GREEN TRANSITION IN AARHUS

3 Holme Parkvej

Climate Action Plan 2021-2024



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CITY OF AARHUS

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INTRODUCTION

Just over ten years ago, Aarhus City Council set an ambitious goal of a CO_2 -neutral urban society by 2030. Since then, municipal employees, companies, knowledge institutions and citizens have been working to reduce the city's emissions. During this period, emissions have successfully been halved. Aarhus is now among the cities in the world to have experienced the greatest positive change in terms of greenhouse gas emissions. For this, we are rightly proud. This shows the benefit of sharing high ambitions.

At the same time, Aarhus as a city region is a global leader in getting green transition and business development to go hand in hand. We must exploit this even more at a time when business development is particularly important.

With the green transition come a number of investments. We will use them to get started – not just in the green transition - but also in one business sector that needs a new beginning. But we can do much more than that.

Being climate-friendly is no longer just for the few. This is an increasing demand from all kinds of citizens and customers. It is therefore important for all companies to adapt. As a municipality, we must support this change through, among other things, training future employees with new knowledge and new skills. The municipality has a huge operational responsibility. Through partnerships in climate-friendly procurement and by using the municipality's operational functions to support the development, testing and demonstration of new solutions, the municipality can make a significant contribution to the necessary change. In this way, we can help inspire the rest of the world with precisely those solutions, developed in local partnerships.

The climate crisis is global, but can only be solved locally. As citizens, we are not only part of our communities, we are also part of the world. In the same way that we rely on others to create change around the world in order to resolve the climate crisis, they also depend on us. Nobody reaches the goal until everyone reaches the goal. The same applies in Aarhus. 90% of the remaining CO_2 emissions in Aarhus come from sources that are outside the city council's direct influence. Therefore, the last part of our journey towards a climate-friendly urban society requires that we take that journey together. If we are smart, we resolve not only the climate crisis. We can also create an even better city for everyone!

In short – we are part of the solution!

Kind regards,

Bünyamin Simsek

Technical and Environmental Councillor, Aarhus Municipality



A DECADE OF LOCAL CLIMATE ACTION

For more than 10 years, Aarhus has worked systematically for climate action. Emissions have halved, and Aarhus is now among the cities in the world to have undergone the greatest positive change in terms of emissions. The lowest hanging fruits have been harvested, which means that the challenges for the next 10 years are even greater.

We have gained a great deal of experience, which provides us with a good starting point for the work over the coming years. We know what needs to be done, and we know what this will require. We have gone from understanding that the climate challenge was a simple exercise in reduction, to seeing the complete jigsaw puzzle, with all the many pieces that must fit in order to build a society without fossil fuels. Now it's all about putting this knowledge into practice and putting the puzzle together. Major changes have been made in the energy sector in particular and with that, a reduction in energy consumption. Over the next 10 years, the issue will be generating a greater transition to renewable energy in the other sectors, and of building a society in which all sectors interact, and where we have reaped all possible benefits along the way. There will be three particular sectors in focus during the coming period up to 2024; transport, essential infrastructure and clean-up:



CO₂-Emissions for Aarhus as a society

Transport

The transport sector is particularly challenged in relation to the green transition and is therefore a particular focus during the coming planning period in Aarhus. The sector has not come very far in the transition to renewable energy. Light transport must be reduced and the composition of transport must be changed, while the remaining light transport must switch to electrical technology and be converted to renewable energy. Aircraft, ships and heavy transport are more demanding and are bound to fossil technology through many large and long-term investments. No viable alternatives to fossil technology have yet been developed. For us to overcome the climate challenge in a timely manner, it will be necessary to find other ways to convert to renewable energy in the short term.

Necessary infrastructure

Through work with strategic energy planning, it has also become apparent that preparing Aarhus for the future is essential for a timely and cost-effective transition. We must carefully plan and future-proof energy infrastructure. Energy planning is therefore also a special focus area in the coming period.

Clean-up

Becoming a carbon neutral society is no longer enough to solve the climate crisis. Although we have put a lot of effort into reducing emissions, too much CO_2 has been released into the atmosphere to avoid severe climate change. In order to meet the goals of the Paris Agreement, this challenge must be taken seriously. Therefore, the preparation and construction of facilities for future large-scale CO_2 capture is also an important aspect of the coming period.



VISION AND ACTION

Many pieces of the puzzle must be placed in the green transition before we reach our goal as a society. At the same time, developments are happening fast. For us to succeed, it is therefore important to keep our eyes on the goal, and divide the task into smaller pieces which can be systematically pursued, while at the same time exploring new opportunities that arise with increasing knowledge and technology.



CLIMATE GOALS







INITIATIVES

Climate strategy

It is important that we have a common vision of the changes that need to be made for us to achieve the goal. Together with the City Council's binding climate targets and a number of ambitious goals for change in all sectors, they set the direction for our work on the green transition. The framework for this work is defined in a number of fundamental principles for the green transition in Aarhus. The direction and framework for this are combined in the 2030 Climate Strategy.

Climate Action Plan

The Climate Action Plan describes the focus areas to be worked on in the coming four-year period. It will help to ensure that the most important changes during this period are implemented and that the desired benefits are realised. The focus areas have been chosen both to ensure the possible short-term changes with direct benefit, but also to carefully form the basis for long-term changes.

Climate Action Initiatives

In order to ensure the implementation of the focus areas and the realisation of the desired benefits, it is necessary to work systematically and in a targeted manner to implement specific changes. So, as a supplement to the Climate Action Plan, a number of initiatives are associated with each focus area, which describe the concrete changes that must be implemented in the plan period up to 2024.

EFFECTIVE GREEN TRANSITION



The transformation of society as a whole requires a transformation of all sectors. The key to creating the necessary changes in climate action is having a good overview of the desired changes as well as the actual results created in society. **We call this** gains.

Naturally, the Climate Action Plan focuses on climate change. The most important benefit is to reduce the amount of greenhouse gas emissions in the atmosphere and in the slightly longer term to actually extract CO_2 from the atmosphere. But what does this mean? In the climate strategy, this translates into a description of the changes that must be created in society. The paths to these can be many, and there are many secondary effects that need to be considered.

