Department of sustainability of Lund. Stakeholders involved: Technical departments in primary role, other departments and public companies in secondary role.	Shared strategic leadership and management to identify actions, prioritise resources and deliver change.	Intervention of an overarching character. Supports several co-benefits indirectly.
Open Academy	Partnership with local universities and other frontrunner cities in region	Closer working with other regional NZCs and academia supports shared learning and identification of shared challenges and solutions to be addressed beyond mandate of single municipality	Leadership : University of Lund. Stakeholders involved: Cities of Malmö, Helsingborg, Region Skåne, Skånetrafiken, Lund university, Agricultural university, Malmö university.	Arena for exchange between research and practice to accelerate transition and learn from experience for the benefit of others	Intervention of an overarching character. Supports several co-benefits indirectly. Knowledge of challenges and needs are transferred to academia for further research and research knowledge can directly be transferred to implementations.
Viable Cities	National collaboration platform between cities, government agencies and academia	Knowledge from cities and regional co-operation can be fed into national government agencies to gain increased support from national government in local implementation	Co-ordinated by KTH University, Stockholm. 23 cities involved committed to climate neutrality 2030, 6 national government agencies, other partners.	Arena for national mobilisation, exchange and development to meet 2030 target.	The aim of the innovation programme is to support climate neutrality of cities by having a holistic approach where synergies and cobenefits are important parts of the theory of change.
CoAction Lund	Large-scale system demonstrator for speeding up climate	Addressing barriers for climate transition in mobility and	City of Lund, Lund University, 25 private business such as Alfalaval,	Local platform for innovation, replication and learning for speeding up	Participation in the system demonstrator requires a willingness to

	transition through innovation	energy sector. Innovations are developed for financing, business models, technology, etc	TetraPak, Axis, Kraftringen and Wihlborgs	climate transition towards a joint mission.	share knowledge, challenges and solutions in an open environment. This leads to the development of solutions for a systemic change.

4.2 Module C-2 Social Innovation Interventions

This module lists the actions taken by the city to support and foster social innovation initiatives or non-technological innovation more broadly (e.g., in entrepreneurship, social economy, social awareness & mobilization, social cohesion and solidarity, etc) aimed to address the systemic barriers and leverage the opportunities identified in Module A-3[3]. It also includes:

- A description of the innovations (what do they innovate?).
- Systemic barriers /opportunities addressed by these innovations (from Module A-3).
- Stakeholders involved in the innovation.
- Additional enabling levers (e.g., technical, policy/ regulatory, democracy/ participatory, fiscal/ financial; learning and capabilities, behaviour change).

Foreseen impact on climate neutrality and co-benefits

C.2.1 Sample Table: Relations between social innovations, systems, and impact pathways					
Intervention name	Description	Systemic barriers / opportunities addressed	Leadership and stakeholders involved	Enabling impact	Co-benefits
(Indicate name of intervention)	(Describe the substance of the intervention)	(Refer to barriers and opportunities identified in Module A-3)	(List leaders and all stakeholder involved and affected, referring to the stakeholders mapped in Module A3)	(Describe how intervention enables climate neutrality)	(Indicate how intervention helps achieve the impact listed in Module B-1)
Mobility management activities,	Co-operation with local communities, Viable Cities and national government to trial policy and investment to support sustainable	Public transport not seen as attractive options for some journeys, purposes or people	Citizens, behavioural scientists, Skånetrafiken, Viable Cities, national government	Increase modal share of public transport and active mobility, lower emissions from fossil fueled cars	Improved public health, better air quality, reduced congestion, reduced noise pollution

[3] For more guidance on social innovation, please refer to the NetZeroCities Quick Read on Social Innovation,to the NetZeroCities Report on indicators & assessment methods for social innovation action plans and the Social Innovation Toolkit. Social innovation case studies are also available on the NetZeroCities website.

	mobility choices				
Participatory budget	A tool for financing of citizen initiatives. Initiatives from citizens or citizen groups for development of neighborhoods	Increase cohesion, well-being and security in society	Lund, citizens and groups of citizens.	Improvement of outdoor environment and meeting places. Less need for travel.	Attractive neighborhoods, increased public health, local democracy
Participatory neighbourhood development for climate neutrality	Develop innovative methods and tools to reduce carbon emissions, improve quality of life and equality. create neighbourhood eco-social consumption profiles develop neighborhood labs, where residents jointly develop proposals for actions. The project will develop an integrated strategy for consumption-based emission reductions, based on socio-economic conditions and residents' needs.	Reducing scope 3 emissions from household consumption in collaboration with citizens, local stakeholders and municipality.	Citizens, Lund university, Stockholm Environment Institute, Digidem Lab	Increasing citizen engagement and involvement of broader groups of citizens through deliberative forums (participants will be reimbursed and selected through a representative process to ensure broad participation)	Improved quality of life, ensuring just and inclusive measures, cohesion, awareness raising in climate change
Circularity and employment training	Circularity and repair initiatives such as Återburkarna, engaging long term unemployed	High cost of repair	City of Lund	Repair and reuse of items that would otherwise have been discarded	Employment training and social inclusion
Create long term structures for citizen engagement in Lund's transition arena	Evaluation, benchmarking and coaching support from WWF to develop new and more effective approaches of	Organisational barriers, high costs of citizens dialogues and difficulties in ensuring implementation of citizen proposals in a	WWF, City of Lund	Empowering community action and co-designing scaleable and equitable solutions	Community cohesion, just transition

	citizen involvement to ensure just transition being integral to Lunds transition arena.	siloed and hierarchical organisation. Legitimacy (representational vs. direct democratic)			
Energy community	Development of energy communities in one of Lunds lower income areas to lower barriers for low income populations to participate in the energy transition	Low pace in expanding renewable energy production and need to decentralise to ensure energy balance and affordable energy	City of Lund, Kraftringen. Klostergården community	Empowering community action and co-designing scaleable and equitable solutions	Community cohesion, just transition

C-2.2: Description of social innovation interventions

New social innovation initiatives for the climate transition
Continued engagement in the long term will be crucial for overcoming existing barriers and addressing remaining gaps. Knowledge of citizens' everyday life and needs is central to developing strategies for involvement and strengthening aspects of justice in the transition. In Lund's continued work with the development of its project portfolio, innovative and new methods to involve more and wider groups of citizens in the transition (procedural justice) is a central aspect. There is also a need to create structures to ensure that benefits from measures are distributed equally and that negative effects are avoided (distributive justice) by developing new tools and indicators to evaluate Lunds climate transition.

To establish structures to ensure just distribution of resources, new indicators and goals for Lund's program for ecological and social sustainability have been developed that includes equity and equality considerations in climate transition and adaptation measures. These are currently under political review, to be decided in autumn/winter of 2024. In addition, new tools to measure scope 3 emissions will be developed that includes spatial socioeconomic and demographic indicators, which will function as a complement to include spatial aspects of justice (see more below).

