



# Climate Protection in the City of Norderstedt

Examples of Best Practice; Experience Report  
on the occasion of  
METREX Hamburg Conference on Climate Change

28/11 – 01/12 2007

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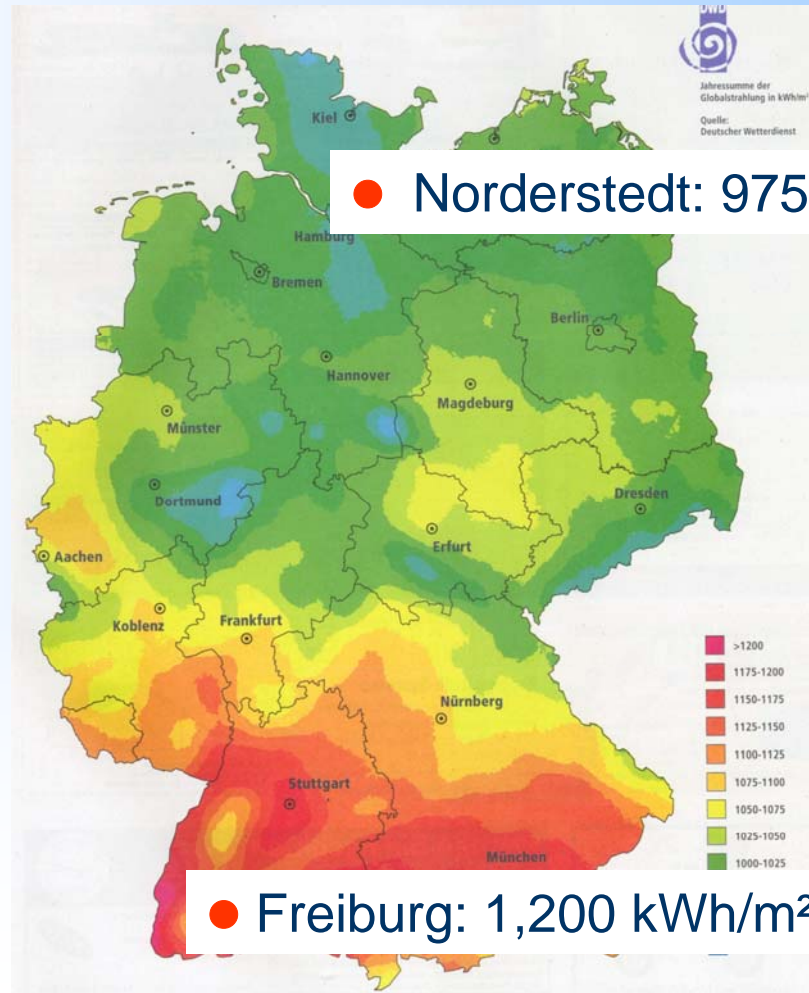
Coordinator for Climate Protection  
City of Norderstedt



Norderstedt eine Idee voraus ...

**Norderstedt**

# Location in the Metropolitan Region





# Urban structure

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Fifth biggest town in the federal State of Schleswig-Holstein:

Founded in 1970 by federation of the 4 villages,

Inhabitants: 74,000,

Growth since 1990: 7 % ,

Commuters: in: 21,554 / out: 17,667 persons per day,

45,967 cars; one of the highest car densities in Germany



# Obligation voluntarily undertaken

**1995:** Norderstedt becomes member of Climate Alliance



Alianza del Clima

Binding itself to the reduction of CO<sub>2</sub>-emissions

1990-2005: - 20 %

1990-2010: - 50 %



# Climate coordination scheme

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**1999:** to implement these objectives, the City Council decided to commission the administration to establish a climate coordination scheme in the administration and to introduce an energy management system.

This aimed primarily at using economic potential of climate protection measures and included the use of economies through behavioural change.

Staff had to be initialized and qualified for the task.



