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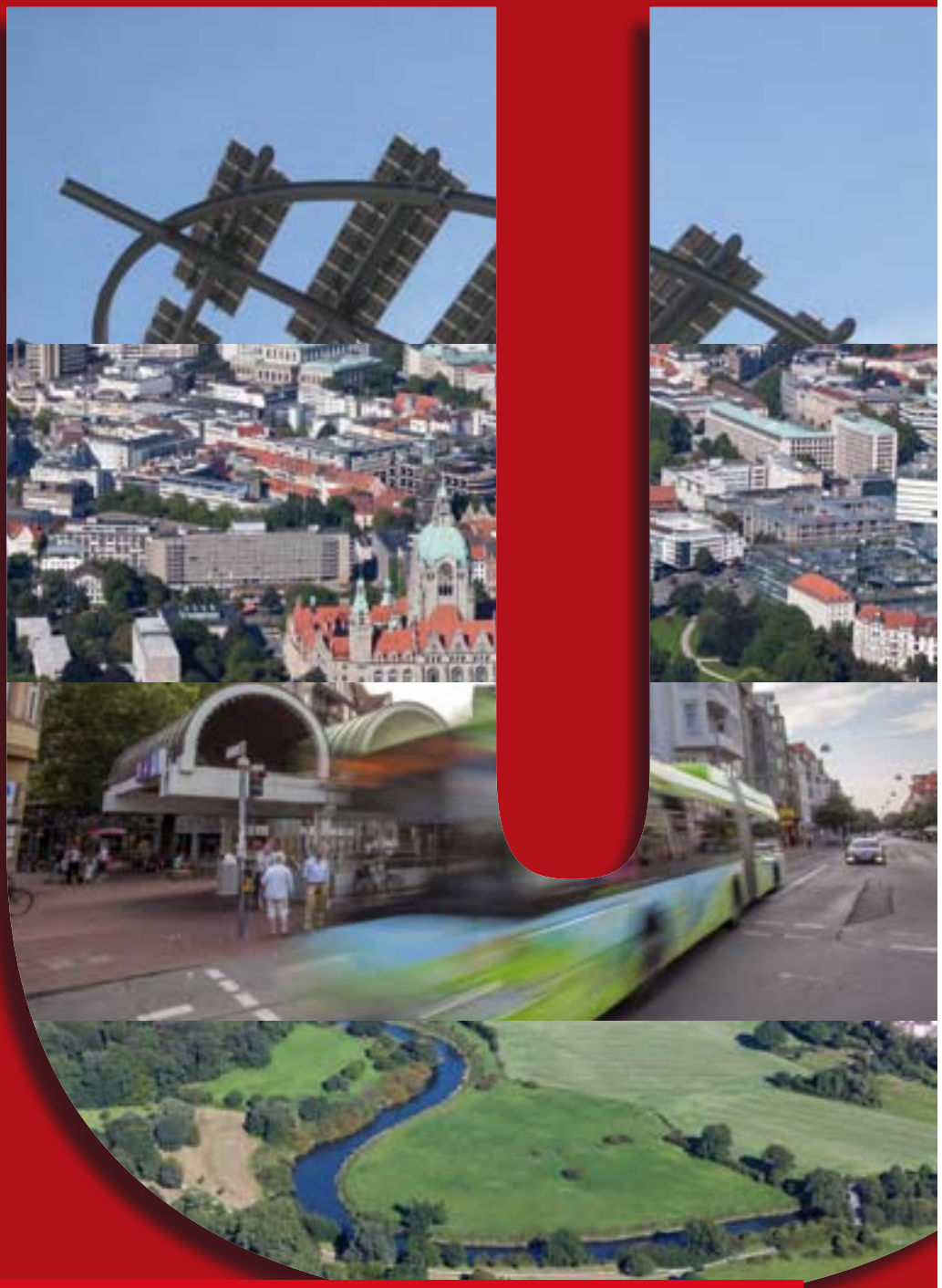


Data – Analysis – Projects

ENVIRONMENTAL REPORT **2012**

LANDESHAUPTSTADT HANNOVER

Foreword

Dear readers,

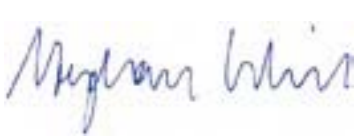
conservation of the environment and natural resources remains a perpetual challenge for us and generations to come, making us orientate ourselves on the principle of sustainability to achieve a future-compatible development of our city.

The fact that sustainability has become an important cross-cutting task for the City of Hannover becomes evident in the description given here of the many projects and measures, which exert a significant influence on the environmental quality of Hannover.

A future-oriented city development requires "indicators". Using the environmental-related sustainability indicators selected in this environmental report 2012 we intend to describe and evaluate Hannover's situation in the various environmental sectors. These indicators show the development trend over many years – in many fields of action looking back over a period of more than 20 years – thus making it possible to measure and evaluate a sustainable development. So the environmental report drawn up on average once every three years provides an objective working basis for our administration and for those in political power.

Alongside the many statutory and authoritative regulations it is the initiatives grasped by the population and the dedication of many active volunteers which bring about an improvement in the environmental quality making environmental protection tangible in very many ways. Precisely for this reason direct contact with you is of the utmost importance to us. Therefore may we urge you to take advantage of our comprehensive website services and contact with our employees regarding the individual specialist topics.

We should like to extend our special thanks to the many employees of the Hannover City Administration, the Region Hannover Authority, Stadtwerke Hannover AG, the Zweckverband Abfallwirtschaft Region Hannover and further private-sector organisations without whose support we would not have been able to present the 2012 Environmental Report in this comprehensive form.



Stephan Weil
Lord Mayor

Hans Mönninghoff
First Town Councillor
Director of Economic and
Environmental Services

Content

DATA – ANALYSIS – PROJECTS

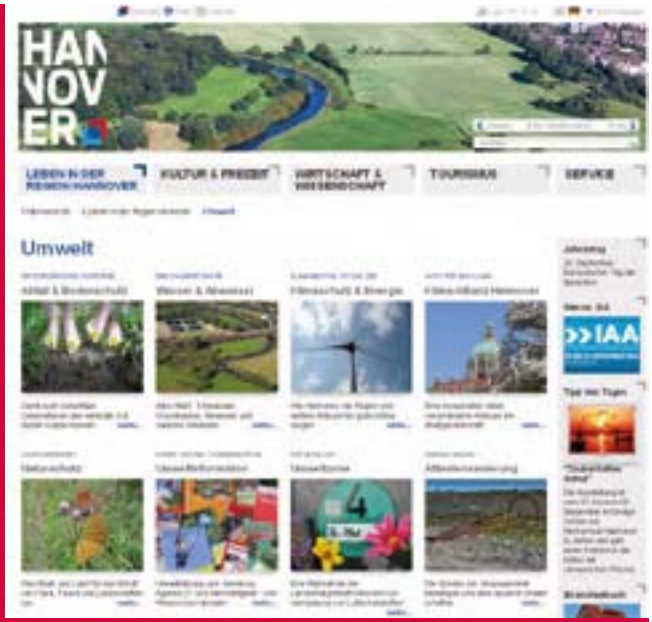
Introduction

Since 1992 the Landeshauptstadt Hannover has regularly published environmental reports showing the current state of the environmental situation, outlining the development over the past few years and evaluating these with regard to environmental policy targets. They provide an objective basis for political decision-making on environmental protection measures and on a way of monitoring their success.

Requirements of municipal sustainability indicators

- Link to practice and communicability
- Relationship to overall concept of sustainable development
- Transparency with regard to methodic basis, selection and evaluation of indicators
- Data availability and reliability
- Support of environmental reporting
- Compatibility with national or internationally recognized indicator systems (City comparisons)

Since 2002 environmental sustainability indicators have been selected for the environment reports whose data are updated on an administration level or are derived from official statistics. The data is managed mainly on a decentralized level by the respective specialist departments and non-municipal institutions, thus ensuring that the indicators are constantly optimized and are open to methodical further development as control and planning instruments.



Sustainability requires a reliable and transparent monitoring of success. Here the continuous updating of indicators is an important prerequisite for showing long-term developments.

Tips for the readers

Environment-related sustainability indicators

Outlining and evaluation of the environmental situation is based on environment-related sustainability indicators which preface the respective areas of activity and are briefly explained. The data basis extends as far as 2011, in some thematic areas there are more than 20 years of data sequences. Indicators describe the development of the city's environmental situation showing the need for environmental policy actions or describing successes of environmental policy measures and their contributions towards sustainable development. In addition the indicators are evaluated by the achievement of their goals, legally stipulated threshold values and benchmarks or also by the accomplishment of voluntary agreements.

Environmental barometer

Especially valid key indicators in the environmental barometer enable an overview of the trend in the individual areas of action. This makes it possible to evaluate the long-term trends and the development made over the past four years (2008 to 2011) with regard to the target achievement of political guidelines, specialist programmes, legally stipulated threshold values or the city development programme "HannoverplusZehn".

Projects and measures

The report based on indicators is supplemented by the presentation of multiple projects, measures, campaigns and actions, which contribute to environmental quality. Due to the diversity of topics this overview must confine itself to selected examples. Special emphasis is laid on the contextual references to the indicators thus enabling scattered reading of the environment report depending on the specific aspects of interest. Successes over past years, but also perspectives and conceptional queries often overshoot the report period of the indicators (2011) upon presentation of the projects.

Environmental education and communication

Selected educational projects and environment communication measures give a slight insight into the diversity of topics and educational possibilities, the environmental advisory network in Hannover and also the exemplary outer-school learning centres.

Special issues

Particular environment policy focuses of the City of Hannover (e.g. adaptation to climatic change, Climate-Alliance Hannover 2020) can also be exemplary projects and measures for other municipalities under the section "Special Issues".

Environmental information

Additional information to that contained in the environment report is available in internet under www.hannover.de where the Landeshauptstadt Hannover and the Region Hannover Authority run a regional internet portal with detailed specialist information. For further enquiries specific searches lead to selected documents, basic data, application forms, brochures and flyers, giving details of contacts for enquiries as well as links to non-local governmental institutions and a facility to send e-mail enquiries and orders.

Many documents are also available in English under www.sustainable-hannover.de, systematically classified according to environmental topic, to provide an international readership with convenient, user-friendly access to environmental information, in particular about special projects, which are of interest beyond the borders of Hannover City.

Environmental Information Law

The Environmental Report 2012 also serves the purpose of the implementation of the Environmental Information Law, which regulates the extended access to and propagation of environmental information. This aims to increase the environmental awareness, enable a free exchange of ideas and promote a more effective participation of the public in decision-making on environmental issues. For Hannover City this means offering easier and more understandable access to environmental information with a wide-ranging systematic availability and propagation of environmental information, in particular via internet.

Gender Aspects

Environmental awareness and behaviour, consumer patterns and nutrition habits, risk assessment or perception or e.g. mobility behaviour vary according to gender. The environment data compiled in this report have not been compiled and evaluated on a gender-differentiated basis. Where gender-specific consequences of local government decisions and measures have been noticed, this is made quite clear in the respective text.

Further information

Telephone	Infotel. Stadtgrün	0511 | 168 | 43801
	Environmental hotline	0511 | 168 | 45555
Internet	www.hannover.de	

Environmental barometer 2012

Environment-related sustainability indicators	Longterm trend	Trend compared to 2008 environment report	Overall assessment from environmental viewpoint	Presentation of indicator on page
Energy and climate protection				
use of renewable energies	↗	↗	+	8
use of combined heat and power	↗	→	(+)	8
domestic electricity consumption	↗	↘	(+)	9
CO_2-emissions due to thermal energy consumption by the city administration	↘	↘	+	9
CO_2-emissions due to electricity consumption by the city administration	→	↗	(+)	9
Mobility and traffic				
car stock (ownership)	↗	↗	–	18
CarSharing	↗	↗	+	19
public transport provision	↗	↗	+	19
public transport demand	↗	↗	+	19
cycle path network	↗	↗	+	21
Air				
general air pollution				
sulphur dioxide (SO_2)	↘	n. m.	+	24
particulates (PM_{10})	↘	→	(+)	24
nitrogen dioxide (NO_2)	↘	→	(+)	24
traffic pollution				
particulates (PM_{10})	↘	→	(+)	25
nitrogen dioxide (NO_2)	↘	↘	+	25
benzene	↘	→	+	24
Soil and land-take				
brownfield site reutilisation	↗	↗	+	34

In the environmental barometer the key indicators provide a general overview of the development of the environmental situation. On the basis of a data series collected over many years the long-term trend of selected indicators and the tendency in comparison to the Environmental Report 2008 is shown. Assessment of this development and with it the assessment of the sustainability development in the individual areas of action takes into account politically determined objectives and targets in specific programmes, statutory limit (threshold) values and considers the aims of a future-compatible, sustainable development of the City of Hannover.

Environment-related sustainability indicators	Longterm trend	Trend compared to 2008 environment report	Overall assessment from environmental viewpoint	Presentation of indicator on page
Nature conservation, agriculture and recreation				
green and open spaces	↗	↗	+	38
roadside trees	↗	↗	+	39
tree adoptions	↗	↗	+	40
protected areas	↗	↗	+	39
extensive agriculture	↗	↗	+	39
organic farmland	↗	→	(+)	39
Water, wastewater and surface waters				
drinking-water consumption	↘	↘	+	46
drinking-water consumtion by city administration	↘	→	+	46
biological quality of watercourses	↗	↗	+	47
water quality category of the River Leine	↗	↗	+	47
near to nature water layout	↗	↗	+	49
wastewater purification	↗	↗	+	48
contaminant load of sewage sludge	↘	↘	+	48
Waste				
amount of waste produced	↘	→	(+)	52
recyclable material collected	↗	↗	+	52
waste disposal quantity	↘	↘	+	53

Longterm trend of indicators and their trend in comparison with the Environmental Report 2008

↗ rising ↘ falling → constant n. m. no measurement values available

Assessment from environmental viewpoint

\+ positive (+) positive with reservations (–) negative with reservations – negative

Presentation of the indicator on page ...

The longterm trend of the indicators, their trend in comparison with the Environmental Report 2008 and evaluation from environmental viewpoint are explained on the respective pages.

Energy and Climate protection

Indicators

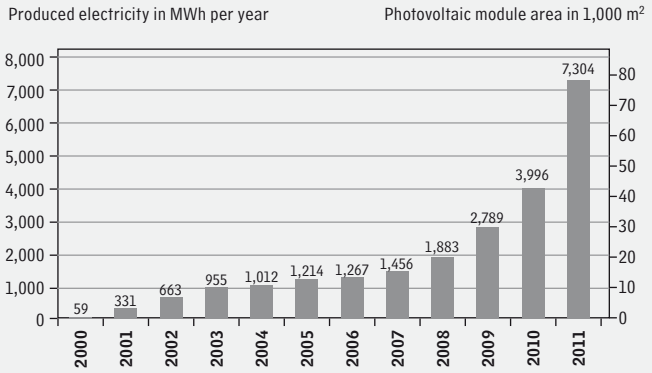
Use of renewable energy sources

Percentage of renewable energy sources in the overall electricity consumption and percentage of photovoltaic installations

In the urban area of Hannover renewable energy can only be generated in a limited form from hydroelectric power, gases (landfill, fermentation and sewage gases), biomass, wind power and solar energy. The share of electricity from renewable sources was 0.6 percent in 1997, 1 % in 2000, 1.3 % in 2005 and in 2011 with round 58.000 MWh a share of 1.8 % of the Hannover electricity supply, whereby round 59 % of the entire renewable energy electricity is produced on the waste disposal sites and sewage plants.

The photovoltaic installations have seen the largest increase. In 2011, 718 installations produced with an output of round 11.000 kWpeak (= maximum output) and a module area of approx 80,000 m², round 7,300 MWh, thus supplying a 12 % share of electricity from renewable sources.

Photovoltaic installations



Source: enercity-Netzgesellschaft and Landeshauptstadt Hannover

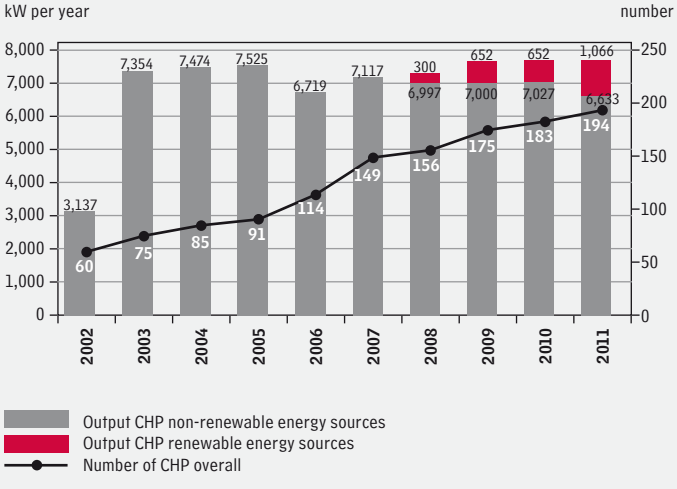
Use of Combined Heat and Power

Number and output of CHP plants in town area (CHP) and their percentage contribution to electricity supply

Co-generation (CHP) means the generation of electricity and useful heat in one plant at the same time. In Hannover the percentage share of electrical power supply generated by the three large enercity power plants in Stöcken, Herrenhausen and Linden is approx. 30 %.

The number of small co-generation plants, so-called block CHP plants rose from 60 in 2002 to 194 in 2011, inclusive of the plants supplied by renewable energy sources. In the case of the plants supplied by non-renewable energy there has been no increase in output since 2003 despite the increased number, as several larger shutdown plants were replaced by a multiplicity of smaller ones.

Block CHP plants in Hannover[1]

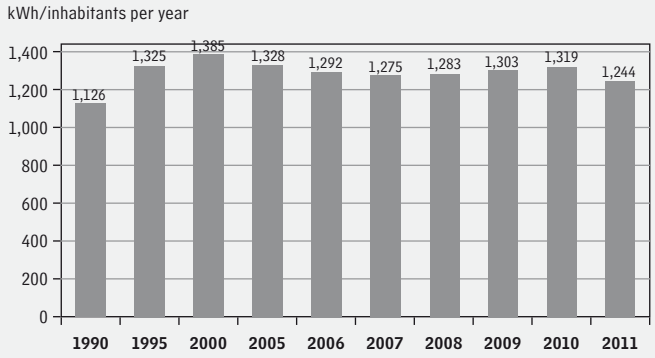


1) without purification plants and landfills

Source: enercity-Netzgesellschaft and Landeshauptstadt Hannover

In the year 2011 the 183 non-renewable source installations in the city area of Hannover with round 6,600 kilowatt (kW) electrical output generated 29,000 MWh electricity, so providing a share of 0.9 percent of the Hannover electricity (the volume supplied from the renewable energy block CHP are counted under "Use of renewable energies"). Reliable data are only available for electricity fed into the public grid; the proportion of electricity used by plant owners is mainly non-determinable.

Electricity consumption of private households



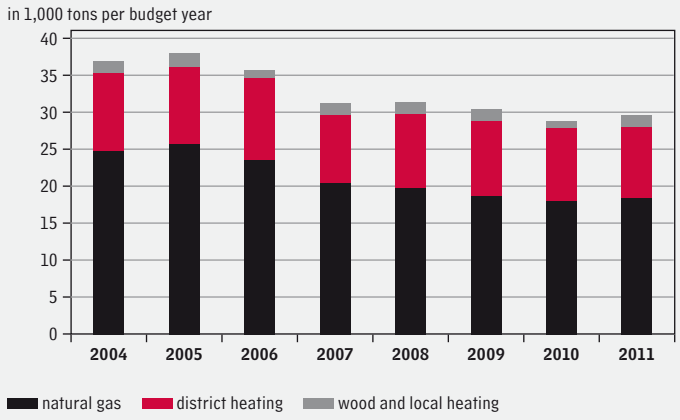
Source: Stadtwerke Hannover AG and Landeshauptstadt Hannover

Domestic electricity

Domestic consumption of private households in kWh/inhabitant per year

The total domestic electricity consumption rose 9 % from 1990 to 2011. From 2000 onwards, however, a positive trend can be recognized: despite the increased number of single-person households and increased equipping with electrical appliances – in particular multimedia – the electricity consumption per head in the period between 2000 and 2011 is reduced by 10 percent. Reasons for this are energy-saving habits and the purchase of energy-efficient household appliances. Here the success of intensive public-relations work and individual energy-saving advisory services becomes apparent.

CO_2-emissions due to thermal energy consumption, weather adjusted

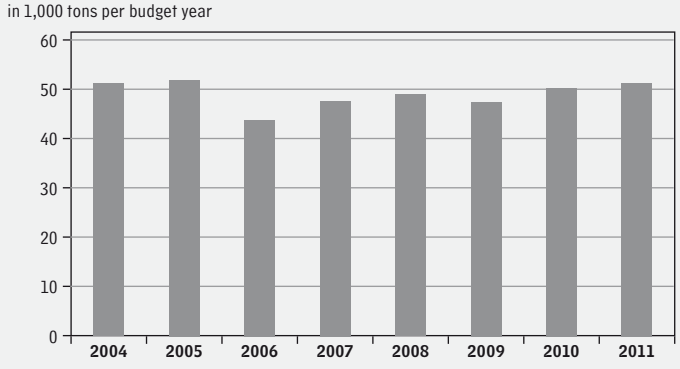


Source: Landeshauptstadt Hannover

CO_2-emissions due to thermal energy consumption by the city administration

CO_2-emissions weatheradjusted in tons CO_2 per budget year

CO_2-emissions due to electricity consumption



Source: Landeshauptstadt Hannover

CO_2-emissions due to electricity consumption by the city administration

CO_2-emissions in tons CO_2 per budget year

The CO_2-emissions due to the heating energy and electricity consumption of municipal properties are related to points of consumption centrally managed by the Building Management Department (cf. page 10), these are approx. 80 % of the city properties. They also comprise rented properties, wherever these are not charged via the rental costs. This is based on the heating and electricity volumes charged in the respective budget year, i.e. the year in which the energy invoices are paid. The consumption does not always occur in the calendar year shown, but partly also in the previous year (eg. meter-reading estimates and subsequent error adjustments). Values are shown only from 2003/2004 onwards as the figures are not comparable with the prior years due to handover to the region. Despite an increased area and usage (full-day schooling, new refectory buildings, extension and new construction of child day care facilities) the CO_2-emissions from 2003/2004 remained almost the same.

Projects and measures

With the aid of its Climate Protection Action Programme 2008 – 2020 the Landeshauptstadt Hannover pursues the goal of reducing the CO_2-emissions by 40 percent by the year 2020 (cf. page 63). In order to assess the status of CO_2-reduction in the city area and the success of climate protection measures, a CO_2-balance was drawn up for 1990 – 2011. This balance will be presented in a separate publication.

Based on the Climate Protection Action Programme the Landeshauptstadt Hannover together with the Hannover Region is currently preparing the 100 % Master Plan for Climate Protection.

Energy consumption by the city administration

The Building Management Department, in its function as owner and constructor, is responsible for a building stock of round 600 buildings on about 310 own real estate properties. These include above all city schools, child care day centres, youth centres and recreational facilities, libraries, administration and fire brigade buildings. Over the past few years energy-related measures were implemented in the sector of building and technical upgrading, to reduce the energy consumption; new construction of city buildings to passive house standards, increased use of renewable energies and biomass as well as CHP and use of district and local heating. Energy-saving due to environmentally conscious consumer behaviour also plays an influential role (cf. page 11).

Between 2007 and 2011 the building volume was 263 million Euro and investments of 240 million Euro are planned for 2012 – 2015. Additionally 153 million Euro were, resp. will be implemented as ÖPP[1] and ÖÖP[2]-projects wherein the schools and day nurseries will be renovated to meet the city's ecological standards (cf. page 12).

Within the past few years 25 out of the 52 primary schools of the Landeshauptstadt were restructured into full-day schools. Longer usage periods and the provision of school meals increase the energy consumption for heating and electricity. In addition for these 25 schools in seven cases it was necessary to increase the area coverage by extensions and new buildings due to the inadequate area available for refectory and recreational requirements.

Full-day operation is also becoming more and more standard even in the case of secondary schools: grammar schools have afternoon schooling at the latest since the abolition of Class 13 as a result of the compacting of tuition time. Consequentially in conjunction with the programme "Sustainable building renovation" the Landeshauptstadt Hannover has set up respectively extended canteens and recreational facilities in eight secondary schools.

Due to the legal obligation to provide sufficient day nursery places at the latest by 01.08.2013, the city of Hannover will have created 52 new groups by mid-2013. At the same time 27 additional groups were set up in the day nursery sector (three to six year olds) by annexes to existing properties (municipally-owned day nurseries), by leasing child day care facilities, partly with the help of municipal affiliates, other lessors or in the ÖPP-procedure. In many child daycare centres the period of care is being lengthened and usage expanded by intensive cooperation with parents (development of family centres).

Over the past year an increase in the number of children in the child daycare group had to be compensated by the setting up of temporary containers at five locations for seven groups. All these spatial extensions have an effect on the electricity and heating energy consumption.

Masterplan Hannover City and Region: 100% for climate protection

For the very first time the Landeshauptstadt and Region Hannover are collaborating on a climate protection project which risks a glance at 2050: What will life be like in 2050? What energy sources will we use for heating purposes or to produce electricity? What means of transport will we use? What courses can we already set today in order to achieve a drastic reduction in greenhouse gas emissions and energy consumption?

In the light of this and many more questions various experts will meet up until the end of 2013 in strategy groups, networks and citizens' dialogues as well ass creative, innovative workshops for the future, in order to develop joint strategies and measures for a climate-neutral Hannover Region (without impact on climate change). This 4-year project has begun in June 2012. The aim is a 95 percent -reduction of greenhouse gas emissions and 50 percent-reduction of energy consumption by the year 2050 in Hannover Region, which poses a great challenge only to be mastered jointly with the entire society in the city and outskirts.

The project is supported by the Bundesministerium für Umwelt, Naturschutz und Reaktorsicherheit (BMU) in conjunction with the National Climate Protection Initiative 2012.
For further information see: www.klimaschutz2050.de

1 *Öffentlich-Privates-Projekt (= privately financed project, whereby the object is mostly under long-term lease.*)

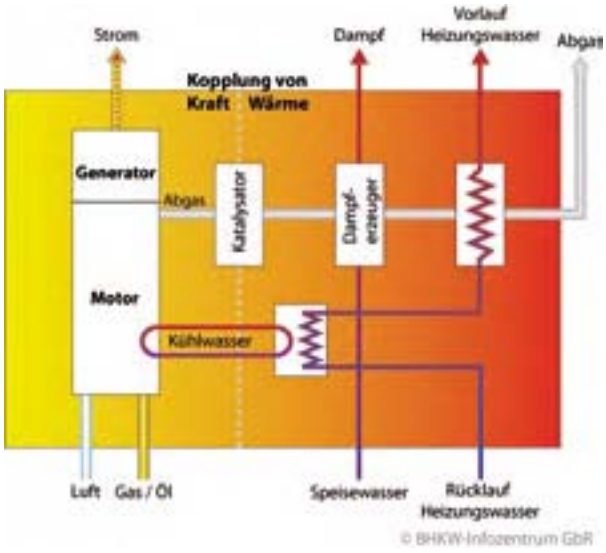
2 *Öffentlich-Öffentliches-Projekt (as ÖPP, but with a public project executing organisation, e.g.Union Boden as municipal affiliate*)

Block CHP plants in municipal properties

For the supply of heat the co-generation of heat and power (by district heating or natural gas: CHP power plants) along with the reduction of the heating requirement, e.g. by insulation and the use of renewable energies is an important component for the reduction of CO_2-emissions.

A block CHP plant (BHKW) produces electricity and efficient heat at the same time. As the electricity produced therein replaces the electricity produced in conventional large power stations with high heat losses, about a third of the primary energy resp. the CO_2-emissions is saved by using CHP. During the energetic retrofitting the city has commissioned four BHKW.

In order to speed up the equipping of properties with CHP regardless of retrofitting, 20 additional CHP plants are planned via contracting agreements. During contracting an external firm will undertake the financing and operation of the CHP plant. The city of Hannover will pay a rate comparable to a rent. The first 10 CHP plants were installed in summer 2012. Fitting of the remaining CHP's will take place in 2013. In total all BHKWs produce in an environmentally friendly manner approximately 3,300 MWh electricity per year (2,300 tons of CO_2-savings). This quantity covers the requirement of about 2,400 Hannover citizens.



Principle of a motor block CHP plant
Source: www.bhkw-infozentrum.de

Energy saving via environmentally conscious consumer behaviour

Non-investive energy saving projects in schools, child day care facilities and in the city administration have established themselves for more than ten years now as a successful contribution to climate protection in the Landeshauptstadt Hannover and serve as a nationwide model. By environmentally conscious consumer behaviour such as heating only as required, avoidance of standby consumption, the participants in more than 90 schools, around 80 child daycare centres and 60 other buildings of the city administration save in the meantime more than one million Euro energy costs and avoid 3,700 tons of CO_2-emissions. Over the entire run of these projects round 10.5 million Euro energy costs have been saved until now.

Updating of these projects has made them much more attractive to participants in past years. With financial backing from the Climate Protection Initiative of the Federal Government the concept for saving energy in schools (GSE-project) 2008 has been revised. 37 schools have now begun to work anew on the GSE-project according to this concept.

The Werkhof Hermann Löns-Park 2010 has been awarded first place in the environmental prize of the Stiftung Arbeit und Umwelt for "energy efficiency with employee participation". The Werkhof was able to come out on top nationwide against great competition from well-known industrial companies.

In order to evaluate the efficiency of the non-investive energy-saving projects investigations were made by the Department of Building Management sector 2011 of those properties,

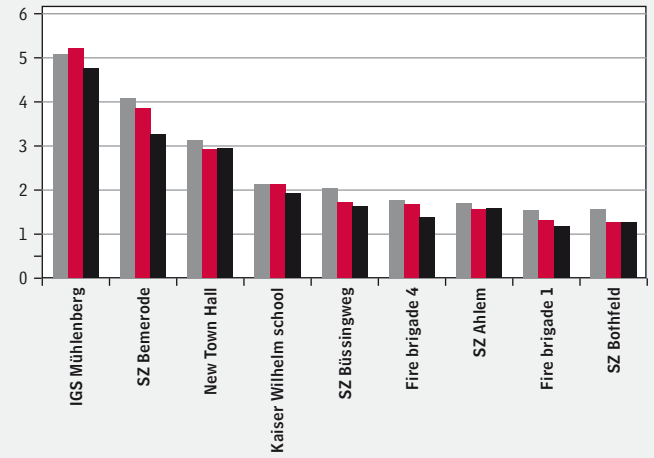
- with the highest heating consumption
- where the building management has carried out a so-called energy inspection
- where no energy reorganization measures on a larger scale have been undertaken in the period under consideration
- where there has been no change in the use or used area.