A central area that Lund will focus on to address both procedural and distributive justice in climate transition is household consumption-based emissions (scope 3). Households' climate impact through consumption is strongly linked to both living conditions and quality of life, with large differences in emissions between different socio-economic groups. Measures to reduce consumption can improve living conditions, but also risk negative consequences, such as increased costs or reduced accessibility if not designed in an inclusive way. Lund is generally a wealthy municipality with a majority of middle- and high-income population and many students. However, the difference between neighborhood areas is large with some neighborhoods hosting populations with significantly lower incomes. The work to address consumption-based emissions is thus closely associated with district development since it is in relation to the local area that the municipality can influence and support households to reduce their emissions and at the same time address spatial injustices in service and infrastructure to lower barriers for a low emission lifestyle for marginalised groups.

The project "Eco-social Neighborhoods: Tools for Sustainable Consumption and Inclusive Climate Transition" (expected project start January 2025) aims to develop methods and tools to integrate ecological and social sustainability into neighborhood development in the city of Lund. By focusing on household consumption-based emissions, the project seeks to develop innovative methods and tools to reduce carbon emissions while improving quality of life and equality. This will be achieved by creating eco-social consumption profiles for different neighborhoods and conducting citizen dialogues, known as neighborhood labs, where residents jointly develop proposals for actions. The

project will develop an integrated strategy for consumption-based emission reductions, based on socio-economic conditions and residents' needs. Additionally, researchers will evaluate and analyse the methods to ensure they are effective and fair. The project's results will be integrated into Lund's climate roadmap and neighborhood programs, making them directly applicable to the municipality's ongoing transition efforts. With the municipality of Lund as the project leader and with partners from academia and civil society, the project is expected to contribute to Lund's goal of halving consumption-based emissions by 2030.

Through the project Lund aims to develop new methods and tools to accelerate the reduction of consumption-based emissions together with citizens. A central feature is the development of eco-social profiles linked to household consumption and socioeconomic features of different neighborhoods, something that has not previously been applied in Sweden and which constitutes one of the project's innovation contributions. Furthermore, test and learning cases of new forms of citizen participation will be carried out in the form of district labs, where citizens from different socioeconomic backgrounds, family status, age etc. participate to develop action proposals that support Lund's goal of reducing consumption-based emissions. In order to increase knowledge of place-based methods for just transition, leading researchers in the field will be involved by establishing a cross-sector practice-based academic workshop and learning forums.

To further increase efforts to empower and enable citizens and marginalised groups to participate in the climate transition Lund will collaborate with WWF to build long term structures for citizen participation in Lund’s transition arena. Through project collaboration in Viable cities program Climate neutral Cities 3.0 (expected start December 2024) WWF will evaluate Lunds work with citizen involvement and provide recommendations for structural and innovative measures to strengthen procedural justice in the climate transition. WWF will also provide coaching in inclusive communication and engagement methods for the transition team and participate in developing new methods for citizen engagement for Lund’s Climate- and energy plan. The Transition Team will adopt a learning approach throughout this process aimed at collective improvement.

To lower barriers for low income populations to participate in the energy transition Lund municipality and the Energy company Kraftringen is also collaborating to finding ways to support the development of energy communities in one of Lunds lower income areas (Klostergården). In 2025 a pre-study will be carried out to investigate technical, financial and legal aspects that can help the establishment of energy communities in the area. Further, in 2025 the mobility team aims to develop its work on accessibility for people with mobility impairment by investigating infrastructure and mobility management measures in bicycle infrastructure.

Existing engagement capacity on which to build climate impact
Within the municipality, a number of different measures and initiatives are underway to involve citizens and different groups in planning related to ecological and social sustainability. Two such measures are the Lund proposal and the Participatory Budget, which is about giving residents the opportunity to influence the municipality. Neither the Lund proposal nor the participatory budget are aimed at specific issues and thus constitute open fora for residents to influence Lund's climate and environmental work.

Despite the fact that the participatory budget has had social values as a starting point, a review of the citizens' proposals for 2023 has shown that a large number can support to goals in LundaEko while contributing to other social values in the local environment. Since the guidelines for participatory budgeting have been broad, it has functioned as a forum where residents have come up with proposals for measures that also contribute to Lund's transition. To date, however, the social profile of the participatory budget has meant that it has not been treated as a strategically important forum for climate and environmental issues, and neither assessment of proposals nor communication has been carried out with a focus on climate and environmental effects.

Collaboration with civil society is an important tool for municipalities to reach certain target groups and co-create solutions around issues of interest. An example of how work has been done at a strategic level to increase opportunities for collaboration was the introduction of Lund's civil society partnership in 2019. Active community organisations in Lund have been able to establish formal idea-based public partnership (IOP) initiatives with support from the city. This is overseen by a partnership

board consisting of representatives from various City departments and four representatives from civil society. Linked to the agreement is a collaboration plan that during the current period has included sustainable development based on Agenda 2030 as one of four focus areas. An overall focus for the partnership board and affiliated associations has so far been on collaboration in social welfare areas. However, through the current action plan, there is an opportunity to deepen and strengthen collaboration with civil society in climate and environmental work, where the agreement creates a platform for strategic and long-term partnerships where social and ecological issues can meet.

There are also a number of examples of different initiatives that have been implemented to involve residents in specific climate and environmental contexts. In the development and subsequent revisions of LundaEko, residents and young people have been involved in the consultation process. Another example is the to-do list for Climate Neutral Lund, which was developed together with civil society, business and researchers and now forms the basis for the continued climate transition work. Many of the measures for involvement are aimed at children and young people and are often carried out in collaboration with the municipality's schools.

Since the early 2000s, Lund has worked to ensure that young people should have greater opportunities to influence the municipality. This is where Youth Policy is established and fulfills an important function. This means that the municipality has youth representation in the form of two young adults who work to increase young people's influence and participation. Examples of activities that are organised are youth councils, influence cafés, student council days and the young voice group. The youth council has been used as a forum to give young people the opportunity to meet politicians to discuss Lund's climate transition and sustainability work.

Another ecosocial initiative to engage children and young people in sustainability is Naturskolan, a resource and development team for all schools and preschools in Lund with the mission to support school development in science, technology, the built environment and learning for sustainable development. The Nature School is also responsible for the Green Schoolyards programme which has been ongoing since 1992 with the goal of creating a change in how school and preschool playgrounds are used and designed. In 2023, Naturskolan was also given an expanded assignment with a focus on the built environmentwith the aim of increasing understanding of the connection between people and places, ecology and culture

Various social initiatives and projects are carried out across city departments to strengthen social sustainability and support vulnerable groups. These include projects with an environmental perspective such as two circularity projects to support people outside of the labour market that are run in partnership between different local government departments. In Återbrukarna, the focus of the work is to ensure that, for example, clothes and furniture are not thrown away but can be reused by repairing or converting them for other purposes. The Recycling Group project deals with different types of gardening and landscaping work in the municipality.