# Environmental education in schools



Every school and nursery school in Norderstedt saves energy for climate protection. Since 1997 3.000 tons of CO<sub>2</sub> and energy costs of 500.000 € could be avoided.





# Energy Management System

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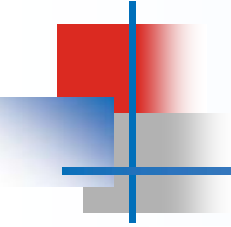
Qualification measure in cooperation with the energy agency of Investitionsbank Schleswig-Holstein (Investment Bank of Schleswig-Holstein):

Qualifying the employees of the

- Office of Environment and the
- Office For Public Bildung

to be able to analyse energy consumption figures, to identify and assess energy saving potentials and to implement energy saving measures considering economic factors.





# Programme „Easy Watt“

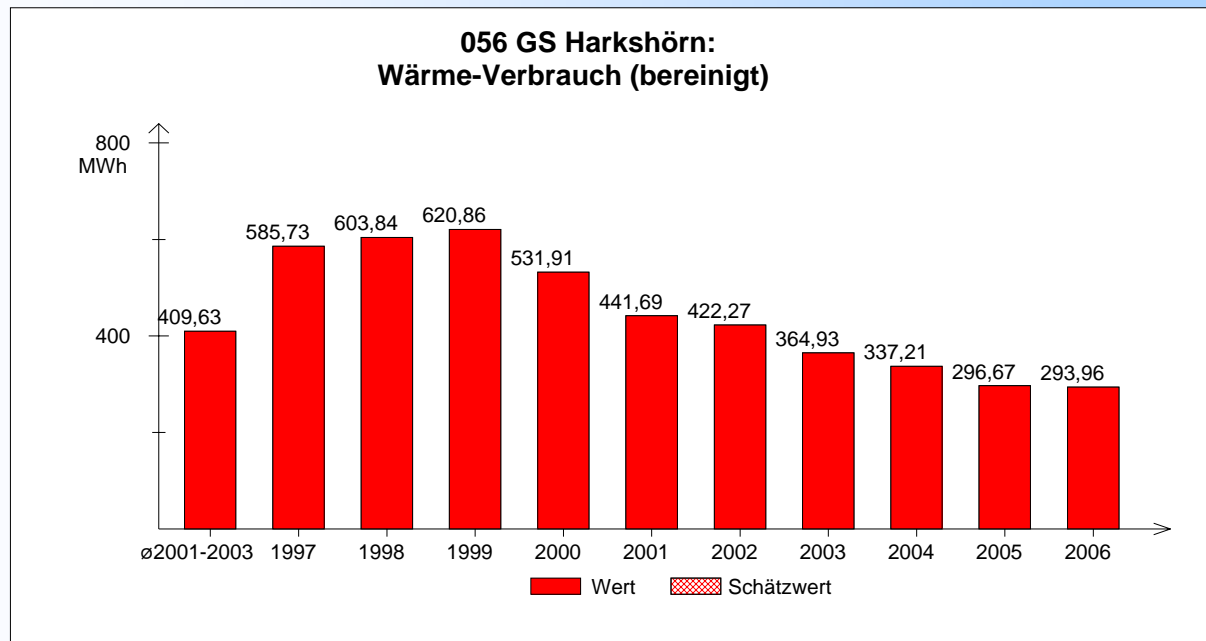
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Model energy saving concepts for 12 public buildings have been prepared and will be gradually implemented.

A prerequisite: Introduction of the energy management programme „Easy Watt“.

Basis for monitoring energy and water consumption, calculating the efficiency of energy-saving measures and supporting an incident analysis.

