



The Hamburg Climate Action Plan

A brochure on the update 2011

Foreword



Dear fellow citizens,

Hamburg can be proud of its ambitious, internationally recognised climate policy. It is one of the reasons why we were selected as European Green Capital 2011.

Together with you, I want to put prove that we deserve this title by doing even more. The Hamburg Climate Action Plan helps us to do that. It not only enables us to reduce carbon emissions, but also gives us a powerful tool for climate policy in this city. We want to involve you, the people of Hamburg, more closely in implementation of the wide range of measures to combat climate change. The Coordination Centre for Climate Issues, which is a part of my ministry, was set up to do precisely that – to ensure implementation of the overarching issue of climate protection in projects and programmes that have a real impact in the city. That is particularly important for Hamburg because the consequences of climate change are becoming clearly evident here. Climate change is about key issues for the future of our planet.

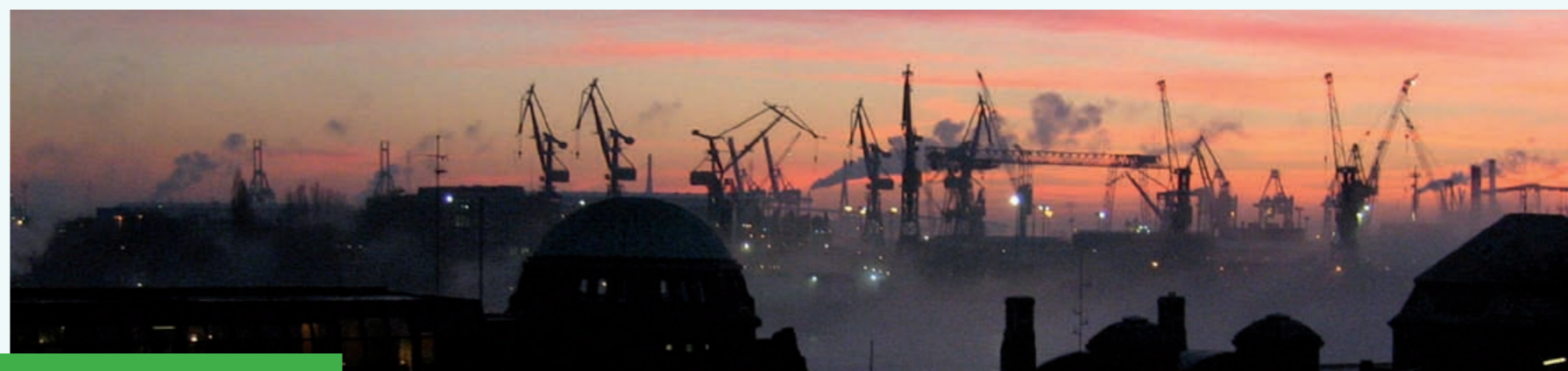
It is people like us who shape the present and the future. We need to strengthen this approach, empowering people to take on individual responsibility – I regard that as a vital task for city policy. As the Hamburg Senator with responsibility for the environment, I am committed to ensuring that we make use of all possibilities to prepare our city for the coming climate change, and to play our part in mitigating the problems of climate change, in a spirit of global responsibility.

I will work to ensure that the funds available in Hamburg for combating climate change are used where they have most effect and give the most benefits for our economy. And where you, the people of Hamburg, can see this and experience it in your everyday lives. Let us launch our efforts to get our city ready for the future.

Yours

A handwritten signature in black ink, appearing to read 'Jutta Blankau'. The signature is stylized and cursive.

Jutta Blankau
Senator for Urban Development and Environment



Climate action in Hamburg



Hamburg in a climate change

The leading scientists of the IPCC (Intergovernmental Panel on Climate Change) agree that climate change is not a scenario for the future – it is already happening. They attribute it to the rapid increase in emissions of greenhouse gases (GHG) such as carbon dioxide (CO₂) and methane. The global climate has warmed up by an average of about 0.84°C in the last 100 years. The IPCC experts believe that the rise in mean global temperatures compared with pre-industrial levels has to be limited to 2°C – that is essential in order to limit the impact of climate change to a level with which humankind will probably be able to cope. Germany, as a member of the European Union, has undertaken to make the necessary contribution to keep within this limit.

The rise in temperature is already having consequences – there are more and more extreme weather events such as heat waves, droughts, severe rainfall and increasingly severe tropical storms. At the same time, the ice caps at the poles are melting, and the glaciers and permafrost soils are disappearing at an alarming rate. We can observe a worrying rise in sea levels. Climate and vegetation zones and regional climate patterns are shifting. All of that is already having an impact on human health, on the economy, and not least on flora and fauna. The experts warn that we will feel the effects of climate change even more in the future.

It is no longer possible to prevent climate change. But it is possible to mitigate it, and to avoid the worst consequences. So we have to act fast and effectively, especially in reduction of greenhouse gas emissions. At the same time, we need adaptation strategies to cope with the global warming consequences that can no longer be avoided.

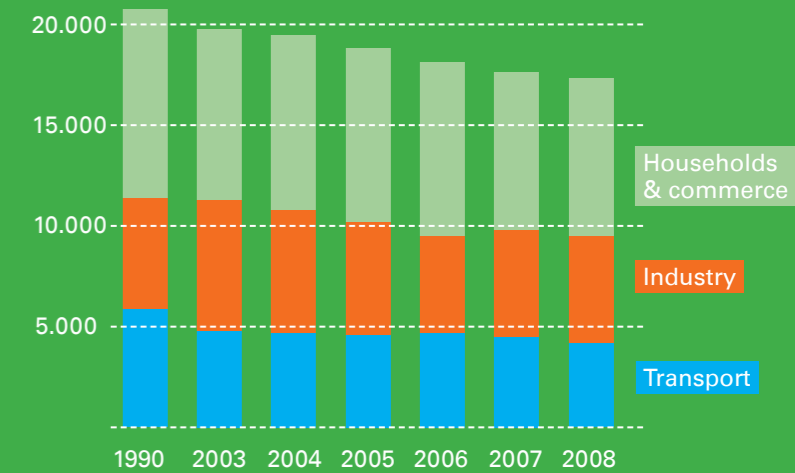
Hamburg is affected in a number of ways by climate change. For Northern Germany, the scientists forecast an average temperature rise of 2.8 to 4.7°C by the end of the century, depending on the scenario considered. There will probably not be more rainfall in the course of the year, but there will be a change in its distribution. Precipitation in our region could increase by 40% in winter, and decrease by the same amount in summer. We will also suffer more frequently from extreme weather situations, such as dry summers with extreme heat periods, and high precipitation levels in winter with severe storms. Hamburg would be affected both by rising storm floods from the North Sea and by higher levels of the River Elbe due to rain and snow melt from inland. A rise in sea level would also have an impact on water levels of the Elbe, and carry increased amounts of sediment into the port and river.

Climate action and adaptation – the two belong directly together



Successes achieved so far – the Hamburg carbon inventory

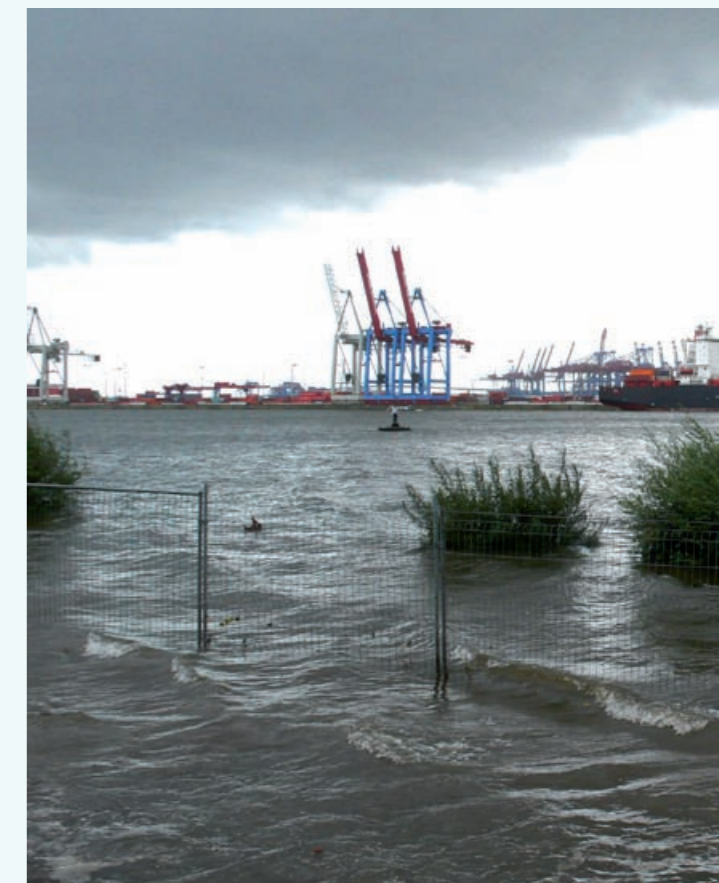
Hamburg's efforts to reduce its greenhouse gas emissions are producing results: in 1990, carbon emissions were still 20.7 million tonnes, but this was reduced to 17.3 million tonnes in 2008. That is a reduction of about 16%. There are a number of reasons for this – the increase in housing space was offset by cleaner and more energy-efficient heating systems for buildings. Energy consumption was likewise reduced in the transport sector. At the same time, increased blending of biofuels gave a reduction in emissions. Electricity consumption stayed at about the same level, but the carbon emissions from generating it were reduced thanks to increasing use of renewables, so that overall emissions were likewise down in this sector.