Lund also runs Fritidsbanken lending sports and outdoor equipment for 14 days to anybody in the community. The primary aim is to ensure affordable access to recreational activities in the city, but it also has the co-benefit of decreasing demand for consumption of new seldom-used items. The equipment available to borrow is often pre-used and donated from businesses or the community.

Streamlining climate and social impact work for a just transition
One area that has been highlighted in research is the risk that environmental investment in rental apartments may lead to increased rents, making it difficult for people to stay in their homes (Mangold et al. 2016). Lund Municipality took note of this challenge in a project where LKF, in collaboration with Kraftringen and IVL Swedish Environmental Research Institute, implemented energy efficiency measures in more than 2000 older apartments aim that it would not lead to too high rent increases. Evaluations of the project have shown that it has succeeded in its goal of halving energy consumption while all tenants could afford to stay in their apartments after the renovation. The same model is now being used for similar measures in other parts of the city. Environmental considerations in the choice of materials for renovation and new construction can lead to a better indoor climate and healthier indoor environments in, for example, schools, preschools and nursing homes.

Other examples of measures that are often justified on environmental grounds but also have a social impact can be found in the field of transport. This applies to sustainable mobility and active transport such as walking and cycling, which can positively impact public health through increased everyday exercise. The Technical Administration has for a long time conducted mobility-promoting activities, and current examples of projects are Active Cities, which is run in collaboration with the City Planning Office to create good street environments for pedestrians, or CoAction Lund, which aims to get companies and employees along the innovation route to reduce car driving and to instead choose walking, cycling and public transport. Other examples are walk-and-cycle campaigns in schools and preschools or Borrow a Bike, which aims to get more people to try cycling to establish new habits.

The management of park and nature areas can contribute to improved and more equal access to green spaces and recreational areas with impacts on public health, social cohesion and quality of life. It can also create new meeting places for the municipality's residents and contribute to. A recent wetland restoration to create a multifunctional nature-based solution is one such example that has also proven to have social values. Sometimes, however, conflicts can also arise such as rubber mats in playgrounds instead of using natural materials, while lighting for perceived safety in park environments can create light pollution that disturbs wildlife. A recent project tried to find a compromise in a park where new play and leisure areas are illuminated while other areas are left unlit.

There is a clear need for increased focus on participatory processes and co-design of solutions to drive the transition process in Lund and secure social co-benefits. The impact of individual choices is significant in several fields of action and in particular transport and mobility and circular economy and sustainable consumption. There is an increased focus on these areas in the city and understanding of the need to work closely with the community to develop measures that can maximise co-benefits and gain broad support and impact. There is a current infrastructure in place and the potential to intensify this work to great effect to help support the 2030 target.

5 Outlook and next steps

This section should draw any necessary conclusions on the CCC Action Plan above and highlight next steps and plans for refining the CCC Action Plan as part of the Climate City Contract in future iterations.

Plans for next CCC and CCC Action Plan iteration

Major challenges but reasons for optimism

The coming five year period will be an intense and challenging time for the City of Lund to drive development towards the Net Zero target 2030. The measures outlined in this first iteration of the Climate Action Plan are highly ambitious and can together reduce emissions by 78% from 2010 levels. The challenge is exacerbated by the need to address wicked problems beyond the mandate of the city administration, not least to address through-traffic on the motorway and trunk roads in the municipality, and to mobilise land-owners and farmers to significantly reduce emissions from agriculture and land-use. This process entails a joined-up approach across the city and with regional and national government agencies. It entails a strong partnership with the business community and a collaborative approach with urban and rural communities to co-design changes that can enjoy wide support and generate high impact. It offers opportunities for economic development, improved service, community cohesion and a just transition. But it will not be easy.

There are, however, reasons to be optimistic. The recent mobility user survey published by Region Skåne shows a continued and significant increase in active transport in the whole region with public transport use up from 20% in 2018 to 25% in 2023 and car use in the same period decreasing from 53% to 49%. In Lund the 2023 data shows car use to be down to 32% in the whole municipality and 25% in the city. A recent survey into public attitudes to climate change commissioned by consultancy AFRY showed that over two thirds of respondents were worried about climate change, 40% wanted more information about local action and 40% were willing to pay more in taxes or fees to address climate adaptation.

These recent surveys indicate strong public interest and a significant shift in mobility behaviour that gives rise to optimism that a concerted effort in mobility management can reach much further. The majority of people in the region have less than 30 cycle ride to work or study and plans to address

regional cycle infrastructure in the CAP can help significantly increase medium-distance cycling. Innovation and development work into on-demand public transport and integrated micro-mobility is under development as is a more joined-up approach between cities, the Region and the public transport company.

More structured community participation
One key area for Lund to develop in the near future is a more structured approach to community engagement and collaborative design processes in order to better understand the needs of different communities of interest or geographical locations when it comes to mobility solutions, circular economy and waste management as well as other local sustainability issues. There are skills and networks in place in the city Culture Department that can be an important base from which to build competence and processes around climate engagement. The partnership project with Digidem Lab will be an important element of process development that can be scaled across the city to bring in local perspective and innovators, and ensure that under-represented voices are brought to the fore. A more inclusive approach can help identify user-led solutions that can help increase user-friendliness, as well as identifying co-benefits or indeed risks of inequitable results of certain changes and ways to mitigate these.

Establishing a new field of work in agriculture
Tackling emissions from agriculture and land-use is a major challenge for Lund, not least due to the limited organisation capacity in this area and limited established networks with the farming community. There is a need for a dedicated member of staff to lead this work and build relationships with farmers and landowners, understand their businesses and perspectives and work together to identify solutions that can have a positive impact on their businesses and that can be tested, scaled and mainstreamed across the wider farming community. There is already a strong partnership in place with the local agricultural university whose skills can be critical in identifying low-carbon business models and practices for the farming community. There are also other interest organisations to join forces with such as the NGO Hushållningssällskapet and the farmers' union LRF as well as other Net Zero Cities across Europe, but not least in the Skåne region. There could be the potential for the three Net Zero Cities and one additional Viable Cities partner in Skåne to work together in Sweden's most productive agricultural region to develop a national pilot for climate neutral agriculture with support from the national Fossil Fuel Free Sweden organisation and their sectoral roadmaps. A challenge of working with the farming community is the seasonal intensity of their work. This means that there is a period through until the spring 2025 where it is possible to start building relationships, but then there will be limited scope to delve deeper into challenges and solutions until the autumn of 2025. It is therefore important to move quickly so that a roadmap and pilot projects can be in place by the 2026 growing season if an iterative development approach is able to provide any impact by 2030.