# Energy Management System



**Wärme-Verbrauch (bereinigt) 2006:**

Verbrauch absolut:

nach VDI 3807 bezogen auf BGF(E):

bezogen auf Schüler:

293,96	MWh
133,32	kWh/m <sup>2</sup>
1,4553	MWh

Since 2005 all public buildings and the traffic lights have been included into „Easy Watt“





# Refurbishment demands

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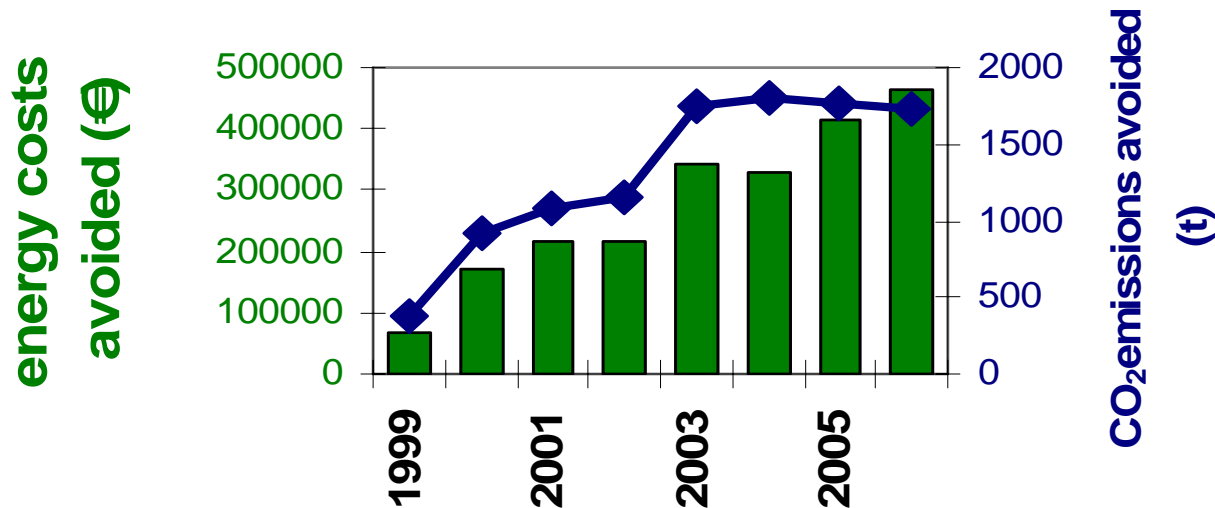
With the help of „Easy Watt“ large public buildings are now subject to monthly consumption monitoring.

The analysis of the refurbishment demands started with the biggest energy consumers:

A large school center constructed in the 1970ties (corresponding to the „Kasseler Modellschule“-scheme) with a low heat insulation and an ineffective forced warm air heating system alone consumend about 10 per cent of the energy of all public buildings!