Thus climate change is a threat to the future of the City of Hamburg – for the health and safety of its people, for its economic and social structure, and for the natural spaces and wildlife of the metropolitan region. A special urban problem is the “city climate effect”, which further increases temperatures. This climate change in urban centres and their surroundings also changes natural habitats. It causes animal and plant species to die out, or to be replaced by other, more adaptable species.


Hamburg's CO₂ emissions going down steadily since 1990

The Climate Action Plan is Hamburg's response to this challenge. It sets effective climate goals, and develops measures to implement them.



13 goals for sustainable climate action

Hamburg's climate action agenda highlights 13 key goals





1. Power supply

Hamburg is taking up the challenge of climate-friendly energy policy, simultaneously ensuring supply security and competitiveness of the city. One of the ways of doing this is to supply carbon-free, or at least low-carbon electricity and heating, produced from a steadily increasing share of renewable energies.

2. Energy saving

Energy saving is indispensable for effective climate action. It should give priority to those areas where most greenhouse gases occur. For Hamburg that means industry and plant engineering, transport and buildings.



3. Renewable energies

Wind energy is to be increased to rated output of at least 100 megawatts, in particular by the replacement of old wind turbines by new, more powerful ones. The use of photovoltaic cells is also to be increased, and of solar thermal panels, and the use of biomass from waste materials.


4. Energy efficiency improvement

To increase the competitiveness of Hamburg's economy in the long term, economic growth has to be decoupled from emissions, while still ensuring that industry remains competitive.



5. Adaptation to climate change

Hamburg is preparing a comprehensive strategy for adaptation to climate change, in order to be ready for its impact and to minimise risks for the future.





6. Building modernisation

The carbon reduction goals require a substantial reduction in energy consumption by buildings, in particular of their energy requirements for heating and hot water. At the same time, it is important to increase the use of renewables and climate-friendly combined heat and power (CHP) systems.

7. Industry and plant engineering

Activities in company environmental protection and climate action are to be improved in cooperation with Hamburg industry, companies, Chambers and Guilds.




8. Exemplary function of Hamburg administration

The city is an example for others. Public buildings in particular have a leading role to play in reducing energy requirements, improving energy efficiency, cutting carbon emissions and using power and heat from renewable sources.

9. Mobility

The Hamburg Senate is creating the conditions for sustainable mobility in all areas of transport. It is improving infrastructure for public transport, cycling and for pedestrians.





10. Research for climate change

Hamburg aims to improve its scientific excellence in research and teaching in the climate sector. That means increasing and focusing research capabilities in climate impact management and climate change mitigation.

11. Communication of climate change

Hamburg seeks to raise awareness in the general population of all aspects of climate change and climate protection. It is systematically building up and expanding the range of easy-access information for the general public.




12. National and international cooperation

Hamburg is using a wide range of networks and cooperation with its twin cities, to present itself as a climate action centre, at regional, national, European and international level. The experience gained in this process is used in further development of the Climate Action Plan.

13. Evaluation and monitoring

Monitoring of CO₂ reduction is conducted in order to check the effect of the Climate Action Plan and if necessary to adjust it. Hamburg will also conduct an evaluation of its Climate Action Plan.



Effective climate policy requires long-term strategies

Hamburg has set itself ambitious climate targets – reducing carbon emissions to just 16 million tonnes in 2012. The Climate Action Plan 2007-2012 is a first step towards fulfilment of these targets. Its extensive range of measures comprises tools and projects to achieve the 13 goals.

Hamburg aims to achieve a substantial contribution by 2020, to the national goal of a 40% CO₂ reduction, as compared to the emissions level in 1990. Then, by mid-century, carbon emissions are to be only 4 million tonnes, that is a reduction of 80%. The city will draw up a Climate Masterplan for this purposes, setting the long-term strategy for a future framework of steps, with quantified goals. A baseline report drawn up for this purpose shows the options for actions to achieve them.

The baseline report provides a set of figures describing the development of Hamburg's CO₂ emissions under different conditions. There is a reference sce-

nario of straight-line development without further efforts to reduce GHG emissions, compared with a reduction scenario with a set of measures to achieve the climate goals. The public are to be actively involved in the discussion on planned regulations and measures. The results of this process will be input into the Masterplan and updated versions of the Climate Action Plan for the coming years.

80% reduction in carbon emissions by 2050 – Hamburg sets a good example



The three subjects highlighted in the baseline report

Building and housing

Heating and hot water supply for buildings must be practically carbon-free by 2050. Achievement of this goal requires energy-efficiency improvement in existing buildings and in new buildings, by means of insulation, use of renewable energies, and improvements in heating systems.

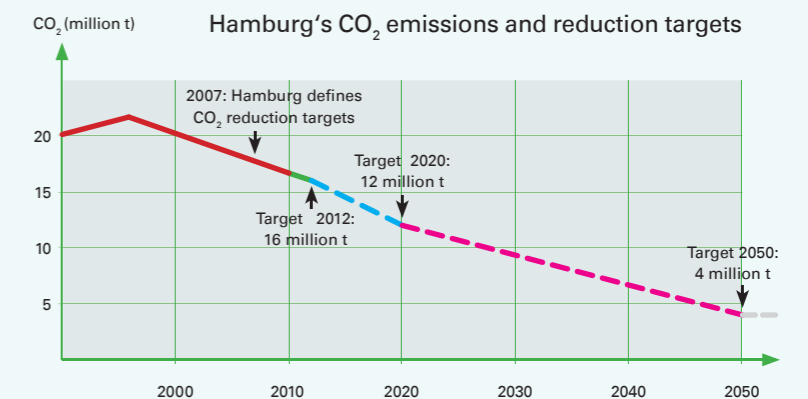


Transport

Transport, especially passenger car transport, accounts for 25% of all CO₂ emissions. A range of different measures are recommended for emission reduction – improvements in public transport, more cycling, more incentives for walking, and also innovative technologies and concepts such as electric vehicles, car sharing and ride sharing.

District heating

Hamburg's heating production and delivery systems are to be improved in the short- and medium-term, to contribute to emission reduction.



Investment with high climate impact

Money for climate protection is money well spent, a good investment for the future. The city of Hamburg allocated nearly EUR 30 million to the Climate Action Plan in 2010. All in all, since 2007 Hamburg has spent about EUR 70 million on programmes established within the Climate Action Plan.

In fact these funds generate investments three or four times as high, because the City gives only co-funding for projects in the Climate Action Plan. Hamburg is in any case up front when it comes to funding of climate action programmes – comparable big cities spend much less on climate projects.