Develop mobility management and whole-journey approaches
Despite the positive trends in the region and city regarding sustainable transport, there is still a need to accelerate the shift from private car to active transport. More collaborative design processes with users can be one way of better understanding needs and barriers amongst different user groups and geographical locations. Regional experiments in integrated micro-mobility and on-demand solutions can be scaled. Co-operation across municipal boundaries and the whole travel-to-work region can help develop a more joined-up approach and the potential for a door-to-door approach to solutions that enable commuting and recreational travel with ease without private car dependence. There is a strong just transition process in developing a more extensive and integrated active mobility system that enables affordable access to work, leisure and service for all income groups, abilities and geographies in the city. A more detailed roadmap for mobility management activities needs to be developed in the coming six month period.

Develop a just-transition approach to vehicle charging
There are significant disparities developing around the electrification of the private car fleet. Inevitably in a market where there are a relatively small number of new electric vehicles on the road, the market for affordable second-hand electric cars is currently quite limited. In addition to this, the cost of charging can vary dramatically. People in single family housing can often have their own charge point and can charge at the lowest tariff or even for free if they have their own solar panels. People in multi-family housing, however, can only access commercial charge points that pay above average electricity costs, making the cost of charging significantly higher. At a highly generalised level, people

in single-family homes are more likely to have higher incomes than many in multi-family housing leading to the conclusion that lower income families may have to pay significantly more to run an electric vehicle. The development of affordable, equitable and accessible charging infrastructure is therefore highly important to enable a just transition for those who may remain dependent on car use despite improvements in active mobility solutions.

Develop a more detailed investment plan, portfolio and timeline for delivery
The current iteration of the Investment Plan is still in its early stages of development and more detailed estimates of the various actions involved needs to be put in place to identify any financial risks or challenges that have not yet been identified. Some projects have more detailed costings than others as is inevitable in an iterative development process. There will be new elections at both local and national level in Sweden in 2026 and it is important at this stage that a clear understanding of the costs of completing the climate transition by 2030 are available by then to support long-term financial decisions by politicians. A more comprehensive investment plan should therefore be completed by the end of 2025.

6 Annexes

The annexes contain any textual or **visual material** to the 2030 Climate Neutrality Action Plan as necessary.

- Description of different networks

Appendix 1. Lund CCC
Description of different networks

The Climate Alliance

The Climate Alliance Lund is a network of companies that works actively with climate change and sustainable development. They share knowledge and experiences to find solutions that benefit both climate and business.

Purpose: The Climate Alliance Lund makes it easier for companies to meet and exchange ideas and experiences on climate and sustainability issues. The network also encourages collaborations between companies, Lund University and the municipality to develop innovative solutions. Climate Alliance Lund helps companies identify and implement measures to reduce their climate impact. The network shows how climate work can be part of business development and create new opportunities for companies.

Target group: Lund University, Lund Municipality and companies in Lund from various industries that are interested in working with climate issues and sustainable development.

Opportunities for the municipality's operations: The Climate Alliance is a network for engaging local businesses in the climate transition. Since the network consists of companies of varying sizes and sectors, the municipality, through the network, can easily reach a wide range of companies. For example, to engage in development work
Municipality's contact person: Jon Andersson

Link: https://lundsklimat.se/

CoAction Lund

CoAction Lund is a scalable and innovative initiative to achieve climate neutrality in energy and mobility by 2030. The CoAction Lund initiative brings together stakeholders from the energy, IT, industrial and real estate industries together with authorities, academia and other organisations. Together, they focus on energy and mobility, as transport accounts for the majority of emissions in Lund and a robust energy system is an absolute necessity for climate neutrality to be achieved.

CoAction Lund stands out from other projects because it brings together over 25 different actors who work together towards a common goal: an interconnected city where energy and transport systems support each other.

CoAction is one of Vinnova's two "system demonstrators" within climate-neutral cities that will show the way and inspire others in Sweden and the world.

Purpose: To reduce emissions from transport through collaboration and joint solutions and increase the share of locally produced and stored renewable energy. The project also aims to create a scalable model for climate transition that can inspire other cities.

Target group: Everyone who lives, works or works in Lund is affected by the project. CoAction Lund is particularly aimed at larger employers, property owners, government agencies, energy suppliers, the university and other actors who can contribute to achieving the goal of climate neutrality.

Opportunities for the municipality's operations: Through CoAction, we can test ideas and collaborate with other actors in particular in areas beyond the mandate and control of the City

Municipality's contact person: Markus Paulsson

Link: https://lund.se/coaction-lund

Climate-neutral cities by 2030 - Open Academy

An open academy at Lund University that supports the transition to climate-neutral cities in Skåne, with a focus on Malmö, Helsingborg and Lund. The Academy offers interdisciplinary research, education and collaboration with local actors to promote knowledge-based and transformative processes.

Purpose: To contribute to the three selected cities in Skåne reaching the goal of climate neutrality by 2030 by offering unique support in the form of research, education and collaboration. The Academy also aims to develop new interdisciplinary knowledge and educational initiatives in the field.

Target group: Researchers, the City of Helsingborg, the City of Malmö, the City of Lund, students, the business community and other actors involved in the transition to climate-neutral cities.

Opportunities for the municipality's activities: Open academia can be used to take part in current research of importance for a climate-neutral city. It is also an arena for discussing possible collaborations between the municipality and academia.

Municipal contact person: Juliet Leonette, Madeleine Wahlund

Link: https://portal.research.lu.se/sv/projects/klimatneutrala-st%C3%A4der-2030-%C3%B6ppen-akademi

Future by Lund

An arena for collaboration and co-creation between universities, municipalities, organisations, business and creative individuals. FBL has a mission to catalyse Lund as a global innovation district with the capacity to solve complex and shared challenges.

Purpose: To create conditions for initiating new solutions to societal challenges by mixing different fields of knowledge and actors. FBL explores, follows developments and develops ideas that shape sustainable societies.

Target group: Universities, municipalities, organizations, business and creative individuals who are interested in collaborating to develop and implement innovations for a sustainable future.

Municipality contact person: Therese Fällman, Johan Frithiof-Karlberg

Opportunities for the municipality's operations: Through FbL's events and workshops, the businesses can have exchanges with universities, businesses and associations in areas such as the smart city and innovation.

Link: https://www.futurebylund.se/

Viable cities

Viable Cities is a Swedish strategic innovation program that works to make cities climate-neutral and sustainable by 2030. The programme brings together cities, companies, academia and civil society to jointly develop and test new solutions to meet the climate challenge.

Purpose: Viable Cities helps cities develop and implement strategies and measures to reduce their greenhouse gas emissions and become more sustainable. The programme funds and supports projects that test new innovative solutions for the climate transition in cities. Viable Cities works to create and disseminate knowledge about how cities can become more sustainable and climate-neutral.

Target group: Municipalities, academic institutions, civil society and companies that develop and offer solutions for sustainable urban development.