Climate balloon at the kick-off event for new energy-saving schools 2012

Work group in the Werkhof Hermann-Löns-Park

Final energy consumption for heating, weather adjusted

in 1,000 MWh per annum



Source: Landeshauptstadt Hannover

The selected properties comprised four school centres (SZ), one grammar school, one comprehensive school (IGS), two fire brigade stations and the New Town Hall as administration building. As seen in the graph an effectiveness of non-investive energy-saving measures by reduction of the energy consumption for heating could be proven from 2008 to 2010. All in all 3,092 MWh heat with 186,000 Euros energy costs were saved in the period under consideration.

New building construction and renovations of the city administration to high ecological standards

In 2009 the City of Hannover – at the same time as the introduction of the new Energy-Saving Regulation (EnEV)- approved the decision to make further improvements in the "Ecological standards for construction within the municipality's area of influence" laid down in 2007. These ecological standards cover voluntary commitments by the City of Hannover – ranging from urban land use planning, property contracts with private and commercial purchasers to constructional energy efficiency requirements for municipal buildings.

New constructions to passive house standard since 2008

	COMPLETED
2008	Residential care home Klaus-Bahlsen-Haus
2008	Child daycare centre Windröschenweg
2009	Primary school In der Steinbreite
2009	Child daycare centre Ricklinger Straße
2010	Rescue intelligence unit at Firestation 5
2011	Grammar school Bismarckschule (annex)
2011	Grammar school Leibnizschule (partial new building)
2011	Grammar school Schillerschule (annex)
2011	Grammar school Ricarda-Huch-Schule (annex)
2011	Primary school Am Stöckener Bach (annex)
	UNDER CONSTRUCTION / IN PREPARATION
2012	IGS Stöcken (annexes)
2012	Eight child daycare centres
2012	Grammar school Goetheschule (annexes)
2012	Sprengel Museum – extension
2012	IGS Mühlenberg

New buildings in EnEV minus 30 % since 2008

	COMPLETED
2010	Grammar school Elsa Brändström (school canteen)
2011	Primary school Entenfangweg (break room)
2011	Grammar school Humboldtschule (school canteen)
2011	Grammar school Herschelschule (school canteen)
2011	Primary school Gebrüder Körting (school canteen)
2011	Primary school Grimsehlweg (school canteen)
2012	Child daycare centre Quittengarten
2012	Child daycare centre Rut-Bahlsen-Zentrum
	UNDER CONSTRUCTION / IN PREPARATION
2012	IGS Büssingweg (Mensa)
2013	Grammar school Lutherschule (school canteen)

The general adoption of Passive House Standards for all new municipal buildings is set as an ultimate target, but at least a thermal protection standard, which is 30 percent higher than the EnEV guidelines of 2009. Unless other special reasons such as listing un-

School canteen at the Schillerschule (Grammar school)
New building to passive house standard

Humboldt Grammar school: energy efficient renovation of a 1960 construction.

der preservation or disproportionately high financial outlay speak against it, the same shall apply even for renovations.

The City of Hannover has erected both complete building complexes (primary schools, retirement and care homes, fire brigade stations and child daycare centres) as well as partly new buildings to passive house standard. In numerous cases complete and partial modernisation of municipal buildings have even surpassed the EnEV-requirements.

Funding for Climate Protection

The climate protection fund "enercity-Fonds proKlima" founded in June 1998 is still unique of its kind in Europe. The annual funding volume of around 5 million Euro is financed by Stadtwerke Hannover AG (enercity), the municipalities of Hannover, Laatzen, Langenhagen, Seelze, Hemmingen and Ronnenberg. The Fonds approved funds in an amount of approx. 49 million Euro, from 1998 – 2011, 38 million of which in Hannover.

proKlima
Der enercity-Fonds

The money is allocated according to specific criteria: CO_2-efficiency, absolute CO_2-reduction, multiplier effect and the innovation level of the measures are decisive. The proKlima annual report 2011 shows Hannover's great interest in climate protection and the proKlima-sponsoring projects. Best example of this: in the New Building-Sponsoring Programme the mean requirement in 2011 added up to 412,006 Euro; in the previous year 275,089. A large portion of the money was channelled as subsidy into passive house projects. In 2011, 71 passive house standard apartments were funded. In addition five passive house new buildings were financially backed in the subsidy programme "non-residential buildings" with 241,705 Euro. These building projects comprised one school, one child daycare centre, one grammar school as well as two administration and office buildings in Passive House Standard.

A completely different overall result in the old building sector. In 2011 the mean requirements for the subsidy programme for "old buildings" was 943,573 Euro, which is round 20,000 less than in the previous year. Reason for the lower demand in the old building programme is the lacking continuity of the Federal policy adopted in the case of energy retrofitting projects. 467, 203 Euro was channelled into the subsidy programme for combined heat and power plants (CHP) in the past year. With this money the Fonds backed 44 new district heating connections. In addition five block CHP plants as well as three electricity-producing heatings were realized together with proKlima.

The "Renewables" programme backed 62 solar plants and four biomass-heating installations. In the subsidy programme "Save electricity" the subsidy volume in 2011 was 84,280 Euro in total. This programme is aimed in particular at private households wishing to cut their electricity consumption. Users have the possibility of receiving advice from an electricity advisor specially trained at proKlima. In the course of the year an "Online Advisory Service for Saving Electricity" was made available as an additional offer at www.proklima-hannover.de and purchaser tips given for selecting particularly economic household appliances.

"Schools & Co." primarily financed educational material for schools and child day care centres as well as further training of teaching personnel. All in all the financial support here amounted to 106,359 Euro and 96,738 in the previous year.

In the period between 1998 and 2011 measures promoted by proKlima led to the avoidance of 85,000 tons of CO_2-emissions per year. Indirectly proKlima also contributes towards strengthening the local economy, then every Euro of subsidized money triggers off about 13 Euro of private investment.

Further information: www.proklima-hannover.de

Fridjof-Nansen-School (primary school): Energy-efficient renovation with listed building conservation

Funding example for highly efficient old building modernisation: Living in the historically listed School for those with sight handicaps.

Low Energy and Passive House Advisory Services

Already during house construction the future course is set for long-term energy consumption and with it the CO_2-emission level. Therefore according to ecological standards all new buildings on municipal land are obliged to be at least in accordance with a Low Energy Plus House. In addition every interested purchaser receives an independent advisory consultation free of charge with regard to energy-saving construction as well as the requirements in the purchasing agreement laid down by the City of Hannover.

This advisory service covers increased thermal insulation, maximum admissible emission values of the heating systems and quality control. Information on current subsidies and the comfort of Passive Houses are an incentive for house builders to do more than merely meet the minimum requirements.

If future housebuilders commit themselves to designing the new building according to Passive House Standard, they will be given preference for the allocation of land. For any additional individual advisory services proKlima offers financial backing for a so-called energy pilot (advisor).

From 2008 to 2011, 290 potential private purchasers and 21 building developers received advice sessions for residential buildings. All potential purchasers of municipally-owned building land are given advice in good time prior to signing of contract. This means that also those housebuilders, who do not eventually purchase at a later date are given advice regarding energy-efficient construction. In this way awareness of the topic is intensified.

Even for the construction of non-residential buildings on municipal land an early consultation in cooperation with proKlima is an obligatory component of the sales contract. In the case of particular types of use for planned buildings a feasibility study backed by proKlima can in individual cases give a better understanding of savings potentials.

Further information: www.hannover.de and
www.passivhaus-plattform.de

Door-to-door advice service

The Climate protection unit of the City of Hannover in cooperation with the Hannover Region Climate protection agency, enercity-Fonds proKlima and the Chamber of Craft Trades run door-to-door advice campaigns on energy-efficient retrofitting once a year in various city districts. This campaign under the title "Gut beraten starten!" (Start well-advised) has been very well accepted over the past few years. In most cases the number of 120 advisory services topped the planned target figures.

During the days of campaign energy advisers go from door-to-door in selected city districts, offering homeowners free, independent and individual advice on possible energy-neutral saving measures and financing models. This action is accompanied by press publications and an informational evening, to which the respective District Mayor invites interested houseowners.

An evaluation in 2010 showed that the campaign fulfilled the houseowner expectations by 80 percent. The advisory services had a marked impact on the decisions to modernize as well as on the investments made. On average 30,000 Euro were invested per consultation so enabling the local economy to profit therefrom.

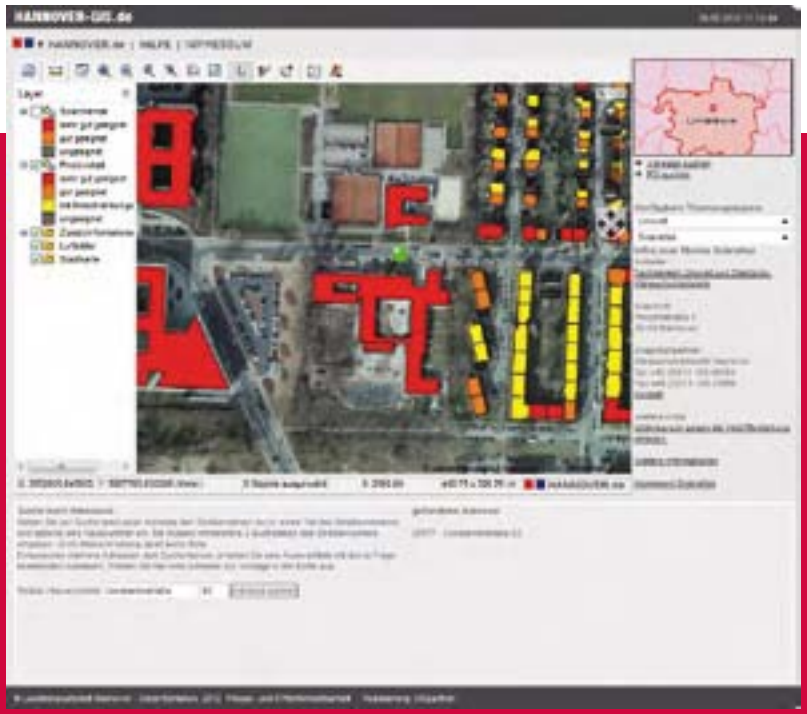
The Klimaschutzleitstelle of the City of Hannover advises interested houseowner families

Houseowner advisory session with energy pilot

Solar atlas Hannover – Hannover out to catch the sun

By 2020 a million square metres photovoltaic area is intended to produce electricity from renewable energy and so cover today's requirement for more than 70,000 people. This is the target of a campaign under the motto "Hannover auf Sonnenfang – one million square metres solar 2020". This action is intended to benefit both environmental protection as well as regional economy. To this aim the City has published a "Solaratlas" in internet at the end of November 2011 under which interested building owners or potential investors can acquire detailed information about areas which are basically suitable for photovoltaic or solar heating installations. The campaign is accompanied by intensive public-relations work and advisory services free of charge, the so-called Solar checks; these are held in cooperation with the "Klimaschutzagentur Hannover" (Hannover Regional Climate Protection Agency) and offer an initial advisory service for the construction of a solar system on the house roof. An additional offer is provided by the enercity-Fonds proKlima. Since 2012 photovoltaic advisors can be requested to give tips especially for tax purposes and financial offices. 25 per cent of the advisory costs is own contribution.

The PR-campaign's aim is to arouse public awareness of the atlas and thus increase the share of renewable energies in the city area. The effort involved is worthwhile: in 2011 there were 1,546 solar systems with a modular surface of 10,300 square metres in the city district, with an upwards trend!



Photovoltaic systems on municipal buildings

Solar energy offers an almost inexhaustible potential for the production of electricity and heat. Nevertheless as yet only a small share of the roofs suitable for the recovery of solar energy in Hannover is put to use. In order to achieve the self-imposed targets of the City of Hannover with regard to CO_2-reduction, suitable roofs of urban properties are leased out to school friends' organisations and investors for the construction of photovoltaic systems. The largest share of leased roofs are those on school buildings, but also on children's daycare facilities, workshops and resident care homes. To make the pupils more aware of the significance of energy production from renewable sources most schools are equipped with notice boards, providing information about current and overall electricity production.

At present there are 54 installations in operation on municipal buildings with an overall output of 1,445 kWp (kilowatt peak = maximum output). The annual production is round 1,230 MWh and can secure the supply of about 880 Hannoverians with electrical energy. The entire modular surface is about 12,000 m^2. Thanks to photovoltaic installations it is possible to achieve an annual reduction in CO_2-emissions of more than 940 tons.

PV-installation Glücksburger Weg primary school

Energy efficiency of Hannover's sewage plants

Urban sewerage systems are the largest municipal energy consumers. The electricity consumption of the sewerage plants in Germany is estimated as round 4.3 TWh per year and is so clearly above the electricity consumption of all schools (3.0 TWh per annum) or that of the street lighting (3.4 TWh per year).

By tradition the fermentation gas produced on the sewage plants in Hannover is used for electricity production. The heat loss (waste heat) occurring is used to heat the digestion tanks and the buildings. There has been a continuous optimization of this form of energy production, causing it to gain more and more significance. By means of the CHP power plants installed on the sewage plants a total of 15,300 MWh electrical energy has been produced in 2011 covering approx. 63 percent of own requirement. At the same time the electricity consumption has been reduced by the following measures:

- Use of electro pumps of max. efficiency grade
  Optimization of pump control
  Reduction of pumping head (lifting height).

In actual comparison with 17 plants in the magnitude of Hannover sewage plants the Gümmerwald plant has the lowest volume of energy consumption of all cities participating. The Herrenhausen plant ranked third best. In future own electricity production is to be increased by the additional use of environmentally-friendly electricity production plants such as photovoltaic installations, by hydropower utilization and renewal of block CHP plants. Energy efficiency is to be further increased by optimized sequence of operations.

EU-Climate protection project Concerto/act 2

Hannover City Administration is running a European climate protection project for local authorities, jointly with the cities of Koszalin (PL), Malmö (SE), Nantes (F) and Newcastle (GB) from 2006 to 2012. The focus in Hannover is on retrofitting older buildings and – wherever possible – the integration of renewable energies in the case of private detached and multiple-occupancy houses and for municipal buildings. The city carries out this project with five other Hannover partners.

The majority of the energy-efficient upgrading (renovation) is carried out by the Spar- und Bauverein eG, Gundlach GmbH & Co. KG Wohnungsunternehmen and the Wohnungsgenossenschaft Herrenhausen e.G. The Stadtwerke Hannover AG has set up the enercity Wooden energy centre, in which cordwood (split logs) are produced from whole tree trunks and are dried directly using the heat produced from the cogeneration plant.

The target GmbH held extensive training sessions for designers, architects and craftsmen. The process of training the craftsmen directly on the building site was newly developed. Enercity-Fonds proKlima was responsible for the detailed evaluation of energy and CO_2-data.

The main concern of Concerto/act 2 in Hannover is to save energy by modernisation and make use of renewable energies. The reduction in CO_2-emissions achieved in this way is an active contribution towards climate protection.

With the help of Concerto 55 buildings covering a total area of 34,171 square metres are energy-efficient renovated and renewable energies with a total output of 2,840 kW are installed. The results for actual consumption are partly available for over three heating periods and with a 50 to 70 percent eating energy saving come off far better than with the conventional modernisation.

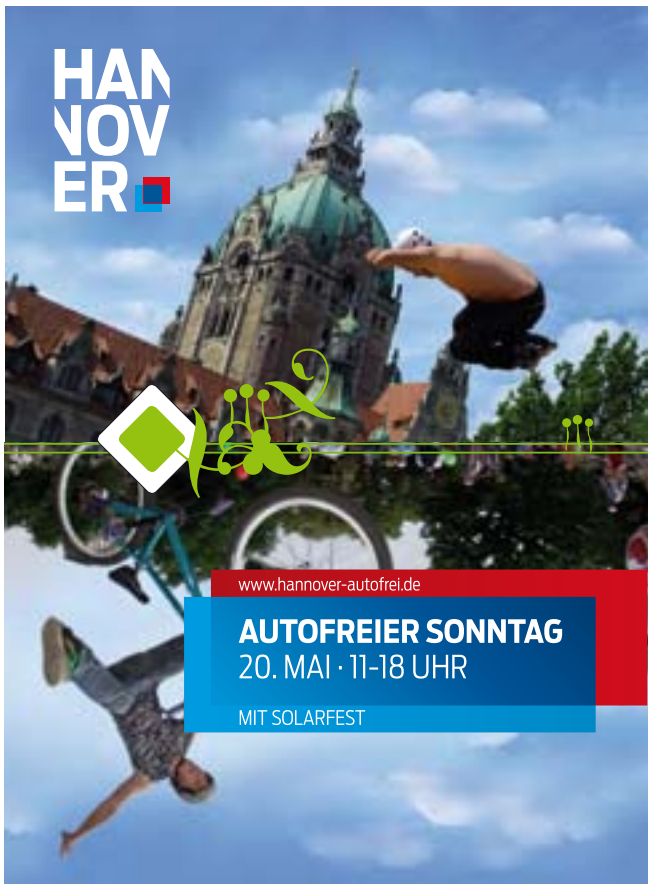
CHP Plant in Herrenhausen sewage treatment plant

Old building restoration Naugarder Weg

Car-free Sunday celebrates its fifth year!

On May 20th, 2012 more than 120,000 guests, celebrated the biggest ever asphalt party of Northern Germany with over 150 organisations, companies and associations, and far more than 100 artists, musicians and performers. They came on bicycles of all kinds, sporty solar vehicles, inline skates, roller blades, on foot, with the bicycle rickshaw or at the cheap GVH-tariff by bus or tram. Twelve miles and four stages offered a kaleidoscope of technical innovations, information, sport activities, poetry and relaxation as well as fun and entertainment for all age groups. Painting, skating, cycling, acrobating, dancing, climbing, testing, experimenting, romping, or just marvelled and relaxed.

From 2013 onwards the car-free sunday will be even more extensive and colourful under the title "Car-free Sunday – Hannover's Climate Festival."



Mobility and traffic

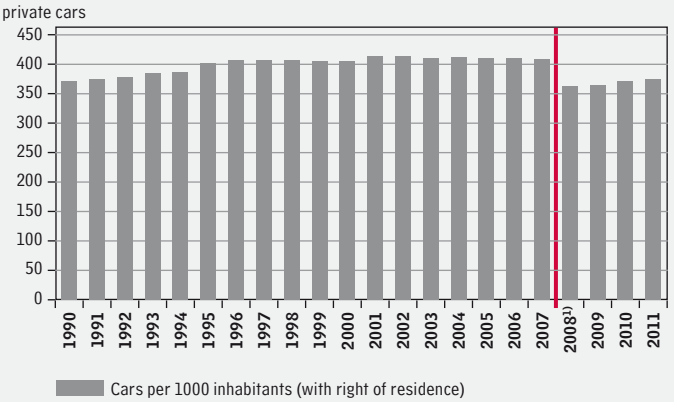
Indicators

Car stock

Number of private cars in relation to the population in cars/1000 residents

At the start of the 90's a clear rise in motorized mobility was recorded, but motor vehicle density stagnated by 2007 with 410 cars per 1000 residents. Due to a statistical reorganization according to the new vehicle registration regulation as from 01.01.2008 a comparison of the figures before and after 2008 is not possible. Between 2008 and 2011 the motor vehicle density rose slightly by 3 %.

Car ownership



1) from 01.01.2008 not including vehicles taken off the road temporarily according to new vehicle registration regulation (nationwide approx. 12 percent).
Reporting day for vehicle stock resp. January 1st of each year

Source: Landeshauptstadt Hannover

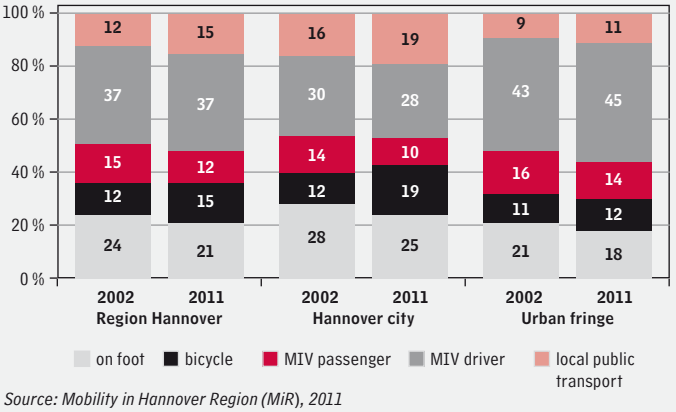
Modal split (choice of transport)

Share of means of transport (on foot, by bicyle, by car, by local public transport) over all journeys covered within the city of Hannover, in percent

According to the latest investigations the share of motorized private transport (MIV) in the City of Hannover has dropped from 44 % (2002) to 38 % (2011); national average is around 58 percent. Whereas the national average of journeys by public transport is only 9 %, in the city of Hannover it is 19 % (2002: 16 %). Bicycle as means of transport has increased clearly from 12 % (2002) to 19 % in 2011 (cf. page 20).

Modal Split in Hannover Region

Journeys, data in percentage



Source: Mobility in Hannover Region (MiR), 2011

CarSharing

Year	Vehicles	Carshare contracts	Persons eligible to book and drive
1999	80	1381	1475
2000	95	1807	2063
2005	89	2052	2691
2008	110	2589	3034
2009	124	2876	3358
2010	136	3212	3689
2011	160	3502	3996

Source: stadtmobil Hannover GmbH

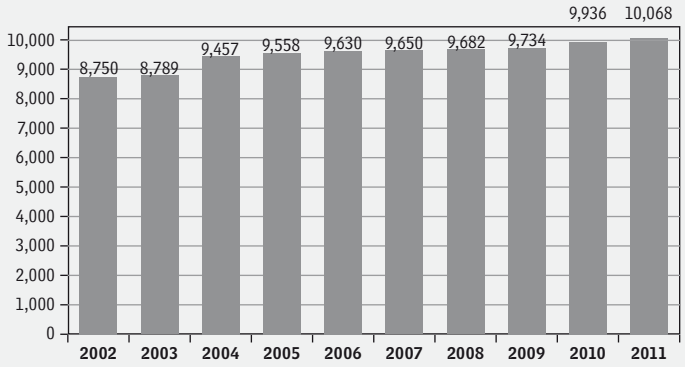
CarSharing

Number of persons entitled to drive, carshare contracts and vehicles operated by stadtmobil Hannover GmbH

In Hannover CarSharing is an essential element of sustainable city mobility with a very long tradition, as can be seen in the example set by the company stadtmobil Hannover GmbH. In 2011 approximately 4,000 people, companies, clubs and administrations used 160 stadtmobil-vehicles in Hannover. Currently there are three CarSharing providers in the city area (cf. page 23).

Local public transport services

seat-km in GVH in millions per year



Source: Region Hannover

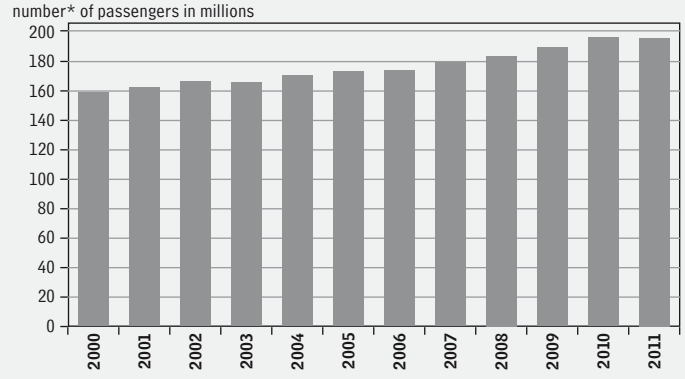
Public transport offer

Total of transportation capacities (vehicle output x average number of seats per vehicle) on all routes in the Greater Hannover public transport area (GVH) in seat-km per year

The Hannover Region has made a marked increase in the traffic services provided over the past few years, adapting it to the positive passenger trend. For example the S-Bahn (light rail) was extended as far as Hildesheim and the tram supplemented by the lines travelling to Altwarmbüchen and Misburg-Nord. Especially on the highly-frequented bus routes the regular-interval traffic was compacted. Positive passenger trend has also led to the use of additional vehicles on the track. For city trams this means the increased use of three-carriage-trams and in the regional rail transport (SPNV) additional booster trains are used in the peak period.

Demand for local public services

number* of passengers in millions



* The number of passengers covers the five segments tickets, Mobilcards, schoolchildren tickets, regional and combi-tariffs as well as social tariffs, severely handicapped persons and children under 6 years. In the environmental reports 2002 – 2008 the latter two categories were not taken into consideration. The current figures therefore deviate from the old publications.

Source: Großraum-Verkehr Hannover (GVH)

Demand for local public transport

Number of passengers on local public transport within the Greater Hannover area (GVH) per year

With 195.5 million passengers 2010 was up to now the most successful year in the history of the GVH-alliance. Passengers in the GVH have undertaken in the year 2010 a total of 37 million journeys more than ten years previously(2000: 158.3 million), which means an increase of round 23.5 %. The growth in passenger numbers in 2010 was favoured by the extreme weather conditions in winter. In 2011 the passenger number was well stabilized despite “cyclist-friendly” weather conditions.

Public transport development

Share of residents (in percent) within the city of Hannover living within 300 m of the next bus stop and/or maximum 500 m of the next S-Bahn/Stadtbahn-stop

The special evaluation carried out by the Hannover Region (2012) regarding the degree of public transport development included those stops at which there is at least one service every half-hour per direction at the peak period and non-busy period and at least once an hour during low demand. The evaluation for the year 2012 for population within the Landeshauptstadt Hannover recorded a share of 72 % living within a radius of less than 500 meters (bee-line) to the next light rail transit resp. S-Bahnstop and in all 92 % within a maximum distance of 500 metres (bee-line) to the next urban rail-resp.S-Bahn stop and/or 300 metres (bee-line) to the next bus stop.

Projects and measures

Traffic policy is related to a city development which is committed to urbanity, sustainability and social balance. Hannover City and Region have therefore set up extensive action programmes to ensure and develop a forward-looking mobility, focussing on safeguarding and strengthening the environment alliance (pedestrian, cyclist, public transport).

Modal split

More and more people in Hannover City and Region opt each day for bus and rail as method of transport for journeys to work, shopping or recreation. A representative study submitted by the Institute of Applied Social Sciences (infas) in April 2012 showed that in the City of Hannover public transport (ÖPNV) holds in the meantime a 19 percent share in the so-called "modal split". Commissioned by the Hannover Region infas carried out a survey with round 3,700 people in 1,700 households in the City of Hannover and the surrounding areas regarding their mobility behaviour. In all 12,000 journeys were recorded, in order to determine the percentage share of different modes of transport in the total number of journeys covered per working day.

With a share of 38 percent the car (motorized vehicle) still remains the most important means of traffic, but public transport records a clear plus of between 16 and 19 percent with a decelerated 'auto' mobility from 2002 to 2011. So the City of Hannover fluctuates in the German comparison between the metropoles Hamburg (18 percent) and Munich (21 percent). The total share of ÖPNV (public transport) and bicycle (38 percent) in the Landeshauptstadt is considerably higher than in the comparison cities of Hamburg, Bremen, Berlin and Munich where the share is only 30 to 35 percent. These figures vouch for the high quality of the local traffic facilities and the cycle-friendliness in the City of Hannover.

Winning choice of transport mode is the bicycle: With a growth of 12 to 19 percent there has been a marked rise in the share of people using the bicycle in Hannover. A good stride forward towards achieving the goal in the "Leitbild Radverkehr" (overall cycle traffic concept), a component in the Mobility Masterplan 2025. The percentage share of cycle transport in the modal split of the City of Hannover is to be increased to 25 percent by 2025.

Mobility Masterplan 2025

In January 2011 the Council of the Landeshauptstadt Hannover has passed the Mobility Masterplan 2025 in which the city paves the way from infrastructure-oriented traffic planning to the development of a future-oriented mobility.

The Mobility Masterplan is an overall plan covering all types of traffic and is intended to contribute towards improving the traffic safety and mobility opportunities as well as towards strengthening a sustainable planning. By promoting mobility alternatives to automobile traffic and the networking of traffic systems a change in the modal split in favour of the environmental alliance (cycle, pedestrian, ÖPNV) is to be achieved.

This Master Plan describes the strategic traffic planning goals of the Landeshauptstadt for the next fifteen years, naming its focal points of activity. Based on the initial situations presented the integrated action concept describes the deficits and potentials of possible alternative actions and their impacts.

The focal points of activiy of the Mobility Masterplan 2025 are:

Mobility opportunities

Important goals are the promotion of mobility alternatives to the motorized vehicle giving special consideration to the needs of persons with restricted mobility.

Bicycle traffic Concept

With a ten-point-programme the cycle traffic share of 13 percent (2002) is to be increased to 25 percent whilst halving the number of cycle traffic incidents involving serious injuries and deaths.

Inner-city traffic concept

Revitalization of the City Ring, waiver of individual parking spaces in the inner-city, attractive extension of bicycle connection routes and pedestrian-friendly crossings are intended to create unmistakably pleasant city spaces.

Mobility management

The City of Hannover is actively involved in the Lower Saxony Masterplan Mobility Management and the expansion of duties and offers provided by the Mobility Centre. The activities of the City and Hannover Region are to be consolidated in a cooperative mobility management. Multi-modal approaches such as CarSharing (cf. page 23) are to be further promoted.

Traffic safety

Focal points of activity are in the sectors concerning speed monitoring and control, prevention by means of public-relations work and traffic instruction in schools. Intensive work towards the improvement of traffic safety for children will be continued.

Air, noise and climate

Action plans to reduce noise impact (cf. page 30) ensure the achievement of environmental quality targets (cf. page 26) by traffic control measures and driving bans as well as speed checks and road design.

Accessibility for car traffic

The aim pursued here is the concentration of necessary car traffic in an efficient major road traffic network with capacities to meet demand. For stationary traffic the parking space availability and demand is quantified with the aim of avoiding local excess capacities and improve the poor use of car parks.

In conjunction with the preparation of the Masterplan, administration, politics, special interest lobbies and associations have in a two-year open dialogue come to terms with the requirements of extensive mobility services and the more and more complex claims made on individual mobility.

For further information see: www.hannover.de (Masterplan Mobilität 2025)

Cycle traffic

In 2008 preparation of the “Leitbild Radverkehr” (Overall cycle traffic concept) was passed by the Council and published in 2010 with the aim of promoting cycle traffic as part of the Mobility Masterplan 2025.

Aiming at a cycle traffic share of 25 percent the first stages for the coming years of overall urban cycle network expansion as well as the updating of the cycle park concept for the inner city are underway. At the start of 2011 the second bicycle station in the Rundestrasse was opened, now making an availability of 776 canopied and supervised cycle parking lots at the main railway station.