The main focus of spending in 2010 was on energy efficiency and renewable energies for public infrastructure, with an additional EUR 21 million avail-

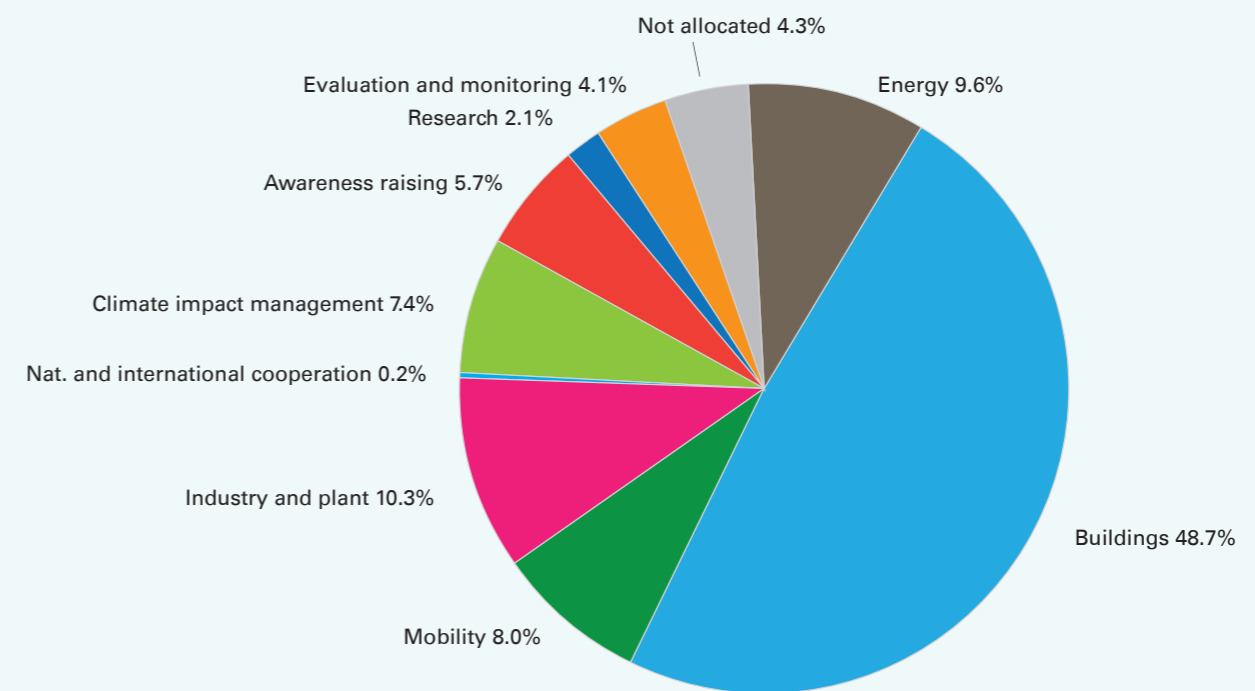
able from the Federal Government's "Economic Stimulus Package II".

However, there are some projects where funding uptake has fallen short of the forecast levels. This was due to unexpected complications in planning

Every euro spent by the City of Hamburg induces investments of 3 or 4 times the amount

and preparations, delaying the uptake of funds. This applies in particular to the energy and building sectors. In total, some EUR 20 million of the available funds provided up to the end of 2010 have been taken up. The remaining amount is available as additional funding for 2011.

The main strategic focal points for 2011 are in programmes and projects that directly reduce carbon emissions, especially in building modernisation. More funds need to be put into public building programmes simply because the timeframe of the Federation's Economic Stimulus Package II is running out.



Fund allocation 2011 from Hamburg Climate Action Plan

On track as the European Green Capital 2011

Can a big city take effective action to combat climate change? A city with a population of 1.8 million, or even 4.3 million (including the metropolitan region). A city with Europe's third largest port, more than 500 industrial companies and an international airport? Yes, it can. Hamburg is proof of that. Hamburg was awarded the title "European Green Capital 2011" by the European Commission, in competition with 34 other cities. "Hamburg has shown major achievements in the past years, and at present has also set up excellent environmental standards across the board," declared the panel of judges in the award announcement. They were particularly impressed by Hamburg's efforts for climate protection.

They likewise attached great importance to the ambitious environmental and development goals that Hamburg has set itself for the future. They include the Climate Action Plan with about 400 projects and an annual budget of around EUR 25 million. And in particular they include the goal of a radical 80% reduction of carbon emissions by 2050. "That is ambitious for a big city like Hamburg, but it can be done," said Janez Potocnik, European Commissioner for the Environment.

Urban environmental protection depends on citizen engagement to make it work. The 1.8 million people in Hamburg can do more by their joint efforts for the environment than, for example, five new wind turbines or 50 solar roofs. So it is one of the key goals to generate enthusiasm for environmental action in as many people as possible for their city's role as the European Green Capital. The activities to do that include energy saving campaigns, about 80 environmental tours, and more than 500 events, to encourage people to join in and to tell them about environmental protection projects and the challenges in Europe and the metropolitan region.

Transport, energy, consumption – the Green Capital issues cover a wide range. Climate protection is their common theme.

Hamburg always sees itself as a learning city. This approach is demonstrated by an interactive exhibition entitled "Train of Ideas", which goes on tour to 18 other major cities in Europe before returning to Hamburg. It comprises seven containers, six of which contain the exhibition, a seventh serves as a meeting point and relaxing area. The exhibition



goes far beyond the perspectives of Hamburg itself, presenting people and projects from the whole of Europe to promote environmental and climate protection.

A series of "Green Capital Dialogues" are held in Hamburg to present ideas for the city of the future. They invite citizens, experts and those responsible in business and municipal government to join the debate.

For details of the events, please visit the website <http://hamburggreencapital.eu>.



Reducing greenhouse gases



Clean energy

Hamburg's ambitious goals for reduction of greenhouse gases can only be achieved by making sufficient savings in electricity and heating, and by using renewable energy sources. Energy-efficiency also has to be improved. If the city wants to set the right

course here, it needs to take more control of the energy grids and networks. That is why the Senate has made preparations for that by setting up HAMBURG ENERGIE.

Main activities

Grid takeover

Hamburg has a large energy and district heating network which has enormous economic value. Therefore the City of Hamburg has obtained a 25.1% ownership of the network to guarantee a strategic impact on energy decisions.

Planning of heating supply

CO₂ emissions for heating supply need to be reduced by up to 95% in order to meet the climate goals. The responsible authority has been mandated to draw up strategic planning for the wide ranging district heating network and its power stations.

"Renewable Energies Cluster"

Hamburg wants to develop further as a leading location for innovative services in the renewables sector. The city has set up an operating company for this purpose.

More energy from wind power

Germany's two largest wind turbines were set up in Hamburg in 2009, going on stream with more than six megawatts each. At present, the city wastewater management corporation together with HAMBURG ENERGIE is building two more turbines at site of the Dradenau water purification plant. That means Hamburg will obtain 50 megawatts from wind power by the end of the year.

The Hamburg Senate is currently seeking additional sites for wind turbines. The rated power could be increased to 100 megawatts if the Hamburg Parliament approves a change in the Land Use Plan. The potential for new compact wind turbines such as vertical rotors for house roofs is also under consideration.

Geothermal heating

A pilot project for geothermal heating is currently being examined for the Wilhelmsburg area. Following completion of the exploration phase, which confirmed the potential for deep geothermal heating sources, the first deep drilling is about to begin.

No expansion of existing funding programmes for use of near-surface geothermal heating sources is planned at the present time, for reasons of environmental policy. But Hamburg will conduct regular checks on whether it is appropriate to fund use of near-surface geothermal sources.

Expansion of "solar energy initiative"

The city expands the use of roofs for solar panels in 2011. This is the follow-up to a project which surveyed more than 130,000 roofs to assess their suitability for photovoltaic or thermal solar panels.

The website www.hamburgenergiesolar.de/Solaratlas.68.0.html is available for people living in the parts of Hamburg covered by the survey to find out whether solar panels would be worthwhile on their roof. They simply have to click on their own roof to find out about the possible size of the plant and potential energy yield.



Avoiding CO₂ by combined heat and power

In cooperation with industry, the Senate has set up an initiative to increase the use of combined heat and power (CHP). Low-cost checks for possible use of mini-CHP plants are supported by HAMBURG ENERGIE and E.ON Hanse AG. The check provides preliminary planning information for a mini-CHP plant with details of cost, savings, and cost-effectiveness of such a plant.

Since the start of the Climate Action Plan, the programme "Companies for Resource Conservation" has initiated 36 CHP plants, which are currently under construction or already completed. By their highly efficient energy use, these installations reduce CO₂ emissions by 41,500 tonnes per year. Commercial premises are optimal locations for CHP plants, because both the electricity and the heat produced in these installations can be utilised at the very vicinity of their point of origin.