Opportunities for the municipality's operations: Viable Cities is the co-ordinator of the cities in Sweden that have committed to becoming climate neutral by 2030. They do this by arranging workshops, conferences, coordinating advocacy work and more. Through Viable Cities, the municipality can participate in knowledge exchanges, new innovations and discuss collaboration within projects with 28 other Swedish cities and solution companies. Viable Cities also announces project funding for innovation projects.

Contact person for the municipality: Madeleine Wahlund, Juliet Leonette

Link: https://viablecities.se/

Collaboration Mission Cities in the Öresund Region

Since 2023, the Municipality of Copenhagen, the Municipality of Lund, the City of Malmö and the City of Helsingborg have a joint forum for management and transition teams. The group meets about 2-3 times a year.

Purpose: To promote exchange of experiences, learning, joint advocacy work around a climate-neutral city.

Target group: Management and transition team

Opportunities for the municipality's activities: The forum is not open. The contact person can be used to highlight the need for cooperation with the cities within a carbon-neutral city.

Municipality's contact person: Jon Andersson

Link: None

Urban Transition Mission, UTM

UTM is a global initiative that mobilises decision-makers at all levels of government to prioritise climate-neutral and net-zero pathways through clean energy and systemic innovation in all sectors and in urban governance. UTM is working with ambitious cities across the globe to demonstrate that systemic urban strategies together with climate resilience and social aspects of the transition can augment reliable, affordable, feasible and cost-effective solutions to reach net zero cities.

Purpose: UTM supports cities in developing their ability to implement climate-neutral solutions. UTM facilitates collaboration between researchers, innovators and cities to accelerate the implementation of new solutions in practice. Finally, UTM helps cities identify and implement the solutions that can lead to rapid and significant changes in their climate work.

Target group: Cities and decision-makers at all levels who work with climate and urban development. Researchers and innovatorsdeveloping solutions for climate-neutral cities. Investors who want to support sustainable urban development.

Opportunities for the municipality's operations: Through UTM, the municipality can take part in joint trainings, presentations and workshops on various topics that are of great importance for achieving a climate-neutral city. Topics such as data analysis, digitalisation, energy efficiency, mobility solutions, working methods and more. Everything is done digitally.

Municipality contact person: Jon Andersson, Tommy Bengtsson

Link: UTM: https://urbantransitionsmission.org/ **Mission Innovation:** https://explore.mission-innovation.net/mission/urban-transitions/

Climate municipalities

The Climate Municipalities is an association in Sweden for municipalities and regions that actively work with local climate action. The members have ambitious climate and energy goals and are at the forefront of measures to reduce greenhouse gas emissions.

Purpose: Climate Municipalities work to accelerate and facilitate their members' climate work so that they can achieve net-zero emissions by 2045 at the latest. The association offers support, inspiration and exchange of experiences between its members to promote the development of effective climate measures. Climate municipalities also act as a strong voice vis-à-vis national decision-makers to highlight the role of municipalities and regions in climate work.

Target group: Municipalities and regions that actively work with climate issues and want to be part of a network for knowledge exchange and advocacy.

Opportunities for the municipality's operations: The climate municipalities can be used for external monitoring, advocacy work, knowledge exchange and inspiration. A tip is to sign up for the newsletter.

Municipality's contact person: The Climate Municipalities' Office has its office in Lund and belongs to the Environmental Strategic Unit.

Link: https://klimatkommunerna.se/

Climate City Contract

2030 Climate Neutrality Commitments

Climate Neutrality Commitments of the City of Lund

CITY OF LUND

Table of contents

1 Introduction

Introduction

The City of Lund is committed to lead climate action

The City of Lund, its political leaders, employees, business and wider communities are committed to taking action on climate change. Climate conditions are now becoming ever more unpredictable, with adverse consequences for human and all other life on earth. Citizens and their cities will be impacted in all parts of the world through direct climate impacts and indirect effects such as economic and social instability. Urgent action is needed, not least in cities, considering they are home to around 56% of the global population and the cause of 70% of CO2 emissions.

European cities who have fuelled their prosperity with non-renewable resources have a particular responsibility to drive change and work together with city partners around the world to deliver more rapid action for the benefit of our communities. Lund realises its responsibility as a prosperous and research-intensive city to take a leading position in the work towards global climate neutrality. 2030 is no longer far in the future, and now is the time to act. By joining forces with ambitious cities across Europe, Lund hopes for increased collaboration, knowledge exchange and access to innovative solutions and finance to help meet the challenging mission of climate neutrality by 2030.

Lund as an early leader with many challenges remaining

Lund has been working actively with sustainability and climate action since the 1990s when it was amongst the Swedish pilot cities working with NGO Swedish Society for Nature Conservation to become fossil-fuel free. The Fossil fuel free cities programme pioneered a more strategic approach to political ambition, council action and partnership development with business and communities to drive change. Lund had particular focus on the energy and mobility systems and our structured work inspired other cities in the region, across Sweden and further afield.

In concrete accomplishments towards climate neutrality, Lund has already come a long way. The previous GHG target, to decrease emissions in Lund by 50 percent by 2020 compared to 1990's emission levels, was reached in 2018 and emissions per capita decreased even more considering Lund's population grew by 42 percent during the same period.

This significant decrease in emissions is primarily due to major investment in energy infrastructure in which emissions from heating and electricity has been reduced by 80% since 2010. The district heating system is now based on biofuel-powered combined heat and power and residual heat. Wind and solar generation have also increased.

In the municipal organisation, electricity, heating, fuel and work-related travel are now 99,4 % percent fossil fuel-free. These results can be largely attributed to work within the initiative Fossil Fuel Free municipalities, a collaboration between several municipalities in Scania. Public transport in Scania, including Lund, is 100 percent fossil fuel free since 2018 when the last buses transitioned. In 2020, Southern Sweden's first modern tramline was inaugurated connecting Lund's city centre to Skåne University Hospital, Lund University of Technology, European Spallation Source (ESS), MAX IV (the world's brightest synchrotron light facility) and the new Brunnshög area in northeastern Lund that will expand significantly in the coming years.

Lund has made many efforts to promote cycling, walking and public transport and reduce car dependency. This has resulted in a 35% reduction of transportation by car/capita since 2010. 27 % of journeys within the city are by bike and Lund is a regular winner of the Swedish award for cycle-friendly municipalities and recently won the award as Best Mobility City in Sweden.

However, whilst emissions from energy have reduced dramatically, emissions from transport demonstrate only a comparatively modest decrease despite being a major focus of attention for thirty years. It is clear that the complexities of the rural and urban nature of the municipality and the interrelatedness with other towns, cities and rural communities in the wider labour-market region need to come under increased focus.

Lund has also been a pioneer in sustainable food and school meals but this is not reflected in changes in agricultural emissions within the municipality. With a large rural footprint, agricultural emissions are now the second largest source of emissions and have remained constant over time. There has been no strategic work in the past to address emissions from the agricultural sector in which the city has only limited mandate.