Landeshauptstadt Hannover is winner of the regional competition "cyclist-friendly community 2010"

Ambitions nurtured by the Landeshauptstadt Hannover bear fruit. After receiving a second place in the regional prize for "bicycle-friendly community" in 2006, sponsored by the state government, Hannover was awarded first prize in 2010.

The existent overall city cycle transport network is made up of different network elements (cycle paths at the side of the road or in green areas, low-traffic connections in tempo 30 limit zones and traffic restraint areas as well as cycle routes). Based on a network concept drawn up in 2003 this network is constantly under further development.

The idea of making the bicycle, an environmentally-friendly traffic means, more attractive as an alternative to the car is supported by new elements. By development of fast cycle routes from the outskirts into the city as well as the increasing use of pedelecs (bicycle with electrically driven pedalling support) it is possible to increase the use of a bicycle for everyday journeys, thanks to the broadening of the cyclist's horizon.

Local public transport

Hannover can boast a successful and widely developed system of Public Transport (ÖPNV). Within the Großraumverkehr Hannover (GVH) the five traffic operations üstra Hannoversche Verkehrsbetriebe AG, RegioBus Hannover GmbH, DB Regio AG, Metronom Eisenbahngesellschaft mbHand erixx GmbH, the Heidesprinter(since 11.12.2011) work together to offer passengers an optimal service package. The integrated public transport system provides a well-coordinated transport network in the region and a uniform tariff system. Short journeys are the basis of traffic planning. Proof of the quality of this service are the annually rising number of passengers in the GVH (cf. page 19).

üstra Hannoversche Verkehrsbetriebe AG

The üstra Hannoversche Verkehrsbetriebe AG belongs to the top flight German local traffic companies. With an annual passenger number of round 159 million passengers per annum in their city buses and trams it is the largest partner in the GVH with a traffic proportion of round 75 percent. With its modern metropolitan railway and fleet of buses the üstra provides environmentally-friendly mobility. The CO_2-emission of the Stadtbahn has been reduced by 22 percent since 1990, then the Stadbahnen produce the energy required partly themselves – from transformed brake energy. From 2013 onwards 50 new environmentally-friendly light rail trains will be underway in Hannover; this investment will be backed fifty percent by subsidies from the State of Lower Saxony.

The üstra bus fleet is also environmentally-friendly: the vehicles acquired over the last years meet with the highest environmental standards. Since September 2011 ten especially low-consumption hybrid buses travel on the route 121, which passes through very heavy traffic zones and densely built up road areas. In this way it is possible to reduce the CO_2-emissions on very busy lines in the inner city by up to 29 percent.

Further information: www.gvh.de; www.uestra.de

Local transport plan

This plan sets itself the target of intensive control over the quantity and quality of the traffic service, in order to provide an effective organisation of local public transport making efficient use of the financial means available. For this purpose a five-year plan formulates the general guidelines and goals for development of the ÖPNV in the Hannover Region developing a respective control concept based on elements for spatial development, quality improvement, route network and marketing strategy. Along with the further development of the bus and rail services a focus for the local public transport plan

2013 will also be the contribution of local transport to the climate policy targets of the Region Hannover. Investigations will be made into the effects of demographic change on the transport demand and the infrastructural requirements.

proKlima Transport development plan for Hannover Region

The preparation of the traffic development plan of the Hannover Region is based on the decision passed by the regional assembly regarding the climate protection framework programme to draw up a concept for the reduction of CO_2-emissions. With this the Region Hannover sets itself the target of achieving the 40-percent CO_2-reduction a guideline formulated by the Federal Government by the year 2020 in comparison to 1990 also in the Hannover Region. According to the CO_2-overall balance of the Hannover Region a share of 21 percent of the entire CO_2-emissions was determined for the transport sector, 84 percent of which was produced by motorized individual transport.

The regional tranport development of proKlima has been prepared over a period of two years with backing via subsidy of the climate protection initiative of the Federal Environment Ministry. It proposes measures to be implemented in four fields of action, namely:

- housing development and local mobility
- public transport (ÖPNV)
- traffic management, road infrastructure and parking
- mobility management.

In the field of action ÖPNV the integrated transport development plan focusses on frequency improvements, climate protection (electromobility, new propulsion technique), new strategies for customer loyalty and customer acquisition. As there is a strong interaction between the traffic and transport development of the Landeshauptstadt and the Hannover Region, both city and region adapt their plans to one another – according to their planning hierarchies.

CarSharing – individual and sustainable mobility

In Hannover the community use of a car as contribution to a sustainable city mobility is being promoted and vastly extended. Currently there are three firms offering services :

Stadtmobil Hannover GmbH

stadtmobil Hannover GmbH originated in 2006 from the Verein Ökostadt/teilAuto (since 1992). Nationwide in Germany there are eight stadtmobil organisations, offering in close cooperation in 74 cities more than 1,800 vehicles at more than 700 stations. Due to the cooperation with other CarSharing services users of stadtmobil Hannover can use more than 4,000 vehicles in 113 cities with their access card.

2009 the Council of the Landeshauptstadt Hannover has passed a concept for further promotion of the organised community use of cars (CarSharing). For this purpose the setting up of CarSharing points in the public area – close to accommodation and inner city in particular in the densely populated city districts, List, Nordstadt and Südstadt. For the first time in 2011 the City of Hannover has withdrawn parking space from public use and allocated it to CarSharing, making it available to stadtmobil by contract (Gestattungsvertrag).

Further information: www.stadtmobil.de

Deutsche Bahn AG, Volkswagen AG CarSharing projects

The Deutsche Bahn AG operates nationwide CarSharing under the name "Flinkster" with 10 vehicles at the main railway station. The aim of the DB AG is to offer customers linkup mobility for the local and long distance train transport.

Further information: www.flinkster.de

In November 2011 Volkswagen started up its CarSharing pilot "Quicar – Share a Volkswagen" in Hannover. The fleet comprising 200 Golf BlueMotion distributed over 64 pickup locations – from inner city over the various city districts as far as the airport of Hannover. "Quicar" is supplemented by "Quicar Plus" especially suited for longterm rental.

Further information: www.quicar.de

Air

Indicators

General air pollution

Annual average air pollution sulphur dioxide, particulates (PM_{10}), nitrogen dioxide, carbon monoxide and ozone

**Until 17.07.2007 Roof station Göttinger Straße*

Data in µg/m³; for carbon monixide in mg/m³; for ozone: number of days per year with exceeding of target value of 120 µg/m³
TA Luft emission limit values set by national technical manual on air purity
39. BImSchV limit and target values (ozone) of 39th national emission protection regulation

[1] PM_{10}: particulates less than 10 µm
[2] target value: number of days with values exceeding the eight-hour-mean value of 120 µg/m³
[3] no metering
[4] prior to 1999 dust was metered as total dust, after 1999 as PM_{10} 1988–2000 neither PM_{10} nor all dust was metered at the traffic station.
[5] (Staub/Kfg) = dust from a fine filter appliance

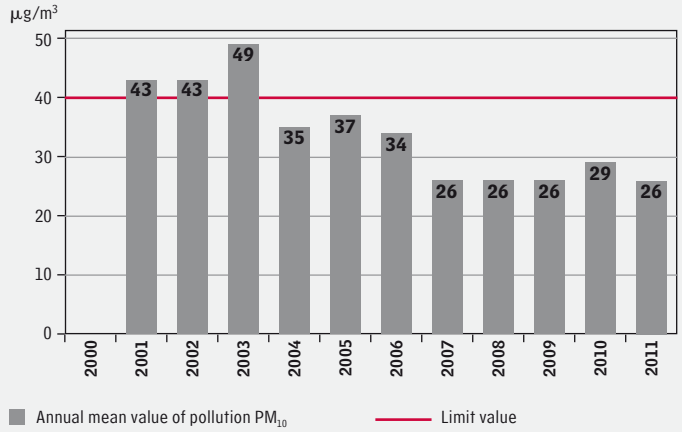
General and traffic-related air pollution

component	1990	1995	2000	annual mean values 2005	2006	emission-/limit-/target-values TA Luft	39. BImSchV
Ambient (Hintergrundstation) Lindener Berg*							
sulphur dioxide	17	11	6	3	3	50	
particulates (PM_{10})[1]	35[4]	38[4]	31	26	28	40	40
nitrogen dioxide	35	28	25	27	24	40	40
carbon monoxide	0.7	0.6	0.4	0.4	0.5		
ozone	[3]	[3]	[3]	9	34		25[2]
Göttinger Straße roadside traffic station							
paticulates (PM_{10})	(122)[4],[5]	(81)[4],[5]	—[4]	37	34	40	40
nitrogen dioxide	77	62	53	69	63	40	40
benzene	18	9	4	2	2		5
soot	—[3]	—[3]	10	5.4	6.2		
carbon monoxide	2.9	1.7	1.1	0.6	0.5		

component	2007	2008	2009	annual mean values 2010	2011	emission-/limit-/target-values TA Luft	39. BImSchV
Ambient (Hintergrundstation) Lindener Berg*							
sulphur dioxide	3	—[3]	—[3]	—[3]	—[3]	50	
particulates (PM_{10})[1]	19	19	18	20	20	40	40
nitrogen dioxide	21	21	20	21	19	40	40
carbon monoxide	0.3	—[3]	—[3]	—[3]	—[3]		
ozone	17	21	10	11	11		25[2]
Göttinger Straße roadside traffic station							
paticulates (PM_{10})	26	26	26	29	26	40	40
nitrogen dioxide	56	56	53	51	43	40	40
benzene	2	1.4	1.5	1.3	1.3		5
soot	5.4	4,7	—[3]	—[3]	—[3]		
carbon monoxide	0.5	0.4	0.4	0.5	0.4		

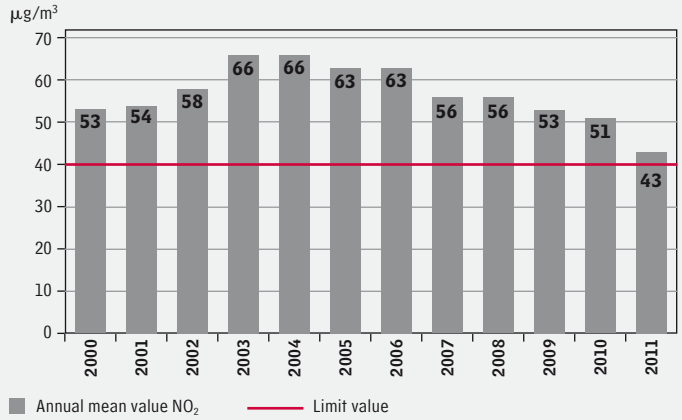
Source: Niedersächsisches Landesamt für Ökologie; since 2005: Gewerbeaufsichtsamt Hildesheim, Zentrale Unterstützungsstelle Luftreinhaltung, Lärm und Gefahrstoffe

Traffic-related air pollution – PM_{10}



Source: Niedersächsisches Landesamt für Ökologie; since 2005: Gewerbeaufsichtsamt Hildesheim, zentrale Unterstützungsstelle Luftreinhaltung und Gefahrstoffe

Traffic related air pollution – NO_2



Source: Staatliches Gewerbeaufsichtsamt Hildesheim, zentrale Unterstützungsstelle Luftreinhaltung, Lärm und Gefahrstoffe

Traffic-related air pollution

Annual mean values of pollution particulates (PM_{10}), nitrogen dioxide, benzene, soot and carbon monoxide in roadside area (Göttinger Straße traffic measuring station)

Since 2004 the annual mean value for particulates (PM_{10}), 40 µg/m³, has not been exceeded at the Göttinger Straße roadside metering station and since 2007 the mean values have been markedly below 30 µg/m³. In 2010 inverted high pressure weather conditions in particular during the first three months led to periodically increased PM_{10}-concentrations and consequently to a comparably higher annual mean value.

The annual mean value for nitrogen dioxide (NO_2) still remains exceeded at the traffic station Hannover (Göttinger Straße). The values do, however, show a slight reduction in air pollution since the introduction of the Emission Zone (2008) and implementation of other air pollution control measures.

Projects and measures

The EU Air Quality Directive (EG-RL 96/62) and its supplementary directives that were incorporated into German law in 2002 set air quality targets to prevent or reduce harmful effects on human health and the environment in all member states of the European Union.

On May 21, 2008 with the Directive 2008/50EG of the European Parliament and the Council for Air Quality and Clean Air for Europe a new directive for air quality came into force, which in August 2010 with the 39th Verordnung zum Bundesimmissionsschutzgesetz (39. BImSchV) was implemented in German Law. This update restructured the air quality directives and laid down new target values and methods for monitoring the air purity. So a target value of 25 µg/m³ for particulates ($PM_{2.5}$) as annual mean value as from 2010 shall apply and will be a binding limit value for all EU-member states as from 2015. In addition the new directive allows the possibility of an extension for compliance with the limit values for particulates (PM_{10}), nitrogen dioxide (NO_2) and benzene under certain circumstances.

Air Quality in Hannover

Pollution levels in the Federal State of Lower Saxony are monitored by the Lufthygienisches Überwachungssystem Niedersachsen (LÜN) with currently 22 automatic metering stations and six roadside metering stations in heavily polluted inner city-areas. In Hannover there are two metering stations.The station on Lindener Berg (until 17.7.2007 roof top Göttinger Strasse) monitors the ambient pollution in the city, the traffic metering station Göttinger Straße also monitors the traffic-related emissions on a North-South aligned road corridor.

The measurement data of the past years show that the annual mean limit (threshold) value for PM_{10} (40 µg/m³) has no longer been exceeded at the traffic station since 2004. From 2007 onwards a marked decrease in the annual mean value was recorded. Since then it lies below 30 µg/m³. The daily mean value (max. 35 overshots of 50 µg/m³) has been maintained at the traffic metering station since 2006, at the background station no other exceeding of this limit value has occurred since 2004. The annually varying weather patterns (e.g. number and length of the inverted weather conditions) have a considerable influence on the number of days per year that the limit is overshot.

For the first time now since 2009 complete annual values for $PM_{2.5}$ are available. Both in 2009 as well as in the subsequent years (2010, 2011) the annual mean values at the traffic metering station are below 25 µg/m³, the limit value applicable as from 2015.

The NO_2 annual mean threshold value is kept constant at the background station. The average of the last five annual mean values is 20.4 µg/m³. At the traffic station the threshold value of 40 µg/m³ is, however, as always exceeded but the values do show a clear reduction in the air pollution since the introduction of the Emission Zone (2008) and implementation of additional clean air measures. Whereas the annual mean value in 2007 was still 56 µg/m³, in 2011 it was only 43 µg/m³.

Air quality plan for Hannover

Due to the failure to comply with the NO_2-annual mean threshold value applicable as from 2010 on the major traffic routes of the City of Hannover it was necessary to apply for an extension (5 years after the limit value came into force) from the European Union in 2011. Entitlement to this extension is the fulfilment of certain conditions named in Article 22 of the RL 2008/50/EG. Also an air quality plan is to be drawn up for the district or conurbation for which the extension should apply.

The "Hannover Air Quality Plan 2011", based on the Air Purity Action Plan of 2007, comprises essentially the description of the current air quality and its development in the past years, outlining the clean air measures previously implemented as well as the planning of the following additional measures for compliance with the pollution limits in 2015:

Preservation and improvement of mobility accompanied by reduction of environmental stress (pollution)

- Considerable increase in cycle traffic's share in "modal split" share of 25 percent
- town planning measures (e.g. improvement of local traffic situation in the town districts, improvement of residential quality on city squares)
- promotion of pedestrian traffic
- further increase in the attractivity of the ÖPNV (public transport network)

Reduction of the emissions of other traffic

- Further perpetuation of car traffic by optimisation of traffic light control.
- Perpetuation of traffic by "controlled Tempo 50"

Clean Air Measures in Hannover: experiences with the Emission Zone

On January 1, 2008 the first nationwide emission zones were introduced in Berlin, Cologne and Hannover as air quality improvement measure. In the meantime more than 50 German cities have an emission zone; in the Ruhr districts covering an area from Dortmund to Duisburg it is no longer possible to travel free without a disc. In Berlin, Bremen, Frankfurt am Main, Hannover, Leipzig and Stuttgart vehicles no longer have access to the inner city-area without a green disc. Other cities have announced a tightening up of their emission zones to green, as e.g. Munich and Augsburg in October 2012.

All doubts expressed prior to the introduction of the emission zones have proven unfounded. Retail traders' fears of considerable turnover losses (not only in Hannover) due to many citizens' no longer

being able to use the car for shopping sprees into town were proven incorrect. On the contrary record sales were reported for Christmas business 2008 (with the Emission Zone) soaring way above the Christmas turnover in 2007 (without the Emission Zone).

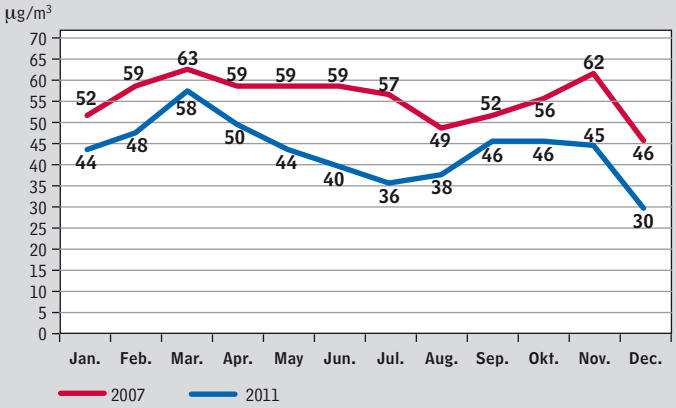
The football club Hannover 96 and the Hannover Zoo, both within the emission zone, announced visitor records for 2010 and this, despite the fact that car drivers could only enter the emission zone as from January 2010 displaying a green disc.

The Chamber of Crafts warned about bankruptcies of companies unable to afford any filter replacement or new car to drive within the emission zone. Nevertheless no firms have announced bankruptcy as a result of the emission zone. This was prevented by the exemption regulation for driving within the emission zone prepared by the city administration, which is eligible to businesses and also to private persons. The number of exemptions applied for were within reasonable limits. In all, only round 8 percent of those affected by the ban on driving within the Hannover Region applied for an exemption to drive within the emission zone. In one third of these cases there were short-term exemption regulations (single journey resp. for up to seven days), so the impact exerted by the exemptions on the effectiveness of the "emission zone" measure can be rated as negligibly low.

Success of air pollution control measures

The success of the air pollution control measures, the most important one of which is the emission zone, can be seen in the trend of the nitrogen dioxide values at the Göttinger Straße traffic station. Since 2007, the year when the Clean Air Action Plan came into force in Hannover, there has been a decrease in NO_2 pollution stress. If the NO_2-annual mean value was still 56 µg/m³ in 2007, it dropped in 2010 to 51 µg/m³ and in 2011 to even 43 µg/m³. The marked reduction in NO_2 pollution in the Göttinger Straße is shown as particularly good considering the monthly mean values in 2007 and 2011 (see Figure). In 2011 the monthly mean values lie way below (at least 5 to maximum 21 µg/m³) the corresponding values of 2007, where the seasonal fluctuations show a similar characteristic.

Comparison of NO_2-monthly mean values 2007 and 2011 traffic station Göttinger Straße / Hannover



The effectiveness of the emission zones was proven in many cities by model calculations, e.g. in Berlin and Cologne. In Hannover the calculations showed a minimization effect of between 4 and 6 µg/m³ in the annual mean. The direct effect of the driving ban as well as the car pool modernisation speeded up by the emission zone regulations, has been taken into consideration here.

Verdicts of the jurisdiction of administrative courts

In all Administrative Court Judgements, which have dealt with suits regarding the emission zone, this was confirmed as commensurate. The verdicts in Berlin, Hannover, Cologne and Wiesbaden show *"that the courts follow the stringent arguments of the environmental administrative powers (Berlin, Hannover, Cologne) and environment associations (Wiesbaden) as well as the established environmental epidemiologists and toxicologists and also back the setting up of an emission zone as the most effective measure."* (Kacsóh, Umweltbundesamt, in: Umwelt und Mensch – Informationsdienst, Ausgabe 4, 2011, page 9).

In Hannover the low emission zone – alongside other air pollution control measures – will continue to be necessary in the coming years in order to be able to meet the NO_2-annual mean threshold value of 40 µg/m³, at the latest in 2015, in possibly all previously highly-polluted main traffic roads.

Further information on the emission zone:
www.umweltzone-hannover.de

Noise

Indicators

Noise exposure

Total area of noise-exposed districts, number of noise-exposed flats, schools and hospitals as well as number of people exposed to noise taking the road network as example

Total area of noise-exposed districts[1] (road network)

area in km²

L_{DEN}[2]	total	>55 dB(A)	>65 dB(A)	>75 dB(A)
2008	204.2	112.1	31.2	5.5
2012	204.2	118.2	37.6	7.0

Number of noise exposed flats, schools und hospitals (road network)

dB(A) L_{DEN}	flats		schools (building)		hospitals	
	2008	2012	2008	2012	2008	2012
> 55	60,000	65,300	440	361	87	50
> 65	17,900	15,000	66	50	16	12
> 75	400	500	0	0	1	1

Number of noise-exposed people, living in isophonic areas[3] with certain level (road network)

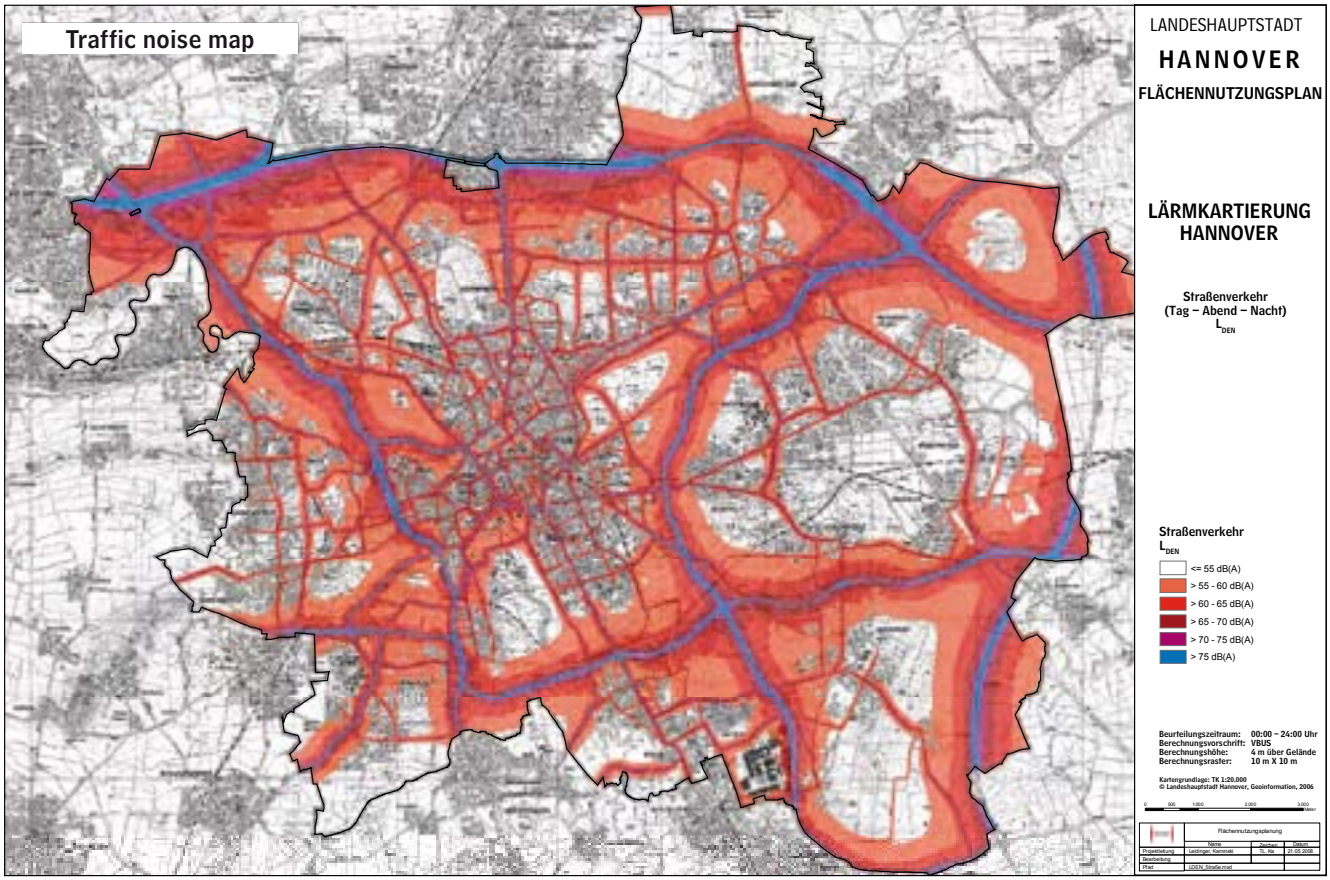
Area in dB(A)	L_{DEN}[2]		L_{NIGHT}[4]	
	2008	2012	2008	2012
over 50 to 55			47,700	49,400
over 55 to 60	66,000	63,100	29,100	26,800
over 60 to 65	40,800	43,100	9,100	6,200
over 65 to 70	25,400	24,500	700	700
over 70 to 75	6,500	6,100	100	500
more than 75	600	1,000		
total	139,300	137,800	86,700	83,600

1) The noise figures published in the 2008 environment report correspond with the noise mapping data of 2008. Based on this noise mapping initial data were improved and noise barriers not yet recorded were supplemented. Noise pollution figures for 2008 correspond with those announced to the European Union in 2009. For remarks regarding comparability of 2008 and 2012 data, see page 29

2) L_{DEN} – average noise level over a 24-hour-period (day, evening, night)

3) Isophone – Contours of similar noise level

4) L_{NIGHT} – night time noise index



Projects and measures

Noise mapping 2012 is based on extensive changes and updating of the initial data of the calculation model. The model data basis was further improved and the data fundamentals of 2008 extrapolated. This includes e.g. the consideration of multiple reflections in road corridors in the calculation model, a recording of the rising population figures right down to the individual buildings since 2008 or the recording of the noise-reducing road surfaces installed within the same period, which led in stages to a reduction in the number of people affected at certain noise exposure levels. The traffic intensity within the town area has only slightly changed since 2008. In accordance with the EU-Ambient Noise Guideline the input data used for noise mapping should not be older than one year in order to guarantee an up-to-date registration.

Due to this complete reconstruction of the calculation model and the named ancillary conditions only a limited comparison with the pollution figures from 2008 is possible.

The statistics of those affected found in the current noise mapping 2012 is – despite the restricted comparability – compared with the number of those affected as in the 2008 noise mapping. In a comparison of both years only slight changes can be seen in the total number of persons affected as listed in the various stress categories with a tendency towards a slight improvement. As far as road traffic noise is concerned, the number of persons affected in the night has declined by 3.6 percent and in the case of L_{DEN}[1] by 1.1 percent.

[1] L_{DEN} – *time span total day as average noise level from day, evening and night*

Noise Action Plan

The Noise Action Plan passed by the Council of the Landeshauptstadt Hannover in 2010 first of all named the numerous measures for noise reduction, which have been continuously implemented for many years.

Urban planning measures for noise reduction respectively noise prevention are above all the forward-looking avoidance of conflicts in the general development planning, the pursuance of the concept of a "city of short journeys" (avoidance of unnecessary car transport, retail trade concept, office space concept) and the designation of vast residential areas as tempo-30-limit zones.

The traffic measures comprise, for example, the promotion of the environmental alliance (public transport ÖPNV, bicycle, pedestrian, CarSharing), perpetuation of traffic flow and the heavy goods traffic control and deviation concept.

In addition in the peak traffic noise exposure sectors of exposure zones 1 and 2 the use of selected local noise reduction measures is being tested for reducing the noise exposure level. These key measures (Four-point-programme) are related first of all only to those areas most strongly affected by the recorded noise pollution exposure levels.

Traffic noise levels – noise levels (1 – red, 2 – orange, 3 – blue)

1. Noise level

Noise exposure night time >65 dB(A) on façades; high housing density

District	Straße	from	to
2	Podbielskistraße	Lister Platz	Spannhagenstraße
9	Friedrich-Ebert-Straße		
10	Göttinger Straße		

2. Noise level

Noise exposure night time >60 dB(A) on façades; high housing density

1	Königsworther Straße		
1/2	Celler Straße	railway underpass	Am Welfenplatz
2	Voßstraße		
2	Vahrenwalder Straße	Werderstraße	Dragonerstraße
2	Wedekindstraße / Celler Straße	Edenstraße	Bödekerstraße
2	Ferdinand-Wallbrecht-Straße	Lister Platz	Moltkeplatz
7	Marienstraße	Berliner Allee	Bahnstrecke
10	Nieschlagstraße/Brauhofstraße		

3. Noise level

Noise exposure night time >60 dB(A) on façades; medium to high housing density

1	Hamburger Allee	Welfenstraße	Steintorfeldstraße
1/7	Marienstraße	Aegidientorplatz	Berliner Allee
2	Melanchthonstraße	Granstraße	Fenskestraße
2	Philipsbornstraße / Guts-Muths-Straße	Kopernikusstraße	Melanchthonstraße
7	Sallstraße	Marienstraße	Lutherstraße
8	Hildesheimer Straße	Südschnellweg	Peiner Straße
8	Hildesheimer Straße	Bothmerstraße	Stiegelmeyerstraße
10	Fössestraße	Limmerstraße	Bardowicker Straße
10	Egestorffstraße / Badenstedter Straße	Brauhofstraße	Lindener Marktplatz

Speed test commissioned in major noise exposure zones

Slower driving speeds mean less noise and less exhaust fumes. The test commission is aimed at achieving a speed reduction to safeguard the night rest period (from 10 pm to 6 am). Here attention is to be paid to the first and second noise exposure levels.

Noise-reducing road surfaces

On a test stretch various different surfaces were compared by the Landeshauptstadt Hannover with regard to noise emissions produced. The accompanying noise meterings have shown that when compared with the previous road surface a noise level reduction of up to 3.3 dB(A) is possible with the DSH-V-surface coating[1] and up to 3.1 dB(A) with the modified grit-mastix asphalt. The road surfaces tried out in this test phase will be used for pending traffic lane renovations.

Noise-reducing street planning design

The design of road areas (e.g. spacing between noise source and façade, speed level, homogeneity of traffic flow) has effects on the noise level and on the subjective noise sensitivity (retention quality, "well-being factor"). In numerous street designs in the Landeshauptstadt Hannover these factors are used. The catalogue of road design measures covers essentially the avoidance of high driving speeds, perpetuation of traffic flow, optimization of non-motorized transport means and the environmental alliance plus interaction between measures adopted on private property and in the road surroundings.

Noise protection demands made on the road building authorities

As the Landeshauptstadt Hannover is not the authority responsible for Federal roads and motorways, light rail routes and rail lines of the Bund within the municipal area, noise protection requirements for the other authorities responsible for construction were formulated in the noise action plan. The Niedersächsische Landesbehörde für Straßenbau und Verkehr (NLStBV), responsible for Federal motorways and major roads will carry out noise remediation measures over the next few years on sections of the Südschnellweg in Döhren and parts of the Westschnellweg in Linden and Stöcken.