IBA shows the way – "Wilhelmsburg Energy Bunker"

64 years after the end of the war, the former flak tower in Wilhelmsburg is being converted for a useful, innovative, and completely peaceful purpose – creating the "Wilhelmsburg Energy Bunker", a symbol of the holistic "Renewable Wilhelmsburg Climate Action Concept".

This is a project of the International Building Exhibition IBA Hamburg together with HAMBURG ENERGIE as its principal partner, and comprises two modules – for renewable energy supply and the re-activation of a ruin. The Energy Bunker is to be a power station on three levels – with solar panels on the roof and south façade, with a biomass-fired CHP plant inside, and with collection of surplus heat in a thermal storage system. The goal is for the Energy Bunker to provide most of the heating and power for the Reiherstieg District, on a low-carbon basis. For more information, please visit the website www.iba-hamburg.de.



Energy-efficient buildings

There is practically no other sector that gives as much potential for carbon reduction as existing buildings. Measures in this area are particularly worthwhile, and are indispensable for delivery of the reductions stipulated in the Climate Action Plan. The main focus is on reducing the amount of energy used for buildings.

In addition, it is important to make more use of renewables and climate-friendly CHP systems. The Climate Action Plan and the Hamburg funding programme are also working to facilitate these goals. Hamburg's Climate Action Plan, adopted in 2007, has also set standards in this area, and will continue to do so in the future.

From 2021 onwards, new buildings are required to meet standards for extremely low energy con-

sumption. These standards become mandatory for public buildings from 2019 onwards. A particularly important area for reducing the carbon footprint of buildings is older buildings, many of which have had no energy-efficiency modernisation. About 85% of the buildings in Hamburg were built before 1978. Even where the materials used are of good quality, the outer walls, roofs and windows are often inadequately insulated.

The Climate Action Plan therefore gives targeted support for improvement of the quality of energy-efficiency in existing buildings. An important factor in this programme is maintenance of the brick façades which are characteristic of Hamburg.

The ENERGY ATLAS – roadmap for climate-neutral Wilhelmsburg

Can the Elbe Islands be climate-neutral? Yes, they can, and the International Building Exhibition IBA shows how. The IBA ENERGY ATLAS provides a roadmap for the way to the post-fossil, non-nuclear age. It is a blueprint and action concept for Wilhelmsburg, Veddel and the Hamburg inland harbour. The concept is based on four pillars – modernisation of existing buildings, energy-efficient new buildings, renewable heating supply and heating networks, and renewable, energy-efficient power generation. Locally generated energy is to meet the power demand of the buildings by 2025, and also to meet the heating requirements by 2050. A positive side-effect is that changing over to climate neutrality also creates jobs and safeguards employment for local industry and commerce.

Support and standard setting for granting of loans

The granting of the favourable loans from the Housing Loans Association (WK) will in future be subject to energy saving requirements. From 1 January 2012 onwards, the Housing Loans Association will fund new buildings only if they meet extremely low-energy standards ("passive house"). From 2011 onwards, there also is a funding provision linked to the zero-energy standard. This is how public funding promotes climate-awareness in building. Stricter standards are also applicable for modernisation since the beginning of 2010 – the requirements of the tough funding regulations for "Modernisation of rented housing 2010" require compliance with a zero-energy standard in some cases. Exceptions are possible where building façades have conservation status.



Main action areas

Jobs and climate action – a good combination

In 2008 Hamburg provided funding for modernisation of about 4,000 single-family and two-family homes, and also housing owned by housing associations, within the "Jobs and climate action" initiative; in 2009 the figure was even higher, that is more than 5,000 housing units. The goal is to establish a standard that is more ambitious than the legal minimum requirements. It specifies reduction of annual heating energy requirements of the buildings by up to 70%; that corresponds to modernisation bringing the standard up to that of newbuilds.

Modernisation of rented housing

In 2009 Hamburg exceeded the target of energy-efficiency modernisation of 7,000 rented homes – by the end of the year it was more than 7,500 housing units. The tougher standard "Modernisation of rented housing 2010" is now in force. It permits upgrading to zero-energy standard in some cases.

Climate action and conservation of brick façades – both are possible

Brick-built façades often require special improvement methods, which are not taken into account by conventional funding programmes. Hamburg has a special funding programme for these buildings and others which are worth conserving. The future funding programme "Urban heritage and climate action" (also known as "brick fund") aims to conserve Hamburg's brick façades while ensuring high energy efficiency of the buildings. The funding is to

be based on an expanded "Hamburg energy performance certificate for heritage buildings".

More energy efficiency for public buildings

Hamburg wants to manage its public buildings in such a way that they have a role model function for private-sector building clients. An expert report conducted for the city has shown that it is possible to set an energy-efficiency standard for public buildings which basically brings them up to zero-energy standard. The same also applies to modernisation of existing buildings.

Climate model districts setting an example

Some model districts are to be established for trials of climate-friendly building, so that the procedures, standards and insights gained there can then be transferred to the planning of other districts. The concept is to include district specific, climate friendly energy concepts.

So far, 19 such model districts have been defined, distributed widely throughout the whole of Hamburg.



Sustainable mobility

The city continues to grow – and so does its traffic volume. Hamburg has to organise mobility so as to meet a range of different needs – individual mobility needs, the requirements of commercial transport, protection of local residents, and the need to combat climate change. At present, about 25% of Hamburg’s carbon emissions are caused by transport, mostly passenger cars and smaller commercial vehicles.

Hamburg wants to increase the share of environmentally acceptable transport in order to avoid continuous growth of carbon emissions in parallel with transport. It is improving its public transport system, improving cycling infrastructure, and supporting the introduction of low-emission, innovative propulsion technologies.

Hamburg aims to improve the situation for cyclists and pedestrians, especially for distances of less than five kilometres. Almost one in two car journeys is for a short distance of this kind – and cars making such short trips do not get up to operating temperature, so they burn up a correspondingly large amount of fuel and emit a large amount of CO₂. And more attention also needs to be given to longer trips, because they are responsible for the majority of kilometres travelled and for most of the emissions in regional transport.



Cycling for success

Hamburg’s cycle hire scheme “StadtRAD” is Germany’s most successful cycle hire system, right from the start. By the end of 2010, more than 75,000 users were registered, and more than a million journeys have now been made. There are three main factors which create this popularity – the first half hour of cycling is free of charge; there is already a closely spaced network of StadtRAD docking stations; and the attractive design of the bikes with an unmistakable Hamburg look to them appeals to many users.

At present there are 72 docking stations, with about 1,000 bikes; in 2011 a further 40 stations and 500 bikes are to be added. Most of the docking stations are in the central area of the city and in Altona, and expansion will reach out in all four directions. The first docking station south of the Elbe has now been set up at Veddel S Bahn station, and a number of docking stations are to be set up in Wilhelmsburg in the near future.



Hamburg vehicles go electric

In 2009 Hamburg was successful in its application, together with partners from the power supply industry, the automotive industry and mobility service providers, in its bid to receive subsidies as one of Germany’s Electric Vehicle Model Regions. That makes Hamburg one of the eight German model regions, receiving funding of about EUR 10 million from the Federation.

One of the major projects in Hamburg is trial of 100 electric vehicles, mainly in commercial transport, and also for Hamburg’s public authorities. The Hamburg public transport company is also involved in this trial, testing series-built diesel hybrid buses in regular line operation.

Hamburg is building up infrastructure with 100 public charging stations by 2011, to ensure energy supply for electric vehicles. They will provide exclusively power generated from renewable sources. A new generation of fuel cell buses will also be operated in the city, running on hydrogen. They will in future be refuelling at Europe’s largest hydrogen fuel station, which is currently in construction in Hamburg’s HafenCity district.

Main action areas

More cycling in Hamburg

Hamburg will improve its cycling network, in particular by construction of a network of “velo routes”, by increased use of cycle lanes, by improved cycle tracks along main roads, and provision of more parking spaces for bicycles. The city will also expand its successfully launched cycle hire system. The proportion of trips made by cycle is to be doubled from 9% in 2002 to 18% in 2015; the current figure is more than 12%.

Strengthening and developing public transport

New S-Bahn (rapid transit) and U-Bahn (metro) lines S4 and U4 are in construction or being planned, to improve infrastructure and public transport services. The power used for public rail transport has been switched over to renewable energy sources.

Transport and mobility management

E-ticketing via Internet and mobile phone is to be expanded in future. Regulations for purchase of low-emission cars for public authority vehicle fleets are in preparation.