In 2022, Lund was selected, together with Bogotá, as a global winner of the WWF competition *One Planet City Challenge*. The jury appreciated the city's ambitious goals, political leadership and a holistic and transparent action plan programme with clear step-by-step objectives and milestones every five years to achieve rapid emission reductions. Lund has also been accoladed as Sweden's Best Council for Environment twice, most recently in 2023.

Lund can in many ways be proud of its history and achievements as a pioneer of climate action, it is in a position, like other leading Swedish cities, of having picked the low hanging fruit already. The challenge now is to work on the boundaries of the political jurisdiction of the city, to strengthen cross-sectoral partnership approaches to drive climate action amongst businesses, community organisations and citizens, whilst also taking bold strategic decisions at a political level to drive the changes that are still within the political mandate, and to support the action needed in other sectors.

Evidence-based climate action

Lund has long experience of working with climate related issues and a tradition of a strong cross-party political commitment to sustainability and climate work based on current science and best practice. Sustainability is at the heart of strategic development and City Office's Unit for Environmental Strategy supports city departments, businesses and other agencies in the delivery of several city-wide strategic plans that are integral in guiding the work towards climate neutrality. These include the Energy plan, the Strategy for Sustainable Transport, the Comprehensive Plan, LundaEko III (City of Lund's cross-sectoral Plan for Ecologically Sustainable Development), Plan for Climate Neutral Construction and the Waste Management Plan. The unit also has a strategic overview and reporting responsibility for the city's carbon budget which covers the municipality's territorial emissions of greenhouse gases (carbon dioxide, methane and nitrous oxide) and is based on the Paris Agreement, national targets and local emissions data.

Lund, home to one of Europe's leading universities, was the first municipality in Sweden to adopt an independent Climate Policy Council consisting of a team of researchers from Lund University and the nearby Agricultural Sciences University who carry out an annual review of progress on climate change action in the city and provide recommendations based on their findings, current scientific knowledge and state of the art in other cities across the world. The Climate Policy Council has focused on key challenges in each report and in 2024 had particular focus on land use issues as an area with significant impact, limited strategic focus from a climate perspective, and which is currently in focus due to the revision of the comprehensive spatial plan.

Partnerships for action

Lund has long been committed to working collaboratively within the city with academia, business and community organisations, but also engaging nationally and internationally with other cities and organisations committed to driving the sustainability agenda. Many of the opportunities and challenges faced by Lund are shared by other cities, not least of which is the limited mandate of local government which necessitates strong collaborative approaches.

Lund is very much a city of knowledge with the University at its core and a strong cluster of knowledge intensive businesses in areas such as IT, pharmaceuticals, packaging and engineering. Most recently Lund has become home to the cutting edge R&I European Spallation Source and adjacent Max IV synchroton light facility. The combination of large multinational business and small knowledge-intensive start-ups has been a driver of the local economy and increasingly there is a focus on climate and wider sustainability issues at the heart of economic development. The business-led Climate Alliance has been operating since 2010 providing an important arena for market leaders in the city. More recently, the partnership approach has been strengthened by the development of the Future by Lund innovation platform to engage business partners and other organisations in innovation for a more sustainable city.

Future by Lund has a wide portfolio of innovation partnership projects including areas such as IoT, Mobility and Future Living where many projects have a focus on climate-related issues such as development of IoT and AI solutions for low-carbon agriculture, smart mobility or new business models for photovoltaics. Many of the projects engage public, private and academic partners and some also work actively with community organisations and end users.

Lund is a signatory of the Global Covenant of Mayors and has been active in numerous Swedish local government partnerships for climate action. Lund was also one of the founding members of the Swedish Viable Cities partnership of 23 municipalities and additional government agencies committed to climate neutrality by 2030. Viable Cities has become a strong arena for knowledge sharing and has the potential to be an increasingly influential arena to drive a more joined up multi-level governance approach to the climate transition with positive impacts across the entire country. Lund has similar hopes and expectations for the Net Zero Cities partnership – that it can be an arena for shared learning and action, but also an arena to drive climate governance and climate finance at a European and national level.

One of the priorities for Lund's work in the current Viable Cities programme is increased community engagement in areas such as mobility, circular economy and community safety. Whilst Lund has a long tradition of communicative work with communities on sustainable mobility, there is a recognition of the need for stronger and deeper engagement with communities, organisations and citizens in parallel with technical investments and change to drive the uptake of more sustainable options within the municipality, but also as part of efforts to decrease highly challenging Scope 3 emissions. Stronger community engagement can also inform policy development and support needs-focussed actions that can be co-designed to meet the needs of local people. Formal arenas such as the youth council or student council can have a role to play alongside more thematic or geographical arenas. It is clear that as the city administration grapples with challenges over which it has limited mandate, that the need for more collaborative and empowering processes with communities across the city is key to enabling action at both a political and personal level.

The need to accelerate the transition

Despite many positive developments, the transition towards climate neutrality in Lund must speed up. The challenge of reaching climate neutrality by 2030 must not be understated. At the current trajectory, it is unlikely that Lund will be able to reach the goals of decreasing emissions by 65 percent by 2025 compared to 2010, and by 80 percent by 2030, reaching climate positivity and close to zero emissions by 2045. The low-hanging fruit have largely been picked and the city is now in the next phase of development in which we need to maximise the use of the toolbox available within the local government mandate and work more actively with other stakeholders to drive their investments, actions, business models and behavioural changes in order to reach the 2030 goals. There has been a significant investment in the city budget to support climate transition work to increase momentum, action and delivery on the ground, so whilst the challenges are significant, so is the commitment and engagement from the city, its citizens, NGOs and wider business community.

Developing a Climate City Contract is an opportunity for Lund to take concrete action to improve an already ambitious climate policy by developing strategies that can increase impact. The Climate City

Contract will increase local focus on an ambitious mission and help mobilise knowledge, technical and financial resources to accelerate the transition process in the city.

The city also hopes that the CCC can help support action to achieve social and economic co-benefits in the climate transition. These may be closely related to environmental outputs such as improved public health through emissions reduction, increased active mobility or more sustainable diets, or issues such as economic development in cleantech and climate technologies, new employment opportunities or increased community engagement and community cohesion.

There is a strong climate awareness and commitment in the community, but it is important for a strengthened mandate and increased engagement that co-benefits are visible for politicians, local people and business leaders. The local climate transition can be an economic driver, can increase quality of life, can support community cohesion and can inspire other municipalities in Sweden or further afield that the climate challenge is also an opportunity to seize.