When you take a closer look at the transition, there are many other important benefits to pursue along the way to achieving the goal. This is either because they are important prerequisites for the transformation of society, or because they help to ensure that the green transition creates a better urban society, with more jobs, better health, etc. The climate strategy describes the primary benefits being worked on with climate action in Aarhus. For the period up to 2024, the Climate Action Plan describes which direct benefits the individual sub-programmes are expected to create and a brief assessment of potential secondary effects. A more detailed description of the individual initiatives and their benefits can be found in the "Action Catalogue" for the Climate Action Plan.

The Climate Action Plan shows the total expected benefits for each sub-programme.

"Total direct CO₂ reduction in Aarhus" is the expected reduction in greenhouse gas emissions up to 2024 within the municipal limits (Scope 1-2).

"Reduction in indirect CO₂ emissions" is the expected gain on reduction outside the municipal boundary up to 2024 (Scope 3).

"Important prerequisites for conversion" is the degree of importance that the sub-programme's initiatives consider as a prerequisite for the overall green conversion of society, e.g. increased knowledge and infrastructure.

"Positive secondary effects" is the degree of other positive effects that actions in the sub-programme create for society, e.g. increased health and more jobs.

"Additional effects" is a comprehensive description of the effects that focus areas have in addition to a reduction in direct CO_2 emissions (Scope 2).



SPECIAL FOCUS ON THE GREEN INDUSTRY



Aarhus has a particularly favourable position in terms of combining green transition with growth. We call this green growth. At a time when the world licks its wounds from the Coronavirus epidemic there is, if anything, a particular need for green growth. The climate crisis is still present and by paying special attention to the many opportunities for creating growth and jobs through the green transition, even major challenges can present opportunities. Many companies in and around Aarhus thrive by providing climate-friendly solutions to the whole world. There have to be more of them.

Business development is therefore a special focus in all efforts in the Climate Action Plan. Together with the overall business plan "partnership for sustainable growth", this creates a platform for green growth. This is achieved by continuing to:

- Work closely with local businesses of all sizes and stages, e.g. on joint development, testing and demonstration of climate solutions
- Cooperation with educational institutions on future climate-competent workforces
- Develop cluster- and innovation environments locally and nationally
- Through partnerships and safeguarding interests with relevant stakeholders that create value for everyone
- Have an international outlook

UNITED FOR THE GREEN TRANSITION

Solving a challenge like the climate crisis requires major changes throughout society. No-one can do it alone. 90% of the CO₂ emissions that remain in Aarhus Municipality come from sources over which the City Council has no direct influence. This is a challenge that can only be solved by all players in society as a whole. We call this 'The municipality leading the way'.

Aarhus is full of players who have taken up the baton. By leading the way, they are helping to light the way for us others, and they are helping take decisive new steps into unknown terrain and to inspire others in the common movement to bring all of society to its goal.

The baton will regularly pass to different players - and a selection of them have found their way to this climate action plan. Meet them over the next few pages.

The climate relay can be found in the municipality's annual magazine for the green transition and regular newsletters, and helps to put a face on the climate initiatives and inspire people across society to act. See more at gogreenwithaarhus.dk



KIMASTAFETTEN

BY 2030, AARHUS WILL

Have fossil-free energy production and have taken a major step further in the transition to a variety of renewable energy sources.

Have a strong position in implementing technologies to capture, exploit and store CO_2 at scale.

Through digitisation, have created a coherent smart energy system that can effectively support 100% renewable energy in all sectors.

Through strategic energy planning, have ensured a cost-effective and timely conversion of the energy system.

Source: Aarhus Municipality Climate Strategy 2030

In order to achieve 100% renewable energy in all sectors in the future, and ensure the optimisation and exchange of energy between everything from buildings to transport, transition to an integrated energy system is vital, and as such, a high priority task.

The Energy sub-programme will help ensure that the key players in the energy system of the future deliver a common, cost-effective and secure transition; that the production of renewable energy is increased and that long-term investment initiatives in green technology are initiated, so that Aarhus contributes to creating greater diversity and resilience across the energy system, and to supplying sustainable fuel (Power-2-X) to the transport sector.

Up to and including 2024, we will work with a common framework for conversion so that energy planning, urban development and urban planning work together on an integrated energy system, with a focus on removing the last residues of fossil fuels from energy production and up to the establishment of several local plants for renewable energy production. Together with the major building owners, we will continue to work on reduced and more intelligent energy consumption, and focus on long-term initiatives such as 'Energy Parks' and 'CO₂ capture', which can, up to and after 2030, begin the major task of 'clearing up after ourselves' while at the same time guaranteeing the heavy part of the transport sector's need for sustainable fuel.

GAINS ARE





Common framework for conversion

Joint strategy and planning is one of the keys to creating a timely and cost-effective – and thus possible – conversion of the energy system in Aarhus. A joint energy strategy has been drawn up with the actors responsible for the production and delivery of energy, and has established a community around the strategy, which coordinates the most important initiatives.

It is now time to realise the strategy, which covers initiatives such as minimising inconvenience for citizens in the construction of energy infrastructure, large-scale solar cell installations, the preparation of new urban areas for renewable energy and infrastructure for electric cars.

The agreements and projects that are co-created in the energy strategy are supported by the planning of all partners. For Aarhus Municipality, this means that energy is incorporated into all relevant levels of urban planning, urban development, etc. so that work on climate-friendly construction and the deployment of charging infrastructure for electric cars is supported.

Additional effects

This focus area is the crucial prerequisite for other actions in the energy area and a number of other areas. This is where the necessary knowledge and solutions can be found within the community between those who share responsibility.

Initiatives

E-1 Implementation of Energy Strategy Aarhus

Related initiatives

- New Heating Plan
- New Waste Plan
- · Construction and urban development

Increased renewable energy generation

Aarhus has come a long way with local generation of renewable energy in its work with previous climate action plans. However, as all sectors switch to renewable energy, even more generation will be needed to meet an expected significantly increased energy demand.

Through these initiatives, we will achieve our goal of reducing the last residues of fossil fuels in energy production and, at the same time, establish several local plants for energy production with renewable sources such as solar and wind power.

Additional effects

In addition to providing significant direct reductions in greenhouse gas emissions, this focus area could help create a local supply of green and cost-effective energy solutions. This will strengthen the competitiveness of the business sector in Aarhus, as green energy solutions become an increasingly competitive parameter.