Environment friendly technologies in transport

Hamburg is promoting electric vehicles and other innovative propulsion systems, environment-friendly taxis and power optimised transport infrastructure, such as LED traffic lights.



Industry and climate action



Industry, commerce, trade and services are responsible for about 50% of Hamburg's carbon footprint. So they have a key role to play in Hamburg's Climate Action Plan. Industry is just at the beginning of a development for systematic analysis of all efficiency potentials and operating procedures. Hamburg is pursuing a policy of cooperation with industry – together with all the major players from companies, chambers and guilds, the city is setting up new concepts for company environmental protection and climate change mitigation. This cooperation is showing clearly visible success, and is to be continued beyond 2012.

A discussion on "Greening our Economies" has been launched, to identify further untapped efficiency improvement potentials in industry. The Hamburg Senate and the business community are cooperating for rapid implementation of voluntary measures for resource efficiency, going beyond the legal requirements.

Main action areas and projects

Developing the Environment Partnership

The programme of the Environment Partnership between the Hamburg business community and the Hamburg Senate promotes environment-friendly and resource-efficient operation. It aims to increase the number of Environment Partners from currently about 800 to 1,000 companies by 2013, and to increase the number of environmentally committed companies from currently 3,500 to 5,000.

The establishment of mobile in-company counselling is an important element in the Environment Partnership. By mid-2011, there were already more than 2,000 on-site advice sessions. As a result, up to 70% of the participating companies have taken an active role in climate protection – e.g. by means of investments in photovoltaic installations, biomass-powered heating facilities or new refrigeration systems.

Companies for resource conservation

This funding programme for small industry gives incentives for voluntary, short-term investments in resource-efficiency measures.

The programme provides for various checks, which for many companies are the first step into optimised energy and resource efficiency - FirstCheck, LightCheck, Heat-Check, ColdCheck, ServerroomCheck, CHPCheck and EfficiencyCheck.

The combination they provide of expert counselling, networking and funding, is having an impact – these companies are helping to mitigate climate change by savings about 147,000 tonnes of CO₂, and saving some 434,000 megawatt hours of energy, and 688,000 cubic metres of water, and avoiding more than 26,000 tonnes of waste. At the same time, they are reducing their annual operating costs by about EUR 21 million.

Funding programme for energy and innovation

This programme was launched in 2009 and provides incentives for small and medium sized companies, giving targeted support to products that give climate protection benefits. 22 project outlines have already been submitted, and the first projects have been launched. Most of the inquiries refer to biomass, biogas, wind and solar energy. The subsidy programme is associated with a cluster management scheme for renewable energies.



Self-commitment by industrial companies

A self-commitment has been signed by eleven industrial companies, for reduction of their carbon emissions in the 2008-2012 period. The targeted savings potential for 2012 is 500,000 tonnes CO₂ per annum, corresponding to 25% of the total savings goal of the Climate Action Plan. The status so far is that carbon savings of 330,000 tonnes have been made by mid 2010. Subtracting the measures co-financed by the "Companies for resource conservation" funding programme, that gives savings of 327,000 tonnes (see page 43).



Well connected - national and international cooperation

Hamburg is a major centre of climate action, cooperating in regional, nationwide, European and international networks. Hamburg can learn a lot from the experience of other cities and regions, and at the same time Hamburg is a model for others in many areas. In particular, Hamburg's Climate Action Plan has met with very positive response both nationally and internationally. Publication of the English-language version of the Climate Action Plan resulted in a great many invitations for Hamburg to European specialist conferences. At regional level, the project work has been inten-

sified in the working group "Climate action in the metropolitan region of Hamburg". At international level, Hamburg has taken up a commitment in the networks Covenant of Mayors and METREX. In parallel to that, preparations have been made for Hamburg as the European Green Capital 2011. Internationally, Hamburg maintains a wide range of contacts on issues of urban development, the port, renewable energies, and general exchange of experience.



Main action areas and projects

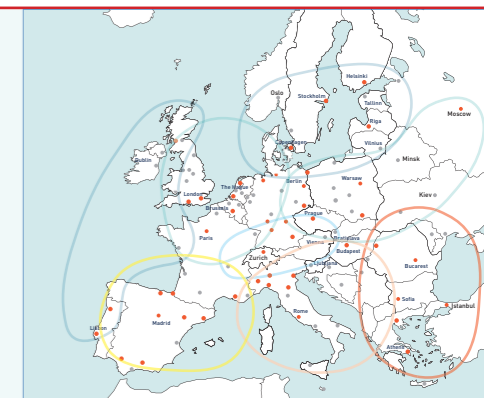
"Co,ol Bricks" for heritage conservation

Hamburg's Heritage Conservation Department is working with 18 project partners from practically all the countries around the Baltic Sea, during the three-year project "Co2ol Bricks", aimed at harmonising the various requirements for climate protection and heritage conservation in the building sector. Its purpose is to make historic buildings more energy efficient without detracting from their identity.

Learning from the neighbours - EU climate project EU CO₂ 80/50

The European regions participating in this project are developing strategies for 80% reduction of regional carbon emissions by 2050. 14 European metropolitan regions are preparing CO₂ inventories, which are then to be transferred to a computer simulation. They are to serve as the basis for a scenario workshop with participation of regional policy makers.

Such workshops have also been held in Hamburg. The results are now established on a broad empirical basis. They show that average emission reduction of 75% is possible by 2050. The detailed results of the simulation are shown at the website www.euco2.eu.



Adapting to the future



It pays to be prepared – climate impact management

Hamburg will be substantially affected by the impact of climate change. That is shown by the Climate Report for the Metropolitan Region of Hamburg, which was presented by the Climate Campus and partners in 2010. The researchers believe that sea level could rise by up to 40 cm by 2050. Precipitation in winter could increase by about 40%, with longer dry periods in summer.

Hamburg has to be prepared for higher flood tides, and has to take action for balanced water management, including drinking water supplies. That is why, right from the start, the Hamburg Senate set a further focus on climate impact management, alongside preventive action to mitigate climate change. Impact management is designed to protect people and the natural environment, and at the same time it is preventive economic action. Failure to act would in the long term mean higher cost for the public and private sector than timely adaptation measures.

The Senate intends to present an overall strategy for adaptation to climate change, in order to coordinate the various activities. This strategy is to prepare Hamburg better for handling the impact of climate change. It will also compare and analyse the current results of climate and adaptation research with practical measures taken so far.

Hamburg will adapt to the rise in sea level not only by increasing the height of the dikes. It will also work with the strategies of the Tidal Elbe Concept developed by the Hamburg Port Authority to counteract the progressive changes in the river system – it will

create more retention space, develop concepts for the Elbe estuary, and optimise sediment management.

It will take various preventive measures to deal with the severe rainfall events which are expected in the future and are already becoming apparent. For example designation of retention spaces to reduce water run-off in the event of floods; and restoration measures for marshes and water meadows, to re-



tain the water in shallow areas so that it is available in dry periods.

These water management measures also help to conserve nature and soils. Similar considerations are also going into urban and landscape planning. The principle here is to ensure that rainwater can drain away into the ground close to where it occurs.



KLIMZUG climate project

KLIMZUG-NORD is a joint project funded by Federal and State resources, bringing together universities, research institutes, authorities, public institutions and private-sector companies. It is to develop strategic approaches for adaptation of the metropolitan region of Hamburg to climate change. All eight counties of Lower Saxony and six counties of Schleswig-Holstein in the metropolitan region are giving their support to this project. It works with landscape planners, engineers, biologists, agricultural scientists, meteorologists, soil experts, geographers, architects and climate researchers. Another goal of KLIMZUG-NORD is to provide information on climate change and its possible consequences. That includes awareness raising for the necessary adaptation strategies.

KLIMZUG-NORD promotes dialogue between science, the business community and the population. It conducts public meetings, seminars, workshops and online debates to get the stakeholders involved right from the planning process.