# Start with the biggest consumers

## Climate protection by refurbishment

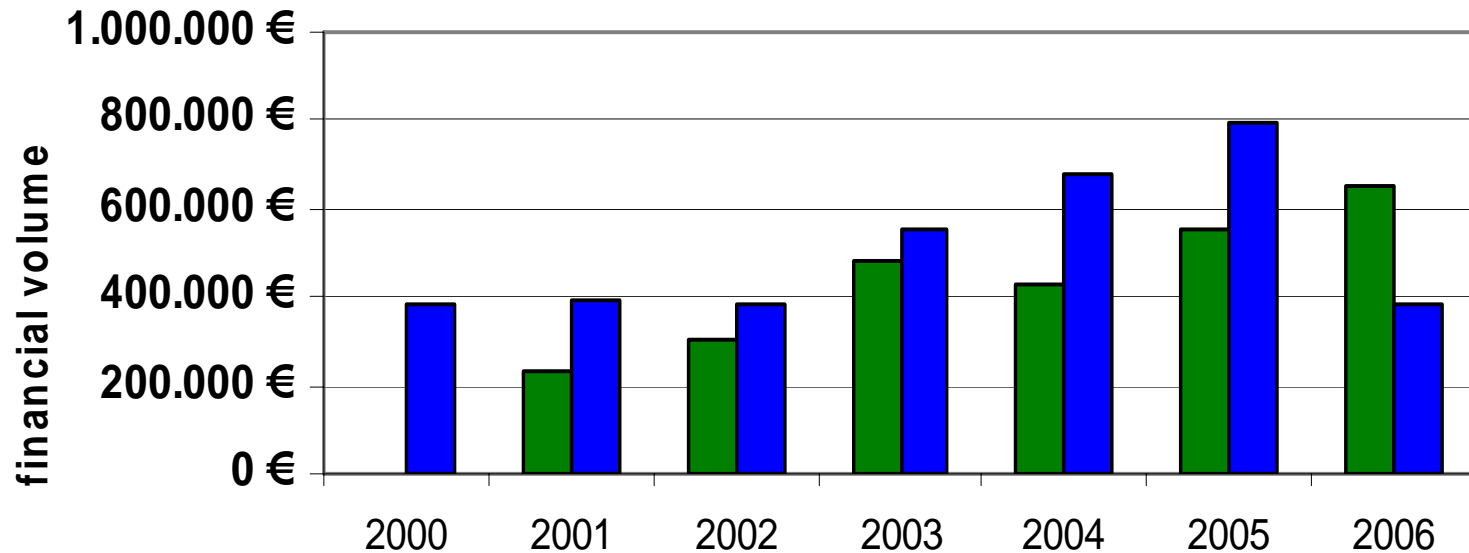


Schulzentrum Süd: Comprehensive refurbishment measures have led to the reduction of CO<sub>2</sub> emissions by 53 per cent



# Reveal the economies

Climate Protection: Climate protection spending - energy costs avoided



■ energy costs avoided since 2000 ■ climate protection spending



# Climate protection is cost-saving

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On the basis of the consumption data in the framework of „Easy Watt“, the climate protection efforts of the city of Norderstedt proved to be cost-saving.

In the year 2006 climate protection investment (manpower, material) of 382,000 € are compared to costs of 649,500 € saved in the budget of the city.



# LED technology for traffic lights



In the years 2003 to 2005 the city of Norderstedt converted 49 of the 101 traffic signalling systems to the energy saving LED technology. Thus the energy consumption and the CO<sub>2</sub> emission could be reduced by 67 per cent.



# First step: detailed analysis...then

All light-signal systems (signallers/signalling devices) and the cost-effectiveness of a conversion of each light-signal system were analyzed.

For 49 of the 101 systems the conversion was cost-effective. The general rule is: the higher the energy consumption the more cost-effective is the conversion.

Jahresverbrauch 230-V-Technik / LED-Technik / Einsparungen		230-V-Technik	LED-Technik	Gesamtsumme netto / Gesamtsumme brutto / Abschreibung		1981,193
				Gesamtsumme netto		21880,57
				Gesamtsumme brutto		25381,46

**Wirtschaftlichkeitsberechnung**

	Verbrauch	Kosten		
<i>Vor Sanierung</i>	[kWh/a]	[€/a]	10,8	Mischstrompreis [€/kWh]
230-V-Technik	16.262,88	2.080		
Glühlampenwechsel		1.000		
<b>Summe</b>		3.080		
<i>nach Sanierung</i>	[kWh/a]	[€/a]	10,8	Mischstrompreis [€/kWh]
LED-Technik	3.756,48	406		
Glühlampenwechsel entfällt		0		
<b>Summe</b>		406		

*Bewertung:* Das Steuergerät ist 2000 erneuert worden. Die Signalgeber sind ohnehin zum größten Teil abgängig. Die Außenanlage muß dringend erneuert werden !

	in [€]	in [a]
Ampeleinlagekosten	25.381,46	
Förderung (25%)	6.345,37	
Investition	19.036,10	
Amortisationszeit		7,1

Stromersparung	[kWh/a]	15.506
Reduzierung der CO <sub>2</sub> -Emissionen	[kg/a]	14.426
Ertrag	[€/a]	2.975

Wirtschaftlichkeitsber&Förderung.xls

# Green light for climate protection!

Economic efficiency calculation:

Investment (2003/ 2005):	660,000 €
Subsidy by ministry of Schleswig-Holstein (Electricity Saving Directive):	138,000 €
Costs avoided (energy, maintenance and repair)	67,000 €/a
Amortization:	6-9 years

The project should be copied wherever light-signal-system are operated on high voltage (230 volts). For low voltage (10 volts) it is not economical.