Initiatives

- E-2 Phasing out fossil energy production
- E-3 Large-scale renewable energy

Related initiatives

- Geothermal energy in Aarhus
- Test of seawater heat pump in Aarhus $\ensuremath{\varnothing}$



The efficient and flexible energy system

Aarhus has a unique opportunity to utilise existing energy infrastructure by creating the energy parks of the future, which can utilise surplus wind energy to produce electrofuels, ensure large-scale energy storage, deliver district heating as a by-product and create the basis for CO_2 capture and storage.

Reducing energy consumption is a prerequisite for a cost-effective green transition. Therefore, we create 'Energispring, which is a data-driven initiative with a focus on better management and optimisation of energy consumption,together with the city's largest building owners.

In order to establish an efficient and flexible energy system, together with energy parks, CO_2 capture and reduction in energy consumption, we must also ensure that the district heating system can utilise its strength to minimise energy waste and create cost-effective collective solutions, e.g. by absorbing excess heat and providing district cooling.

Additional effects

Long-term initiatives in this area can result in very large reductions up to and after 2030, and great potential for creating the framework for technological development, jobs and exports from Aarhus.

Initiatives

- E-4 Surplus heat and district cooling
- E-5 Energy parks and CO₂ capture
- E-6 Energy Jump

Related initiatives

- Climate alliance
- GoGreenWithAarhus (Delegations service)





OVERVIEW OF INITIATIVES

Common framework for conversion

E-1 Implementation of 'Energy Strategy Aarhus'

Increased renewable energy generation

E-2	Ending fossil energy produktion
E-3	Large-scale renewable energy

The efficient and flexible energy system

E-4	Surplus heat and district cooling
E-5	Energy parks and CO2 capture
E-6	Energy Leap Aarhus

CLIMATE RELAY

Jacob Vittrup, CEO, NRGi.

What do you see as the biggest challenge for the green transition in Aarhus?

We face challenges in the the tax system. The wise men of economics have recommended that electricity tax be reduced. Both in terms of CO_2 content and energy content, tax on electricity is higher than on other fuels, which distorts the energy consumption of companies and households, resulting in loss of productivity and welfare, and which delays the green transition.

The challenge is primarily to get the right business models – the technologies are already there.

A reduction in taxes will also make it possible to convert a larger proportion of passengerand goods transport to more sustainable forms of energy, such as electricity.

In addition, new tax structures will support the reduction of energy consumption in buildings from before 1979, which have not yet been energy renovated. The challenge is primarily to get the right business models – the technologies are already there.



TRANSPORT AND MOBILITY

BY 2030, AARHUS WILL

- Have reduced the city's transport needs as much as possible.
- Have increased the proportion of passenger transport in public transport, by bicycle and on foot.
- Have a highly electrified passenger car fleet (40% electric cars).
- Run all public transport, private buses and taxis without fossil fuels (100% reduction).
- Have reduced the consumption of fossil fuels in trucks, ships and aircraft (30% reduction).
- Have ensured, through proactive cooperation, the necessary infrastructure for supply of renewable energy in the transport sector in a timely and cost-effective manner.

Source: Aarhus Municipality Climate Strategy 2030





Transport is by far the largest contributor to greenhouse gas emissions in Aarhus. The number of passenger cars is increasing and the proportion of renewable energy is small. One important tool is to minimise the need for transport. In this way, the need for new energy production, storage and infrastructure will be reduced and the costs will therefore also be reduced. This is particularly important in the green transition, where transport requires large amounts of new renewable energy. For this reason, we continue to work on smart urban development and behavioural changes in order to minimise the need for transport.

However, consumption of energy is not the same across all modes of transport. Therefore, work is also being carried out to change the composition of means of transport. This is achieved by working to ensure that more people choose a bicycle, carpooling or use the light rail system.

However, conversion to renewable energy also requires a major shift in transport technology. Petrol cars must be replaced with electric cars. And aircraft, ships and trucks must replace fossil fuels with new types of fuels produced with wind turbine power. For this to be possible, buildings and cars must intelligently share energy.

GAINS ARE



Reduction in indirect CO2 emissions

LOW

Important prerequisites for transition

HIGH

Positive derived effects

LOW



Reduced transport needs

Reducing the need for transport minimises the expected increase in the need for renewable energy and infrastructure for this sector. This helps to make the conversion more affordable and at the same time has a number of positive effects. Aarhus Municipality therefore actively uses municipal plans and local plans to set requirements for the development of the city, so that the need for transport is minimised. In existing urban areas, the municipality will focus on changing behaviour, both in the transport of people and goods, e.g. by promoting office communities and the possibility of working from home and joint deliveries in collaboration with the city's businesses.

Additional effects

The focus area is an essential prerequisite for achieving the goals for mobility and transport, as less transport is easier and cheaper to convert. In addition, reduced driving also helps to reduce air and noise pollution, as well as congestion in the city, thus making room for other purposes.

Initiatives

- TM-1 Ensuring alternatives to motorised transport in urban planning
- TM-2 Fewer fossil miles per person in daily life
- TM-3 Implementation of City logistics

Related initiatives

- Parking policy
- Municipal plan

Change the composition of transport

An important tool to reduce greenhouse gas emissions and create more energy efficient transport in the city is to change the nature of transport. This can be done by getting more people using modes of transport with less energy consumption, such as light rail, carpooling and bicycles. The climate-friendly choice must also be the easy and natural choice. Aarhus Municipality is working to create a good framework for cyclists and improve public transport. This is done, for example, through the bicycle action plan and the forthcoming public transport plan for Aarhus Municipality.

Additional effects

In addition to reducing the need for energy for transport, a change in the composition of transport also helps to increase health and well-being by reducing particulate emissions and increasing exercise.

Initiatives

TM-4 More choose public transport TM-5 More bicycles

Related initiatives

- The bicycle action plan
- Collective traffic plan



Change of technology and fuels

Even though the need for transport is reduced and many people are changing modes of transport, there will still be relatively high fossil fuel emissions in the sector. In order to achieve the goal of the green transition, it is essential that the municipality works to increase the proportion of renewable energy in transport. This can be done, for example, through electrification of private cars and alternative fuels for aircraft, ships and heavy transport. And by ensuring access to renewable energy in the form of electricity and alternative fuels, from an energy system in balance with the transport sector. Aarhus Municipality will therefore engage in targeted dialogue and cooperation with companies, to develop transport plans and work to increase the production and availability of the alternative fuels.