*Too much water is dangerous –
and so is too little*

Managing water – the RISA project

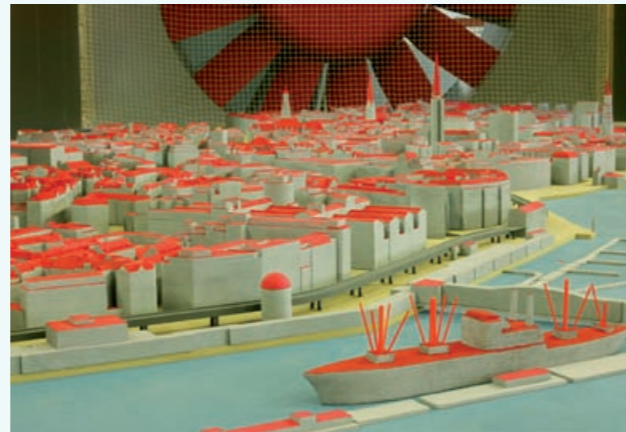
As climate change continues, we have to expect increasing precipitation quantities. That is what makes the RISA project (Rain InfraStructure Adaptation) so important for Hamburg's adaptation strategy. It is a joint project of the responsible authority and HAMBURG WASSER. The goal is to work out a plan by 2012, setting the regulations for management of rainwater.

The project is also to integrate water management measures into urban and landscape planning and transport planning. It is also preparing a legal framework for decentral water management in new building areas.



Modelling the urban climate

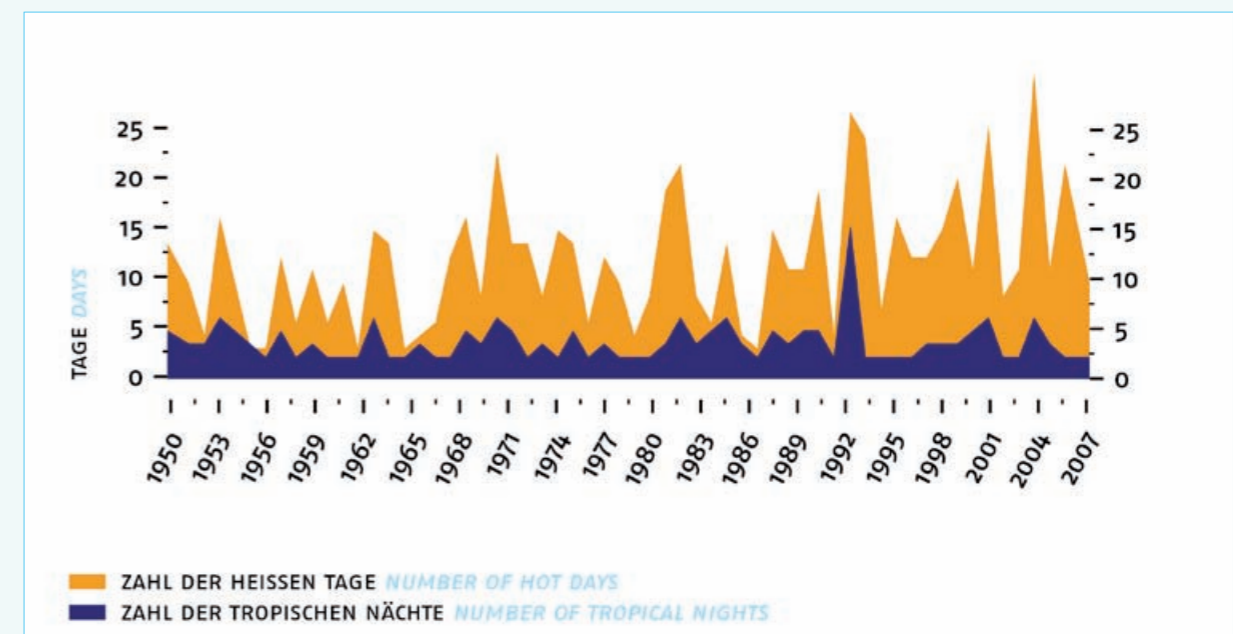
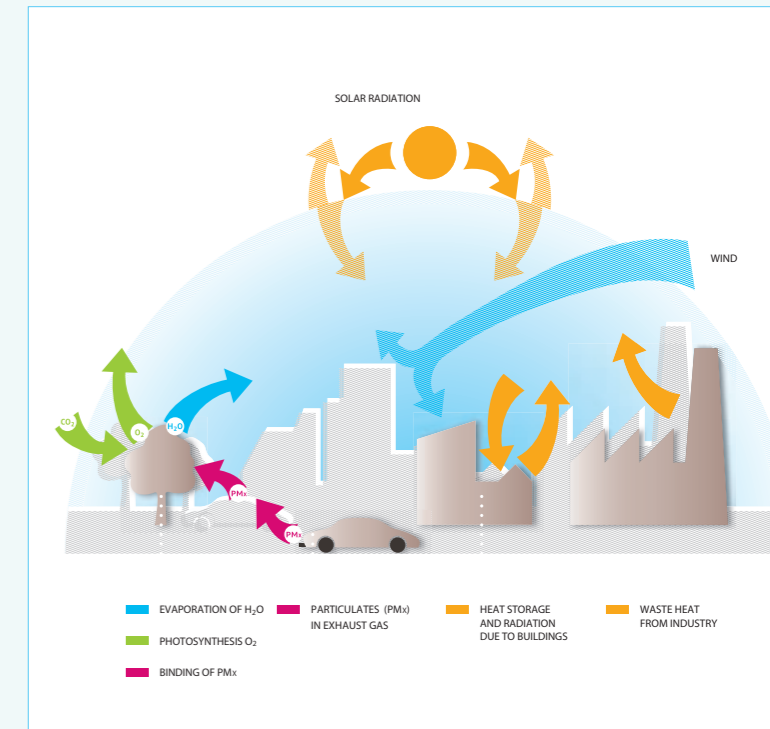
Anyone who cycles on the outskirts of the city at the height of summer notices that the temperature drops considerably as soon as it gets greener and the houses are no longer so close together. The densely built-up areas in the city centre often collect heat in summer during periods where there is little exchange of air. This phenomenon is one of the greatest challenges of climate change for Hamburg. An urban climate survey has been conducted, and given first indications of how to combat this effect by urban planning and design. The next step is to draw conclusions from that for urban and landscape planning.



There is still a lot of research to do

But it is clear that urban planning and architecture have to give increased regard to local aspects – such as the urban climate influence on the immediate surroundings and on the city as a whole, and also changes in the urban climate due to global and regional climate changes. Established methods and models can be used to assess whether certain building programmes are good for the climate. Local aspects also include those changes which are caused by the city itself, for example by changes in its land use plan.

But at the present time it is not possible to quantify which measures cause which effects. For example, whether a densely built city is better for the urban climate than a widely spread urban area. A numerical model “METRAS-urban” has been created by the Climate Campus for simulation of land use changes.





Knowledge
for the future

Everyday climate awareness

Government regulations and economic incentives are definitely helpful in combating climate change. But we cannot deliver results without climate awareness in everyday activities. Long-term success is dependent on everyone playing their part. Activities by individuals are indispensable, specifically in energy saving. And climate awareness in consumption can also make a real difference. That is why awareness raising and knowledge transfer are key elements in climate action.

For example, a zero-energy house will only work properly if the people living there are aware of what is right for the climate, e.g. appropriate ventilation. People will buy low-emission cars only if they are aware of the climate impact. And purchase of regional products depends on a change in behaviour both on the supply side and on the demand side.

A learning process – carbon saving

Hamburg is putting climate awareness on school timetables – from childcare centres to adult education institutes. So that everyone knows what really matters. For children, the best way is learning by doing – so that they can experience for themselves how individual actions can change the world, if enough people join in.

Adult education institutes, consumer advice centres and the Hamburg Energy Agency (Hamea) are to provide information on energy issues as part of their non-vocational education programmes. Vocational education and training programmes are to include the latest on climate technology, e.g. for builders and contractors, to improve the services they provide.

Car or bicycle?

Regional or exotic fruit?

Our everyday lives are full of decisions which are relevant for the climate



Project examples

Right from the start – climate action at schools

Hamburg's schools are developing climate action plans, on the principle of "Climate – we are taking action!" This project is at present unparalleled in Germany. Among other things, schools can draw on support by workshops, teaching materials, continuing education courses and on-site support.

The schools largely set the goals and measures of their climate action plans themselves. The main focus is on awareness raising. About 15 to 20% of energy consumption can be avoided simply by changes in behaviour, for example in use of the heating system. The first 23 pilot schools have been working on climate action plans since autumn 2009.