# Additional advantages



The LED technology increases the reliability of the systems and thus the safety of the traffic tremendously. Compared to traditional bulbs, the so called „sun phantom effect“ is avoided too.

# Greenlight award

The requirements of the European Commission to reduce the energy consumption in this category by 30 per cent were by far fulfilled.





# A highlight of climate action

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Born as a climate protection idea and then checked for cost-effectiveness, the measure has become a highlight of modern administrative action:

The arguments of

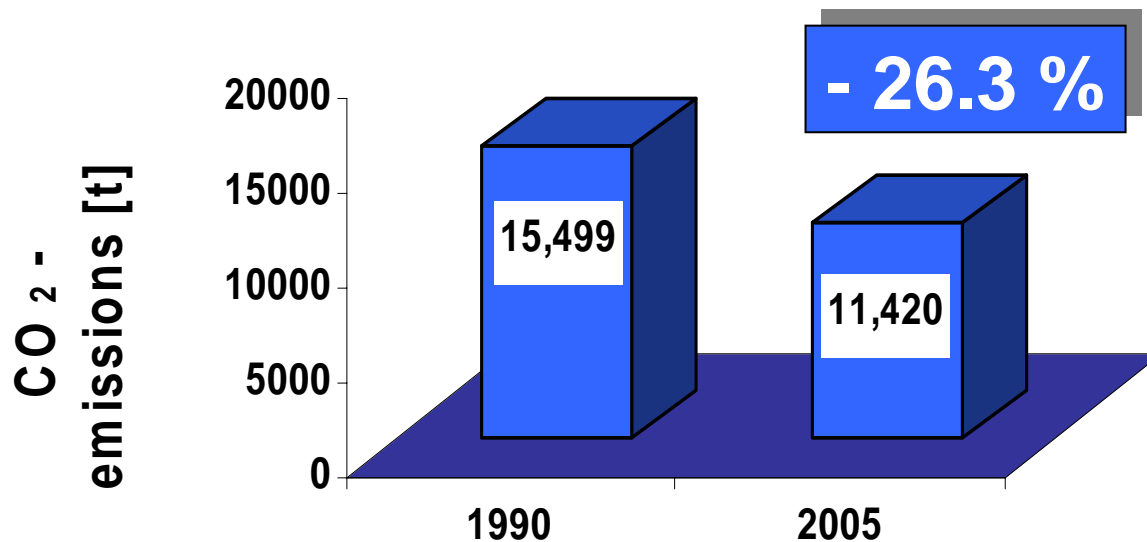
- ecology and
- cost-effectiveness and the
- subsidy from the ministry

convinced the administration and the politicians to act quickly and in an unbureaucratic way.