Additional effects

In addition to having one of the greatest potentials for direct GHG reduction locally, this also offers significant commercial potential for the development of new technologies, products and services that can generate increased local exports. There is also a health benefit from electrification of transport in relation to particulates and noise.

Initiatives

- TM-6 Promotion of Electric Vehicles
- TM-7 Taxi Electrification
- TM-8 Phasing out fossil fuels in the transport sector

Related initiatives

- Green transport plan
- Energy strategy Aarhus

Tools and infrastructure

In order to succeed in a green transition of the transport sector, it is important to create the necessary prerequisites for change. For this reason, the focus area will be the incentivecreating tools to increase motivation among citizens and companies, both through cooperation on changed transport, but also with regulation, where necessary. Necessary charging and energy storage infrastructure must be developed so that the transition in technology to electricity and fossil-free fuels can succeed, and companies must be offered support in the transport transitions. This major shift to renewable energy and new technology provides many opportunities for efficiency, e.g. in the area of lighting, but it also places great demands on planning and ensuring the necessary infrastructure for the energy supply of the city's transport in a timely manner.

Additional effects

In addition to supporting the overall transport effort, this focus area contains significant efficiency potentials for municipal operations, as well as considerable potential for support of local innovation and business development in creating a more attractive city.

Initiatives

- TM-9 Regulation and incentive for climatefriendly passenger transport
- TM-10 Ensure adequate charging and energy storage infrastructure
- TM-11 Replacement of Road Lighting for LED

Related initiatives

- Charging infrastructure strategy
- Lighting strategy



OVERVIEW OF INITIATIVES

Reduce transport needs

TM-1	Ensure alternatives to car-dependency in urban planning
TM-2	Fewer fossil person-kilometres in daily life
TM-3	Implementation of City logistics

Change the transport composition

TM-4	More people choosing public transport
TM-5	More cyclists

Change of technology and fuels

TM-6	Driving electric cars
TM-7	Taxi electrification
TM-8	Ending fossil fuels in the transport sector

Tools and Infrastructure

TM-9	Regulation and incentives for climate-friendly passenger transport
TM-10	Ensure adequate charging and storage infrastructure
TM-11	Replacing street lights with LEDs

CLIMATE RELAY

Kristian Buus and Anders Bjørnlund, Buus Anlægsgartner A/S.

What do you see as the biggest challenge for the green transition in Aarhus?

One of the major challenges for the green transition of Aarhus is transport. It is not only passenger transport, but also commercial transport that places a strain on it. That's why we are trying to convert our own fleet. So far we have five electric cars out of 45 cars. One of the challenges in acquiring more electric cars is that the charging infrastructure is still not sufficient. There are simply too few charging stations.

It is obvious that private individuals could use our electric cars during the periods when they are standing still.

In addition, we would like to contribute to even more people considering electric cars. As a company, we do not use our cars all the time. In fact, we wanted to increase the coverage of our electric cars. It is obvious that private individuals could use our electric cars during the periods when they are standing still. Unfortunately, we are challenged by the taxation system for commercial vehicles, which means that it is not possible for private individuals to rent a commercial car. In addition, there is a lack of insurance solutions for these issues. We believe that sharing economy - for example in cars - can help to reduce the general consumption of resources and thus contribute to resolving the climate challenge.



CONSTRUCTION AND URBAN DEVELOPMENT

BY 2030, AARHUS WILL

- Have a city that supports a society of renewable energy as optimally as possible.
- Have grown larger without increasing energy consumption.
- Significantly reduce greenhouse gas emissions from materials and activities for construction and urban development (70%).
- Have implemented changes ensuring that soil from construction and civil engineering activities is generally not transported outside the districts in which they take place (maximum 5km).
- Be among the country's leading test and demonstration cities for climate-friendly construction.

Source: Aarhus Municipality Climate Strategy 2030

In order for future buildings and open areas to support a city with renewable energy in all sectors, they need to use minimal energy, use energy correctly, produce and store energy, supply energy for e.g. electric cars, be flexible and durable and not emit CO_2 in the construction phase.

The Construction and Urban Development sub-programme will help to ensure this, so that we can create a reliable and robust energy system and infrastructure, such as batteries, that will handle fluctuations in renewable energy. Work must be focused on construction designed for a long lifespan, flexibility and high recycling, so that the CO_2 footprint from the construction phase is reduced.

By 2024, we will work together with the construction stakeholders on a common green direction for climate-friendly construction and urban development. Through partnerships, pilot projects and innovation laboratories, we will work to ensure that Aarhus can become a leading test and demonstration city for climatefriendly construction, and work for a circular city, whith the goal of a 70% reduction in greenhouse gas emissions from materials and activities to construction and civil engineering.

GAINS ARE Reduction in indirect CO₂ emissions MEDIUM **Important prerequisites** for transition **MEDIUM Positive derived effects** MEDIUM

CONSTRUCTION AND URBAN DEVELOPMENT

Common green direction

As with the Energy Strategy, which sets the direction for climate work up to 2030 in the energy sector, a common strategy for building, construction sites and urban development must be developed, which will ensure close cooperation between all key players within construction. The strategy must be formulated in close collaboration with the upcoming plan strategy and revision of the municipal plan.

Energy production on roofs and facades, energy storage, energy renovations and increased waste sorting equipment will be part of the urban landscape, and the architecture policy will therefore help raise the debate around how a city of 100% renewable energy with the necessary climate adaptation should look.

The framework for the green conversion of construction is largely determined by legislative changes. Input concerning barriers to legislation, legislative changes and experiences with the scope of the law are collected and passed on to actors with an influence on the formation and adaptation of legislation.

Additional effects

The focus area is a crucial prerequisite for realising the ambitions for the conversion and development of tomorrow's urban development and construction. This is where knowledge, initiatives and relationships are created, together with the responsible stakeholders, who enable many of the sub-programme's other activities.

Initiatives

- BB-1 Climate-friendly buildings, construction sites and urban development strategy
- BB-2 Green Architecture Policy
- BB-3 Energy in urban planning

Related initiatives

- Architecture policy
- Plan strategy and revised municipal plan
- · Acquisition and land-sale strategy

Leading city for test and demonstration

Aarhus has great potential to be a leading test and demonstration city for climate-friendly construction, plant solutions and urban development. A joint effort is therefore being launched to create a partnership for climate-friendly building culture. This can make it possible to unite the many players in the construction and civil engineering industry, who together can realise this potential.