Good advice – Hamburg Energy Agency (Hamea)

The private households are responsible for nearly a quarter of all carbon emissions in Hamburg. The Hamburg Energy Agency (Hamea) provides advice and information to motivate people to save energy and play an active part in mitigating climate change. Hamea operates as an ideas provider, and aims to "translate" Hamburg's climate action goals into practical projects.

From the region – for the region

Buying regionally produced food and artisan products, and using local services, are important contributions to climate action. They keep transport distances short, strengthen the regional economy and local farms, and help to protect recreational areas in the district.

The initiative "from the region – for the region" was selected as one of eight initiatives nationwide for cooperation in the "Regional Alliances" project funded by the Federal Ministry of Agriculture. Both the strategy and the model project are considered exemplary, e.g. the projects for institutional consumers, restaurants, school meals and weekly markets.

The Hamburg Planetarium – appropriate information

The Hamburg Planetarium acts as a "climate change information and education centre". More than half a million people go there every year. The Planetarium, located in a former water tower in the Stadtpark, is equipped with high-end visualisation technologies which enable it to communicate the relationships between local and global events with a knowledge transfer programme that appeals to all the senses. "Climate Igloos" compatible with the media equipment of the Planetarium, are to be set up from 2011 onwards as "mobile lifeboats" for interactive briefing and debriefing sessions on-site in schools, at meetings and environmental fairs.



Seven days for the climate – the Hamburg Climate Week

What will climate change mean for us? How can we make our consumption more climate friendly? What new results are reached by climate research? The Hamburg Climate Week gives visitors of all ages exciting insights into climate research, and communicates new knowledge of all areas of climate action.

From 23 to 30 September 2011, scientists, the Hamburg authorities and companies are inviting the public to an interactive theme park in the Europa Passage shopping centre in Hamburg. The Climate Week will start with the Climate Night, and there will be an extensive supporting programme and an eco- and organic market to round it off. A special educational programme will be arranged for schools.

Further information on the Hamburg Climate Week is available at www.klimawoche.de.



Hamburg climate research – excellence and commitment

Climate research and climate impact research give us an insight into possible developments of our climate, based on complex computer models. The research results show us what changes are necessary, and above all what adaptations may be required. They are the basis for forward-looking climate policy – and are integrated in Hamburg's Climate Action Plan.

Hamburg is proud of its numerous research facilities, which are reputed for their research in these areas at national and international level, and wants to build on this outstanding reputation for science. It is focusing particularly on basic research, interdisciplinary cooperation and networks.

Focus on the Climate Campus

Hamburg is putting the focus on the Climate Campus for further development, with further improvement of its outstanding basic research. The nucleus of the Climate Campus is the excellence cluster "Integrated Climate System Analysis and Prediction (CliSAP)" at the University of Hamburg. CliSAP is funded in the framework of Excellence Initiative II of the Federation and States, with about EUR 32 million over a five-year period.

Basic research and applied research are to be increased in the areas of renewable energies, energy efficiency and sustainable urban development and resource efficiency. Cooperation with the neighbouring states of Schleswig-Holstein and Lower Saxony plays a vital part in this.

*The more complex the subject,
the more important is basic research*



Exemplary projects

Climate Campus for interdisciplinary research

The Climate Campus brings together 18 university institutes, the research facilities of the Max Planck Institute for Meteorology, the Helmholtz Centre Geesthacht, and the German Climate Computing Centre, and partner institutes from the Hamburg region. Together, they are working on basic research on climate development. They analyse past and present climate changes, and develop viable forecasts on that basis.

The scientists at the Climate Campus seek answers to the question of how humankind can respond appropriately to climate change. The subject is complex, and that makes an interdisciplinary approach even more important. It involves economists and sociologists, who model the impact of emissions trading on the climate, and examine the conditions needed to realise a low-carbon society. It involves peace researchers, who analyse the risk of climate conflicts; and media scientists, who examine how reporting on the subject influences citizens and politicians. The overall goal is to develop action options for society and governments – and to put climate policy on a sound scientific basis.

E-Harbours – smart power management for ports

The University of Applied Sciences is the partner in the E-Harbours project. Its main goal is to get an overview of the possibilities for smart power management in ports. This is to be the basis of innovative business concepts for implementation of a smart power consumption management system. For example, E-Harbours is working on drainage pumps in the port, to demonstrate the environmental and cost benefits of smart power consumption management.

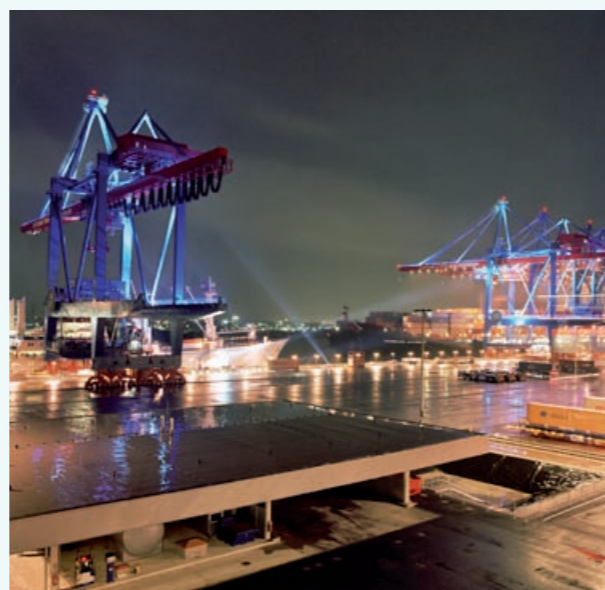
The German Climate Computing Center uses low-carbon computing

The German Climate Computing Center (DKRZ) does climate modelling which would not have been conceivable just a few years ago. For example, the global scenarios for the IPCC (Intergovernmental Panel on Climate Change). Even today, there are very few places in the world where these calculations would be possible. It is not least for this reason that the DKRZ with its high-performance computers is one of the most important partners at the Climate Campus.

But climate research itself produces emissions – high-performance computers need huge amounts of power. That is why the DKRZ has launched a project to research and test efficiency improvement measures in cooling of computer rooms. The DKRZ has devised a way to separate the warm air and the cold air in the computing room, thus reducing energy consumption in cooling of its computers by between 10% and 20%. It was able to extend the season where exclusively outside air is used for cooling the computer centre, by installing larger coolers on the roof. And it installed sensors to record power consumption, in order to identify further energy saving potentials. The results achieved here are an international example of successful energy saving in a large computing centre.

Top-level research in the excellence cluster CliSAP

The research of the excellence cluster "Integrated Climate System Analysis and Prediction" (CliSAP) of Hamburg University is divided into four key areas: climate analysis, climate variability, climate and humans, regional effects and risks. To ensure long-term high-level research in these areas, new groups of researchers have been put together and the graduate institute "School on Integrated Climate System Sciences" set up for sustainable training of experts.



Monitoring and evaluation



Results count – monitoring and evaluation

A strategy is worth no more than it can deliver in reality. That also applies to the Climate Action Plan. The City of Hamburg has set up monitoring, to check the effectiveness of the strategy and the appropriate use of funds, giving a mandate to the well-known Wuppertal Institute for Climate, Environment and Energy

“Bottom-up” or “top-down” – differentiated CO₂ monitoring

Hamburg has already conducted interim evaluation with scientific monitoring by the Wuppertal Institute, to assess the carbon emission reductions delivered so far. Hamburg has taken a highly innovative approach, because the CO₂ emissions were inventorised both at state level (“top-down”) and as the individual measures of the Climate Action Plan (“bottom-up”). That makes it possible to give particularly realistic assessment of the Climate Action Plan.

Hamburg prepared an overview of the CO₂ quantities to be saved as early as 2007, on the basis of estimates – these savings were made up of the various individual items as shown in the diagram on page 7. The item “emission reductions still to be made” de-

scribed a residual amount of 200,000 tonnes, where it has not yet been decided what measures are to be taken to deliver this reduction.

The interim evaluation distinguishes between effects which are directly due to activities undertaken at Federal level, and those which result from the Hamburg Climate Action Plan.

The calculation is based among other things on the following principles: the calculation does not include population growth or demolition of houses. Hamburg activities which were mainly initiated by Federal activities are included as reducing emissions. New buildings with tough energy-efficiency standards are already included as a saving in the first step of evaluation.