Commissioned agent of the ÖPNV in the City of Hannover is the Hannover Region. The üstra Hannoversche Verkehrsbetriebe AG and die Regio-Bus Hannover GmbH are by order of the Region the operators of ÖPNV. A noise-reducing railroad construction incorporating a grass covered track with high-grown grass and the future acquisition of lightrail carriages with the optimisation of noise aspects in visier are important starting points. The complete changeover of the bus fleet to hybrid buses by 2020 will similarly represent an important contribution to noise reduction.

Within the framework of the noise remediation programme on rail routes of the Bund (Federal rail routes) some railroad sections in Hannover were noise-remediated by the construction of noise barriers and the promotion of passive sound protection measures (eg. sound-insulating windows). Currently the noisy condition of the section Hannover-Centre East to the shunting yard in Hainholz is being processed. In the coming years several bridges in the Hannover rail network are pending remediation.

1 DSH-V-surface coating: "Thin overlay on spray seal, hot on hot"

Soil and land-take

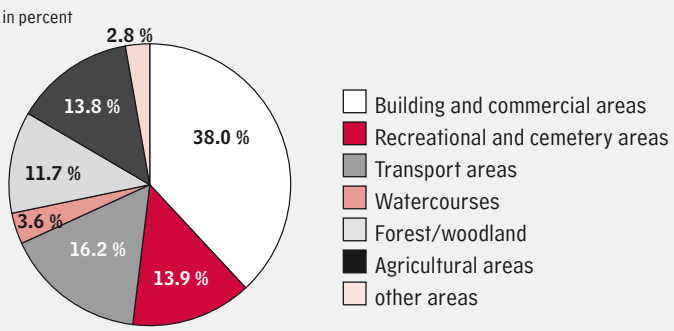
Indicators

Land utilization

Areas by type of use as proportion of the total city area, in percentage and hectares

The settlement and transport and communication area has grown by 727 hectares (5.5 percent) due to the creation of new residential and transport areas between 1992 and 2011. This came about in particular at the expense of agricultural areas, which have decreased over the same period by 810 hectares. The "settlement and transport area" is the result of the total of the use type, buildings and adjoining undeveloped areas, commercial areas, recreational and cemetery areas as well as transport areas. It cannot be identified with "impermeable areas" as here also unsealed areas in the form of eg. greened inner courtyards as well as recreational and cemetery areas are contained. In Hannover there is a total of 13,917 hectares of settlement and transport area (2011), that corresponds to a share of round 68 % of the urban area. Round 14 % of these are recreational and cemetery areas (cf. page 38).

Land according to types of use as proportion of the total city area (2011)



Areas according to use types in hectares

	1992	2000	2004	2007	2009	2010	2011
Total area city district	20,408	20,407	20,401	20,414	20,414	20,414	20,414
Building and commercial areas	7,303	7,646	7,724	7,729	7,755	7,769	7,772
Recreational and cemetery areas	2,816	2,884	2,905	2,864	2,853	2,857	2,830
Transport areas	3,070	3,216	3,267	3,267	3,273	3,286	3,314
Watercourses	669	697	706	719	720	724	731
Forest/woodland	2,274	2,294	2,279	2,369	2,385	2,387	2,386
Agricultural areas	3,624	3,097	2,964	2,902	2,853	2,816	2,814
other areas	652	574	555	563	575	575	567

Data basis until 2006 Hannover City administration land use audit, from 2006 ALK-usage (ALK = automated property mapping)

Projects and measures

In the Federal Government's view each municipality should make its contribution towards the goal set by the National Sustainability Strategy and limit the use of area demand (land conversion) on a nationwide basis by the year 2020 to 30 hectares per day. "Saving active space" is a fundamental aim of a sustainable city development and means :

- strengthening the inner development of cities and conserving previously untouched land
- limitation of soil surface sealing to only that which is inevitable
- a precautionary soil conservation linking up ecologically significant free space
- making industrial derelict land and other polluted areas reusable again (land recycling, reclamation of derelict land).

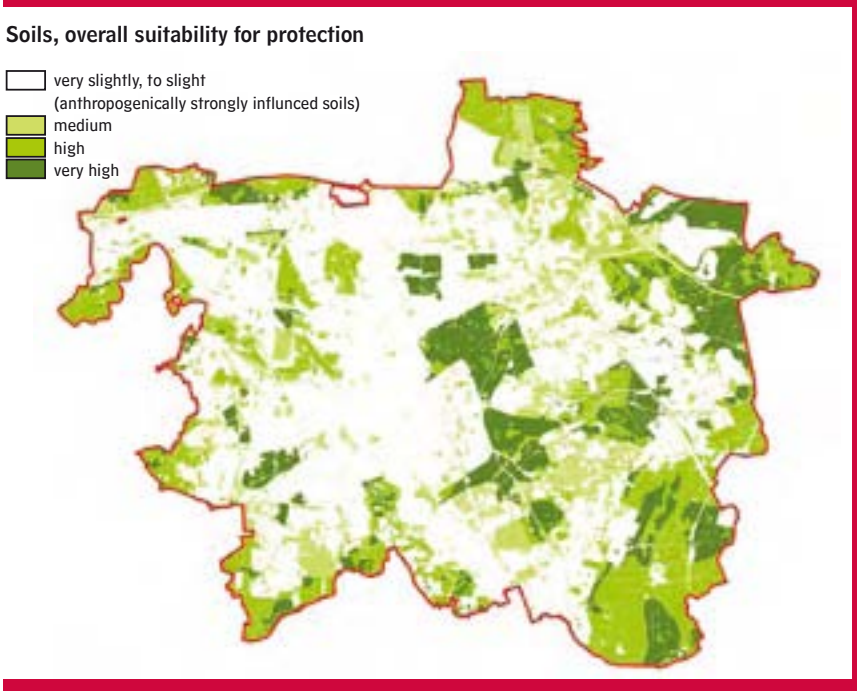
Precautionary soil protection in planning project

Here the main focus is on the economical and conservational handling of the protected resource, land. In the urban land use planning of the City of Hannover the protected resource, land, is incorporated in the considerations between environmental concerns and planning concepts. Since 2010 a digital map is used to evaluate the soil's suitability for protection, showing soil in various colours in the city district to indicate grades of suitability from very slight to very high.

The following soil functions are taken into consideration:

- biotope for plants (natural soil fertility, biotope development potential, close-to-nature)
- hydrological balance (water retention capacity)
- repository of natural and cultural history (geoscience and cultural science significance, uniqueness/rarity).

With the help of the soil function map detailed statements regarding the suitability for protection of land affected by the planning are possible. A desirable aim is then to steer the sealing of soils by construction on areas which are comparatively of little significance to the soil functions. Alternative planning variants taking soil protection into consideration are discussed in urban planning in conjunction with the drafting of concepts for industrial and residential areas for example by development of formerly used areas or revitalization of derelict industrial land. The subsequent urban land use plan procedural decisions, binding for everyone, are made bearing in mind the different concerns.



Map of the overall soil function assessment for the city district of Hannover

Source: IFUA, 2009

Reutilization of derelict land

Former industrial, railway and military areas of land are for the City of Hannover an important part of a sustainable land stock policy. In most cases these areas are well-incorporated in the settlement structure with access to existing infrastructural facilities. Derelict land property in good location has therefore always been put to use again in past years. Often higher-grade uses for example such as housing and service enterprises which enable a financial compensation for the demolition of the building or cleaning up of soil and groundwater contamination after the building development.

From experiences in the past the City of Hannover has succeeded in assuring an extensive support of such projects in the urban planning procedure and prior to clearance of problematic contamination loads.

At the time of the last survey in 2007 there were 62 industrial sites fallen derelict with a total area of round 210 hectares. Pleasingly enough no notable increase of new derelict brownfield sites could be observed in the more recent past. Long deserted land such as the area of the Südbahnhof (approx. 12 hectares) or the former Conti-site (approx. 20 hectares) in Limmer are currently being built-up respectively developed for industrial and commercial use or housing projects.

From derelict brownfield to science and research location

In Marienwerder the Science and Technology Park Hannover has been created. Former property of a battery manufacturer was reactivated as location for university and scientific enterprises, institutes and companies.

The terrain, which is intersected by the Roßbruchgraben was derelict for a long time. The soil was contaminated with heavy metals from former industrial emissions, which impeded the marketing of the surrounding industrial properties. The site remediation involved the renaturalisation of the Graben and the creation of a country park – a campus offering recreational possibilities as an attractive address for investors. With the help of this active land recycling it is hoped to create 500 high-grade job locations.

From high-rise housing estate to modern residential area for young families

From high-rise housing estate to modern residential area

In the framework of the model project "Urban renewal Vahrenheide" (Stadterneuerung Vahrenheide) which is being financed with funds from the Land Niedersachsen and the City of Hannover, the modern residential area with a friendly atmosphere, "An den Holzwiesen", was created in the redevelopment area Vahrenheide-Ost from the derelict Klingenthal high-rise housing estate of 2004.

Prior to the property award the City of Hannover had sponsored an investor competition. The aim was to develop suggestions for the planning of a building site with favourably priced homes to extend the residential possibilities for young families.

The winner of the competition purchased the land from the City of Hannover. The artificial landfills on the sites were removed, cor-

New campus on the former battery manufacture site of the Science and Technology Park Hannover

Science and Technology park Hannover: Green belt Roßbruchgraben

Hall 96 – a centre for creativity on former brownfield

rectly disposed of and the building land filled with clean sandfill, so that future home owners could be guaranteed clean soil.

Integrated industrial area concept

The City of Hannover intends also in future in times of demographic and structural change to do justice to its sustainability role as Landeshauptstadt and make its mark as economic centre of the region and Lower Saxony as well as important scientific research and university location and as city with a high quality of living. In 2011 it has compiled and evaluated the land potentials in the intendment of a sustainable and innovative city development in the form of an expertise on an "Integrated industrial area concept for the Landeshauptstadt Hannover"[1]. This shows amongst other things what branches will make enquiries for land over the next ten to 15 years in Hannover and whether the existing land potential corresponds in quantity and quality to the location requirements. As a result the experts underline the sigificance of the existing land potentials within the city if they determine: *"For the [...] land demand according to current knowledge no new designation of areas is necessary, as potential is available to a great extent due to the (re-)utilization of existing areas. A boosting of these areas should be the central strategy of the Landeshauptstadt Hannover [...]"*[2]

In the policies for the industrial area development 2012 to 2020 it is stated: *"As a basic policy it would be expedient to lay the emphasis of industrial area development on derelict areas contaminated with waste deposits but unfortunately under consideration of the cost burden and the anticipated earnings only very few areas are available. If the remediation costs surpass the value of the land, then use of the areas are only meaningful if the vast majority of the public interest speaks in favour of the use by a certain enterprise. Several derelict areas contaminated with waste deposits are conceivable as industrial area, for example the currently intended two hectare derelict area on the corner of Hans-Böckler-Allee / Clausewitzstraße for office construction and the area of the main goods railway station. Hannover has also made very good experiences with the reactivation of larger building complexes such as the Hanomag site. In the case of the railway improvement work in Leinhausen (round 10 hectares) the creation of industrial areas is suggested in future instead of the building of flats. Beyond that in the administration's opinion no significant industrial potential can be seen in the recycling of contaminated areas, as the remediation costs resp. the remediation risks are so high that they are uninteresting for companies wanting to set up business. Presumably a change can only occur if the State of Lower Saxony sets up the long demanded fund for reclamation of derelict land or the private landowners have own interests in solving the contamination problem of derelict land."*

1 *Integriertes Gewerbeflächenkonzept (GFK) für die Landeshauptstadt Hannover, Lübeck/ Hannover, 4. Juli 2011 prepared by the CIMA-Projekt+Entwicklung GmbH, Lübeck; NIW Niedersächsisches Institut für Wirtschaftsforschung, Hannover; NORD/LB Regionalwirtschaft, Hannover commissioned by the Landeshauptstadt Hannover*

2 *Integriertes Gewerbeflächenkonzept für die Landeshauptstadt Hannover, page 120*

Minimum Investigation Programme for playing areas

The Minimum Investigation Programme for open spaces of day nurseries and children's playgrounds – in short known as MUP – has been in use in Hannover since 1997. This concerns precautionary soil investigations in areas of highly sensitive uses. Both for the construction of new children's playgrounds as well as day nurseries, where the outdoor facilities are intensively used by (small) children as well as for the reorganisation of such installations/establishments the City of Hannover has the ground concerned investigated according to MUP and evaluated.

A brochure revised in 2011 shows the development of the investigation programme, the experiences made in its implementation and the results obtained. In the meantime MUP investigations of 300 sites are available, at the time of the first edition (2004) it was still 100. With the experiences gained on site MUP develops the legal fundamentals and scientific findings.

For MUP there are three important goals: precautionary soil protection, averting of financial risks and damaging effects on the environment.

Evaluation of the investigation results to date showed in one third of all investigated play areas an exceeding of test values prescribed by the Federal Soil Protection Ordinance, in a further 20 percent the stricter, more precautionary benchmarks which are also applied in the urban land use planning in Hannover, were reached. The reason for this are among other things the debris rubbish content landfills.

All in all on every second play area investigated construction measures were necessary. Because the investigations were incorporated in the redevelopment and rearrangement of the play areas involved, the costs for the necessary decontamination measures could be kept low and the high demands made on the soil quality realized.

Further information: www.hannover.de (Mindestuntersuchungsprogramm für Kinderspielflächen)

Typical road fretting with rubble in the substructure

Drilling repository

The drilling repository of the City of Hannover has a scope of about 15,000 drillings, round 5,400 of which are digitally recorded. Further supplements to the drilling repository are undertaken case-respectively. The oldest drillings originate from the start of the 20th century and were taken over partly from the drilling repository of the Lower Saxony Landesamt für Bodenforschung. Alongside the documentation of geological sections during the groundwater monitoring network the documents of the drilling repository supply valuable indications about the stratigraphic structure of the upper soil strata. In particular artificial landfills with anthropogenic constituents (building rubble, domestic rubbish, slag, ashes, and other substances) are regularly recorded. With the material available it is possible to commission special further investigations to research into the danger of areas of potential pollution (older suspect sites), old landfills and the like. Users of the drilling repository are apart from diverse sectors and operations of the Landeshauptstadt Hannover, engineering offices, well construction companies but also citizens, regardless of gender. Necessary supplements to this repository are undertaken by employees from the Environmental Protection Sector in the form of augering by hand (exploration of artificial landfills), depth gauging (investigation of hydrogeological conditions) or by drilling companies (deeper exploration drilling). From the existent expertise comments further supplementations to the drilling repository can be acquired.

Road construction waste management

The City of Hannover carries out road construction measures ranging from the renewal of cycle pathways to the new construction of roads. In many cases work is carried out in existing routes, often, however, even new land is used due to expansion and new construction. The road substructure frequently contains war remains or slag and ashes, which are contaminated with harmful substances. Substratum and top layer were often manufactured from binding agents containing tar. In very rare cases these strata also contained asbestos.

Due to the tightening up and increasing complexity of the waste legislation a safe disposal of polluted materials is no longer possible without further proof of their constituents. The City is under obligation to guarantee a proper clearance (disposal or utilisation). In the past due to unclear disposal methods there were often repeated obstructions of building sites, which led to unpredictable cost increases.

The building site investigations taking place prior to excavation measures provide indications of contaminated soil and road construction waste with tar content. In order to assure a professional expert declaration already prior to the call for bids the results are checked and evaluated with regard to their relevance to waste legislation, so that possible disposal methods can be pre-stipulated already prior to award of contract to the civil engineering companies.

Gas Works 1930

Restoration of former Glocksee Gas Works site in conjunction with flood protection measures on the Ihme

The Gaswerk Hannover-Glocksee was at the start of operation in 1826 the first in Germany. Operated until 1918 by a British company, it was forced into liquidation and then became property of the City of Hannover. Due to the changeover to district gas, production then came to an end in 1930. Air raids in the second world war destroyed vast parts of the gasworks and at the start of the 70's the remaining buildings still standing were demolished right down to the top of the cellar and the terrain redesigned as public park (cf. page 50).

Soil investigations prior to the actual flood water protection measures at the Ihme provided indications of problematic contaminations in the region of the former gasworks location. The subsurface remains of the production installations were for the most part still existent and landfilled with building rubble as well as production waste materials. The investigations showed the presence of typical gasworks noxious substances such as polycylic aromatic hydrocarbons, phenols, volatile aromatic hydrocarbons, mineral oil hydrocarbons and cyanides in partially high concentrations. To prevent the risk of contamination for both groundwater and Ihme a soil remediation (regeneration) was urgently required.

In connection with the cutting of the bank, excavation of the contaminated earth down to a depth of four metres was carried out as well as the reconversion of pools of tar oil still existent in the underlying stratum (Hot Spots). These hot spots were landfilled with non-contaminated soil. All in all round 45,000 cubic metres of contaminated soil and building construction rubbish have been removed and professionally disposed of.

The total construction time for the cutting of the bank in the area of the former gas works site was eleven months including time for restoration of the green corridor. Since conclusion thereof a surface and groundwater monitoring is being made to verify the success of the restoration process.

Green area restored after cutting of foreshore

Contaminated land programme 2012 – 2016

Since the end of the 80's the Landeshauptstadt Hannover has kept a register for contaminated land, initially prepared by the City itself and later with the foundation of the Region in the year 2001 was taken over by the Region Hannover as responsible authority. Since that time the responsibility for the initial exploration of areas of potential pollution lies within the responsibility of the Hannover Region. More detailed investigations, safeguarding and restoration measures prescribed by the authority must, however, be applied for and remunerated by the respective property owners.

Except for old landfills as yet no systematic investigation of suspect sites in the area of the City of Hannover have ever been carried out. Now by implementation of theContaminated Land Programme 2012 – 2016 passed by the council the City of Hannover intends to start with the systematic exploration of these suspect sites on municipally-owned properties in agreement with the Region Hannover. If risks for the environment are determined, then restoration and safeguarding measures are to be financed from the programme.

In addition private owners, who – as in the case of Riedel de Haen – are to be incorporated into the responsibility of the Region as owner without responsibility status for exploration respectively restoration measures shall also be granted an allowance for any necessary investigation and restoration measures.

In the derelict land register of the Hannover Region a total of 4,000 suspect sites are recorded. An intersection of the suspect area mapping with municipal ownership is carried out. As presumably not all city owned suspect sites (derelict sites, landfills) can be processed by 2016 it is necessary to set a priority according to use, public interest and other criteria.

A sum of 400,000 Euro was allocated in the municipal budget for the contaminated land programme for the year 2012. For the years 2013 to 2016 there is an annual amount of 850,000 Euro available.

The contaminated land programme consists of the following three pillars:

- exploration of municipal land properties (priority given to playground investigations as well as other areas of sensitive use)
- safeguarding and restoration measures
- promotion of exploration and safeguarding/restoration measures for private property owners.

Alongside systematic exploration, as warranted, projects such as for example the soil investigations of outdoor swimming pools will also be financed from the contaminated land programme.

Recreational space, nature conservation, agriculture and forestry

Indicators

Green- and open spaces

Extent of green and open spaces in hectares, percentage of city area and in relation to the population in m²/resident

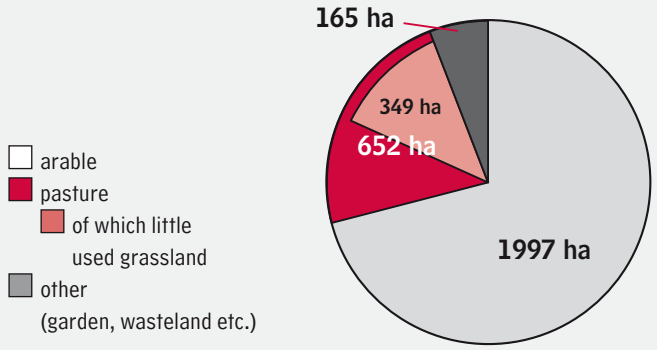
Nationally and internationally Hannover has made its name as the "City of Gardens". Per resident there is in total round 107 m² publicly accessible green space (30.6 m² green space, 1.9 m² playgrounds, 45.4 m² woodland, 2.6 m² moors, 20.7 m² allotment gardens and 5.3 m² cemeteries). All green space and open space (including agricutural land and waterways) make up a total of round 50 % of the overall city area. The aim of the City of Hannover is to retain and develop the open space quality in the city districts; to this end the greenspace in residential areas will be improved by adopting a range of programmes.

Green- and open spaces

	extent in ha	in % of city area	m²/resident
Public parks and gardens	155.4	0.76	2.95
Herrenhausen Gardens	115.9	0.57	2.20
Other public greenspace(green corridors, green links, local recreation areas, woodland, farmland (municipally owned)	1,099.1	5.38	20.89
Playgrounds, playingfields	98.7	0.48	1.88
Roadside greenspace	241.0	1.18	4.58
Open spaces around public buildings	143.8	0.70	2.73
Cemeteries	280.0	1.37	5.33
Botanical and zoological gardens, special gardens (e.g. Hannover Zoo,Berggarten, School Biological Centre)	46.0	0.22	0.87
Woodland (municipal, state-owned and private)	2,386	11.69	45.36
Agricultural land (private)	2,814	13.78	53.50
of which, arable land	*1,997*	*9.78*	*37.96*
meadow, grazing	*652*	*3.19*	*12.39*
Moorland	138	0.68	2.63
Water	731	3.58	13.90
Allotment gardens	1,091	5.34	20.73
Sportsgrounds	293	1.44	5.57

Status 2012, reference figures: city area 20,414 ha on 01.01.2012; official population 526,020 on 30.11.2011

Agricultural land use (2011)

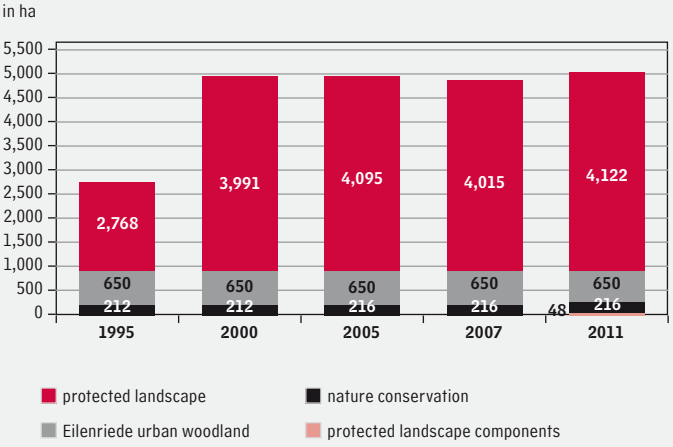


Agricultural land

Size of agriculturally used areas in hectares and percentage

Since 1992 there has been a decline in agricultural areas from 3624 hectares to 2814 hectares (2011) due to construction measures or claim of replacement measures. The ratio of arable land to green space shifted in favour of the green space from 645 ha (2008) to 652 ha in 2011. This meant an increase in the extensive green space in the city area to a total of 349 ha. The share held by ecologically managed areas has remained constant with 120 ha.

Protected countryside



Protected areas

Extent of protected landscape areas, nature conservation areas and protected landscape components in hectares

Designation of protected areas is intended to safeguard on a longterm basis landscape and biologically valuable areas for human recreation and the conservation of indigenous flora and fauna. In addition to the existing 17 landscape protection areas totalling 4,122 ha and three nature conservation areas of about 216 ha, the council of the city of Hannover has in 2011 designated six smaller protection areas important for nature conservation, so-called "protected landscape components" (GLB), with a total coverage of 48 ha. Thanks to the Eilenriede protection statute approximately 650 ha of one of the most valuable urban woodlands within federal territory has been safeguarded from encroachment and inappropriate uses since 1956.

Roadside tree development in Hannover

	existing trees[1]	new plantings[2]	felled	net increase
1990	32,320	882	275	607
2000	38,312	1,553	313	1,240
2005	42,870	406	487	- 81
2008	44,442	416	334	82
2009	44,582	391	278	113
2010	44,941	418	267	151
2011	45,083	322	196	126

1) The stock of trees includes all those in the tree register. Year by year changes in this figure are derived not only from the net increase of trees but also from new recordings and deletions in the register due to incorrect or failure registrations.

2) New plantings are often not added to the register until one or two years after planting. Therefore these figures are updated and do not tally with those in earlier publications. Different, but more accurate figures for new plantings are given for past years.

Tree stock 31.12.2011

Roadside trees

Number of roadside trees, new planting and tree felling

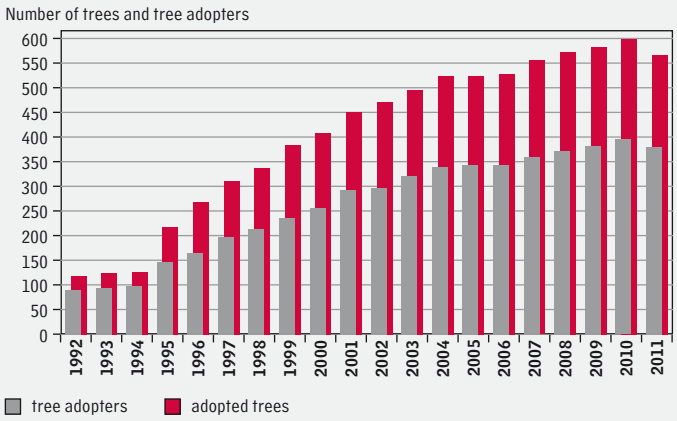
Since 1990 the number of roadside trees has risen to 45, 083 (2011). In this period 7,483 trees were felled as a danger to traffic or deleted from the register as they failed to meet the criteria for roadside trees. At the same time, however, 15,572 roadside trees were newly planted, giving a net increase of 8,089 (18 %) trees between 1990 and 2011. Round 8 % of the entire tree stock, judging by the trunk girth, are presumably more than 75 years old, 36 % are younger than 25. More than 150 tree species, most frequently linden trees (26.8 %), oak trees (20.8 %) and maple (13.3 %).

Tree adoptions

Number of tree adopters and trees cared for

Since 1981 it has been possible to 'adopt' a tree in Hannover as a contribution to caring for and preserving the city's valuable stock of trees and improving the residential environment. In 2011 there were 380 tree adopters, looking after 567 trees. In all 316 tree grates were planted with summer flowers, herbaceous perennials or roses. In comparison to 2010 the number of tree adopters has slightly decreased, making it necessary to increase the advertising campaign for this project.

Tree adoptions



Projects and measures

Undeveloped areas and various landscape elements such as public gardens and parks, green spaces, playgrounds and sports fields, allotment gardens and cemeteries as well as arable land, meadows and woods, natural bathing lakes, moorlands and scrubland are close-to-home recreational spaces with important functions for a future compatible sustainable urban development. In Hannover these make up almost 50 percent of the city area, which not only invite for recreation and sport but also improve the environmental quality of the city and are biotopes for wild growing plants and for animals. Securing this open space quality, caring for and developing the landscape areas as well as the agricultural working of these areas are important sustainability objectives of the 'Hannover plus-Ten' programme.

Hannover: Federal Capital of Biodiversity

In 2011 the City received a particular award for its many years of engagement (commitment) in nature conservation: Hannover became "Federal Capital of Biodiversity", the winner in a competition with 124 German cities and municipalities. Together with four other cities from France, Spain, Slovakia and Hungary, Hannover was awarded the title of "Capital of Biodiversity" on a european level.

In the special topic on page 63 a detailed description is given as to which measures lead to this award.

"More Nature in the City" Programme

Already in the Environmental Report of 2008 the new city biodiversity programme was described. Under the title "More Nature in the City – a programme to promote biological diversity in Hannover" a brochure was published in which the aims of the programme and many different projects for implementing these aims – first of all in a five-year period – were presented. This programme, too, was a reason for Hannover's award as Federal City of Biodiversity.

Public-relations work and environmental education are one focus for making the inhabitants of Hannover more aware of the topic and an exhibition was prepared as medium for presentation of the contents of the programme.

The exhibition "More Nature in the City"

Hannover has already been described very much as a City "in the green" – since 2011 it is also "Federal Capital of Biodiversity" (cf. page 63). But what does that actually mean "Biodiversity"? Where can it be seen and experienced? How does it come about? How important is it for our lives and our environment?

The exhibition provides the answers. It illustrates by means of pictures and interesting information what beauties of nature and particularities are to be discovered in Hannover and what diversity is to be found not only in the large forests (woodlands) and landscape areas on the outskirts of the city but also on many small islands in the city centre and in the residential areas. It also describes the

problem of the frequent threat to this biodiversity indicating the measures necessary to conserve and promote it. Wherever people's demand for living space, commercial zones, traffic areas etc. extend more and more, this means that the living space for animal and plant world becomes increasingly smaller.

What does the city do to maintain and promote the natural spaces, what can each individual do in his home and work environment to ensure that the natural biodiversity remains intact? The exhibition also provides information and many ideas for children, grownups, families, schools and all those interested.

Nature Weeks 2012

From June 5th (Environment day) to 31st July, 2012 the exhibition "More Nature in the City" was presented in the foyer of the Ada-und-Theodor-Lessing-Volkshochschule Hannover and in the Bürgersaal of the Hannover Town Hall in order to popularize the topic for the urban population and visitors from other places. As a follow up to the series of events on Water weeks in 2010 and Climate weeks in 2011, the Nature weeks in 2012 occupied themselves with biodiversity within the city. In the second year of the Biodiversity Decade proclaimed by the United Nations attention was drawn to the progressive decline of biodiversity and tips for nature protection in one's own living environment. The presentation was accompanied by a colourful programme with different activities (e.g. setting up of a bees garden, mobile plantations in the urban district), lectures and nature exploration (e.g. geocaching-action for families, treasure hunt at Hannover's waterways, cycle tours). A lecture on "holiday souvenirs and wildlife species conservation" cast a look far beyond the borders of the city of Hannover.A further Nature week highlight was the Geoday of Biodiversity organized together with the Volkshochschule Hannover. As from Autumn 2012 the exhibition will be shown at other locations in Hannover. For information and contact see www.hannover.de.

1000-Trees-Programme

This programme has a decisive share in the annual increase of tree stock. Since 1999 additional trees are planted in conjuction with this programme on particularly problematic tree locations, e.g. on impermeable areas or areas with piping. This is used to check primarily inner-city roads for additional planting respectively ideas from political level and population concerning possible new tree locations. By summer 2012 about 870 additional tree locations were created, which enhanced public areas both ecologically and from the urban design aspect, so improving living conditions.