Aarhus already has a number of experiences and competencies to draw on in relation to new building materials and solutions. Together with the partnership, a laboratory will be established for climate innovation and the testing of new solutions, in which the municipality, private players, educational and innovation environments can put their knowledge into play in pilot projects.

Additional effects

Cooperation, testing, and development of new solutions contributes to creating jobs and increasing opportunities for green exports within construction and urban development, just as the focus area can contribute to increased international awareness of Aarhus within product innovation, urban development and construction.

Initiatives



The circular city

Through previous climate initiatives, Aarhus already has a strong position when it comes to circular construction. The circular city builds further, with a focus on the overall value chain of construction and a more holistic way of building, developing and planning, (for example through the promotion of renovation and recycling rather than new construction) material banks and demonstration buildings with climatefriendly materials. The circular city has visible sustainable resource management, reducing the municipality's overall CO₂ footprint. This is achieved through sustainable land management, smart waste sorting, reduced fossil-driven machinery and optimal planning of the city's layout.

Additional effects

Promoting recycling of building materials and other resources will create significant secondary CO_2 reductions, thereby reducing the need for the production of new ones. A focus on circular economy can be a transverse platform for construction sector's players in the development of climate solutions, which can only be achieved by thinking across industries and sectors.

Initiatives

- BB-5 Circular economy in construction and civil engineering
- BB-6 Sustainable soil management
- BB-7 CO₂ neutral construction sites
- BB-8 Climate-neutral construction strategy
- BB-9 Climate-friendly social housing strategy

Related initiatives

Circular economy recommendations





OVERVIEW OF INITIATIVES

Common green direction

BB-1	Strategy for climate-friendly building, construction sites and urban development
BB-2	Green architecture policy
BB-3	Energy in urban planning

Leading test and demonstration city

BB-4 Climate Forum

The circular city

BB-5	Circular economy in construction
BB-6	Sustainable soil management
BB-7	CO2 neutral construction sites
BB-8	Climate-neutral construction strategy
BB-9	Climate-friendly social housing strategy

CLIMATE RELAY

Lars Kvist and Heidi Hjort Thuesen, Arkitema Architects.

What do you see as the biggest challenge for the green transition in Aarhus?

Aarhus is undergoing major changes. The city is being transformed, becoming more densely populated, and new neighbourhoods are growing. It's happening fast. The traffic infrastructure and the city's breathing spaces are under pressure. Online shopping and digitisation are changing and affecting the life of the city – for better and for worse.

The city and its architecture must be developed in a balance between new technological opportunities and spaces for social communities.

Technical solutions are available, but not necessarily used. The sustainable city requires holistic thinking towards new ways of living, building and developing.

The city and its architecture must be developed in a balance between new technological opportunities and spaces for social communities.

The challenge is to get everyone involved in the development of a social, attractive and green city.



INDUSTRY AND AGRICULTURE



- Have implemented a comprehensive energy efficiency improvement in industry (30%).
- Have an industry that no longer uses fossil fuels for process energy and that has converted internal transport to renewable energy (100%).
- More climate-friendly local agriculture, that has significantly reduced greenhouse gas emissions (25%).
- Industrial companies and agriculture have integrated climate and circular economy into their business models.

Source: Aarhus Municipality Climate Strategy 2030



Aarhus is still an industrial city. It is not always obvious, but many people work in the process industry that continues to characterise the city. Around the city, active farming is flourishing, which is the origin of a strong produce-cluster growing food for the whole world. Both sectors are still dependent on fossil fuels, but also have great potential to contribute to the green transition. The municipality will therefore support minimising energy and resources and that the city's industry and agriculture achieve production without the use of fossil fuels.

At the same time, we must ensure that as much surplus energy or waste as possible is reused, for example as extra heating or in a symbiosis with other companies. In the future, one company's waste must become another company's raw material. Agriculture has a good weighting between climate-friendly food production, CO_2 storage and energy production that supports the needs of society. This requires new types of business models, technologies and collaborations.



INDUSTRY AND AGRICULTURE

From soil to soil

Until now, there has been no focus on targeted cooperation with the agricultural industry on the climate agenda in Aarhus. For this reason a platform for project collaborations between important local players is being created. There is particular focus on climate-friendly use of private land and food value chains, and together with other stakeholders, new forms of landuse are being identified and supported. These benefit both the economic bottom line and the climate in interaction with national legislation and national policy initiatives for the area. The municipality's contact with the agricultural authorities acts as a lever for cooperation, dialogue and development.

Additional effects

Increasing the speed of the green transition within the food industry can strengthen the robustness and competitiveness of the industry and help to create precisely the products that will meet tomorrow's demand for climate-friendly food. By using land for CO_2 storage, more nature can also be created and with that, a richer life for citizens, animals and plants.

Initiatives

- IL-1 Food value chains from soil to soil
- IL-2 Climate-friendly agricultural land use
- IL-3 Enhanced supervision and dialogue with agriculture

Industry processes

Today, many industrial companies use fossil fuels for heating and processes. Some of this can be replaced by locally produced energy and new fuel-free technologies, but not all. Therefore, the production of renewable energy for companies must be increased and fossil fuels replaced by alternative fuels. The use of fossil and virgin materials in production must also be replaced by increased recycling and circular models, where materials are cycled, so that one's waste is the other's raw material. As an authority and partner, the municipality will continue to develop statutory supervision into an even more active tool that can help identify energy streams and materials, share knowledge and create new collaborations to promote the green transition in the industry.

Additional effects

Replacing the use of fossil fuels with cheaper renewable energy, and following this up with more efficient use of energy and materials, not only benefits the climate, it also benefits the bottom line in industry and increases competitiveness. Increased symbiosis on the use of resources, will allow new products and companies to arise.

Initiatives

- IL-4 Solar energy for industrial companies
- IL-5 Alternative sources of liquid gas
- IL-6 Strengthened supervision and dialogue with industry
- IL-7 Circular economy and symbiosis



Knowledge and cooperation

Being a small company alone can make the journey to a fossil-free world difficult. The partnership for green growth introduces a partnership for conversion. With this, small businesses and agriculture can join forces and commit to reducing greenhouse gas emissions in a voluntary partnership. Building new knowledge and skills is an important part of this partnership. For example, by enhancing the qualifications of newly qualified academics with competencies in green transition and finding precisely the companies in the partnership that lack these competencies, green transition, employment and growth are created. We call this win-win-win and it is the stuff that generates valuable changes. But even with the best intentions and will to change, there can be bumps along the way. Knowledge from the partnership must therefore be translated into a joint effort when laws and regulations stand in the way of transition.