# High environmental success

## CO<sub>2</sub> emissions from public buildings and traffic lights 1990-2005

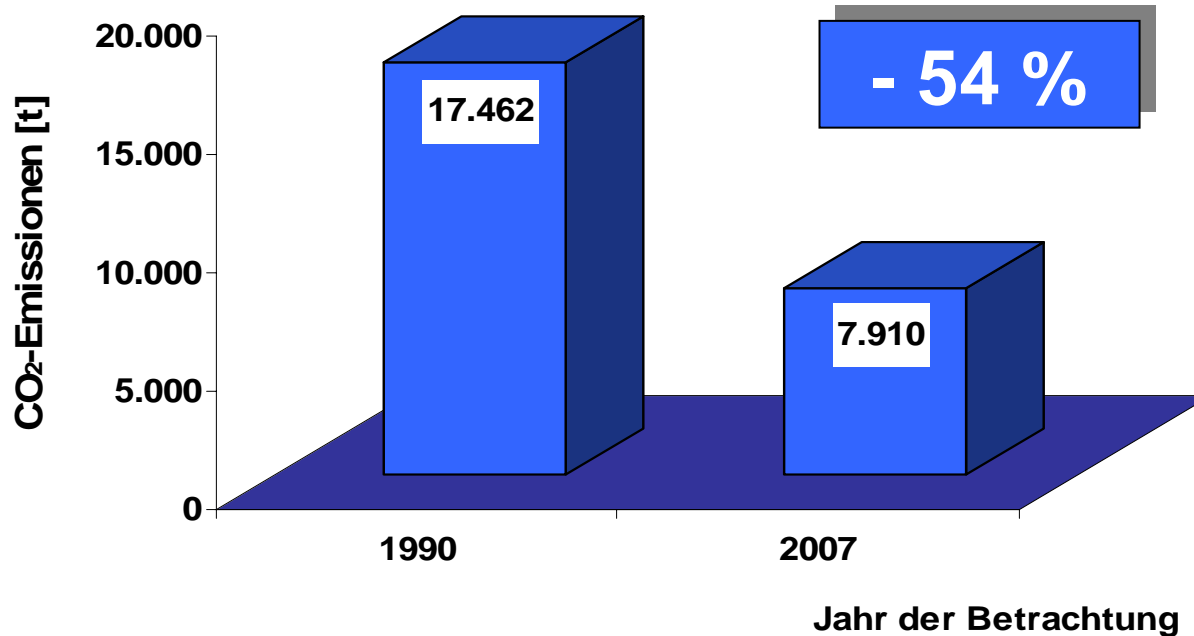


The German competition „Bundeshauptstadt im Klimaschutz“ revealed an average CO<sub>2</sub> reduction by 12.1 per cent (period 2000-2005).

- 77 heated public buildings
- 101 traffic lights

# in the area of own responsibility!

**CO<sub>2</sub> emissions from public buildings  
and traffic lights 1990-2007**



Using Green Electricity (100% reg.) from Stadtwerke Norderstedt in 2008 the city of Norderstedt will achieve the objectives in the own area of responsibility!

# Noise reduction plan...

As a part of Hamburg agglomeration, Norderstedt is obliged to set up a noise action plan until July 2008 as required in the EU-Environmental Noise Directive.

Visualization of the noise emissions in strategic noise maps.

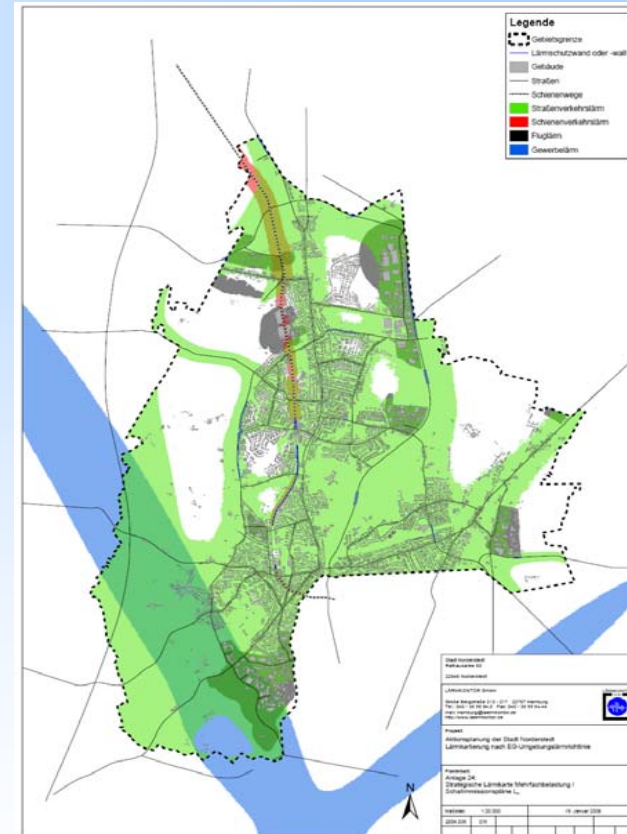


Fig. 4: Noise exposure in Norderstedt – blue = air traffic noise, green = road traffic noise, red = rail traffic noise, grey = noise from industrial activity sites.