Planting of new roadside trees on the traffic island, Stöckener Straße

Climate change and Roadside trees

In the past few years it was already determined that the consequences of climate change additionally stress and weaken the urban roadside tree stock, in particular at difficult and borderline locations in the roadside area and in highly impermeable areas. In future this will lead to a strict "selection" of roadside tree locations. Those with an adequate potential or tree and root growth will be able to generate a healthy tree growth even in the future. Others, however, which fail to show this potential under more climatically severe conditions would be waived as suitable tree locations. New types of damaging organisms, favoured partly by the consequences of climate warming – such as damaging insects and verticillium fungus causing a wilt disease – pose an additional hazard for tree health. The result here is a reduction in tree vitality and an increase in remediation and renovation outlay.

The effects of climate change – in particular in the densely populated city quarters – lead to disadvantageous development trends for the inhabitants, such as overheating in summer, marked reduction of air humidity content and lack of dust binding connected with negative impacts on human wellbeing and health. Therefore the quantity and quality of the urban tree stock represent quite an essential item in the attenuation of such extreme weather conditions in the highly sealed-off inner cities. Roadside tree locations are here to be regarded as a valuable surface and area resource for the public authorities, which must therefore be optimally managed. Measures to be taken for site improvement are, for example, the best possible cleaning up and extension of root zones (rhizospheres) or the emplacement of new substrates combined with tree fertilizer, soil conditioners and drainage pipes.

Playground in Gneisenaustraße

Ecological enhancement of playgrounds and schoolyards

With the political initiative "Sonderpgrogramm zur ökologischen Aufwertung von Schulhöfen und Spielplätzen" a very effective instrument has been created for improving the environmental quality of existing playgrounds, making them more attractive to children and younger people whilst involving them actively in the planning process. This programme was approved by the 1998 policy and was planned initially for two years. Experiences made in 1998/99 were very positive encouraging the special programme to be extended from year to year.

The close collaboration between all stakeholders, such as e.g. children and parents, schools, associations and initiatives, politicians and local administration is a clear indication that this form of project is both in keeping with the times and forward-looking. When designing playground areas not only the wishes of the children but also the ecological safety of the soil (cf. page 35) and building materials, durability of apparatus, as low as possible maintenance costs and recyclability of materials are all important.

The financial framework is based on a rate of 0.5 Euros per resident and year plus planning and participation costs. The City district councils have given the programme extra financial support. Besides that many contacts are made with local housing associations and companies who might be persuaded to participate in the projects or to make a financial contribution. In this way since 1998 around 206 playgrounds and schoolyards have been partly or completely renewed and ecologically upgraded.

Playground adoptions

Volunteer playground "adopters" are contact people for playground users. They pass on information about damage to equipment and plant stock as well as misuse to Hannover City's Environmental and City Greenspace Department. On account of their good knowledge of the location they are also involved in the planning and possible replacement acquisition. Since the revival of the adoption scheme in 2001 there has been a successful recruiting of new adopters. From initially round 30 adopters in 2001 the number has risen continuously in the following years. In the summer of 2012, 62 playgrounds in the City area were looked after by a total of 78 playground adopters.

Generation-Fitness-Parcours

Since 2009 there have been new offers directed equally at younger and elderly people: multifunction equipment, mostly laid out as parcours, make exercise possible and a target-oriented training for coordination, power, endurance and mobility in the open air. Without any extra preparation exercises can be carried out on modern, high-grade equipment, to boost flexibility, dexterity and strengthening of the musculature. In addition by their very proximity to playgrounds these new facilities combine recreation and sport, so creating a possibility for young and old to get together socially. The

Fitness meadow Schmachteberg

new facilities are located at the community centre (Freizeitheim Ricklingen), in the southern part of the Eilenriede, in Vahrenheide, on the Fössewiese in Davenstedt and at the main entrance to the Tiergarten. Additional projects are currently under planning and are to be set up primarily in the vicinity of playgrounds in order to promote the contact between the different generations in this way.

Geophyte Programme

For more than 20 years now, every autumn thousands of bulbs are planted at the roadside and in parks and green corridors – started in 1991 with "Let a 1000 bulbs bloom" and continued in consecutive years as "Hannover blüht auf". In addition to the more than 500,000 daffodils planted on the verges of the main roads to enhance the city, since 2006 different species and types of spring bulbs were planted over many years as part of the "Geophyte programme" at many locations in Hannover giving them their own very special charm. After conclusion of this programme a leaflet was issued, informing about the many species, presenting the most beautiful colourful locations within the city; along with the Scilla bifolia on Lindener Berg, now star tulips in the Wiehbergpark in Döhren, dog tooth violets and snowdrops at the Hexenturm in the Hinüberscher Garden in Marienwerder, angel's tears narcissus on the garden cemetery in the Südstadt or "poet's daffodils" at Maschsee and the Musikhochschule, grape hyacinths flourish at the Deister roundabout and wild tulips in the Von-Alten-Garden. The new flyer "Spring blooms in Hannover" provides details of locations motivating people to visit them and to take an interest in the topic of geophytes/spring blooms. It gives a description of the various species used with regard to their origin, characteristics, location requirements and light, inspiring people with planting ideas for their own garden.

Sowing of colourful wildflowers – native assortments

In the Landeshauptstadt since 2006 wild and summer flowers enhance above all the roadside verges, green space areas, tree bases and temporarily available plots of land. A colourful sea of plants enriches the city's image from spring until autumn, arousing a positive reaction from the population, delighted with the colourful array. There is an improvement in the atmosphere, especially on traffic routes, an increased citizen's identification with "their" city districts and road corridors. Apart from being a feast for the eyes the beautiful flowers also serve ecological purposes. Many insects are dependent on certain plants in their biological cycle. Butterflies intensify the "optical splendour" and forage plants are available for "honey collectors".

The species selection for plant assortments is made according to purpose and location intended. Ornamental planting is made up primarily of species with particularly striking, long-flourishing colourful blooms adapted to extreme living conditions. For areas with rather a rural/countryside flair, varieties of native plant species with a special emphasis on herbs are selected. Seed harvesting and propagation is local, the commercially available assortments are selected and put together paying special consideration to the specific location in mind. The aim is to harvest the seed on urban areas.

These flowering meadows form elements in the biotope network of urban fabric (city design). They combine with measures of the programme of local biodiversity strategy, using their colourful blossoms to advertise an image of biological diversity.

New forest management planning 2012 – 2022 for Hannover City Forest

"Forest management" is a management and planning instrument for forestry operators prescribed by forestry laws. Due to the longterm production periods it is attributed great significance. In periodical intervals (10 or 20 years), the so-called forestry management cycles, the forest stock is classified by forestry experts according to tree types, age, wood supplies and numerous ecological criteria. This is followed by an efficiency control and planning for the next forest management period.

In the municipal forest areas managed according to strict FSC- and Naturland-stipulations the recreational and nature conservation function will in future still be given priority and felling kept to a minimum.

Expansion of the natural forest areas, on which there is no human utilization whatsoever, is intended and those areas of the Vorderen Eilenriede strongly frequented by forest visitors and in a section of forest between Hildesheimer Straße and Mainzer Straße the withdrawal of normal wood utilization. In addition the regeneration of the forest oak is promoted and with this a sustainable protection of this main tree species achieved. Considerable waiving of the use of the target diameter ruling meets with the desire of many citizens for consequent protection of old trees and fulfils an important contribution to deadwood replenishment and climate protection.

City Cemeteries – green oases in the city centre

In all just about 280 hectares of cemeteries in park layout belong to Hannover's green area, 90 percent of which are under municipal ownership, among them being Engesohde, Stöcken, Ricklingen, Seelhorst and Lahe.

First and foremost the cemeteries naturally fulfil the function of burial place for the deceased and are part of the bereavement process of those left behind. For this purpose the cemeteries have for more than 100 years now been laid out as parklike green spaces, in order to provide a suitable location for a respectful farewell, the living green symbolizing the feeling of hope for the next of kin and creating a pleasant atmosphere. The majority of the historical cemeteries in Hannover are under cultural heritage and show an unusual garden design, making it possible to recognize the cemetery culture of the respective epoques. The cemeteries with historical sepulchres of renowned persons also have a great significance for the history of the city itself. All these qualities contribute to making the cemeteries places for relaxing and peaceful local recreation.

In addition the cemeteries fulfil important ecological and climatic functions: they are e.g. habitat for many animal and plant species, promotoring the creation of cold air.

One particular feature here are the "Räume der Stille" (rooms of peaceful retreat) at the Stadtfriedhof Ricklingen, which offer the possibility of open-air funeral ceremonies in a "grünen Andachtsraum" (green remembrance garden/area); apart from this there are installations in five rooms, which help people to come to terms with the phases of saying farewell, which every person goes through as soon as the announcement of an oncoming loss is proclaimed.

Pond and chapel at Stöckener Friedhof (cemetery)

Local recreation by bicycle – Green Ring and Julius-Trip- Ring

The "Grüne Ring" is a 160-kilometres path for cyclists and walkers linking the open countryside spaces on the urban fringe of Hannover. The 80-kilometres base ring and the urban fringe loops to Garbsen, Sehnde/Laatzen and Ronnenberg/Gehrden are closely integrated with the existing leisure pathway network making them easy to reach from residential areas. In 2008 the Green Ring celebrated its tenth anniversary.

Since April 2008 Hannover's cycle network has been supplemented by the 25-km circular route "Julius-Trip-Ring" named after the first city garden director of Hannover. The cycle route leads right around the city as local recreational facility, linking the Maschsee lake, banks of the River Leine and Ihme with Herrenhausen gardens, around allotment gardens in the North to the Eilenriede and back to the lido on the South.

The Garten Region Hannover – a Hannover Region project – has invited people since 2009 to get to know the colourful variety of one of the greenest garden networks and metropolitan areas of Europe most rich in culture in connection with a newly created garden network – including a varied event programme. In 2012 the garden region bridges the gap between green and blue, focussing attention on the topic of water under the motto "Blue locations". In connexion with this garden region topic water marks are installed on the Green Ring in 2012 and 2013, intending to focus people's attention on things worth knowing and seeing about the water locations on the Green Ring.

Sport in the open

People always prefer to pursue their sport activity in the open, therefore in the past few years more opportunities have been offered for participation with and without club membership. This accommodates the individual leisure sport as well as the challenges sought by ambitious sports fans. Running and cycling are among the most popular sportive activities.

In 2011 the designated running trails around Maschsee, in the city forests Eilenriede and Seelhorst have been compiled in the flyer "Laufen(d) in Hannover". Seven marked trails ranging from 2.4 to 21.1 kilometres in length are used for training for stretches up to half marathon. The 21,0975 kilometre long half-marathon route in the Eilenriede is a very special experience – it leads through the nationwide longest inner-city running trail in a forest.These running trails are complemented by keep-fit-parcours and fitness area. In the green belt of Roderbruch there is a discgolf parcours and in the northern and southern part of the Eilenriede two well-paved skater circular routes have been created.

See www.hannover.de for more information and guides to numerous kick-about areas for children and youngsters, newly set-up generation-fitness parcours, cycle routes and circular tours as well as links to the flyer and brochure downloads.

Water, groundwater, surface waters and wastewater

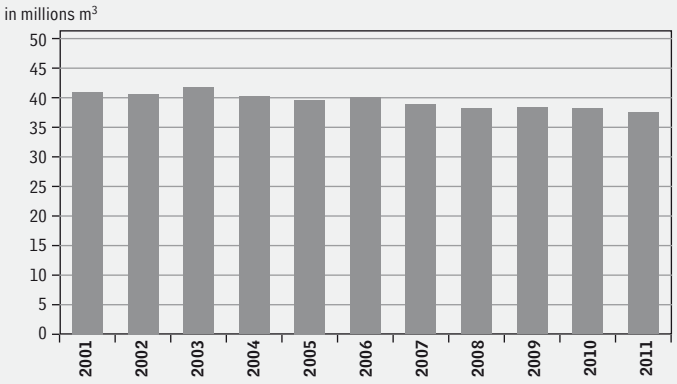
Indicators

Drinking-water consumption

Consumption by tariff and special contract customers (e.g. individual industrial customers) in the water supply network of the Stadtwerke Hannover AG, total in million m³, and in litres/head

Quantities of water supplied by Stadtwerke Hannover AG (serving Hannover, Laatzen and parts of Langenhagen, Hemmingen, Pattensen, Ronnenberg and Seelze) have declined steadily in recent years. Consumption fell by 19.5 percent between 1992 (46.6 million m³) and 2011 (37.5 million m³). Figures for daily per head consumption of drinking-water supplied by Stadtwerke Hannover AG show a marked reduction between 1990 (157 litres) and 2011 (138 litres per day). The figures in litre/head of population refer to tariff customers (private households, small businesses and other customers).

Quantities of drinking-water supplied by the Stadtwerke Hannover AG



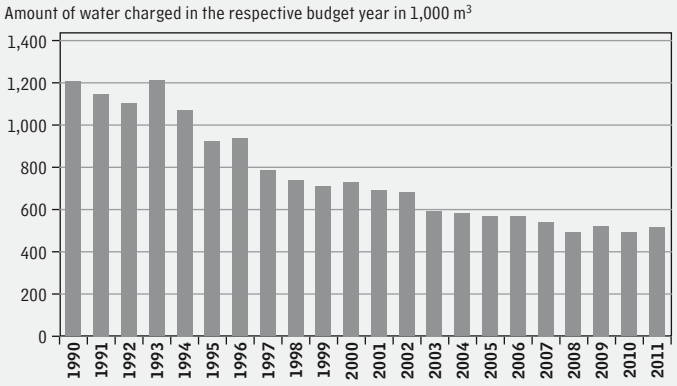
Source: Stadtwerke Hannover AG

Drinking-water consumption by the city administration

Total drinking-water consumption in municipal buildings in m³ in the budget year

The water consumption in the buildings centrally managed by the Building Management Department has decreased from 1990 – 2011 by 57 percent, but also due to reduction in areas, e.g. due to the foundation of the Region. Since 2002, the first year after the foundation, the decline is 24.1 percent with for the most part a constant building stock. As a result of the expansion of the usage periods in schools (eg. development of full-day schools, increased setting up of canteens), as well as more stringent hygiene regulations the water consumption since the year 2007 has stagnated (cf. page 49).

Drinking-water consumption in municipal properties



Source: Stadtwerke Hannover AG

Water quality of the Hannover watercourses in relation to their stretches in percent

Water quality class	1998	2001	2004	2007	2012*
II	27,3	33,3	43,0	43,0	49,0
II – III	60,2	54,7	46,3	48,6	45,1
III	7,7	7,1	5,9	4,0	2,4
III – IV	0,6	0,6	0,6	0,6	—
IV	1,5	1,5	0,3	—	—
denudation	2,7	2,7	4,0	3,8	3,6

* Status September 2012

Quality class II = moderately polluted
Quality class II – III = critically polluted
Quality class III = strongly contaminated
Quality class III – IV = very strongly contaminated
Quality class IV = excessively contaminated

denudation = at least partial biological denudation

Biological quality of watercourses

Proportion of stretches of watercourses in quality class II in relation to the total length of all watercourses in percent

In densely populated city areas of the north German lowland watercourses of quality class I and I–II naturally do not occur. It can be regarded as positive that the share of the watercourse stretches with water quality class II (moderate pollution) has risen within 14 years from 27.3 % (1998) to 49.0 % in 2012, whereas the share of the watercourse stretches with quality class II–III (critical pollution) has dropped from 60.2 % to 45.1 %. Only 6 % of the watercourse stretches are still strongly contaminated resp. biologically denuded, in particular by salt release from the potassium industry.

From 2004 until today (2012) the quality status of the Leine where it leaves the city is the same quality status (quality class II), as at the point where the river enters the municipal area. In 1998 the quality data revealed deterioration due to the discharge of wastewater within the municipal area, which reduced the quality by one class and caused what is called "critical pollution" of the Leine (quality class II – III). Since 2004 ammonium and ortho-phosphate values downstream from the city show only slight increases in comparison to those upstream, so the quality class is not worsened.

Water quality of the River Leine

Water quality class as defined by the Saprobic index as well as ammonium content, BSB_5 and total phosphate

Water quality parameters for the River Leine – annual average figures

	1998	2001	2004	2007	2009	2011
upstream from Hannover						
Saprobic index quality class	2.24 II (moderately polluted)	2.26 II (moderately polluted)	2.17 II (moderately polluted)	— [2]	2.28 II (moderately polluted)	— [2]
ammonium (mg/l NH_4)	0.18	0.15	0.08	0.08	0.10	[3]
ortho-phosphate (mg/l PO_4)	0.27	0.45	0.38	0.38	0.25	[3]
BSB_5 (mg/l O_2) – *individual value*	1.30	2.00	3.00	2.50	1.50	—
downstream from Hannover						
Saprobic index quality class	2.36 II – III (critically polluted)	— [1]	2.09 II (moderately polluted)	— [2]	[1] II (moderately polluted)	— [2]
ammonium (mg/l NH_4)	0.45	0.29	0.15	0.10	0.13	0.12
ortho-phosphate (mg/l PO_4)	0.46	0.46	0.48	0.43	0.35	0.33
BSB_5 (mg/l O_2) – *individual value*	4.00	1.20	4.50	4.40	3.90	—

1) Lack of indicator types (displacement by neozoen) no reliable analysis possible; quality class allocated based on chemical/physical values.

2) Water quality map of the City of Hannover is based on data for the period 2004 to 2007, the quality map appearing end of 2012 on data for the mapping period 2008 to 2012. Each body of water is sampled only once during this period. The data for the Leine were obtained in 2004 and 2009, therefore there are no data on the saprobic index for 2007 and 2011. Both ammonium and ortho-phosphate content are determined annually and at monthly intervals in addition to the water quality mapping.

3) No data available as yet.

Wastewater purification

Combined purification capacity of the sewage alliance operated by the Hannover wastewater urban sewerage plant

Hannover urban sewerage system is required by law to carry out further elimination of carbon, phosphorus and nitrogen. Adherence to the limit values is monitored round the clock. A modern and efficient wastewater treatment, qualified operational staff and provision of an intensive advisory service for the general public and the business sector, assure that the limit values are continuously complied with. Since 2001 the limit values at both large-scale sewage treatment plants have even been undercut.

Combined purification capacity of the sewage works operated by Hannover urban sewerage plant in the year 2011

Constituent		Threshold value (monitoring values)	Gümmerwald sewage plant[1)]	Herrenhausen sewage plant[1)]
CSB	mg/l	60 48[2) 4)]	34	43
TOC	mg/l	15	8.9	10.3
NH_4-N	mg/l	10[3)]	0.1	0.1
Nges (N inorg)	mg/l	13[5)]	5.9	6.1
	mg/l	10[2) 4)]		
GesN (TNb)	mg/l	10[6)]	7.0	6.8
P ges	mg/l	1.0	0.5	0.4
AOX	µg/l	100	46	44
Lead (Pb)	µg/l	50	< 3	< 3
Cadmium (Cd)	µg/l	5	< 1	< 1
Chrome (Cr)	µg/l	50	< 10	< 10
Copper (Cu)	µg/l	100	< 20	< 20
Nickel (Ni)	µg/l	50	< 6	< 6
Mercury (Hg)	µg/l	1	< 0.2	< 0.2

1) Annual mean values 2011
2) For these parameters lower values (EW) were voluntarily set in 2011 in compliance with the German Waste Water Charges Act (AbWAG)
3) At temperatures > 12° C
4) from May 1st to 31st December 2011
5) from May 1st to 31st October 2011
6) as annual mean value

Pollutant content of sewage sludge

Heavy metal content of sewage sludge in mg/kg dry weight and in percentual comparison to threshold values

Analytical values of sewage sludge from Hannover's sewage work alliance

	Determination of pollutant content in mg/kg TS (dried matter)									
Annual mean values	Pb	Cd	Cr	Cu	Ni	Hg	Zn	AOX	PCB	Dioxine[2)]
1985	117	n. t.	99	220	62	n. t.	1,368	n. t.	n. t.	n. t.
1997	76	1.8	32	201	25	1.7	876	293	0.02	11.0
2000	54	1.4	26	257	20	1.2	928	288	0.03	11.0
2008	64	1.1	32	322	25	0.8	843	243	0.02	8.1
2009	49	1.0	28	341	22	0.7	844	225	0.01	2,.0
2010	38	1.1	37	366	26	0.6	873	244	n. u.	n. t.
2011	37	1.1	33	368	27	0.7	886	230	0.01	3.2
limit values as defined by AbfKlärV 1992[1)]	900	10	900	800	200	8	2,500	500	0.20	100
QLA limit values	200	2.5	200	550	80	2	1400	400	0,05	30
Undercutting of QLA-limit values for 2011	82 %	56 %	84 %	33 %	66 %	65 %	37 %	43 %	80 %	89 %

Pb = lead Cd = cadmium Cr = chrome Cu = copper Ni = nickel Hg = mercury Zn = zinc
AOX = adsorbable organically bound halogen PCB = polychlorinated biphenyls
QLA = quality certificalte for outstanding agricultural utilisation n. t. = not tested

1) AbfKlärV – German Sewage Sludge Ordinance of April 15th 1992
2) in ng/kg/dried matter

Projects and matters

Good drinking-water quality

For more than 100 years now drinking-water for the City of Hannover has been provided in Fuhrberger Feld, in the Wasserwerke Elze-Berkhof und Fuhrberg, today supplying round 90 percent of the drinking-water from this area for more than 650,000 inhabitants. In the groundwater protection area extending over 30,400 hectares the sustainable water management of the Stadtwerke Hannover AG (enercity) employing comprehensive groundwater protection activities in cooperation with local agriculture is the basis for the excellent water quality provided. Via a large arterial distribution system with a total length of more than 2,200 kilometres the water is distributed to the supply area.

The water supplied by the Stadtwerke Hannover AG undercuts the stringent threshold values prescribed by the Drinking-Water Regulation in all parameters and confirms this high drinking-water quality by regular drinking-water analyses in the waterworks and in the water distribution system. The water has a balanced mineral ratio and in addition has a very low nitrate content. (For current annual analyses data see www.enercity.de).

Deciduous tree-planting programme

For more than fifteen years enercity has implemented a deciduous tree-planting programme in the woodland area of the Fuhrberger Feld with the aim of converting coniferous forest into valuable deciduous tree stock. Deciduous forest produces not only more but better quality groundwater than coniferous forest stock and at the same time the forest conversion helps to stabilise the forest stock and protect the climate. With round nine million seedlings already more than 2,500 hectares have been converted into mixed forest or broad-leaved (deciduous) forest.

Prudent use of water – “Virtual water”

With regard to the renewable, worldwide unequally distributed resource, water, it is not merely a question of adopting “classical” water saving methods and a rational use of water in the household. Water saving “in global terms” entails the effective backup of water economy approaches, which take into consideration the regions with water deficiency as well as the regions with excessive use of water. Water saving can be influenced by a change in our consumer habits. Our round 120 litres (equivalent to twelve buckets) for daily drinking-water consumption of private domestic customers are opposed to round 5,000 litres (500 buckets) of average daily consumption of “virtual water”, which means the water consumption hidden in the production of individual consumed products. By eating and using regional and seasonal products it is possible to make an effective contribution to the reduction of water shortage in arid countries.

Drinking-water consumption in municipal properties

Since 2007 the water consumption in the buildings centrally managed by the Building Management Department has stagnated. Further savings are not to be expected, for many different reasons:

- Due to the development of schools into full-day schools, expansion of childcare services the length of time used in these institutions has extended, increased installation of canteens and kitchen facilities
- The statutory guidelines for drinking-water hygiene require partly, that in little used or over-dimensioned pipeline trains or even after pauses in usage, pipeline networks must be flushed clean.
- Saving of drinking-water no longer has priority in user projects, as the water consumption does not present an ecological problem and further savings would lead to even greater problems for drinking-water hygiene and wastewater disposal.
- By tightening up the drinking-water ordinance there will be even less leeway for drinking-water economy.

Nevertheless by implementing investive measures as well as maintenance, attempts will be made to cut the costs for the supply of drinking-water. Less used pipeline trains will be shut off in order to minimize the outlay for flushing and hot-water pipelines will be dismantled.

Renaturalisation of watercourses

In Hannover approximately 4,500 of the 20,414 hectares (2011) city area are sealed surfaces connected to the drainage. With an average annual rainfall of 600 millimetres this means that from the builtup land alone approximately 27 million cubic metres of water are drained off via channels into the watercourses. This water is polluted by oil residues, wear debris from tyres, dog excrements, as

Daily drinking-water consumption of twelve buckets of water compared with 500 buckets of “virtual water”

Renaturalisation of the Rohrgraben in Hannover: inundation shortly before (above) and shortly after (below)

well as other organic material and is channelled off with the other precipitation water into the watercourses.

The waterway network of Hannover covers about 150 kilometres of small ditches and streams, which absorb this rainwater and channel it together with the natural runoff. For more than 15 years now Hannover has adopted a programme to improve its waterways in accordance with the Water Framework Directive (WRR). After determination of deficits in the watercourse structure a link up and networking of small, medium and large watercourses was systematically achieved by renaturalisation and conservational maintenance of waters. In time a more and more compact network of biotopes was created, contributing to a green city design for urban recreation.

Since 1996, 24 watercourses have been renaturalized. These watercourses are ecologically managed and further developed with especially designed maintenance plans. Developments are documented by monitoring.

This renaturalisation has improved both the water structure quality with regard to dynamics, layout, cross-sectional design, river bed and bank structure as well as water environment and water quality.

Water quality in the City of Hannover

The proportion of watercourses meeting quality class II is an important indicator of whether our lakes and rivers are being used sustainably. Watercourses in Hannover's municipal area are regularly monitored for quality by the Association for Limnology and Water Protection (ALG) e. V. Water quality regulations are based on biological studies of microfauna, (worms, insects, crustaceans, snails and the like). Supplementary to this, numerous chemical analyses and physical testing are carried out. Data on up to 16 chemical and physical parameters are obtained at each monitoring site.

The quality map of the City of Hannover from 2007 will be updated by the end of 2012. It shows the water quality of 38 watercourses, sampled at more than 90 test sites.

Flood protection

Since the dramatic floods of recent years flood protection has acquired high priority in public discussions. These events also promoted a new legislation from the European Parliament which came into force on 26th November, 2007 regarding the Evaluation and management of flood risks (EG-HWRM-Richtlinie) which has since been incorporated into the amendments of the Water Economy Law (WHG) and the Lower Saxony Water Law (NWG). Here a framework for the evaluation of flood risks to reduce the disadvantageous consequences of flooding for human health, cultural heritage and economic activities is intended.

In order to satisfy the rising requirements for effective anti-flooding precautionary measures, Hannover City has examined the existing flood prevention arrangements and developed options for improvement. In 2006 an appropriate overall planning was passed, adopting planning goals and priorities.

Action priorities are the development of the River Ihme between the Leinert and Legion bridges, rebuilding the Benno-Ohnesorg bridge and reconstructing the dyke in southern Ricklingen with a total volume of about 30 million Euro. Implementation of these initial partial measures, rebuilding of the Benno-Ohnesorg bridge and the renovation of a former gas works site located in the construction area was concluded in 2011. With the excavations of the Ihme foreshore the flood protection on the Ihme will be completed at the end of 2012. The extension of the dike in Ricklingen is intended as from 2013.

Closed dike gate in Ricklingen

Mulden-Rigole in private sector

Rainwater management

Every settlement activity causes the sealing of surfaces for roads, residential and commercial buildings. These inevitably impose an interference in the natural water economy, as due to the resultant increased runoff an increase in floodwater peaks and a decline in groundwater increment is brought about. In Hannover already at a very early stage construction and design possibilities for rainwater management were used in the construction of new housing estates to retain as far as posible the natural discharge regime existing prior to construction even after construction. To this aim the infiltration of rainwater in the precipitation area as well as the retarded release to the waterflow were provided. The system of open rainwater runoff has become an important municipal design element, improving the city climate, balancing the temperature and creating a recreational area for the population.

The "Ecological Standards for Construction in the Communal Sphere of Influence" (Ökologischen Standards beim Bauen im kommunalen Einflußbereich) passed by the City Council in 2007 stipulates that rainwater management must be systematically checked at several stages during every local development plan. The following priorities and planning variants from "optimally" (1.) to "should be avoided wherever possible" (6.) have to be complied with:

1. (total) rainwater (RW)-infiltration in gulleys (Mulden)
2. (total) RW-infiltration in Mulden-Rigolen (gulleys and gravel-lined ground reservoirs)
3. RW-runoff in Mulden and retention in rainwater-retention-basin (dry/wet)
4. RW-runoff via gulleys (Mulden) into flowing waters /trenches
5. RW-runoff via gulleys (Mulden) into RW-storm drainage
6. (wherever possible, no longer) runoff of rainwater from roads and roof surfaces into storm drainage.

By adopting decentral infiltration of the rainwater volumes both from private as well as public areas attempts are still consequently made in the construction of housing and commercial buildings to avoid the construction of public storm drains in the street area. This reduces development costs which would otherwise be incurred and then distributed among the adjoining residents.

Roof-greening (cf. page 72) can, as a result of the "spongelike effect" of the soil and plant layers involved, provide a considerable rainwater retention. All these measures contribute towards evaporation, so exerting a positive influence on the microclimate whilst reducing possible dust formation.

Hannover's sewage sludge achieves award-winning quality

By means of the measures implemented by the urban sewerage system Hannover has improved the quality of its sewage sludge. Since the start of 2006 Hannover is the first city in Lower Saxony to receive the quality mark for outstanding agricultural utilisation (QLA-quality assurance division of the association of waste used in agriculture) in Categories I and II (parent materials and end products). In April 2011 the urban sewage system has also been awarded the quality mark for the category III (application concept). With this quality seal the company for quality assurance of the Association of German Agricultural Testing and Research Institute (VD-LUFA) in cooperation with the German Association for Water, Wastewater and Waste e. V. (DWA) confirms that a quality assurance system has been successfully used for sewage sludge.

This confirmed that Hannover's sewage sludge has matched up with the quality of sludge from a rural community without industrial enterprises and is comparable with the requirements of good quality compost. This means that Hannover's sewage sludge meets with values well below the legal guidelines.

The table below provides information on the utilization of the sewage sludge.

Herrenhausen sewage treatment plant

Trend of sewage sludge disposal quantities 1992 – 2011 in tons

Year	Total quantity	Agriculture	Co-incineration	Composting/ Recultivation	Landfill
1992[1)]	72,400	51,800	0	0	20,600
2000	58,389	39,407	0	18,982	0
2005	59,622	32,769	12,329	14,524	0
2011	57,008	31,276	21,441	4,291	0

1) In 1992 the sewage sludge was conditioned with 13,800 tons of limestone. Adjusted by this share the total volume of the sewage sludge amounts to 58,600 tons.