Additional effects

Transforming the city's businesses and agriculture doesn't just help reduce local greenhouse gas emissions. The transition also creates demand outside the municipality for climate-friendly solutions, and companies become more resilient, with increased demand for climate-friendly products. This not only helps to resolve the climate crisis, but also ensures and creates new local jobs.

Initiatives

IL-8 Green change agents for industrial and agricultural concerns

Related initiatives

- Aarhus Municipality's climate alliance
- "Partnerships for sustainable growth", Business Plan Aarhus





OVERVIEW OF INITIATIVES

From soil to the earth

IL-1	Food value chains from soil to soil
IL-2	Climate-friendly land use of agricultural land
IL-3	Strengthened supervision and dialogue with the agriculture sector

Industry processes

IL-4	Solar energy for industrial companies
IL-5	Alternative sources of liquid gas
IL-6	Strengthened supervision and dialogue with industry
IL-7	Circular economy and symbiosis

Knowledge and cooperation

IL-8	Green agents of	change for industria	al and agricultural concerns
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CLIMATE RELAY

Anne Zachariassen, Chief Operating Officer, Port of Aarhus.

What do you see as the biggest challenge for the green transition in Aarhus?

At Aarhus Harbour, we are committed to making things happen so that ideas, plans and strategies are translated into action.

> We are currently working to establish an energy guild that can ensure green power for the operation of all the companies at the port.

Our own strategy has two sides. On the one hand, we aim to be CO_2 neutral by 2030 and be the most sustainable port in the Baltic Sea Region – and we are well on our way. On the other hand, we want to establish a framework that can support green development for all the companies at the port. This means that our contribution to the green transition will also benefit our customers and partners.

Currently, we are working to establish an energy guild that can ensure green power for the operation of all the companies located at the port, regardless of whether they need power for cooling a cold store or for the many electric cars and electrified machines that we already see around the port.

An energy guild will enable companies to contribute to a common green project, reaping both investment and utilisation benefits, because more companies can work together more.



TRANSFORMING AARHUS

BY 2030, AARHUS WILL

- 1 Have developed new technologies and innovative forms of cooperation that help support the transition to a CO₂ neutral society, and doubled exports of climatefriendly solutions.
 - Have the most climate-friendly and competent citizens and companies in Denmark.
 - Be in a strong position among the leading cities in green transition.

Source: Aarhus Municipality Climate Strategy 2030

Tildeles i 2017 UI: Premie: Radgivningssession med COWI, Merkur Bank, Wondperfect og Klimasekretoriatet

CONT Processor & PERFE

In order for Aarhus to become a CO₂-neutral city in the future, supported by green, innovative and digital companies, as well as local and educational communities, it requires a strong public movement and strong business partnerships.

In close cooperation with the research and education sector, Aarhus Municipality will be an attractive municipality to study, work and do business in; through knowledge, cooperation, drive and joint commitment from the cultural community to the business community. Aarhus Municipality will become a magnet for the most talented and innovative citizens, students, researchers and entrepreneurs. At the same time, Aarhus will retain its international position as a leader in a number of green and climate-friendly solutions.

Up to and including 2024, the focus will be on innovation, partnerships and funding within the climate area, as well as development of Aarhus as a leading innovation platform, test and demonstration city for green solutions. Strengthening the knowledge of citizens and companies is a prerequisite for companies to find employees with the necessary qualifications within climate, green transition and innovation. In order to increase drive towards the green transition in Aarhus, access to and opportunities for active participation in decisions are being strengthened through the consultation portal, the Danish Council of Citizens and the public budgets.

GAINS ARE

Total direct CO₂ eduction in Aarhus

Reduction in indirect CO₂ emissions

MEDIUM

Important prerequisites for transition

HIGH

Positive derived effects

MEDIUM





Innovation and export

Under this focus area, the business and growth initiatives that focus on innovation in the climate area and the development of Aarhus are brought together as a leading innovation platform and test and demonstration city. Partnerships and funding are essential for this to succeed.

A commitment to start-ups and growth environments, as well as established companies, is essential for innovation across sectors. These initiatives must be seen in the context of the business plan, where the focus is on supporting players in green transition as a driving force for innovation and growth, thereby helping all companies to maintain their competitiveness. Aarhus is already internationally recognised as a leader in a number of green and climatefriendly solutions. This will continue and develop through strengthening existing local, national and international networks and experience with business delegations.

Additional effects

This focus area contributes significantly to the international branding of Aarhus as a climate and innovation city, and the city's companies as suppliers of green solutions. This benefits exports and opportunities for major international collaborations on green conversion around the world.

Initiatives

- AO-1 Promoting innovation in climate and green transformation
- AO-2 Strengthened exports of climate solutions and branding of Aarhus as a climatefriendly city

Related initiatives

- Business plan
- Energy strategy Aarhus
- Climate alliance
- GoGreen Delegations service
- Acces Cities and collaboration with Pittsburgh, USA

Knowledge and capability

There is a need to raise the level of knowledge and competence about climate change and green transition, and to strengthen citizens' and local communities' opportunities for action. This is a prerequisite for companies to attract employees with the necessary qualifications within climate, green transition and innovation.

The focus area includes initiatives aimed at children and young people, families, adults, local communities and cultural institutions, as well as various professions, associations and NGOs.

Existing and new digital platforms are being utilised, as well as physical manifestations of climate action, and binding partnerships are being established with the city's short, medium and higher education institutions. Concerning adults, both traditional citizen information and educational activities are being considered, as well as brand new initiatives such as mobilisation through the training of climate ambassadors with strong contact with citizens throughout the urban community.

Additional effects

By building up climate knowledge and competence among children, young people and adults, manpower with the right qualifications within the climate and green transition is ensured for companies. The same applies to partnerships and collaborations with the city's many educational institutions. The municipality's cultural institutions and cultural stakeholders will be able to bring citizens' thoughts, hopes and dreams into play regarding a CO_2 -neutral future.