Activities of the Federation

The results of Federal activities have so far well fallen a long way short of the expected reductions of 450,000 tonnes CO₂. In total, they give annual emission reductions of about 82,000 tonnes CO₂ in the period 2007 to 2009. However, a number of Federal funding schemes were not included in the calculation. The data must therefore be regarded only as a provisional result. Expected efficiency increases giving savings of about 100,000 tonnes CO₂ have likewise not yet been included.

Emission reductions by the Hamburg Climate Action Plan

The data give the following provisional picture for CO₂ reductions:

Year	2007	2008	2009	2010	2011	2012
t/CO ₂	45.496	243.498	330.646	390.667	345.774	422.981

Source: eBIS-Klima Hamburg, own calculations (tonnes CO₂ p.a.)
* Data forecast on the basis of potential data of measures (status July 2010) or continuation of impacts from previous years

Analysis of the savings achieved shows that major areas include building modernisation and funding of heat generating systems. In the first evaluation step up to August 2010, about 70% of the intended reduction was delivered, at just under 391,000 tonnes. According to current estimates, it is possible to meet the ambitious emission reduction goal of 500,000 tonnes CO₂ per annum by 2012 – but that will require timely implementation of measures related to the International Building Exhibition (IBA), a number of ambitious energy goals in urban building projects, and plans for renewable energies.

Not everything can be evaluated

Some projects, for example in the transport sector, or educational activities, information campaigns, consulting and public relations work, are not capable of evaluation, because they cannot be quantified. Altogether, they are estimated to account for 10% of total savings (200,000 tonnes CO₂).

Good intentions are not enough.

Accurate evaluation shows what really works.

to evaluate the reduction so far achieved in carbon emissions. Hamburg is setting new standards here – an overall monitoring process like this is the only way to identify possible weaknesses and take measures to prevent wrong developments.

The Wuppertal Institute has initially been mandated to prepare a rough concept for evaluation. A number of criteria are relevant for that.

Ten criteria for evaluation

1. What is the relationship between the funds used and the results delivered?
2. Are there any gaps in execution and implementation?
3. Do the projects meet high quality standards in content and method?
4. Do the measures of the Climate Action Plan have unintended side-effects?
5. Are the key players involved in the implementation process?
6. What effects has the programme achieved with important multipliers and target groups?
7. What stimuli does the programme give for the regional economy?
8. In what way does the Climate Action Plan have an impact on the emissions of other greenhouse gases?
9. Are the present procedures appropriate for effective and efficient implementation of the Climate Action Plan?
10. Are the organisational structures appropriate?



Emission reductions of industry

The industrial companies already implemented reduction of 333,000 tonnes by mid-2010, having set themselves a self-commitment of 500,000 tonnes by the end of 2012. Further measures have been announced by the companies, so they are on track to meet their target.

Climate Action Plan delivering results

The Wuppertal Institute has reached the conclusion, based on the interim evaluation, that Hamburg has gained major stimuli from its Climate Action programme – with an ambitious carbon reduction goal, with the structures of the Coordination Center for Climate Action, and with a monitoring process. That has made it possible to deliver enormous emission reductions, which would not have been possible without the structure of the Climate Action Plan. As the Wuppertal Institute proposed, an extended evaluation of the Climate Action Plan also takes account of regional structural effects, employment effects and efficiency aspects. The Institute recommends adjustment of the Climate Action Plan to achieve all the goals – implementation measures for carbon reduction should be increased, and the successful funding programmes in the energy, building and business sectors should be continued and if possible increased.

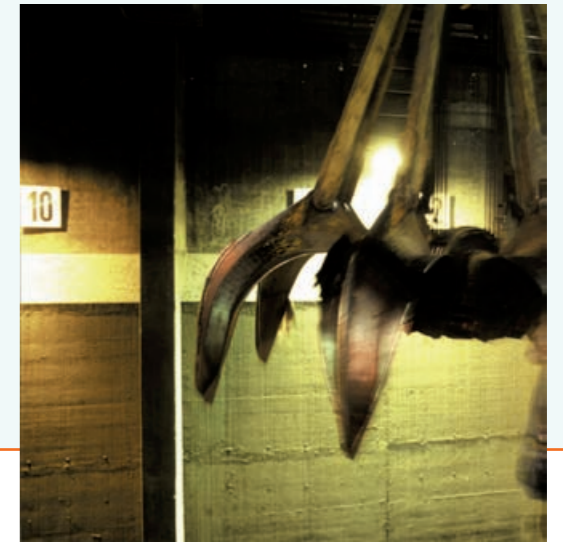
Eleven industrial companies – one goal: Reduce carbon emissions by 500,000 tonnes by 2012

Eleven Hamburg-based industrial companies have kept their word and made a substantial contribution to reduction of emissions that damage the climate. The goal they have set themselves is to cut emissions by 500,000 tonnes by 2012. A self-commitment to this effect was signed on 12 September 2007 by ADM Hamburg AG, ArcelorMittal Hamburg GmbH, Aurubis AG, AVG Abfall Verwertungsgesellschaft mbH, HOLBORN Europa Raffinerie GmbH, H&R Ölwerke Schindler GmbH, Lufthansa Technik AG, Sasol Wax GmbH, Stadtreinigung Hamburg AöR, TRIMET Aluminium AG and Vattenfall Europe Hamburg AG.

Half way through the project in mid-2010, the eleven companies had delivered a remarkable reduction of 333,000 tonnes. They succeeded by means of investments in production technology in getting a decisive reduction in their

energy consumption. The key to this, say the companies involved, was flexibility and a voluntary commitment rather than rigid regulations. That was the only way to get tailor-made, efficient solutions.

The eleven companies are optimistic that they will be able to deliver the promised reductions within the commitment period. That would mean they are taking on a 25% share of the CO₂ emission reductions specified in the Hamburg Climate Action Plan.



Useful addresses

Hamburg Climate Action Plan

www.klima.hamburg.de/klimaschutzkonzept

City of Hamburg

www.hamburg.de

Hamburg Climate Portal

www.klima.hamburg.de

European Green Capital 2011

www.hamburggreencapital.eu

Companies for Resource Conservation

www.hamburg.de/ressourcenschutz

Hamburg Environment Partnership

www.klima.hamburg.de/umweltpartnerschaft

International Building Exhibition 2013 (IBA)

www.iba-hamburg.org

Hamburg Energy Agency (HAMEA)

www.hamburg.de/energieagentur

Metropolitan Region of Hamburg

www.metropolregion.hamburg.de

Klimzug-Nord

www.klimzug-nord.de

Norddeutsches Klimabüro

www.norddeutsches-klimabuero.de

Climate Service Center (CSC)

www.climate-service-center.de

HARBURG21 –Harburg Sustainability Portal

www.harburg21.de

SolarZentrum Hamburg

www.solarzentrum-hamburg.de

Environment Centre Hamburg-Karlshöhe

www.umweltzentrum-karlshoehe.de

Education for Sustainable Development

www.bne-portal.de

Centre for Forward-Looking Construction

www.zzb-hamburg.de

Contractors & Energy Efficiency

www.handwerk-energieeffizienz.de

Hamburg Energie Solar

www.hamburgenergiesolar.de

Renewable Energies Hamburg

www.erneuerbare-energien-hamburg.de

International Garden Show 2013 – igs

www.igs-hamburg.de

Zero-energy houses in and around Hamburg

www.ak-passivhaus.de

Commuter Portal – Metropolitan Region of Hamburg

www.mrh.pendlerportal.de

International City Alliance – Covenant of Mayors

www.eumayors.eu

World Future Council

www.worldfuturecouncil.org

Hamburger Climate Action Foundation

www.klimaschutzstiftung-hamburg.de

Climate Alliance of European Cities with Indigenous Rainforest Peoples – Alianza del Clima e.V.

www.klimabuendnis.org

ICLEI – Local Governments for Sustainability

www.iclei.org

Contractors Training and Continuing Education for Sustainability

www.habina.de

Climate Campus of Hamburg's Universities

www.klimacampus.de

Climate Action at Schools

www.klima.hamburg.de/klimaschutz-an-schulen

Hamburg Climate Week

www.klimawoche.de

EUCO₂ 80/50 Project

www.euco2.eu

Initiative for Jobs and Climate Action

www.klima.hamburg.de/arbeitsundklimaschutz

Electro-Mobility in Hamburg

www.elektromobilitaethamburg.de

Green Taxis for Hamburg

www.hamburg.de/taxi-mietwagen/2612192/hamburger-umwelttaxi.html

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