Waste

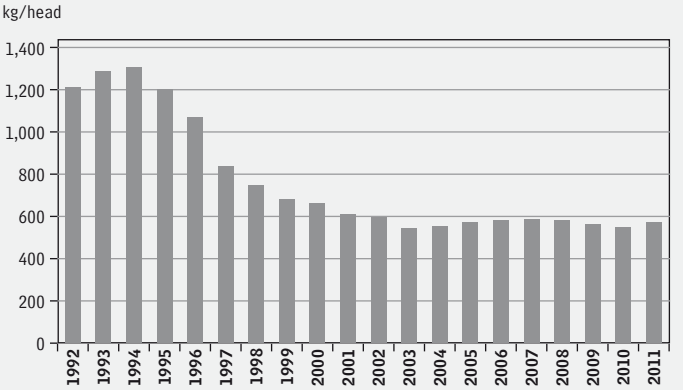
Indicators

Waste volume

Total quantities of waste delivered from the City of Hannover and Hannover Region in kg per head/annum

After a marked decline in the 90's (1992: 1,215 kg per resident) the quantity of waste produced has, in the past few years, settled to an almost constant level and was in the year 2011 at 570 kg per resident. Separate recyclable material collection has therefore proven worthwhile, but the possibilities have now almost been exhausted. Awareness of the exhaustibility of primary raw materials as well as knowledge of the recyclable material law currently being revised by the Federal Government will possibly provide new impulses.

Total waste produced in the City of Hannover and Region[1)]



1) from 2002 data provided for the Hannover Region

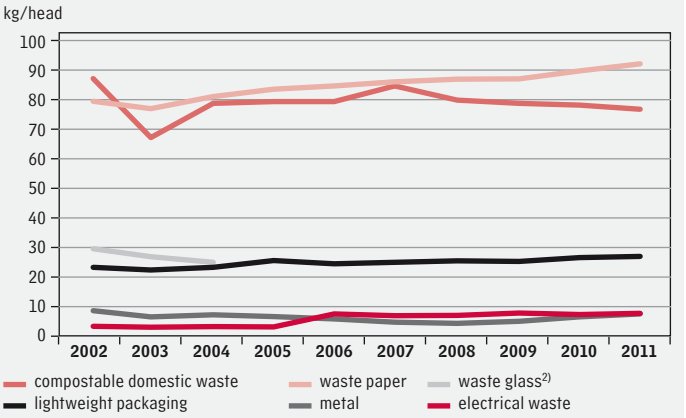
Source: Zweckverband Abfallwirtschaft Region Hannover

Quantity of recyclables

Recyclables collected given as total and broken down by type in kg per head/annum

Endeavours to save resources and the partially positive trend in the market price for waste paper and metal over the past few years have led to a rise in the quantities collected; waste paper eg. from 79.6 kg per resident (2002) to 92.3 kg per head in 2011. The resultant takings flow into the municipal budget and so benefit the citizens.

Recyclables collected from Hannover Region[1)]

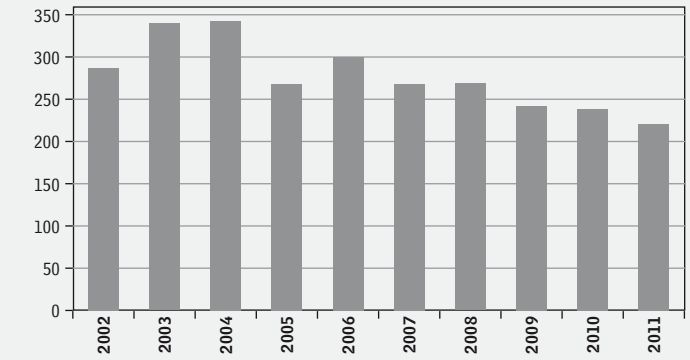


1) Data given for the Hannover Region

2) As of Jan. 1st 2005 glass is no longer collected by aha, so no data available

Source: Zweckverband Abfallwirtschaft Region Hannover

Total waste disposal from the Hannover Region[1)]



1) Volume data for Hannover Region

Source: Zweckverband Abfallwirtschaft Region Hannover

Waste disposal volume

Quantity of disposed waste from the City of Hannover resp. Hannover Region in relation to the number of inhabitants in kg/inhabitant/year

Over the past ten years there has been a decline from 287 kg per inhabitant (2002) to 221 kg per inhabitant (2011) in the quantity of waste for disposal, which is landfilled or thermally treated. This positive trend mirrors the increased recovery of used wood, street rubbish, soil and construction waste. Since mid-2005 untreated waste may no longer be deposited on landfills. The setup of the biological treatment stage of the mechanical residual waste treatment plant (MBA) led via the extraction of the organic substance to a reduction in the landfilled quantity and so to the quantity for disposal. From 2006 onwards the MBA and incineration plant in Hannover-Lahe underwent a continuous process optimisation.

Projects and measures

The Zweckverband Abfallwirtschaft Region Hannover, in short known as "aha", is the public waste management organisation for 21 municipalities in the Hannover Region and so, too, for the Landeshauptstadt Hannover. The tasks of the 1,680 employees, of all genders, involve the collection and transport of waste and recyclables from 550,000 households and round 50,000 businesses, as well as waste treatment and landfill disposal. In addition aha is responsible for road cleaning and winter services.

Environmental protection is an integral part of the aha-company philosophy. To achieve these targets aha has implemented an integrated management system, which comprises systematic determination, documentation and evaluation of environmental impacts resulting from the operational activities of aha. This management system fulfils the requirements set by

- DIN EN ISO 9001:2000 for a quality management system
- DIN EN ISO 14001:2005 for an environmental management system
- as well as the Waste Management Facility Ordinance (Entsorgungsfachbetriebeverordnung (EfbV))

Climate protection by construction of a new building according to Passive house standards

In 2013 a 920 square metre house in passive construction, comprising 120 offices, social and recreational facilities will be ready for occupation on the aha site in the Karl-Wiechert-Allee. In comparison with a building according to standard by law 500 tons CO_2 will be saved annually.

Climate protection by Nordberg-landfill covering

The body of the Hannover landfill, storing 10 million cubic metres of waste from a period of 44 years is given a surface sealing. This measure is a longterm method of preventing the uncontrolled escape of landfill gases, which would have a negative effect on the climate. In addition to this a new biotope for plants and animals is created on the recultivation layer.

“Alles geputzt”, “putzmunter” and “Großer Rausputz”

On March 24, 2012 round 4,000 people, more than ever before responded to the invitation from aha and enjoyed cleaning up Hannover. They filled 2,382 sacks full of rubbish. For every full sack aha donated one Euro to the municipal organisation “bed by night”, which helps street children.

The “Große Rausputz” stands for rubbish clearance actions taking place the whole year round in Hannover Region. In 2011, round 12,000 people cleared away rubbish on a total of 130 locations, fields, woods and green corridor.

aha is a member of the alliance “Der Norden räumt auf” (The North clears up), which was founded by six North German cities in 2011. This was intended to use synergies and make more people aware of the topic “tidiness” (Sauberkeit).

Favourite locations kept spick and span

The litter campaign “Meine Stadt halte ich sauber” (keep my city tidy), which is carried out in 2012, is intended to arouse people’s, in particular young grownups’ awareness of the topic of litter. The idea behind this being: If you feel at home here, leave no rubbish lying around. aha therefore invites people to name their favourite hangouts via internet and facebook, record them in a street map and become a “tidiness ambassador” (SauberkeitsbotschafterIn) for this location.

This project is being carried out in cooperation with the City of Hannover, as in addition to transport and communication zones, in particular green and parklike areas are often left in a very fouled and littered condition at the end of summer activities and events. The campaign is backed by various ambassadors (Citygemeinschaft, Vereinigung Lindener Geschäftsleute, various companies and establishments).

For further information: www.aha.de

Environment and Economy – An idea becomes model of success

An interview with Hans Mönninghoff

On August 1, 1988 a separate Directorate of Environmental Services was set up and since 1989 Hans Mönninghoff has been the responsible head of this directorate. In 2005 the City of Hannover went one step further to become the very first European City to amalgamate environmental and economic tasks in one directorate. Here is an interview with the "dual function director" who is to retire on 31.07.2013: nevertheless there will be no change in the directorate layout for the future.

Herr Mönninghoff, the amalgamation of economy and environment was initially regarded as very critical; many feared too many extreme contrasts in these topical fields. What positive synergistic effects can you highlight between economy and environment, e.g. at the most exciting interface – the municipal land and building policy?

One example of the positive synergistic effects: the economic administration of the city regularly buys up areas of land, which are further developed in planning and then resold for the setting up of businesses and housing construction. The result of this integrated approach is, that this land is not sold to the highest possible bidder but in the case of several interested purchasers,acceptance is granted to the one who realizes the highest ecological standard for the planned buildings and area design . This standard is stipulated in detail in the purchasing contracts. Even in cases where the land does not belong to the city, the latter often exerts considerable influence on how it will be built by means of urban planning contracts.

Are there occasions when disputes arise between economy and nature conservation?

Very few, among other reasons because we can prove to the environmental organisations that we always primarily try to reactivate derelict land and only make use of open landscapes when absolutely necessary. In doing so we ensure that new local development plans have a high ecological standard and that climate-ecological compensation measures and fresh air corridors remain intact within the city. A compatible inner consolidation of the city with convenient access to rail traffic is, contrary to a car-dependent urban sprawl of landscapes, also a contribution to ecological optimisation!

Precisely in the case of new industrial zones ecological aspects can be implemented with relatively simple planning instruments: New flat roofs must be greened in Hannover – due to this requirement alone 650,000 m^2 new green roofs have come about in the past 10 years in Hannover. Without this measure there would have been more than 400,000 m^3 water runoff per year. Now there are only maximum 150,000 m^3 and this means a time-lag flow off – an important flood control protection measure. The remaining approx.

250,000 m^3 evaporate, and so contribute to an improvement of the city climate in hot summers.

Green economy promotion in the City of Hannover, what does this mean?

Large firms require no support on a local level, but in conjunction with the municipal economic promotion start-up aids and loans are granted for small and medium-sized companies, which are newly founded or expanding in the environmental sector. Additionally there is for example a special competition for setting up companies in the climate protection sector. As far as existing businesses are concerned it goes without saying that nowadays due to the limited funding available preference is given to those businesses,which realize a higher environmental standard or have innovative ideas for new environmental products.

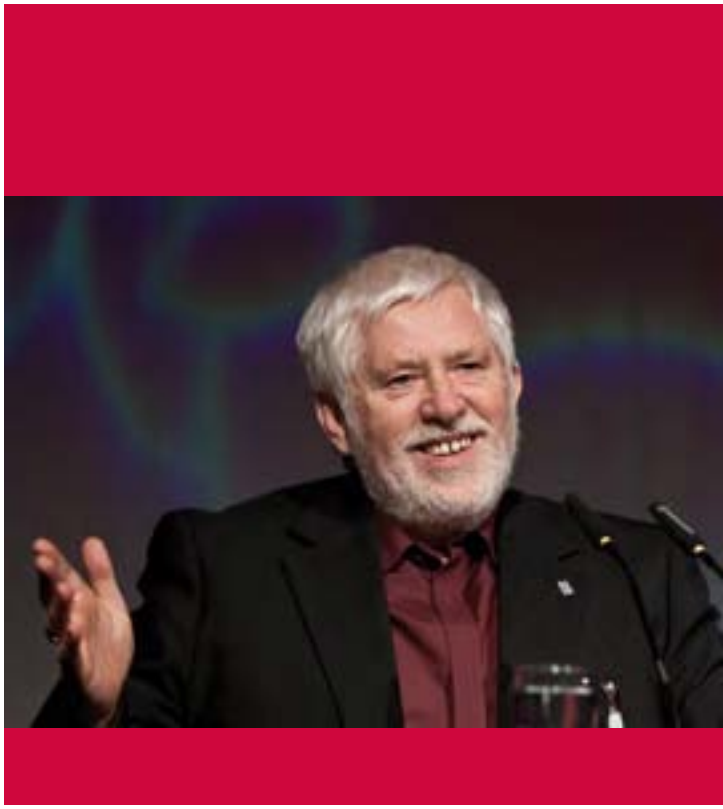
The contacts in conjunction with the municipal economy promotion serve in addition as an excellent "door opener" for the successful "ÖKOPROFIT" project in Hannover. In this cooperation project between economy and city more than 140 firms have been examined, to see how they can save money in the water, energy and waste sectors. There is an active benchmark process between the companies. The advantages for the environment are clear to see and the companies are given the possibility of presenting themselves in a good position with optimal operational environment protection, so saving resources and increasing their economic stability.

Your directorate is also responsible for the management of approximately 600 buildings (schools, kindergarden, administration buildings etc.) What positive synergistic effects does the renovation or new construction of buildings have, for example?

As far as the energetic renovation measures currently being realized in an extensive programme are concerned, not only the high legal standard set by the energy-saving bylaw in Germany is being implemented but also a 30 percent higher target. This is a commitment which we have taken on in order to achieve our share in the reduction of the CO_2-emission. Last but not least this is a good investment in the future, if we take into consideration the anticipated energy price increases. New urban buildings are constructed according to passive house standard. The large roof surfaces of the municipal buildings are made available to private investors, who instal photovoltaic installations. The municipal financial economy will then profit from the leasing of these roof areas. There are in the meantime 54 photovoltaic installations on the municipal buildings covering an approximately 12,000 m^2 module area; the electricity production provided in this way is sufficient to meet the overall requirement for approximately 900 people.

Are there any other synergistic effects in the energy sector between environment and economy?

Yes, two examples: on the one hand most large companies within the city, housing associations, interest groups etc. are obliged in a campaign "Climate Alliance Hannover 2020" under the patronage of the Lord Mayor, to do everything within their power to achieve a 40 percent reduction in the CO_2-production in the city area by 2020



compared to that of 1990. On the other hand the "enercity-Fonds proKlima" is very productive as far as the regional economy is concerned. For ten years now an annual amount of five million Euros is raised by the Stadtwerken Hannover, the Landeshauptstadt Hannover and five urban fringe local authorities, with which approximately 1,000 projects are financially supported every year: house owners receive grants, if they insulate their buildings to a greater extent than legally stipulated, craftswomen and architects are trained and model projects realized. Analyses have proven that one Euro funding opens up approximately 13 Euros of private capital, with the result that this fund represents a considerable stabilization programme for the regional economy, in particular handicraft.

Hannover has become the "Federal Capital of Biodiversity" in 2011 and is known as the "City of Gardens" and is one of the greenest cities in Germany. How important are these soft location factors for city marketing, which also falls within the responsibilities of your economic directorate?

We have just launched a huge city marketing campaign under the motto "City with a high quality of living" – and naturally the environmental sector plays a central role here – and the tourist advertising campaign focuses special attention today on the parks and recreational areas well worth seeing. As far as the acquisition of company relocations to the city are concerned, we draw special attention to the high environmental qualities of Hannover, amongst other things the 107 m^2 public green area per city inhabitant, an absolute top value for German large cities. The personnel managers of large companies in Hannover emphasize the fact that the rate of qualified personnel moving away from here is very slight when compared with other cities – people feel good in Hannover.

Environmental education and environmental communication

The UN-World Decade of "Education for sustainable Development" (2005 – 2014) appeals to the opening up of educational opportunities for all people to participate actively in the design of an ecologically compatible, economically efficient and socially equitable environment. This principle of a policy based on sustainability applies in particular for the environmental education sector.

Environmental education and communication for Hannover entail the communication of actual topics, beacon projects and programmes, the provision of a central and competent contact partner for the population, educational facilities, organisations and associations and above all to intensify the awareness of the population for the environment and a sustainable lifestyle by means of selected educational projects, while always focussing on the expansion of ones own capacity to act.

Environmental communication statistics show: there is a continuous rise in the demand for environmental educational offers. An abundancy of offers ranging from activity boxes, workshops, further educational courses, excursions, support, exhibitions, advisory services to a multiplicity of projects and events are only possible in Hannover due to the numerous cooperations with other specialist sectors, institutions, associations, schools, persons engaged in the cultural sector, environmental instructors and volunteers active in association with the "Environmental Consulting Network".

The following projects represent a small selection. The out-of-school learning centres are within the competence of the respective institutions.

The environmental educational work in 2011 focussed, among other things, on the topics of climate protection and climate change.

Climate weeks Hannover 2011

Together with the Volkshochschule Hannover the Environmental and City Greenspace Department organized the 2011 climate weeks in the period from 6th – 28th January. The exhibition "Everyone can protect the climate" (Klima schützen kann jeder) presented by the consumer centre for Lower Saxony was supplemented by an accompanying programme with lectures and courses on the topics of energy and climate protection. Basic knowledge and practical tips as to how to protect the climate at home and when out and about. Courses on climate-friendly cooking, reduction of the household electricity consumption as well as a lecture on the planning of bicycle tours. All these provided impulses for climate-friendly behaviour.

"Climate Workshop – Environmental experiments for future research scientists"

At the end of 2011 the climate protection topic was taken up again, this time focussing on the environmental educational work for schools. The multiple award-winning climate exhibition of the Deutschen Bundesstiftung Umwelt was presented in Hannover's town hall from November 11th – 12th December. At eight stations the interactive presentation made causes and consequences of climate change evident and offered concrete solution approaches for the protection of environment and climate. 24 experimenting islands invited interested visitors to go on a discovery tour to explore the connections between personal energy consumption, carbon dioxide emission and climate change.

With a programme specially prepared for school classes of the Sekundarstufenbereiche I and II (secondary school stage I and II) the content of the individual thematic islands were developed

and presented. An additional market stand with climate-friendly products and regional information rounded off the offer.

All in all 42 guided tours of the exhibition were held, 33 of which for school classes. In addition to that there was a daily attendance of about 100 interested citizens.

Learning by experimenting

By trial and error children find out about the phenomena of their environment, trace the connexions and find out how something functions. The project "Versuch macht klug" links up with the scientific curiosity (enquiring mind) of children and focusses on free experimentation. This is an important contribution to scientific basic knowledge.

With the help of three experiment boxes comprising an abundance of test material, which can be hired out free of charge by child daycare centres, primary and special-needs schools, children get to know the multiple properties of water, learn about the mechanical and regenerative energies or discover the phenomena of magnetism. With the help of simple test objects the children are supported in their investigations and their further interest is aroused.

In order to make the start with experimenting easier for teachers and trainers, the Environmental and City Greenspace Department (Umwelt und Stadtgrün) offers full-day trainee sessions, supervised workshops and a brochure with numerous test instructions. During the trainee sessions the participants carry out numerous experiments and construct test objects. Tips are given regarding the implementation of the experiments in one's own establishment. To date 172 schools and child daycare establishments with a total of 345 teachers and nursery school teachers have attended the trainee courses which have been offered four times a year since 2007.

Project "Abfall – nein danke!"

Four times now the Environmental and City Greenspace Department has carried out the project "Abfall – nein danke!" (Waste – no thanks!) in cooperation with the Zweckverband Abfallwirtschaft Region Hannover, which is part of the project "ERFOLGREICH ABFALLARM" (low waste success) of the City of Hannover.

For one whole week pupils from two schools from one city district are creatively engaged with the topic "rubbish", discuss waste separation and avoidance and develop ideas as to how waste can be reused. This results in scenes for a stage programme to be performed in front of the entire school at the end of the week, including fashion shows, marionette and mask theatre, dance and music interludes. The special thing about this: all the requisites and costumes are made from rubbish.

In order to integrate the theme sustainably into the lessons and the everyday school routine the schools receive backing in the form of instructional material, paper and waste workshops as well as advisory consultation on the topics of waste separation and paper recycling. In addition the pupils visit the waste disposal site in Lahe. This project is intended to arouse the pupils' awareness of the importance of a conscious attitude towards the environment and resources in their own living sphere.

The following schools took part:

- Primary school Alemannstraße (2008) – 80 pupils
- Primary school Hägewiesen and Fridtjof Nansen primary school (2010) – 150 pupils
- IGS Stöcken (comprehensive school) and primary school Am Stöckener Bach (2011) – 200 pupils.

In 2012 the project was carried out in the IGS Badenstedt and the Friedrich-Ebert primary school in Badenstedt with 200 pupils.

Learning by experimenting ("Versuch macht klug!")

Props and costumes made from waste

Sustainable pupil-run enterprises

At Hannover's schools there are in the meantime more than 20 pupil-run enterprises which have committed themselves to the principle of sustainability. The pupils produce and sell products, or provide services while taking into account ecological or social interests. They sell healthy break-time snacks or environmentally-friendly school materials, repair bicycles, produce honey, offer computer courses for senior citizens and occupy themselves with renewable energy sources among other topics.

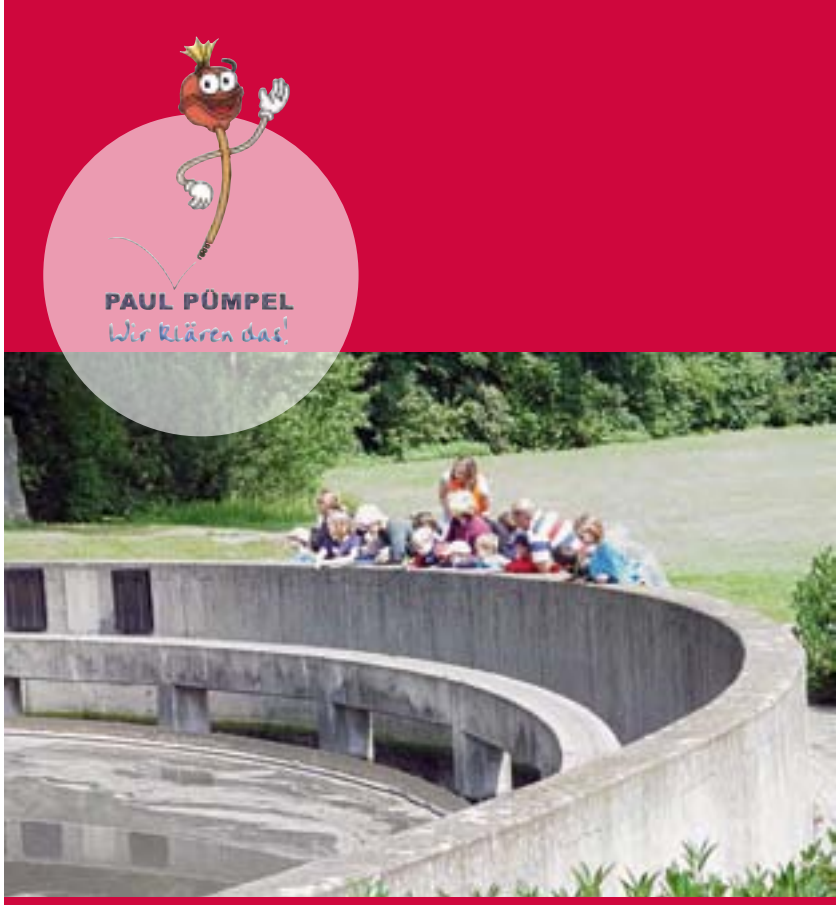
Three of the Hannoverian firms have already received the "silver" certificate, which is awarded by the Lower Saxony Ministry of Education to sustainable pupil-run enterprises. Certificates in bronze and silver have been awarded since May 2012 – as preliminary stage before application for the gold award. The different level of awards are proof of how far the business structures have been developed within the pupil-run enterprises and what role the firms play in connection with the vocational orientation within the school and the mediation of education for sustainable development.

Sustainable pupil-run enterprises are school projects organized just like real companies. Pupils put their own business idea into practice, familiarize themselves with all aspects of setting up and running a business and gain earnings with their product. By mediation of important key qualifications, pupil-run enterprises are an ideal preparation for embarking on a career.

The schools receive individual advice on organisational, financial and legal aspects regarding the setting up and operation of pupil-run firms, information material as well as training on topics such as "presentation", "bookkeeping" or "sustainability".

The "Sustainable pupil-run enterprises" are a collaborative project of the Environmental and City Greenspace Department, libraries and schools as well as Economic Affairs, which is carried out in coordination with the nationwide network "Sustainable pupil-run enterprises".

Pupil-run enterprise Bicycle repair



Tour of sewage treatment plant

Urban sewerage system Hannover – an environmental dialogue with the public

The Stadtentwässerung Hannover has been contributing to environmental protection for more than 115 years now, which makes it Hannover's oldest environmental operation. In order to present this task to a wide public the Stadtentwässerung organizes sewerage plant tours for schools (class 5 onwards) and groups of adults. From 1995 to the end of 2011 a total of more than 33,000 people participated in one of more than 1,700 tours. The intention of these tours is to explain the operation significance of a functionable wastewater system and the high outlay involved in wastewater purification. Particular focus is made on the comparison between the population, which profits from a regulated wastewater system and the round 40 percent of the world population having no wastewater draw-off and purification.

Using various models the visitors receive an explanation as to how much wastewater is produced daily by the use of a toilet or shower, and the amount of rubbish which enters into and passes through the drainage system. The intention is to make visitors aware of the fact that the toilet is not a rubbish bin and indicate what everyone of us can do to protect the water – and in turn protect our environment.

Great attention is given to environmental education for children. The mascot of the Stadtentwässerung Hannover – Paul Pümpel – explains to the children in a playful manner how the Hannoverian sewerage operation works. The Stadtentwässerung participates

regularly in the "Waterday" (22nd March) and the "World toilet day" (November 19th) in order to bring the various topics of water usage and water pollution more intensively into the focus of public awareness, appealing to a wiser handling of this valuable resource, water.

In addition to sewerage plant tours and participation in exhibitions the Stadtentwässerung Hannover provides brochures free of charge (also in the major foreign languages), information material and flyer as printed version or as download on its homepage. Films on the topic of wastewater explain to the public the importance of wastewater purification.

For further information see www. stadtentwässerung-hannover.de

Out-of-school learning locations

Kinderwald Hannover (Children's forest)

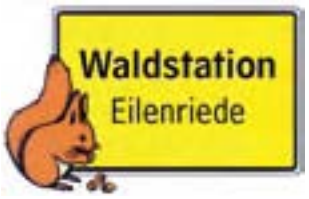
Hannover's Kinderwald is a seven hectar large former derelict area at the edge of the Mecklenheider Forst, which children since spring 2000 have planted, designed and further developed. It is a location where they can romp to their heart's content, wade through the water, experiment, sing and enjoy experiencing nature with all their senses.

The involvement of the children and youngsters is a great concern here: this means they can express, realize and develop their own requirements and wishes for the design and care of the terrain available. In 2011 the terrain concept was updated in conjunction with workshop participation and the "Green Classroom" set up.

In 2011 a total of 496 workshops and events with more than 10,000 participants took place. These facilities open up for all age groups target-specific access to nature and offer experience in the sector of art and ecology, planning and constructing. Here children and youngsters from 3 to 18 years old develop their spontaneity and creativity but also learn their own strengths and weaknesses or limitations. First and foremost practical work, team spirit, tolerance and design competence are promoted. There is a wide variety of offers : experimentation, terrain and art workshops for child daycare centres and schools, plant and care actions for families, holiday actions, seasonal festivities, Kinderwald choirs, fixed group activities such as the children's group and wilderness group as well as current projects such as e.g. "Learning stops/stations" (Stationenlernen) – a special school project for vocational preparation or the new scientist project with focus on "discovery learning".

The Kinderwald Hannover was distinguished twice as UN-decade project "Education for sustainable development" and plays an exemplary role nationwide.

Waldstation Eilenriede



Since 2004 this woodland station exists in the Hannnover Stadtwald Eilenriede, a four hectar area with round 17,000 visitors per year. On round 220 days a year various offers of activities are made for the target group school pupils, kindergarten children, families and multipliers on one and the same level. Guided tours to forest, nature and other topics of interest, study groups for nearby schools, wood handicraft in the workshop on site, outdoor activities such as pond scooping with a net and searching for organisms living in the soil. The idea behind all this is to come into contact with the visitors, arouse their interest and motivate them to become active in playful learning with all their senses giving consideration to the seasons. An extensive programme caters for the various different needs of the

Dream catchers in the Kinderwald

Waldstation Eilenriede

visitors. There are rallies, wild animals such as fitchets, a centre for treating birds with ailments and as the very latest highlight a forest "skyscraper" (lookout) which invites visitors to climb and discover the various forest levels right up to 36 metres.Spread out over the layout and in the forest "skyscraper" there are numerous adventure stations, which arouse the interest for independent discovery of the forest.

The Waldstation Eilenriede has for 8 years now made it possible for youngsters in their voluntary ecological year (FÖJ) to gain their own experience in practical sustainability. Since 2009 the Waldstation has been a project partner in W.A.L.K., a vocational qualification project for deprived pupils, male and female in the transitional period between school and profession at out -of-school learning locations. Here hidden talents are discovered and design competence mediated. The W.A.L.K. Project is an award-winning UN decade project "Education for sustainable development".

Furthermore there has been an intensive cooperation with the Leibniz University Hannover, Institut für Freiraumplanung (Institut for open space planning) regarding the topic "Environment and sustainability education" in connection with a teaching appointment. An audio guide for the Waldstation has been produced as a recent result of this cooperation.

Schulbiologie zentrum Hannover

School Biology Centre

The School Biology Centre has developed in 130 years from a one hectar large nucleus to the 16 hectar environmental training establishment in Germany directed primarily at school requirements, and consisting of four centres:

- Botanical School Garden Burg (Environmental and scientific training)
- Open air school Burg (Forest education)
- Botanical School garden Linden (courses in gardening practice)
- Zoo School Hannover (in Hannover Zoo)

The main task of this centre is to provide a backup for a practice and experience-oriented school instruction in the scientific sector. All offers are aligned to fit in with the schoolteachers' instruction timetable and the skills or competences to be acquired as defined by an Education for Sustainable Development (BNE). Explore, grasp and understand nature and natural science phenomena from experience of and with living animals and plants is the main priority.

The BNE offer deals with "classical" biology topics (eg. genetics, evolution, biodiversity, ecology) and interdisciplinary topics (for example rainforest/desert, climate change, environmental and bioindicators, renewable energies). Nature and natural science phenomena can be explored in the school biology centre using living objects in the garden and terrain, grasped and subsequently understood. Pupils can come to terms in practical experience with everything which has been learned in theory.

Offers of the school biology centre cover :

- Instruction for all school forms from pre-school to final secondary school examinations
- Teacher and nursery teacher trainee courses (cascade training)
- Comprehensive advisory service for teachers, male and female in the natural science topics
- Backing of study seminars and universities to firmly establish BNE as part of the teacher training
- Educational tooling for the lessons and explanation of the materials to be hired out
- Offers for the general public, for example Sunday morning programmes for grownups and children, environmental forum, guided tours through the alchemist garden.

To implement these offers there are in all more than 16 hectares of land with seven hectares of forest, with ponds and flowing waters, many thematic gardens such as e.g. energy, insect, genetics, geological and alchemist gardens as well as greenhouses as learning sites and eight classrooms available.

The wildlife park and vivarium make it possible to learn from living animals, the market garden (nurseries) support the school gardening work and make available more than 2,500 plant deliveries of living plants for instruction purposes.