Initiatives

- AO-3 Education knowledge and learning about climate
- AO-4 Democracy citizen involvement and co-creation

Related initiatives

- Citizenship policy
- Culture policy

Mobilisation and behaviour

One thing is to inform and reach out to citizens. Another thing is involvement. The focus area will strengthen citizens' opportunities for, and access to, active participation in decisions on the green transition in Aarhus. This will ensure greater ownership and drive among citizens through active citizens' councils and budgets.

We must think about strengthening local climate action and how we develop and adapt together with citizens. A central initiative is the establishment of Climate Centre Aarhus, with the purpose of providing information and guidance on active climate action in the city; to citizens, NGOs, companies and other stakeholders. This will make it easier for everyone with ideas for climate initiatives to realise them and provide a flexible dialogue with the municipality where necessary.

Additional effects

With increased involvement and ownership, the drive to create a CO_2 -neutral urban society is increased, as well as the demand for climatefriendly products and solutions for the benefit of companies.

Initiatives

- AO-5 Community united for the green transition
- AO-6 Partnerships knowledge-sharing and strong collaborations
- AO-7 Measurement and communication ensure and make results more visible

Related initiatives

Citizenship policy



OVERVIEW OF INITIATIVES

Innovation and export

AO-1	Promoting innovation in climate change and green transition
AO-2	Strengthened exports of climate solutions and branding of Aarhus asa climate-friendly city

Knowledge and capability

AO-3	Education – knowledge and learning about climate
AO-4	Democracy – citizen involvement and co-creation

Mobilisation and behaviour

AO-5	Community – united for the green transition
AO-6	Partnerships – knowledge-sharing and strong collaborations
AO-7	Measurement and communication – ensure and visualise results

CLIMATE RELAY

Arnold Boon, University Director, Aarhus University.

What do you see as the biggest challenge for the green transition in Aarhus?

One of the major challenges for the green transition in Aarhus is to translate sustainable ideas and research into concrete actions. With a broad-based research and study environment, Aarhus University is in a strong position when it comes to developing new sustainable solutions. And we see that many of our students and employees are highly motivated to promote environmental sustainability.

We want to integrate sustainable development even more into our activities, and we want to think more about the university as a form of living lab, where we test sustainable ideas. At the moment, we have an internal sustainability seminar where we ask students and employees to provide input on how we promote sustainability and create a greener future.

"

We want to integrate sustainable development even more into our activities, and we want to think of the university as a form of living lab to a greater extent.



A GREEN ORGANISATION



Have its own and purchased transport work that does not use fossil fuels.

Have more energy efficient municipal buildings ($_{30\%}$ less energy) as well as municipal building and construction activities with significantly reduced direct and indirect CO₂ emissions from materials and construction work ($_{70\%}$ compared to 1990).

Have municipal tender and procurement systems that proactively support the green transition.

Have ensured a green transition of municipal companies through dialogue and follow-up, thereby exploiting the opportunity to support the transition in society.

Have managers and employees who have the necessary knowledge to be climatefriendly employees and fellow-citizens.

Source: Aarhus Municipality Climate Strategy 2030



The main focus of the initiative is on the municipality's largest emissions, especially transport, and the removal of the associated use of fossil fuels. At the same time, there is a strong focus on the consumption of energy in the municipality's own buildings. This must be reduced and made flexible so that it can also support a society on renewable energy.

There is also a focus on exploiting the opportunities the municipality has to influence the outside world and to support the transition, both locally and internationally. We are therefore working hard to make ever-increasing demands on suppliers, and to maintain a close dialogue with partners and municipally-owned companies.

In order for us to succeed in changing Aarhus Municipality's own operations, we have to ensure the necessary capability among the municipality's managers and employees. New knowledge must be used, behaviour must be changed and we must ensure that it is as easy as possible to participate in the green transition. For this reason, one important job in this sub-programme is to increase knowledge and motivation, as well as create a visible and up-to-date green transition. This will also help to make employees more climate-competent citizens in their private lives.



A GREEN ORGANISATION

Procurement and tendering

The municipality is a major purchaser, which is why it has an effect on market development when the municipality makes demands. Especially when this happens strategically and in collaboration with other major purchasers. A green procurement strategy will be drawn up to support the right requirements for the municipality's partners and suppliers. However, the municipality is a large body, and many people make purchases. An important part of the focus area is therefore to make it easy to create lasting behavioural changes, so that green conversion becomes a natural part of purchasing throughout the municipality. For us to be able to monitor results, new tools for measuring and assessing purchases are being developed through specific trials, for example with office furniture purchases.

Additional effects

The City of Copenhagen's procurement counts for a significant part of its climate impact outside the City, and therefore affects the outside world, even though the local effect may be small. By entering into strategic partnerships for the development of new solutions with the business community and knowledge institutions, the municipality can utilise its own operations for testing and demonstration, and to strengthen development and increase green exports.

Initiatives

- KA-1 Strategic initiative for green changeover in procurement and tendering
- KA-2 Sustainable circular furniture
- KA-3 Green balance monitoring and measurement methods for green procurement and tendering

Related initiatives

· Climate-friendly food purchasing

My climate-friendly workplace

Change in behaviour requires the building up of knowledge, skills and motivation among all employees in Aarhus Municipality. These characteristics are all necessary for employees to be proactive and valuable in the green transition. Not only as part of the municipality as an organisation, but also in their daily work outside the workplace. Motivation requires an understanding of the importance of, and opportunities for, concrete actions, and it also requires a visible green transition. The focus area therefore relies on close cooperation in the municipality's MED system.

Additional effects

The municipality's employees constitute a relatively large proportion of the municipality's citizens. A climate-friendly workplace therefore also creates climate-friendly citizens who can be good role models for the rest of society. At the same time, being part of a working community with a responsible green profile helps to generate pride and attract talent.

Initiatives

- KA-4 Building motivation and knowledge among employees in Aarhus Municipality
- KA-5 Capacity building and training of employees in Aarhus Municipality
- KA-6 Changed workflows, digitisation, data and surveys in the workplace
- KA-7 Communication and climate at eye level



Fossil-free municipal transport

The municipality's own transport is the largest contributor to greenhouse gas emissions for the municipality as an organisation. The City Council has therefore decided that the municipality's own and purchased transport must be fossil-free by 2030 at the latest and that a separate plan "The Green Transport Plan" should be drawn up. The implementation of this plan is one of the most important initiatives within the climate-friendly workplace. Important elements of the plan are the electrification of the municipality's fleet and purchased transport, but the focus area is also about electrification of city buses. We will create visibility by sending a signal through the cityscape about a changing city, and by motivating others to participate in the transition. Employee-transport must also be converted, e.g. by creating good opportunities for bicycleand electric car parking at the municipality's buildings, as well as through behavioural design and incentives to minimise the need for driving their own cars, and by getting more people to choose fossil-free transport at work.