# Noise action plan...

More than 7 per cent of the population are exposed to noise that is harmful to their health. More than 67 per cent experience sleep disruptions.

In the noise action plan „Norderstedt. Lebenswert leise (Norderstedt-livably quiet) a harmonized package of measures focused on road traffic was presented.

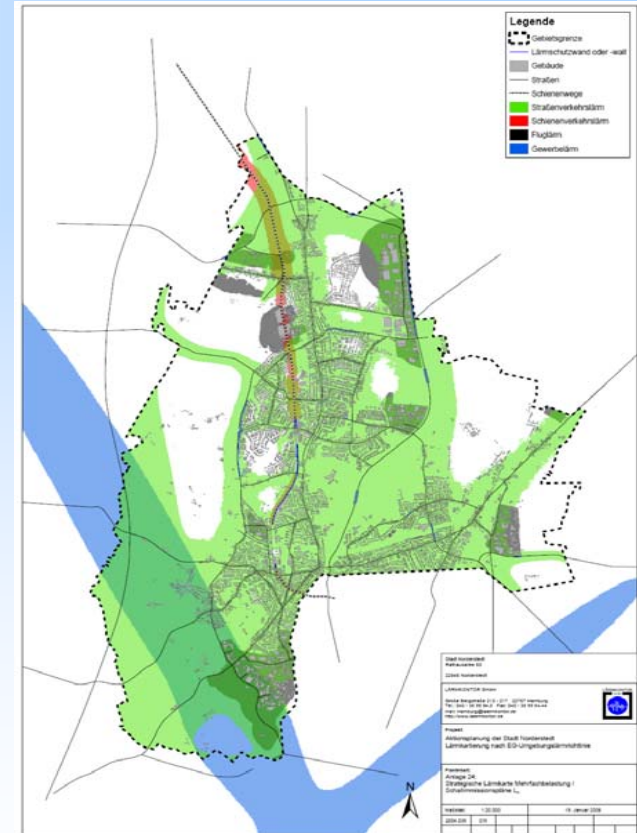


Fig. 4: Noise exposure in Norderstedt – blue = air traffic noise, green = road traffic noise, red = rail traffic noise, grey = noise from industrial activity sites.

# ...Climate protection in traffic

<b>Choice of transportation in Norderstedt</b>			
	<b>Status 2004</b>	<b>Forecast 2020 (without NRP)</b>	<b>Forecast 2013 (incl. NRP)</b>
<b>Individual motorised transport</b>	57per cent	58per cent	51per cent
<b>Local public transport</b>	10per cent	11per cent	11per cent
<b>Bicycles</b>	17per cent	17per cent	22per cent
<b>Pedestrians</b>	16per cent	14per cent	16per cent

A part of the noise reducing effect is achieved by the shift of 350,000 individual transport trips especially by bicycles (plus 5 per cent) and bus and train (plus 1 per cent).



# More environmental alliance...

Measures to increase the attractiveness of public transportation, bicycles or walking led to a 39.2 per cent increase in the number of bus traffic since 1997 and 50 per cent in underground use between 1998 and 2003.



Bus acceleration: at 44 traffic lights the bus has right of way. The bus runs quickly and fluently: – 10 % CO<sub>2</sub>





# reduction of CO<sub>2</sub> by 3 per cent overall

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Through the measures of noise reduction planning

- 25,000 tons of CO<sub>2</sub> can be avoided; corresponding to
- 11 per cent of the traffic emissions and
- 3 per cent of the overall emissions of the City of Norderstedt

With respect to the national economy and on the basis of real estate prices the overall noise reduction plan amortizes after 12 – 30 month.





Thank you very much for your attention!

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**Norderstedt**  