The lending-out section has a multiplicity of models, equipment and materials for instruction including readymade packages provided for complete instruction units. In 2011 more than 25,000 sets of instruction materials were lent out to schools.

In 2011, 1,609 classes/groups with 33,241 participants were taught, in all, round 63,700 attended.

In the school biology centre, Hannover children can explore nature

Special issues

Federal Capital of Biodiversity – More nature in the City

Hannover is Federal Capital of Biodiversity 2011

Since April 6th, 2011 Hannover is the German Capital of Biodiversity. Here the city is esteemed for its special commitment towards maintaining and promoting biological diversity. The Economic and Environmental Head of the directorate, Herr Mönninghoff was presented the prize of 25,000 Euro in the Cologne Town Hall and was given a nameplate. This prize will be used for a model project to promote roof and façade greenery in Hannover-Linden (cf. page 73), which was developed in conjunction with the Alliance for Environment and Nature Conservation.

124 towns and municipalities, of which 46 large cities participated in the International Year of Biodiversity 2010 in the competition. The competition is carried out in connexion with the international project "Capitals of Biodiversity" which is promoted by the european environmental programme LIFE+.

"Hannover gives the biodiversity topic great priority. The City concerns itself intensively and consequently with the protection of biological multiplicity, by adopting an holistic approach" stated Alexander Otto, Chairman of the Board of trustees for the "Living City" trust as reason for the award.

The Competition

With this prize many different activities, programmes and projects of the City of Hannover are appraised, which are only seldom to be found to this extent in one single community. Some examples,which have been implemented for many years in the practical work locally, are:

- the Eilenriede and all other urban woodland areas are natural land and FSC-certified (Forest Stewardship Council), are cultivated according to the directives for close-to-nature silviculture. In addition a programme for deadwood promotion is applied.
- The flowing waters are as far as possible designed as close-to-nature and their own dynamics is consequently integrated into the maintenance of watercourses (cf. page 49).
- In the landscape spaces of the City small waterways are set up, woody plants planted, grassland cultivation extended, wild field herbs are protected and an environmentally-friendly agriculture promoted.
- With the Courtyard and Residential Environment Programme citizens are also assisted in designing their residential areas green and close-to-nature. Since 2012 the programme is continued in the form of a competition under the title "Gartenlust".
- In order to achieve the genetic diversity of the flora, the municipal nursery cultivates plant material native to the area.

Alongside all these direct measures for promoting biological diversity there is a series of programmes and establishments, which serve the declared aim of the city, to arouse the enthusiasm of people for nature in their proximity: numerous environmental educational facilities for schools and Kindergarten, the guide programme "Green Hannover", the Kinderwald, the woodland study centre with the Waldhochhaus (lookout centre), the school biology centre, the district farm – they all mediate using well thought-out educational concepts both for children, youngsters as well as adults the significance of biological diversity and offer diverse incentives for participation in nature conservation activities (cf. page 58 ff).

Mehr Natur
in der Stadt!

Programme “More nature in the City”

Hannover has been awarded the accolade as “Federal Capital of Biodiversity” not only for establishments and activities already long in existence but also for its continued work with the programme “More nature in the City” in many different projects regarding the conservation and improvement of biological diversity within the city area. Here too are some examples:

Plant species aid programme

This programme aims to compile details of rare and endangered plant species, to conserve their location, promote with specific-care measures, increase stock and, wherever possible, revive former occurrences. In a registration sheet the current stocks are described and necessary conservation measures listed. This is followed by the dicussion of the measures to be implemented with the care operations on site and their subsequent initiation.

Animal species programme

The programme is implemented to conserve the habitats of especially endangered animal species and to create new biotopes for these. Stocks of strictly protected species – bats, amphibians, dragonflies, bees, field hamsters, to name just a few – are recorded, existing data inspected or, wherever necessary, newly acquired and conservation measures for their habitats compiled in order to achieve the long-term safeguarding of the population.

Mapping and repressing of invasive neophytes

Invasive neophytes are plants which have been imported from other countries and parts of the earth, respectively brought into or out of the country by people and which displace native local plants out of their habitat due to largescale propagation. Examples of these are the giant hogweed, knotweed, black cherry or Canadian gold rod. If due to the spreading out of these species the habitat of native (local) and endangered plant species are threatened, steps are taken to control and repress the invasive species.

Kronsberg: “Indian Summer”

Leine alluvial plain

Discover and keep alive historical cultural landscapes

Historical cultural landscape elements such as pollarded willows, "Rottekuhlen" (retting pits), so-called "Hufendörfer" and others, which have moulded over centuries the diversity of our landscape today, are still partly existent but are often go unnoticed. By means of this project they are to be rediscovered and made tangible for those interested. In the exemplary area of Misburg an inventory was taken. At a later date offers such as children's adventure tours, multi-generational story telling or landart projects are intended to arouse the awareness of the historical landscape elements.

Marl pit Misburg

Multimedia and nature experence

The use of digital media is intended to encourage children and youngsters to participate in discovery tours and entice them out into the open air. One example of this is geocaching – treasure hunting in nature. The paperchase with the GPS (Global Positioning System) combines technology and fun in the open air and is a well-loved favourite by all age groups all over the world. Pleasure in seeking, discovering and having surprises can also be an ideal incentive for learning in and about nature. In the Mecklenheider Forst a sophisticated cache was set up which requires knowledge about trees and teaches how to recognize the individual species.

Dare to let the land run wild – even in the city

If the term "wilderness" is only associated with vast untouched landscapes such as jungle or steppe, then wildnerness and town do not fit together. But if "wilderness" is understood to be a habitat in which plants and animals can settle down and develop even over a small area without the help of human beings and with as little interference and care as possible, then such locations can be possible even within the city area. To give animals and plants more space and freedom for independent development is an important contribution to promoting biological diversity.

For this purpose a cooperation project between Hannover, Frankfurt and Dessau is planned for which the Bundesamt für Naturschutz (Federal Office for Nature protection) has offered the prospect of funding from the Federal Programme for Biological Diversity. The creation of a "city wilderness" is to be allowed on different selected areas. By means of intensive communication and public-relations work the city population's interest for and acceptance of these "wild" areas is to be aroused. In Hannover the natural forest areas in the city woodlands are to be extended and in green belts partial areas are to be excluded from intensive care, so allowing nature discovery areas to develop near to residential areas for children, who would otherwise grow up in very densely builtup city districts.

Climate Alliance 2020 Hannover
A city commits itself to good climate

The conditions for a successful climate protection policy in Hannover are favourable. Already in 1992 the Council of the Landeshauptstadt passed the decision to cut Hannover's CO_2-emissions by a quarter within 15 years. An initial climate protection programme followed and important organisational steps were introduced. The balance was, however, disillusioning: between 1990 and 2005 only 7.5 percent CO_2 could be saved.

The Challenge

For this reason the efforts in climate protection must be even greater. By 2020 the annual CO_2-emissions are to be cut by 40 percent in comparison to those of 1990, this means 1.8 million tons per year.

To meet this challenge a broad participation of the urban society in climate protection is necessary, so in 2007 Lord Mayor Stephan Weil invited many groups within the city to participate in the drafting of the new climate protection action programme. This was unanimously passed by the City Council in December 2008 after one years work. Since that time large firms from industry and service sector, church organisations, environmental associations, trade unions and political parties have all been involved in the implementation of the programme. Since 2008 they are organized in the Hannover Climate Alliance 2020, comprising three active networks, which meet for conferences in workgroups on a regular basis:

1. The Energy Efficiency Network is an amalgamation of large firms and service enterprises, which meet to discuss various topics such as employee motivation, technical building service and others. Several commercial enterprises have launched their own climate protection programmes for the purpose of continuous improvement. They balance the CO_2-emissions of their activities and act accordingly. Manufacturing companies set their stakes on the most efficient plant, channel their waste heat into the district heating network or purchase green electricity. For the most part Hannover trams use electricity produced with renewable energy. Many insurance companies, banks and service providers have their base in Hannover and improve their large office buildings by converting their building envelope, efficient building technology engineering and new air preparation installations. Others compensate the CO_2-emission of the flights of their employees. The energy efficiency network carried out a joint action in September 2012: the multi-mobile-day was an offer to all climate alliance partners, to make their employees aware of environmentally-friendly and low impact (climate-compatible) mobility.

Stephan Weil, Lord Mayor of the Landeshauptstadt Hannover, presents the Climate Protection Action Programme.

2. The Climate Protection Partnership, in which the large housing companies in Hannover, housing industry associations and tenant representation work towards climate protection, meets four times a year. The housing companies, to which a large number of rented flats in Hannover belong, improve the insulation of their buildings, instal efficient heating systems, connect their

"Energy" as topic of instruction

buildings to district heating or, wherever possible, use renewable energy sources (fuels). This group has started up the internet portal www.klimafreundlicher-wohnen.de, which makes extensive information on energy-efficient living available to the tenant.

3. The Multipliers comprising educational institutions, political parties, churches and non-governmental organisations from Hannover exchange information two to three times a year on climate protection measures. This group has launched a joint project, the climate protection path in the Hannover city sector, Nordstadt; namely a multi-media guide with five stations on the energy topic, availability as from Spring 2013.

Another important contribution is made by the local energy supplier, Stadtwerke Hannover AG (enercity). The Stadtwerke produce their electricity totally free from nuclear power and have committed themselves to making the largest contribution to climate protection from the energy production sector. For example, the extension and modernisation of the heating and power station in Linden, a co-generation plant, which was the start of the district heating network in 1963, is about to be completed. There the Stadtwerke is installing another gas and vapour turbine with which 130 megawatt electricity is produced and its additional 90 MW thermal output fed to the district heating network – 200,000 tons less CO_2-emissions than would be produced by a coal-fired power station. By extension of the production of renewable energy and the co-generation scheme, which already entails 30 percent, as well as by other measures, the Stadtwerke will save 700,000 tons CO_2 annually by 2020.

The City Council sets a good example

In 2007 at the opening event Lord Mayor Stephan Weil said "Everyone must pull their weight". The city council sets a good example. With its unanimous decision in December 2008 the CO_2-reduction target becomes binding for the city council. More than 30 package measures, from environmental and climate-friendly acquisition, building management to car pool, all will be implemented within the next decade. These measures concern not only municipal properties but also the acquisition, mobility of employees as well as informational and campaign work. In addition an internet based Solaratlas (cf. page 15) was developed for the citizens. The City hopes this will provide a significant increase in the renewable energy production within the urban area.

Well-insulated buildings using efficient heating technology offer great possibilities. The City builds new buildings, e.g. child daycare centres and schools only to passive house standards, requiring next to no heating energy. Existing buildings are energetically upgraded to a standard at least 30 percent more efficient than the statutory building regulations demand (cf. page 12).

The Hannover Climate Alliance 2020 has launched an important chapter in the City's history. A brochure and six-minute film available in German and English give an impressive description of the activities in the Landeshauptstadt.

Further information: www.klimaallianz-hannover.de

Members of the Hannover Climate-Alliance

Climate protection and town planning
Example – zero:e park

HANNOVER-WETTBERGEN
zero:e park
O-EMISSIONSSIEDLUNG AM HIRTENBACH

HANNOVER
meravis mensch • raum • vision
NLG aktiv für land und leute

In the SouthWest of Hannover the II. Building phase for a future-oriented model project is already being realized, implementing far-reaching climate protection goals within urban city planning. Since the start of construction in 2010 in Hannover the zero-emission estate zero:e park at Hirtenbach has marked a new development area with 330 detached houses in passive-house construction covering the whole area. This implements an innovative concept, which ties up with its ecological aims for the Kronsberg-settlement constructed more than 10 years ago for EXPO 2000. In all there will be no CO_2-emissions on balance for heat suppply and domestic fuel on the new building site making zero:e park am Hirtenbach a follow up to the Kronsberg estate (1999) a further milestone on the way to future-compatible building construction in Hannover. Partners of the City of Hannover in the marketing of the building estate are Wohnungsbaugesellschaft meravis Wohnungsbau und Immobilien GmbH and der Niedersächsischen Landgesellschaft mbH (NLG).

Energy Standards for New Building Estates

Both for the zero:e park estate in Wettbergen as well as for the current KronsHoop construction phase at Kronsberg the energy standards valid for Hannover are applied, which are also a focal hub in the urban specialist programme of the Climate Alliance Hannover 2020 (cf. page 66). The most significant instruments of action for this are:

- a solar-optimized and energy-efficient area development planning
- stipulation of high energy standards and a compulsory consultation in land purchase and heritage building rights agreements as well as in contracts subject to public law (urban planning and implementation contracts)
- an energy-efficient renovation (upgrading) of municipal buildings and passive house standard for new construction of municipal properties (cf. page 12).

One aim of the building development concept is the creation of framework conditions for a future building plan which will enable a minimizing of CO_2-emissions caused by heating supply and domestic electricity. Passive housing development achieves a high degree of energy efficiency and is therefore one of the criteria (benchmarks) for town planning. For this purpose following aspects in the town planning are taken into consideration :

- structural compactness
- southern alignment of structure resp. roof surfaces and main recreation rooms
- guarantee of solar energy utilization by means of shadow-free façades and roof surfaces as well as by structural allocations (building elevation and clearances).

Thorsten Hiete (NLG), Matthias Herter (meravis), Lord Mayor Stephan Weil, Uwe Bodemann and Hans Mönninghoff at the joint ground-breaking ceremony

First townhouses in zero:e park

Energy concept zero:e park

Basis for the planning of the zero:e park was the prizewinner draft of the City Planning Competition (2005/2006) of AG Baufrösche und foundation 5+ from Kassel which received national attention. The fundamental principle of this energy concept is to reduce the heating requirement of the houses by means of an efficient energy coverage method with passive and active solar energy utilization reducing the heating requirement of the houses to a minimum, so that combined with the use of renewable energies only a small remainder must be compensated beyond the building area.

For the entire zero:e park building area a heating and household electricity compensation requirement for the climate neutrality of on average 1,300 MWh per year was ascertained, which is intended to be covered via the production of electrical energy using a reactivated hydropower plant.

Statutory stipulations in the local development plan

This new bulding estate is intended to provide attractive, competitive housing facilities for detached housing, especially suited for family needs. The most important basis for the realization of climate protection goals is the local development plan coupled with a municipal planning contract. The results of the competition draft and energy concept were ensured as far as possible by the statutory stipulation of building elevation, clearance and alignment (orientation).

To avoid casting a shadow on the neighbouring buildings even when the sun is low and in order to guarantee the compactness of the building shell, for this development plan in addition to the stipulation of two full floors an elevation stipulation was developed in the form of an envelope curve (Hüllkurve). This so-called envelope curve stipulates clearances and elevation limit for the future building shell. Within this stipulation the building owners still have considerable leeway as regards building or roof configurations, enabling them to realize an individual high-grade architecture.

Design for City houses in the II building phase,Competition prize holder, Prof. Carsten Lorenzen (Copenhagen/Dresden)

Agreements in the townplanning contract

As the possibility of statutory stipulations in the local development plan are only limited, further agreements for the implementation of the climate protection estate are settled in the town planning contract, namely:

- commitment to passive house standard with maximum 40 kWh/m² per year primary energy requirement for heat supply
- guidelines for heat supply (solar installations for warmwater supply)
- early consultation of building owners
- compensation arrangement for the residual energy requirement for heating and domestic electricity supply via a reactivated hydropower plant.

Even for the supermarket planned in the building area an obligation to passive house standard is agreed upon in the urban planning contract. To put this into practice not only the heat supply and the air exchange are taken into consideration but also an optimized solution for the cooling load caused by the equipment and its utilization of heat. Planning, implementation and later utilization will be accompanied in the form of a study by the enercity-Förderfonds proKlima and the Passivhausinstitut in Darmstadt over the next few years.

Counselling and information for a living neighbourhood

Implementation of the previously named targets demands an intensive, broadly based counselling, information and assistance (including quality assurance) of building families and partly property developers. Along with an early advisory service giving impulses at the climate protection unit of the Landeshauptstadt Hannover those wishing to build have a proKlima funding at their disposal to cover the costs of an energy pilot. This adviser provides tips with regard to design, points out optimisation possibilities and suggests initial steps for quality assurance. In addition an accompanying city project with the title "Lebendige Nachbarschaft" (LeNa) ("living neighbourhoods") supports the development both of the new construction site as well as of the entire city sector. Specialist information regarding energetic and ecological building and renovation is available both to new and old inhabitants to the same extent.

LeNa
lebendige
Nachbarschaft

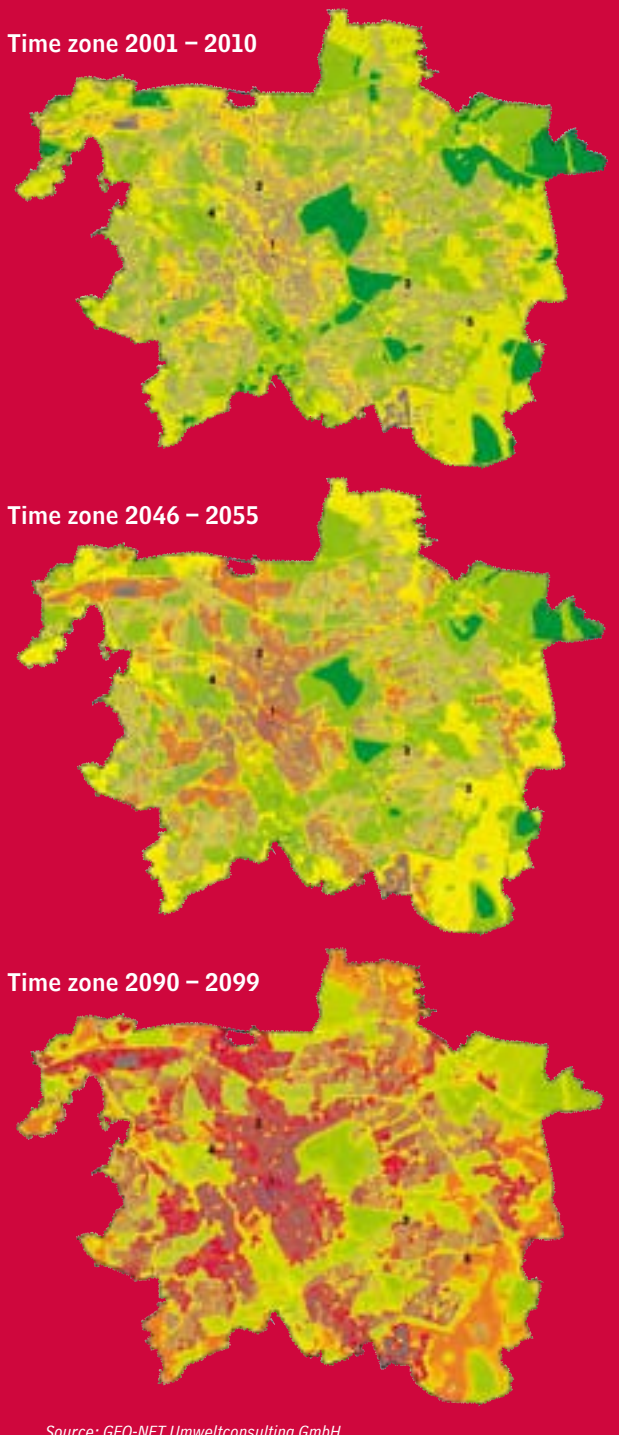
Building information evenings and other activities offer at the same time good opportunities for neighbourly exchange of ideas and opinions. An external LeNa-planning team (architecture office and planning office for domestic technique) is available to answer concrete questions. After filling out a questionnaire an evaluation of the consumer data in the new housing area carried out by proKlima is intended to give more insight into the actual effects. In addition a garden manual was developed giving planting suggestions and ideas for passive house gardens using local (native) plants and shrubs.

Further info: www.hannover.de and www.zero-e-park.de

Climate change – Hannover adapts

There is a worldwide climate change, on average, it is becoming warmer. Despite the introduction of numerous climate protection measures to reduce greenhouse gas emissions, among expert circles it is propagated as certain that by the end of this century global warming (related to the pre-industrial level) will be on average at least two degrees Centigrade. The consequences of this will be felt very clearly by people living in the large cities. For this reason climate change adaptation measures must be adopted additionally at the same time as other necessary climate protection measures for reducing CO_2-emissions. The City of Hannover meets this challenge for its round 520,000 inhabitants by adopting numerous measures and developing its own strategy for coming to terms with climate change.

Summer thermal pollution due to the influence of climate change in the City of Hannover



Source: GEO-NET Umweltconsulting GmbH

The changes linked to climate change will impose far-reaching consequences for the living conditions of people, especially those living in the cities. Here on the one hand the climatic changes will be intensified in their effect due to the city climate already existent, and on the other hand it is precisely here that one finds sensitive categories of people (elderly or sick people, small children) as well as many investments and installations (infrastructure). In the course of demographic change the number of elderly people in Hannover is rising. This affects, in particular, the very aged (85+), who are healthwise very susceptible. By 2025 the number of extremely aged citizens is anticipated to rise by a third, from today's approx. 14,400 to then approx. 19,400 (e.g. population forecast 2012 to 2020/2025, Landeshauptstadt Hannover, 2012).

Changes due to climate change will become noticeable by:

- an increase in the stress produced by summer weather conditions and heatwaves as well as a considerable increase in the number of hot days and tropical nights with negative effects on people's health
- a change in the annual rainfall distribution (increase in winter, decrease in summer) an increase in torrential rain / extreme weather conditions with an increased risk of flooding and damages to buildings as well as respective infrastructure
- an increase in summer drought periods with negative consequences for green areas, roadside trees as well as for agriculture/ forest and water management.

Consequences of the climate change for Hannover

In order to acquire a picture of future anticipated summer heat stress, the City of Hannover has a commissioned a model of meteorological parameters relating to climate change for the city area of Hannover. The results of these model calculations show that in the city by the end of this century a considerable increase in the number of "days of heat" with a max. temperature of more than 30 degrees Centigrade and "tropical nights" with air temperatures not below 20 degrees is to be expected.

In the densely built and tightly sealed-off inner city the average number of 9.6 "days of heat" (from 2001 to 2010) will more than double to 21.9 in the period between 2090 and 2099. The average number of tropical nights will increase sevenfold (increase from 1.4 to 9.8 nights). Also in town districts with perimeter and perimeter edge development there will be a marked increase in the number of days of heat and tropical nights. For example for the town district

Refreshing cool down on Ernst-August Platz

Vahrenwald a rise in the number of days of heat from an average 8.7 to 19.1 and tropical nights from on average 1.2 to 9.2 for the above-named periods.

The climate predictions show in addition that the periods of heat will last longer, their onset will shift to the spring, a season in which the human organism has not yet adjusted to heat and therefore reacts more sensitively to heat stress.

Anchorage of numerous adaptation measures

During planning of adaptation measures it has been shown that the City of Hannover – alongside its many years of commitment to environmental protection – has in past years already put a lot into motion, which also benefits the climate adaptation:

- Since 1993 the infiltration of rainwater precipitation in building construction areas is designated, inasmuch as examination of the building site and groundwater corridor intervals have shown suitability. Rainwater management in building areas has been stipulated in the respective policies of 1995. These were passed by the City council in 1996 together with environmental water engineering practices for waterway layout, responsible in the meantime for the renaturalization of more than 20 kilometres of flowing water courses, and help to alleviate the damages caused by heavy rain and flooding.

- Since 1994 there are in addition policies for handling roof greening. These stipulate, among other things, which roof areas must be categorically greened.

- The number of roadside trees has increased in Hannover from 32,320 (1990) to 45,083 in 2011. Roadside trees exert a great influence on the attenuation of weather extremes in strongly sealed-off areas.

These good approaches should be pursued further in conjunction with the strategy adopted for climate change adaptation and supplemented with additional measures. Sustainable city planning will take up a central position. One important measure, which must be implemented at relatively short notice will be the safeguarding of free areas forming cold air and fresh air corridors, in order to ensure an adequate ventilation of the city on days with heat stress.

See municipal climate adaptation as an opportunity

Over the next few years the City of Hannover will intensify its public relations work, in order to win over the support of various actors outside the City Administration (associations, clubs, business enterprises etc.) for the implementation of adaptation measures. The citizens are to be given more intensive information as to how they can adapt to the anticipated climate change in their residential and work environment. Here the measures for adaptation to climate change should be communicated not as a requirement in face of a threat but as a chance to improve the quality of living in the city but also the personal quality of life.

Façade greenery improves the microclimatic conditions on buildings

Planting of new roadside trees at Jahnplatz

Roof and façade greenery

Current discussion on climate change adaptation measures also deals with the increased creation of roof and façade greenery. Green roofs and façades represent the smallest green areas within the city. It is precisely in the densely populated and markedly sealed-off city sectors with road corridors, where there is no room left available for roadside trees, that often the only remaining possibility is to develop roofs and façades as vegetation areas.

Façade greenery alleviates extreme temperatures

Advantage of roof and façade greenery

These improve first and foremost the microclimatic conditions on the building itself. The thermal effects lie mainly in the attenuation of extreme temperatures in the course of the year. The foliage, air-cushioning and evaporation in the vegetation layer reduce the heating up of roof areas and walls due to intensive incoming solar radiation in the summer and the heat loss from the house in the winter. This brings about a more balanced air conditioning of the rooms and can cut the heating energy requirement.

A further positive effect of roof greening is the rainwater retention whereby 70 (extensive greenery) to 90 percent (intensive greenery) retain the precipitation in the vegetation layer and give it off to the environment again by evaporation. This is a contribution to the cooling of the air in sealed-off city sectors. Remaining flow-off is stored intermediately in the substrate layer and given off to the canalisation with a time lag. Peak flow off in the event of torrential outbursts of rain is reduced by about 50 percent by means of greened roofs as opposed to non-greened roofs.

In addition to these climatic effects roof and façade greenery can also improve the quality of air in the city area, as they bond and filter out air contaminations (pollution) – in particular, fine dust.

Also roof and façade greening offers living space for numerous plants and animals and so increases the biological diversity especially in densely builtup urban quarters. Inasmuch as they improve the work and living environment for the population they achieve a welfare function which is not to be underestimated. Roof cultivation carried out by experts extends the life span of the roof areas in comparison to those flat roofs without greenery.

Roof and façade greenery – a long-standing topic for the City of Hannover

Already in the directives for ecological building in Hannover published in 1993 roof and façade greening was proposed as measure for several target areas.

In 1995 these objectives were reinforced in the guidelines for the management of rainwater in construction areas.

Parallel to these publications in 1994 the policies for handling roof greening in building development plans were prepared and passed by the Council. The policies apply to underground car parks in all building areas, as well as for all flat-roofs with a slope of less than 20 degrees in business areas, industrial and special zones and block inner zones, which can be looked into from the surrounding construction and wherever the static conditions of the roof allow. A mapping of the green roofs in 2010 showed that up to now more

than 2,200 roofs had been greened with an overall area of round 640,000 m^2. This means that instead of 400,000 m^3 rainfall flowing into the sewerage system (canal network), only 150,000 m^3 maximum flow into the sewerage system, approx. 250,000 m^3 evaporate and so improve the city climate.

Roof greening and photovoltaic – a combination with advantages

The policies for handling roof greening in local development plans have now been updated because green roofs and photovoltaics were previously regarded as competition. However, green roofs do not exclude the installation of photovoltaics, on the contrary: roof greening increases the efficiency level of the installation, as the performance of the module is reduced by about 0.5 percent per degree centigrade heating. As a temperature of 35 degrees celsius is not normally exceeded on greened roofing, the modules remain cooler on the green roof and so maintain a high level of performance. So for this reason the administration will in future strive in its portfolio and respectively advise third parties to realize a combination of green roofing and photovoltaic installations if the static equilibrium allows.

Promotion measures for roof- and façade greenery

Since the introduction of the split wastewater levy, roof greening has been indirectly promoted by making it possible to reduce the rainwater levy by 50 percent if roof greenery is carried out professionally.

In the package of measures provided for adaptation to climate change enhanced public relations work is provided to make the advantages of greening possibilities clear. In addition funding guidelines are being prepared, showing how money can be made available to assist in the financial outlay due to greening.

Combination – roof greening and photovoltaic installation Werkhof Stammestraße

Pilot project "More Nature in the City: Façade and roof greenery in Hannover-Linden"

A pilot project "More Nature in the City: Façade and roof greening in Hannover-Linden" by the BUND e. V. in cooperation with the Environmental and City Greenspace Department is to try out the basics for the practical design of promotion for roof and façade greening. In the framework of this two-year project first of all the potentials for façade and roof greening on residential and commercial properties are to be ascertained in the densely populated city district of Linden (approx. 17,000 inhabitants per km^2). Parallel to this an intensive advertising campaign is being started to smooth out any misgivings in the population with regard to façade and roof greenery, and highlighting the positive effects. Thirdly a consultation and funding programme is intended. Every façade greening is to be subsidized with up to 350 Euro and every roof greening with up to 3,000 Euro. Based on the experiences gained from this project the funding programme is to be extended, if need be, to the entire city district.

Roof cultivation in an inner-city backyard

Precautionary soil and groundwater protection, allotment example

Groundwater monitoring Hannover

From the groundwater monitoring system operated municipally since 2003 it is known that the groundwater flows into the city area from the South resp. Southwest and Southeast. The downstream flow is to the North via the Wietze resp. Northwest via the Leine. Due to its passage through the city area there are considerable pollution inputs from the most varied sources such as industry and traffic, waste dumps (landfill), sewerage and lots more. Among other things the organic substance content increases and due to decomposition processes oxygen existing in the groundwater is used up. The higher the organic substance content of the groundwater, the quicker the oxygen is exhausted. In addition the new formation of groundwater and with it the input of oxygen-content precipitation water in particular in the inner-city area is very markedly reduced due to the strong protective sealing. The groundwater milieu shifts quite coarsely from South to North from high oxygen content to anoxic.