Additional effects

In addition to the direct reduction in local greenhouse gas emissions from the municipality's own activities, this focus area also contributes to an effect on the rest of society. For example, this could be suppliers changing transport technology used for other deliveries than just those to the municipality, and by the municipality leading the way and helping to push for expectations in the market, as well as testing and demonstrating new solutions to others.

Initiatives

- KA-8 Implementation and operation of Green Transport Plan
- KA-9 Urban bus electrification
- KA-10 Climate-friendly employee transport during working hours
- KA-11 Climate-friendly transport to and from work

The municipality's properties and subsidiary companies

The municipality has come a long way in reducing energy consumption from the many buildings and properties that the municipality itself owns. This work will continue, but at the same time serious work on reducing consumption and greenhouse gas emissions from the construction and civil engineering phase will be initiated. Buildings must be prepared to interact with an intelligent energy system for clean renewable energy and a world where virgin resources are not used. Energy must be used correctly, energy must be produced, and the buildings must be flexible, utilised optimally and they must be able to be reused and converted to the users' changing needs. Energy must not burden the climate or the world's resources, and must also make it easy to be a climate-friendly employee. This requires new models and tools, partnerships with industry, testing of new solutions and a systematic monitoring of results.

Additional effects

This focus area has great potential, not only to reduce the impact of greenhouse gas emissions and resource consumption outside the municipal borders through market impact, but it also offers great opportunities through the construction programme and partnerships with industry to support the development, testing and demonstration of new solutions.

Initiatives

- KA-12 New financial and budget models for buildings
- KA-13 Climate-friendly and profitable operation of buildings
- KA-14 Requirements, tools and methods for operational and climate-conscious solutions in construction
- KA-15 Buildings as a framework for employees' climate efforts in their everyday work
- KA-16 Green ownership



OVERVIEW OF INITIATIVES

Climate-friendly procurement and supply

KA-1	Strategic initiatives for green changeover in procurement and tendering
KA-2	Sustainable circular furniture
KA-3	Green balance — monitoring and measurement methods for green procurement and tendering
ly clim	ata friandly workplace

My climate-friendly workplace

KA-4	Building motivation and knowledge among employees in Aarhus Municipality
KA-5	Capacity building and training of employees in Aarhus Municipality
KA-6	Changed workflows, digitalisation, data and surveys in the workplace
KA-7	Communication and climate at eye level

Fossil-free municipal transport

KA-8	Implementation and operation of Green Transport Plan
KA-9	Urban bus electrification
KA-10	Climate-friendly employee transport during working hours
KA-11	Climate-friendly transport to and from work

The municipality's properties and companies

KA-12	New financial and budget models for buildings
KA-13	Climate-friendly and profitable operation of buildings
KA-14	Requirements, tools and methods for operation and climate-conscious solutions in construction
KA-15	Buildings as a framework for employees' daily climate efforts
KA-16	Green ownership

CLIMATE COLLEAGUE

Birthe Jason, teacher, Sabro-Korsvejens Skole. Winner of the 2018 Climate Colleague Award.

Every year, Aarhus Municipality names an employee as the Climate Colleague of the year.

The award will focus on all the different ways in which employees work with climate challenges in their daily work. One of the winners is Birthe Jason, a teacher at Sabro-Korsvejen School.

"The role of the school is to enable the children to take care of the planet. They are the ones who will inherit it. That's why it is obvious for us as a school to integrate climate and sustainability into the school day," says Birthe Jason.

At Sabro-Korsvejens Skole, this is worked on at two levels. Themes are based on selected subjects such as geography and social studies. In addition, there are annual project weeks based on topics related to climate and sustainability. And the students are happy about it.

"Once a year we have an 'international week' where all the students at the school work on the same topic. For example, recycling and sustainable entrepreneurship have been the focal point. In this way, you can work with what is appropriate for the individual age group in the different classes. At the same time, pupils see what the other pupils have worked on at the end of the week. It gives a sense of community and ownership of the challenges we face," says Birthe Jason.



LEADING CHANGE IN THE COMMUNITY

Climate action is one of the biggest projects for change in modern times. All parts of society and all citizens, businesses, etc. are affected by the changes. Ensuring direction, progress, knowledge, motivation and results therefore requires management for change on a large scale. In Aarhus, the municipality is leading the way and it contributes to supporting the necessary changes. As part of this, the municipality works according to the principles of program management and has organised the work not only across the municipality's own administrative areas, but also across society as a whole, in a number of strategic and practical partnerships.



Progress and results of the initiative are communicated through a variety of media, gathered together under *gogreenwithaarhus.dk*

PLATFORM FOR GREEN TRANSITION

In order to run a programme for change as large as the entire green transition of the organisation and society, a range of supporting measures are required. These are grouped in this focus area and anchored with the program management. The purpose of this is to ensure the best possible conditions for the many employees and other stakeholders who will have to create the necessary changes in society. This applies not only in relation to gaining knowledge and skillsets with stakeholders concerning green transition and change-management, but also to creating a common, visible platform for collaboration and dissemination of results. creating the best framework for the transition through shared safeguarding of interests among central legislators, and raising funds from foundations. etc.

Initiatives

- PK-1 Strengthened interest management
- PK-2 Fundraising and cross-project support

PK-3 Joint communication and dissemination

Related initiatives

- Aarhus Municipality's Green Innovation Fund
- Go Green Delegation Service
- GoGreenWithAarhUs





COLLABORATION ACROSS BORDERS

The climate crisis is a global challenge that requires local solutions. For this reason Aarhus is participating in a large number of national and international networks. It is here that experiences are shared and tasks are approached across the groups. Aarhus Municipality participates in the following collaborations:

- Covenant of Mayors
- Eurocities
- DK2020
- DN Climate Municipality

The Climate Action Plan and related documents have been prepared in collaboration with more than 400 local, national and international players. This means that the plan itself has been created in and by the community that will also implement the changes to help us reach the goal of green transition. Aarhus Municipality would like to thank you very much for all contributions, both large and small. They have all been important.









13 CLIMATE