2 Goal: Climate neutrality by 2030

Goal

Lund has made the political commitment to be climate neutral by 2030 with an 80% reduction in GHG emissions by 2030 from 2010 levels and an interim target of 65% by 2025. By 2045 the city will be climate positive and emissions close to zero. Emissions from the transport sector will be reduced by at least 90% between 2010 and 2030. There is also a consumption based ambition to reach a target of 1 tonne / capita by 2050 and to establish clear 2030 targets in the near future. The targets cover the entire administrative territory of the city including the rural area and villages.

Lund's Programme for Ecologically Sustainable Development 2021-2030 (LundaEko III), contains the overall goal for the municipality's climate and environmental work and is based on national environmental quality objectives, Agenda 2030 and Lund's vision. The Programme provides the overarching policy framework with more detailed targets and action programmes outlined in other strategic documents related to more specific areas of work such as mobility, energy and waste. Together this builds a coherent governance framework for climate action across the city administration and city-owned or co-owned businesses and utilities in housing, energy, waste and water.

There are no ETS facilities in Lund.

There is the potential for significant co-benefits from climate action and reducing reliance on fossil fuels. Firstly, many mitigation efforts, such as the preservation and increase of green and natural areas, are simultaneously beneficial for climate adaption and increased resilience towards the adverse consequences of climate change. The severity and impact of e.g., heat waves, extreme water flows and droughts can be decreased. Health benefits related to climate action for the City of Lund's inhabitants will include e.g., cleaner air, healthier modes of transportation, calmer and greener village and city centres. The transition to a carbon neutral economy also offers many business and work opportunities and the potential for Lund's knowledge intensive economy to flourish and develop to meet the climate challenge and other major societal issues.

It is, however, important for the city to establish structured plans for co-benefit development and realisation as it cannot always be assumed that the benefits arise without active support and actions. The integration of social and economic development actions within or linked to climate actions will be essential to these added values and highly important activities.

3 Strategic priorities

Strategic priorities

The City of Lund has identified 6 priority areas to reach climate-neutrality by 2030: Transport & mobility, Agriculture (and sustainable land use practices), Circular Economy and Sustainable Consumption, Net Zero Construction, Energy, Carbon Sinks. The focus areas reflect the overall priorities in Lund's GHG mitigation work.

1. **Transport and mobility:**

Transport accounts for around half of the emissions in Lund, prompting ambitious and wide-ranging measures to be taken to reduce transport-related emissions. While emissions from public transport and travel within the municipal organisation have been reduced to nearly zero, emissions from private and business-related transport have proved more difficult to influence, and on the current trajectory Lund risks not reaching the goal of decreasing transport sector emissions.

Lund's work with mobility is guided by the strategy for an environmentally adapted transport system (LundaMaTs) that describes the importance of engagement with citizens and businesses and the integration of active mobility in urban and rural development. Lund's overarching programme for sustainable development (LundaEko III) includes a target to decrease GHG from the transport sector by at least 90% between 2010 and 2030, and the proposed revision to the Comprehensive Plan proposes a maximum share of journeys by car at 33%. These targets are extremely challenging given the rate of change over the last ten years, and success here will be critical in the overarching 2030 target. This will necessitate innovation, thinking outside of the box and transformational development in the coming years and will be an area in which support through the Climate City Contract could be of particular importance.

2. **Agriculture (and sustainable land use practices)**

After transport, the agricultural sector is the second largest source of GHG emissions in Lund, accounting for approximately 20 percent of total territorial emissions The municipality's influence is limited and measuring emissions is inherently complicated. The Climate City Contract process has been grasped as an opportunity to create a common vision of how the agricultural and food sector should develop, and in defining the role of the municipality in achieving reduced climate impact, sequestration and holistic sustainability. A multi-stakeholder approach is needed across the whole food production chain, not only in primary production, in order to support an economically viable transition. There are agricultural innovators in the municipality, and other innovative and creative food business, and the local Swedish University of Agricultural Sciences is an important partner.

This is an area in which Lund and other municipalities have limited experience of strategic development work and where innovative approaches and the development of win-win actions will be essential for success. Lund is aware that emissions from agriculture are not a priority within the Net Zero Cities programme, it nevertheless is compelled to act in order to address the second highest emissions source in the municipality. Lund therefore recognises not only the local importance, but the opportunity to contribute to new approaches of impact in rural locations across Europe in a field that is challenging to address from a political, financial and social perspective.

3. **Circular economy (and sustainable consumption)**

Lund's Programme for Ecologically Sustainable Development 2021-2030 includes goals related to circular economy for the municipality's own consumption and production and in particular for circularity as a tool to halve emissions in the construction sector by 2025 and be net zero by 2030.

The Waste Management Plan aims to decrease total waste by 35% between 2013 and 2030, which means that waste levels should decrease to 401 kg waste/inhabitant the year 2026. Key measures include minimising and improving separation of waste streams with high climate impact such as

plastics, textiles, electronics, construction and demolition waste; reducing food waste; awareness raising internally and externally and waste minimisation, especially in construction.

Enabling a more circular economy is an important role for the city to support wider moves for more sustainable lifestyles and consumption for the local community. Many of the individual consumption choices have their primary impact outside of the municipality but Lund is exploring ways of working with Scope 3 emissions in its own activities through procurement and in the wider community through awareness raising and improved access to circular products and services. There is significant scope here for innovation and development in the business community and opportunities for the development of new products and services or for new businesses to emerge to fill gaps in the emerging circular economy.

Once more, however, the challenges of the transition to a climate neutral and circular economy are dramatic in a city with significant Scope 3 impacts around the globe and where historical work in Sweden has focussed primarily on recycling and heat-recovery rather than decreased resource use. Collaboration with other NZC cities, market innovators and multi-governance stakeholders will be critical in the creation of a dramatic transition.

4. Net zero construction

The construction and property sector accounts for approximately one fifth of Sweden's total domestic emissions, and just over a third of all waste generated. Local figures are not available but can be expected to be slightly higher due to the relatively high level of construction in the city. Lund, just as Sweden as a whole, experiences high construction-rates to cater to the needs of a growing population. Lund is expected to expand with 16000 new inhabitants, or a growth of nearly 12.5% by 2030.

Combining this trend with the national and local climate goals is challenging, but essential in order to reach climate targets. The City of Lund has therefore developed a plan for climate-neutral construction. The plan includes an action plan with four key areas to guide towards increased circularity in the construction sector through early stage planning; procurement and innovation based on whole life impacts; increased reuse of existing buildings and materials; and cross departmental and sectoral collaboration.

5. Energy

Lund's Programme for Ecologically Sustainable Development 2021-2030 includes targets to reduce end use and primary energy by at least 15% between 2015 and 2030. The target for local renewable energy generation is 1300 GWH of which 100 GWH from solar and wind by 2025 and 150 GWH by 2030.

Lund's Energy Plan has four focus areas: 1. Energy-efficient transport and renewable fuels, 2. Engaging more people in the energy transition, 3. Energy-efficient properties and contracting, 4. Increased self-sufficiency of renewable energy with circular flows.