Allotments beneficial to the groundwater

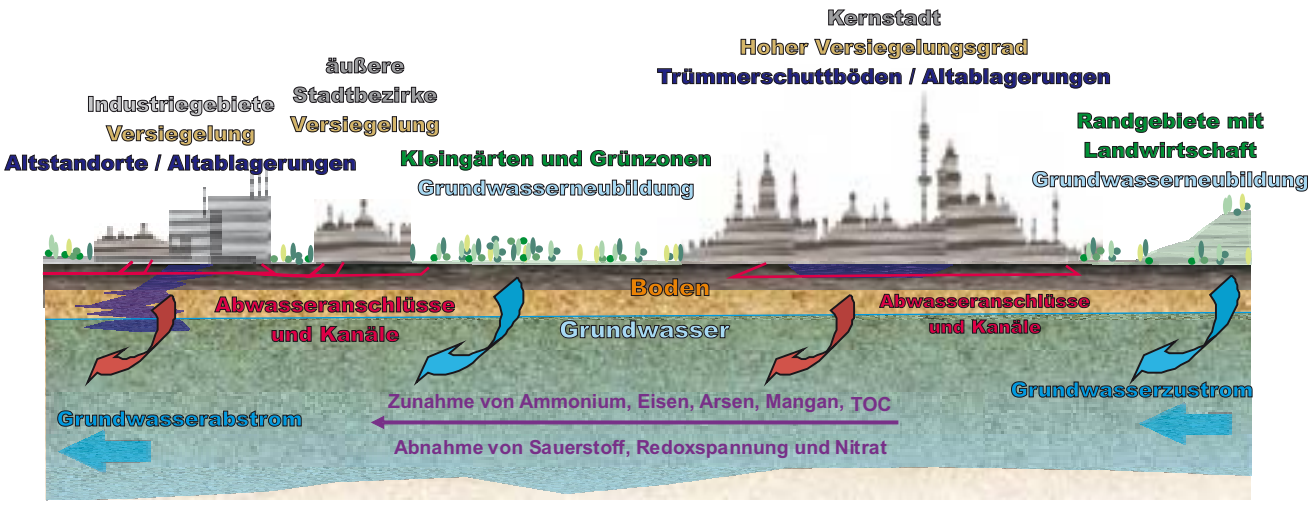
Every unsealed and uncontaminated area of land, which allows the infiltration of precipitation water over a large area, contributes to an oxygen influx into the groundwater and the creation of a "positive" groundwater milieu. With a total area coverage of well over 1,000 hectares the areas used as allotment gardens make up a relevant portion of these regeneration areas. Alongside numerous other factors such as greenery and recreational use not to mention the positive climatic functions they also have a great significance for the groundwater.

Investigation programme allotment gardens

In Spring 2011 the City of Hannover and the Bezirksverband of Hannover allotment gardeners have decided to cooperate and carry out a groundwater monitoring sysem in the allotment gardens sector. Using two installations as an example their influence on the groundwater is to be closely investigated. The investigation parameters were selected in such a way as to supply valid information regarding the influence of allotment gardens on the groundwater.

The investigation findings show that allotment gardens fundamentally have a positive effect on the groundwater due to the oxygen influx by means of rainwater infiltration. Nevertheless the (negative) influence of intensive gardening activities is also shown. In at least half of the gardens presumably too high an amount of fertilizer application or unfavourable fertilizing times have caused an increased nitrogen resp. potassium content in the groundwater.

On the other hand the evidently improper use of extended herbicides and possibly even the still current use of substances no longer



Schematic diagram of essential elements influencing groundwater quality.
= high groundwater increment, intake of precipitation water with high oxygen content
= low groundwater increment, diffuse intake of organic substance, nutrients and noxious substances (eg. POPs, medicinal products), exhaustion of oxygen, change in redox milieu.

Source: Dr. Pelzer and Partner

approved must be named. In half of the garden fountains/wells plant treatment and pest control agents (PBSM) were determined, partly way above the threshold limit as prescribed by the Groundwater legislation. In addition three substances without approval for use in Germany were detected.

Also a part of the oxygen intake is exhausted again due to a partially too high input of pollution material from the allotments. In order to increase the positive influence exerted on the groundwater by allotment gardens, respectively eliminate the negative influence wherever possible, the City intends to launch future campaigns together with the Fachberatung des Bezirksverbandes in favour of the abandonment of PSBM and the restricted application of fertilizers.

Taking of samples from a groundwater metering point

Public relations work

At the Freizeit- und Einkaufsmesse ABF 2012 (ABF – Ab in den Frühling ("ABF – Off into spring")), a joint stand with the Bezirksverband Hannover informed allotment gardeners about soil and groundwater protective gardening. Practical tips are to be found in the new issue of the brochure entitled Soil protection in Hannover allotment gardens. The connection between soil protection and groundwater protection is explained and impressively illustrated by the rainworm, which wriggles its way through the individual chapters.

Further information: www.hannover.de

Rio+20 – Local Sustainability! & Fifth Network 21 Congress

A sustainable, future-compatible development of the City of Hannover has many faces: e.g. climate protection, area management, demographic change, integration, local and regional economic promotion, sustainability-oriented acquisition or the participation in city development policies. For all these topics the "Rio+20 – Local Sustainability Congress" held in Hannover in December 2011 was an excellent forum for forming an opinion.

For the very first time in Germany 23 totally different political, economical, environmental and consumer protection organisations gathered together successfully to discuss future topics practice-oriented at a local level. Under the motto "Rio+20 – Local Sustainability ! & Fifth Network 21 Congress" more than 700 participants were invited to Hannover from 7th to 9th December 2011 in connection with a nationwide congress to discuss the future compatibility and sustainability of cities and communities.

Around 30 work groups with representatives from non-governmental organizations, mayors/mayoresses as well as specialists from culture, science, media and city administrations – but also interested lay-men discussed questions such as: what can local authorities do to align their financial policies with sustainability? How will our cities develop to meet sustainable demands? What role will the local economy adopt? How to achieve a consciously fair style of living? How can cities become climate-neutral?

The nationwide significance of the congress was underlined by a top-notch team. Contributions were presented by the former Federal Minister of the Environment Klaus Töpfer, Katrin Göring-Eckhardt, Vice President of the German Bundestag, Vandana Shiva, conservationist and civil rights activist as well as holder of the Alternative Nobel Prize, Union leader Frank Bsirske (ver.di) and Michael Vassiliadis (IG BCE) as well as representatives of non-governmental organisations.

RIO Nachhaltig vor Ort!
+20
& FÜNFTER
NETZWERK21KONGRESS
Hannover
07. - 09. Dezember 2011

The Congress was hosted by the Landeshauptstadt Hannover in collaboration with the GRÜNEN LIGA Berlin e.V., an amalgamation of environmental initiatives, which organized the conference at the same time as their fifth "Network 21 Congress".

Market of possibilities

At the same time as the Congress there was a "Market of Possibilities". More than 40 organizations and firms presented themselves with their projects and products in the sphere of sustainability. Thanks to its positioning in the recreational area the exhibition was well-attended and offered possibilities for intensive discussions.

Youth Congress ... the generation to come!

In a youth congress preceding the Rio+20 congress forty young people from all over Germany, between 18 and 24 yrs. of age, pre-

Vandana Shiva, Stefan Richter, Hans Mönninghoff and Katrin Göring-Eckardt

pared their own ideas about a sustainable development providing creative contributions to the main Rio+20 congress. Under the motto ... the next generation! the youngsters were engaged in a creative way – theatre, radio, campaign workshop, creative workshop in finding out how our towns can become more worthwhile to live in from an ecological, social and interesting point of view.

A lot accomplished, more to do ...

At the conclusion of the congress all participants passed a declaration intended from a local viewpoint to provide impulses for the German delegation of the UN-Summit for Sustainable development in Rio de Janeiro 2012 (Declaration in appendix). The Environmental and Economic Director of the City of Hannover, Hans Mönninghoff attended, as representative of the municipal umbrella associations from 18 – 22 June, 2012 the United Nations Conference on Sustainable Development in Rio de Janeiro, Brazil. Here preceeding the state conference important experiences were exchanged and demands formulated to State level. Examples here are an intelligent and economic utilization of energy, renewal of building stock from an energetic viewpoint, future-compatible forms of mobility, integration of people with migration background, preservation of the quality of nature in the cities as an important location factor in future, as well as the linking up of economic and environmental sectors. Herr Mönninghof may well have been one of the few participants who had already been in Rio in 1992 in his function as Environmental Director at the preceeding conference. But now – perfectly in keeping with the congress focus on "Green Economy" was present in his dual capacity as Director of Economics and Environmental Affairs (cf. page 56).

The prerequisite for all demands is, however, that more and more people become motivated in favour of a sustainable, future-compatible development of our city. Education, social commitment and the cooperation of many actors within the city, State and Federal Republic and also worldwide are a vital basis for this aim.

Further information: www.hannover.de
www.rioplus20kongress.de and www.sustainable-hannover.de

... the next generation

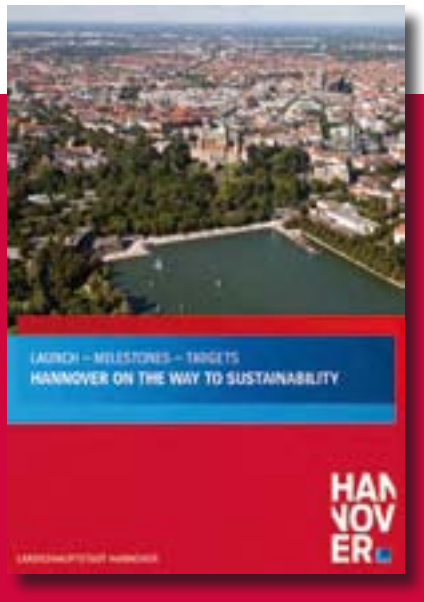
Brochure "Hannover on the way to sustainability!"

Cities and communities play a large role in achieving sustainability, as they are at the political level closest to the people. Over the past years in the Landeshauptstadt Hannover many projects, directed towards sustainability, have been initiated and implemented, i.e. they take into consideration ecology, economy and social aspects to the same extent with regard to our future generations.

During the congress in Hannover the City prepared a brochure, compiling various projects and examples which put into practice the concept of "Hannover on the way to sustainability". These include such projects as Europe's largest zero-emission housing estate, sustainable pupil-run businesses, occupational orientation or educational training projects for underprivileged youngsters and much more.

Further information: www.hannover.de (Hannover on the way to sustainability) and www.rioplus20kongress.de

Closing plenum



Agenda 21 – Hannover goes networking

Lokale Agenda 21
Hannover

In 1992 at the United Nations Conference for Environment and Development a worldwide action programme was passed by 179 States for the 21st century: Agenda 21. By taking into consideration ecological, economic and social demands the Agenda 21 is intended to contribute in all parts of the earth, that people may satisfy their basic needs. In 1995 the Council of the Landeshauptstadt Hannover decided to draw up a local Agenda 21 in a city-wide dialogue with citizens as well as all social forces (groups).

The Agenda 21-office coordinates this participation process with all those interested. Goals and projects were developed. In cooperation with clubs and institutions e.g. from environment, health, development policy and educational, scientific and economy numerous actions and material for trainingand public relations work are prepared. The Agenda 21 – fullhouse plenum, which meets up four times a year, is an open forum for all interested parties. Here projects, planning and initiatives with regard to sustainability and the Agenda 21 are presented, discussed and project partners linked up in a network.

Millennium development goals in Hannover

In September 2000 the member states of the United Nations have named concrete goals for eight sectors and fixed them as Millennium Development Goals (MDGs). These MDGS were recognized by 189 States and stand for a more just and better world.

With the council decision to sign the "Millennium Declaration of the Member Communities of the German Municipalities" the City of Hannover has committed itself officially in 2009 to the Millennium Goals. Numerous activities are intended to arouse the public's enhanced awareness of the millennium development goals and by the adoption of responsible local action to support their achievement. Here the Agenda 21-office works hand in hand with commerce, restaurants, clubs and interest associations as well as establishments from the environment, health, development or educational sectors. Numerous events and projects are carried out together, exhibitions presented and informational material prepared for a training aimed at sustainable development.

Agenda 21-Plenum: Informational network and interchange location

Along with an intensification of the public relations work considerable progress could be achieved in the sector of sustainable consumption. So, in May 2010, Hannover was distinguished as first fairtrade city in Lower Saxony. Prior to this the Council passed the decision that the City and its municipal establishments would no longer purchase any products from exploitative child labour, but rather give preference to fair traded products.

Hannover celebrates 3rd place in the "Fair Trade City" competition, in New Town Hall

Millennium development goals

Goal 1 Eradication of extreme poverty and hunger
Goal 2 Achieve general primary education
Goal 3 Promotion of gender equality and empower women
Goal 4 Reduce child mortality
Goal 5 Improve maternal health
Goal 6 Combat HIV/AIDS, malaria and other diseases
Goal 7 Ensure environmental sustainability
Goal 8 Develop a global partnership for development

Fair Week Action in New Town Hall canteen

Veggie Day Picnic on Georgsplatz

Yasuní Action Alliance collecting for climate protection and Yasuní rainforest

"aware & fair – bewusst und fair handeln"

In conjunction with the EU project "aware & fair" initiated by the Agenda 21-office the effect of local trade is made more transparent and easier to understand by means of concrete examples. Here the millenium development goals are to be given particular consideration. At the same time concrete possibilities of action such as the purchase of fair trade products are to be developed and shown. The project is aimed at administration, consumers, educational institutions, commerce, media, economic representatives and non-governmental organisations. Hannover was able to win over its twin cities Poznan (Poland) and Blantyre (Malawi) as well as Litoměřice (Czech Republic) and Miskolc (Hungary). Together the european cities participated in promoting (expanding) the market for fair trade products from Malawi (e.g. macadamia nuts, tea and rice). Documentation, reports, photos etc. are intended to provide transparency, giving products, producers and production methods a "face".

Public awareness of the goals is to be created and the cooperation intensified to overcome the joint global challenges : growing poverty, diseases such as AIDS/HIV, malaria, global climate change, use of natural resources, illiteracy, equalityand the future impending global oil production maximum.

Veggietag – bunt.bio.lecker

The regionwide campaign "Veggietag – bunt.bio.lecker" (Veggie day – colourful.bio.tasty) under the patronage of the Umweltzentrum Hannover (environment centre), intends to whet the appetite for vegetarian delicacies. It functions like this: one day a week in canteens and refectories, schools, firms, authorities but also in restaurants tasty alternatives with vegetables, grain, tofu, cheese and co. are offered. One meatfree day per week is healthy and prevents harmful climate gases. In the meantime more than 60 institutes in the city and region are participating in this initiative. The Agenda 21-office of the City of Hannover, the Slow-Food Convivium Hannover, Transition Town e. V., Utopia Team, Vegetarierbund Deutschland (VEBU), der Verband Entwicklungspolitik Niedersachsen (association for development policy) and the Wissenschaftsladen Hannover (science shop).

Hannover in the Climate Alliance

Since 1990 the City of Hannover is foundation member of the Climate Alliance of european cities with the indigenous population of the rainforest with the aim of protecting the earth's atmosphere. The City of Hannover has committed itself to the reduction of emissions harmful to the climate and to support the conservation of the rainforest. The Agenda 21-office plays a leading role in the global aspect regarding the indigenous populations and the climate alliance of european cities. Together actions such as rainforest painting actions, Kindermeilen ("Kids on the move") campaign or informational events regarding the protection of the Yasuni-National park are caried out. The important project is that the chocolate from Columbian cocoa proves how climate and rainforest protection as well as fair wages can be sustainably combined.

Project team at 2nd Partnership meeting in Blantyre/Malawi

MDG-reporter from Blantyre, Poznan, Miskolc and Litoměřice visit a health-food shop

Presentation of MDG-goals designed by students

ECOPROFIT

ÖKOPROFIT® is a cooperation project of the Landeshauptstadt Hannover, the urban fringe municipalities of the Hannover Region and the established resident companies. ÖKOPROFIT® stands for ECOlogical PROject For Integrated environmental Technology.

In the city of Hannover this programme, practised worldwide, was introduced in conjunction with the local Agenda 21 in 1999 for the first time in Northern Germany. The Landeshauptstadt followed the suggestion of the local Agenda 21-work group "Work" to introduce a "suitable advisory system to achieve an ecological optimisation of companies and organisations in Hannover".

In 2000 the first round of ÖKOPROFIT began in Hannover. Since 2005 the offer has been open to companies and institutions of the urban fringe communities. In the meantime 143 businesses have decided on ÖKOPROFIT and have successfully participated. Many of them commit themselves and continue to carry on their work in the ÖKOPROFIT-Club. All in all 35 million Euro could be saved by the measures taken in the companies. This proves that ecology and economy can be combined, in order to come closer in business to the mutual key objective of sustainability.

ÖKOPROFIT consists of several modules: regular joint workshops with specialist lectures, exchange of information as well as additional individual advisory consultations of the local companies participating by experienced environmental advisors resp. engineers.

Energy saving, waste management, avoidance and proper handling of hazardous substances, water consumption and waste water production, employee involvement, legal security but also socially responsible acquisition and further aspects of social sustainability are on the agenda.

In April 2012 the tenth ÖKOPROFIT beginners' round with 16 businesses has made the ÖKOPROFIT-club into one of the largest networks in Germany with 47 operations. This documents the success of the programme in the City and region of Hannover.

Further info: www.oekoprofit-hannover.de

ÖKOPROFIT-award ceremony in 2011

Hannover Congress Centre
Sustainability as trade mark (brand image)

In 2007 Hannover Congress Centre (HCC) gradually began to develop and implement the overall theme of sustainability as a concept for the Congress and Event centre.

The aim is to make the sustainability concept both mean and long-term a standard requirement for event establishments from the point of view of the organizer, guests and customers. This can already be seen in the rising number of enquiries. For example in the meeting and event barometer of the European Institute for Tourism enquiries are made from year to year into the implementation of ecological and corporate social responsibility measures and the percentual rates of increase year by year are in double figures.

Hannover Congress Centre

The Hannover Congress Centre (HCC) is one of the largest conference centres in Germany. In all the HCC covers a total area of 13,000 m² with a seating capacity of 15,000. The neoclassical Kuppelhalle, which was actually constructed as a round hall, is the heart of the complex. Next to the 100 yr. old Stadthalle spacious event roomsand more than 30 conference and seminar rooms complete the offer.

The Congress Centre fulfills all requirements – from a single conference to a large international congress. All in all there are 3 multi-functional event rooms, seven festival rooms and 31 conference rooms available, all suitable for individual arrangement and together making up more than 10,000 m². A 40,000 m² large landscaped grounds is similarly available for exhibitions and the 60,000 m² park is open for relaxation.

Hannover Congress Centre (HCC)

Green-Globe-Recertification

In the Hannover Congress Centre the 2007 process began with participation in the ÖKOPROFIT®-Certification process and was continued with the industry-specific Green Globe Certificate. After an initial certification with 83 percent, the recertification in 2011 with 94 percent and concluding in June 2012 with 97 percent. The independent team of auditors confirmed the fulfilment of 283 out of a total of 291 indicators, which evaluate the responsible and conscientious management according to ecological and social viewpoints. Since 2008 considerable savings potentials in consumption were achieved in the HCC with regard to the energy supply sectors, water and waste management. An important factor here is the acquisition of electricity supply in future no longer from a coal-fired power station but from the power plant in Linden driven by gas and vapour turbines with a fuel efficiency rating of more than 85 percent. The high use-efficiency conserves natural resources whilst reducing the CO_2-emission.

These positive consumption resp. cost figures are the result of a permanent development and optimization process which is to be continued even in the future. This made possible an almost 16 percent reduction in electricity consumption from 2004 to 2011. The reduction was achieved e.g. by means of ambient air installations, use of motion detectors in storage areas or the exchange of illuminants of modern technique such as LED. The Upgrading of the drinking-water installation, minimizing of pipeline cross sections as well as weak taps and the use of aerators led to an almost 30 percent cut in the water consumption from 2008 to 2011.

Since 2012 training courses have been offered for personnel further and advanced training in the sustainability sector, in order to integrate sustainability advisors for event supervision and further sustainable development of the house.

In future the HCC will set up a guidebook or a sustainability codex for internal and external communication of the Congress Centre. In 2012 and 2013 the structure of the gastronomical services offered shall be further developed with regard to sustainability, in order to ensure the concentration to a large extent on the acquisition of regional produce, with the appropriate necessary replanning and adaptation of the meals offered. Additionally the menus offered in the restaurant and banqueting facilities will be supplemented by vegetarian, vegan and biological wholesome/wholegrain foodstuffs. The vision of a wellness gastronomy in the HCC appears under the title “Gastronomie bewusst genießen” (gastronomy for conscious enjoyment). This will be backed in communication by appropriate certifications of these facility offer sectors.

Subjective assessments of the living conditions in Hannover

For a city such as Hannover wishing to promote its attractivity for its inhabitants, to actively shape the demographic change and improve the quality of living for the population, information regarding the citizens' assessment of the actual living conditions is of particular significance. Top of the list is the citizens' satisfaction with certain living sectors and the municipal infrastructure, and the naming of fields of action in which the inhabitants see a possible need for action. This is why the City of Hannover has undertaken sample surveys on a regular basis every two to three years to evaluate the living conditions in Hannover.

It is not only the objective data regarding the individual environmental media which mirror the quality of living in Hannover but also the results of the 2011 sample survey: among those questioned greatest satisfaction was expressed with "medical care", 92 percent of all participants were "very satisfied" or "satisfied" with this aspect. Between 90 and 80 percent followed with the "offer and quality of parks and green areas" (89 percent), "public transport" (86 percent). "Public safety during the day" (86 percent), "cultural institutions / events" (83 percent) and "leisure and entertainment offers" (80 percent) were voted as best. 76 percent of those questioned are very satisfied and satisfied with "waste disposal and household waste collection", 64 percent with the "environmental quality" in general and 63 percent with the "cycle pathway network". Least of all was the satisfaction in the year 2011 with regard to "facilities for youngsters to meet" (23 percent), "parking facilities" (29 percent) as well as "integration of foreign fellow citizens" (31 percent).

As in previous years the "proximity of green and recreational areas" (21 percent) as well as "good traffic connections" (19 percent) were most frequently named as advantages in own city district. These were followed by the advantages experienced due to "central location and proximity to the city centre" (14 percent) as well as "good shopping facilities in the city sector" (12 percent).

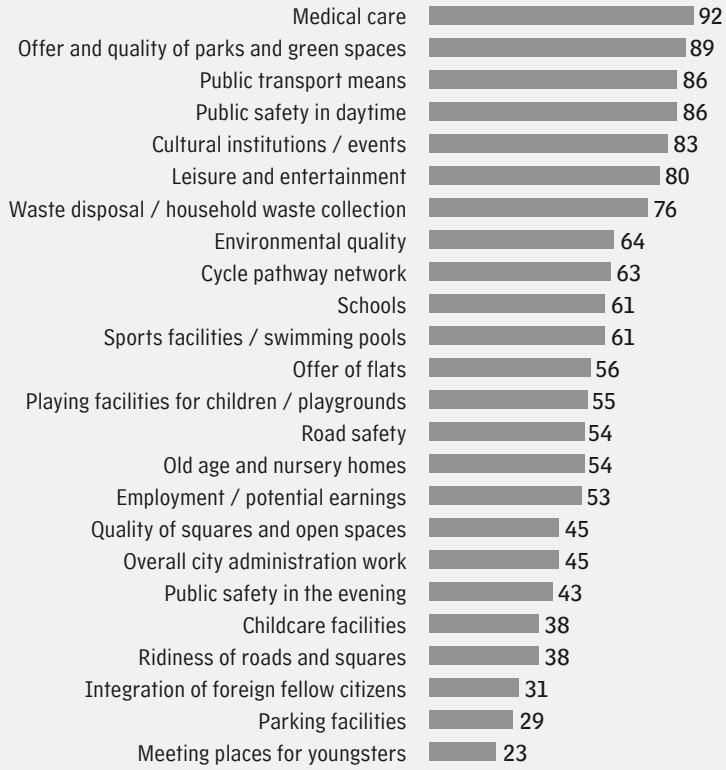
Even aspects of education and family policy were assessed as positive on a city district level: 71 percent of those questioned gave the grade "very good" and "good" for satisfaction with schools and 65 percent for satisfaction with playgrounds and playing facilities for children. In comparison to 2008, in particular "playgrounds and playing facilities for children" (+ 8 percent points) were given a much better evaluation as well as „schools „(+ 6 percentage points). Here it can be seen that the programmes carried out by the city are taken advantage of even on a city district level and have led to a positive evaluation.

As far as disadvantages in own city districts are concerned "noise, traffic, construction sites" (17 percent), "poor shopping facilities" (12 percent) as well as "few parking lots / parking problems" (10 percent) were the most frequently mentioned.

For further information see: www. hannover.de (Representative survey)

Satisfaction with various sectors of life in the City of Hannover 2011

"Very satisfied„ and "satisfied" in percent



Source: Landeshauptstadt Hannover, Representative survey, 2011

Appendix

Declaration
Rio+20 – Local sustainability!

Hannover, December 2011

Rio+20 – Many accomplishments, but more is to be done

Twenty years after the Earth Summit in Rio de Janeiro the global community prepares itself again for a new summit to be held in 2012. Threats, which appeared only on the horizon in 1992, are now realities that call for decisive action. The ecological footprint of humanity far exceeds the biocapacity of the Earth. Climate change continues with undiminished speed. Appropriate action is now more urgent than ever before to ensure that development of human civilization remains sustainable. At the same time, the number of countries that uphold the vision of sustainable development and that incorporate its fundamental and guiding principles in their national development plans and programmes keeps growing. Over the past 20 years, many important measures have been initiated in Germany to promote sustainable development in many sectors. However, a lack in adequate regulations governing the real and financial economy remains.

Moreover only a few pioneering communities have succeeded in significantly improving their ecological balance. It therefore seems necessary to further promote ecological urban and regional development in a manner that enhances "regenerative communities" and mainstreams the concept of sustainable development on a larger scale. From 7. – 9. December, 2011, 23 project partners have held the nationwide congress "Rio+20 – Local sustainability and fifth Network21Congress" in Hannover in preparation for the World Summit 2012. More than 600 persons, committed to local sustainability, spent two days exchanging experiences made over the past two decades and discussing foreseeable and desirable perspectives for the future. We will document here some of the balance items and give the German Rio+20-delegation the following tips and ideas from a local viewpoint:

1. A sustainable future can only be achieved through local action

As a model, the natural, healthy, socially equitable and climate-neutral city is accepted by many. Private consumers and businesses, as well as cities, municipalities and regions can contribute to a reduction of greenhouse gases by the intelligent and economic use of energy, the energetic renovation of existing buildings, sustainable procurement and sustainable forms of mobility. Gradual adaptation to climate change requires a future-oriented supply structure and waste disposal structure. These efforts must be intensified in the coming years. Measures for a social and livable city will achieve greater social cohesion and integration of people with immigrant backgrounds, guaranteeing all residents participation in public life and access to public goods. In past decades, innovative communities, companies and associations as well as numerous Agenda 21-processes and other diverse sustainability initiatives have shown that achieving sustainability at the local level is possible.

2. We need profound and measurable changes

We need to build on the experience of successful models and pilot projects and take further comprehensive and measurable steps in the redevelopment of cities towards a sustainable future, including better infrastructure, buildings, enterprises, private households and public institutions. In this context local measures to protect the climate and to accelerate the transition towards a greater use of regenerative energy supply are given a special significance.

Nature and biodiversity are of high value in their own right even without use. In addition a high level of natural quality in the cities is an important factor for companies seeking to locate in a city. Natural green spaces become even more important components in the adaptation to climate change and for quality of life. Many of the German and European communities are still far from exhausting their opportunities to achieve sustainable development.

3. Sustainability requires participation and cultural change

In order to inspire more people to practice sustainable lifestyles and to adopt a policy of sustainability, it is necessary to strengthen public participation and a sense of responsibility to ensure and to show greater appreciation of social engagement. Robust future-oriented integrative solutions require the cooperation of all actors in society and public responsiveness. Sustainability must be embedded as a principle in everyday actions: production processes, efficient use and saving of energy, consumer behaviour and mobility, caring social safety nets and daily work life. Local authorities must

encourage and empower the public to get more involved by sharing their knowledge, experiences and ideas in sustainability-oriented projects and processes.

Education for sustainable development, cultural and artistic creativity and social commitment is an important task. It is essential to develop and communicate positive images of an attractive, natural, healthy, climate-neutral and socially equitable city. The aim is a cultural shift towards more practical applications and greater appreciation of sustainability and its value.

4. Business and environment as well as economy and ecology must move closer together

Imperative here is an ecological reconstruction of the economy towards greater energy and resource efficiency, closed circuits of material flows and a social market economy, whilst also recognizing the limits of ecosystems.

Many companies and their employees have already taken significant steps towards a sustainable economy. Production and consumption on the one hand and nature and environmental protection on the other hand have to be reconciled in order to achieve a resource-conscious restructuring of the industrial society. Innovations are particularly needed in resource-, and energy-intensive industries. The expansion of renewable energies creates new regional value chains, which need to be further developed. Future economies will not get by without applying new concepts of use and range of services offered, solidary forms such as cooperatives and a new appreciation of public goods.

In the context of the ongoing preparations for the UN conference in Rio in 2012, the advocacy for a 'Sustainable Economy' (Green Economy) calls not only for national measures but also for international agreements and standards as well as their local implementation e.g. in the contracting of infrastructural measuresss and public services.

5. We need a sustainable energy supply and climate-friendly mobility

A nuclear-free and CO_2-neutral energy supply structure requires significantly more and better energy saving measures than those currently implemented.

The expansion of renewable energies is well on its way. The use of agricultural land for production of biomass, wind energy and photovoltaic electricity must not lead to inacceptable negative impacts on food production and nature conservation. This applies nationally as well as internationally (e.g no deforestation of rainforest for the energy supply of industrialized countries.

With regard to mobility, there are huge gaps on the path towards a CO_2-free future. More compact communities, nationwide CarSharing schemes, limitation of fuel consumption and emissions as well as more efficient technologies and measures to combat the growing freight traffic on roads. One key to climate-friendly mobility is the ambitious expansion of cycling and public transport and better integration of transport services. Since the concept of sustainability should be developed in a regional context in the first place, cities and their surrounding municipalities need to work closely together to jointly plan material flows, energy supply network and mobility needs and services etc.

6. Big changes can only succeed if we work together

As local actors we need the collaboration and support of state governments, the federal government and the European Union.

Policies directed at municipalities, private and public institutions, companies and associations, as well as residents should enable them to act sustainably. This requires that local authorities in particular be provided with adequate resources. The required balance between revenues and expenditure also needs to be re-established.

Public funds must be used in such a way as to reduce the consumption of resources, promote social cohesion of society and counteract the exploitation of third world countries.

Taking a global perspective, local authorities can pursue their global responsibility more intensively to promote cooperation with local communities on other continents in the sustainable use of resources and the establishment of democratic, local structures, as well as to mutually combat climate change.

The Declaration of Hannover

A central concern of the German government delegation at the UN conference next year should be to give more recognition to the pioneering initiatives that were spurred on by local actors in the past two decades in many countries. The aim is to support local innovation and momentum towards sustainable development and to tap undiscovered potentials. International organizations, the European Union, the Federal Government and the state governments should involve local authorities as a key partner in sustainability processes from the very beginning. International strategies such as the Millenium Development Goals of the United Nations and national strategies such as the Sustainability Strategy of the Federal Government are important orientations and guidelines for the actions of local actors. International organizations, the EU, the Federal Government and the States must direct their policies more strictly than ever before to the principles of sustainability.

That is the signal of the "RIO+20 – Local sustainability!" congress in Hannover.

Landeshauptstadt Hannover

LANDESHAUPTSTADT HANNOVER
THE LORD MAYOR

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