Guiding all work with energy use and supply is the Energy hierarchy that states that the first step must always be to decrease energy use; step two is the utilisation of residual energy; step three is prioritising renewable energy and step four is the use of lowest emission non-renewable sources as the last resort.

There are significant challenges with security of supply in the region due to limited production and a need to upgrade the network for electricity supply from the production facilities further north in Sweden. Lund and local utility Kraftringen are engaging strongly in regional discussions to find solutions to this issue.

6. Carbon sinks

Lund has as yet not developed a clear strategy for carbon sinks but recognises that there will be 20% of the emissions reduction that will need to take the form of off-setting in the short term to meet the

2030 target. Beyond 2030 the aim is to continue work to reduce the amount of offset by addressing residual emissions.

Lund has been exploring the potential in carbon sequestration, soil improvement and other applications of biochar, not least through a major R&I partnership supported by the Swedish Innovation Agency. The Rest to Best project has demonstrated the potential of biochar production and use within the municipality suggesting that biochar could have multiple benefits and be a viable carbon sink for some of the emissions in Lund that cannot be avoided by 2030.

Lund is also in the process of understanding how the plans for carbon capture and storage on the waste to energy plant in Malmö that handles waste from Lund can impact Scope 3 emissions for Lund. Further analysis work needs to be carried out in dialogue with SYSAV, the waste management company, and the City of Malmö and NZC.

Critical stakeholders in work with the strategic areas

In all strategic areas, but especially Mobility and Circular Economy, the City of Lund has limited direct mandate and so collaboration with other stakeholders is integral to bring about accelerated change. In many ways, Lund is in a good position here. The city already has a long tradition of collaboration with Lund University, integrating research in policy processes and projects, as well as local businesses. The Climate Policy Council harnesses knowledge available at Lund University and the nearby Swedish Agricultural University SLU to provide high level feedback and advice. The Climate Alliance is a well-established business network supporting each other in their climate transition work.

More recently CoAction Lund has been established bringing together 25 stakeholders with sustainability ambitions from the energy sector, IT, industry and real estate, as well as authorities, research and other organisations with a focus on energy and transport systems. The current partners are;

Akademiska hus
Alfa Laval
Axis
Camurus
Coride
EC2B
Energy Opticon
ESS
Future by Lund
Ideon Science Park
Innovation Skåne
Kraftringen
LKF
LKP
Lunds kommun
Lunds universitet
Medicon Village
Modity
Rise
Skånetrafiken
Tetra Pak
Trafikverket
Trivector
ViaEuropa
Wihlborgs

There are also established partnership fora and partnership models with civil society organisations and the Climate transition team is actively supporting the development of new approaches and business models to further support climate leadership from voluntary organisations with the Circle Center organisation as a test case. There are plans for a social innovation hub to better support civil society initiatives.

4 Process and principles

Process and principles

Transition governance

The co-ordination role of the Climate Transition process in Lund is positioned close to the political leadership in a strategically central role in the Environmental Strategy Unit under the Economic Development and Sustainability Section in the City Office.

The core of the transition team is in place and the team is expanding with a number of central roles and support functions. The transition process is driven by a central process manager and a team of transition managers each with responsibility for one thematic action area. The transition managers will have access to support skills from specialists in business development, communications, external relations, strategic development, economics, analytics and innovation. Specific projects for the delivery of the transition areas are supported by a management board with an overview of the city's climate change project portfolio. A climate economist is also planned to be part of the support team.

The transition process is integrated into other strategic plans and targets in areas such as mobility, energy and waste and engages other city departments and city-owned businesses in delivery and monitoring. There is therefore a wide mobilisation of resources around the wider municipal concern to deliver climate action throughout the technical functions within the organisation and with collaboration with other more social functions in the city. In order to fully realise the potential in the development of co-benefits, it will also be necessary for a wider engagement to secure socio-economic synergies.

The actions for the climate transition are overseen at a central portfolio level, where the cumulative impact of actions can be assessed and synergies and potential policy conflicts can be identified at an early stage, and additional resources mobilised to maximise impact.

Whole society approach

It is very clear that the challenges of the coming stages of the climate transition need to deal with a complexity of limited municipal mandate and significant numbers of stakeholders that hold the key to climate action ranging from small to large businesses, community organisations to citizens as well as academia. The overarching principle for the transition process builds on a cross-departmental and cross sectoral collaboration with a strong grounding in climate science, financially and socially acceptable measures that can help drive economic development, improve quality of life and increase social justice locally and globally. The creation of a socially just and equitable transition is key to ensure a joined up long term approach with broad public and political support.

Monitoring, learning and iterative development

The Climate Transition process in Lund combines traditional local government monitoring, reporting and planning on a quarterly / yearly cycle with a more iterative continual assessment and learning approach to enable rapid response to changing circumstances and experience of delivery. Whilst the traditional monitoring and reporting takes place in each local government department, the climate transition iterative approach will bring together participating local government departments as a unit and work with other stakeholders on a regular basis to understand progress, challenges and opportunities.

The process will be led by the transition team and co-ordinated with major projects in the portfolio such as CoAction Lund and CoPilot Lund and together with the Future by Lund innovation platform. The process is designed to build a strong team across organisational boundaries and to share personal and organisational perspectives, learn from the different approaches and circumstances of individual initiatives, organisations or project teams in order to rapidly scale successful solutions or

processes, tackle problems that arise collaboratively and identify challenges, improvements, opportunities to accelerate progress and increase impact.

Some projects and initiatives actively engage evaluators and critical friends within the delivery framework and this can provide additional perspectives. The Climate Policy Council of independent researchers provides an additional critical friend analysis on progress, challenges and priorities for the continued development process. The results and conclusions of the learning process are shared with senior management and the political leadership to ensure that challenges and opportunities can be addressed at an appropriate level, and that learning from the climate transition process can be fed into other relevant work in the city. This reporting is then supported with more conventional quarterly and annual reporting through the political system and fed into annual work programming and budgeting processes and also into global climate reporting on an annual level.

5 Signatories

The table below enlists the signatories[1] who are committing to this CCC, and thereby to help the city achieve its goal to reach climate neutrality by 2030. Specific agreements that articulate the details of the climate action(s) between the municipality and signatories are added to the individual contracts in Appendix 1 (see sample in section 6). The number and relevance of signatories' commitments is likely to increase over time.

Name of the signatory (organisation)	Sector / Domain / Level of operation[2]	Legal form	Name of the responsible person	Position of the responsible person
City of Lund	Local government	Kommun/municipality	Anders Almgren	Mayor / Chair of the City Executive Committee

[1] Climate City Contract signatories may be individuals or organisations. They ideally include national and/or regional governments, for example concrete agreements/ commitments made through the multi-level governance engagement processes supported by NetZeroCities, CapaCities, and other emerging national level initiatives.
[2] Please mention if the organisation is active at local, regional, national, or international level.