

**5. Quality of local ambient air**

Present details of the original and/or most recent Action Plan, including any relevant disadvantages or constraints resulting from historical and/or geographical factors which may have influenced this indicator area negatively.

Make reference to:

1. Number of days per year on which EU limit values were exceeded for PM10 (daily mean of 50µg/m<sup>3</sup>);
2. Number of days per year on which EU limit value/long term objective for sozone was exceeded (8h mean of 120µg/m<sup>3</sup>) ;
3. Annual mean concentration of NO<sub>2</sub> PM10 and PM2.5.

Air pollution in Copenhagen is primarily due to traffic in the city. Car traffic is assessed to be responsible for up to 90% of air pollution in the busiest streets. The National Environmental Research Institute (DMU) recently published a report presenting measurement results for 2010 from the monitoring programme for air quality in Danish cities. Copenhagen air quality is improving, and according to the report, concentrations of certain pollutants such as lead, carbon monoxide, sulphur dioxide and particles are falling, and are meeting EU limit values for air quality whereas the limit value for NO<sub>2</sub> are still being exceeded.

According to the report of the National Environmental Research Institute entitled "The Danish Air Quality Monitoring Programme", report no. 836, 2011, air contents concentration are as follows:

Annual mean values in Copenhagen for 2010

Concentration	Annual mean values µg/m <sup>3</sup>
NO <sub>2</sub>	56
PM10	28
PM2.5	17

Number of exceedances of limit values in Copenhagen for 2010

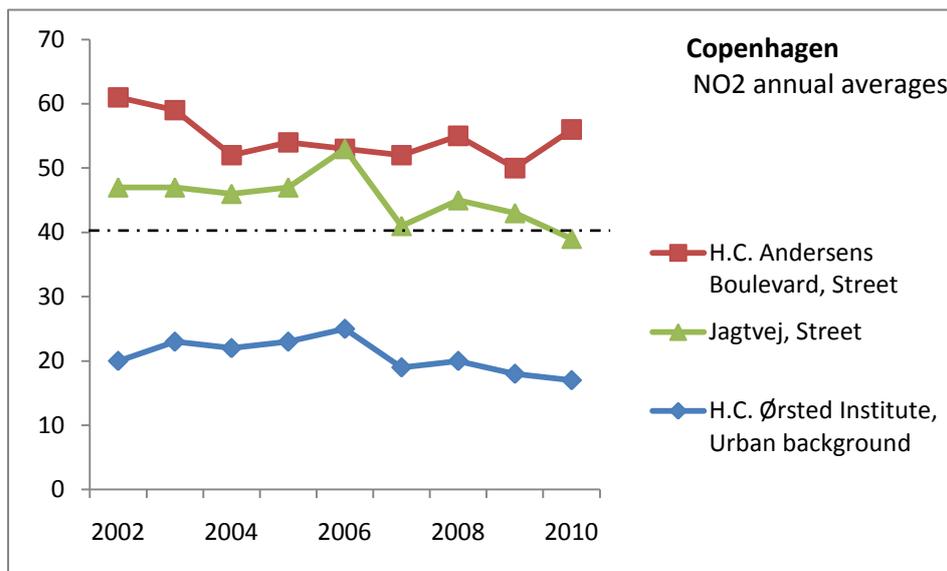
Concentration	Number of days with exceedances of limit values of 50 µg/m <sup>3</sup>
PM10	15
Ozon (Traffic)	2
Ozon Urban Background	5

Measurements of PM10 have been below the annual limit value (40 µg/m<sup>3</sup>) since 2007. And the daily mean value for PM10 (50µg/m<sup>3</sup>) has not been exceeded more than the accepted 35 times since 2009.

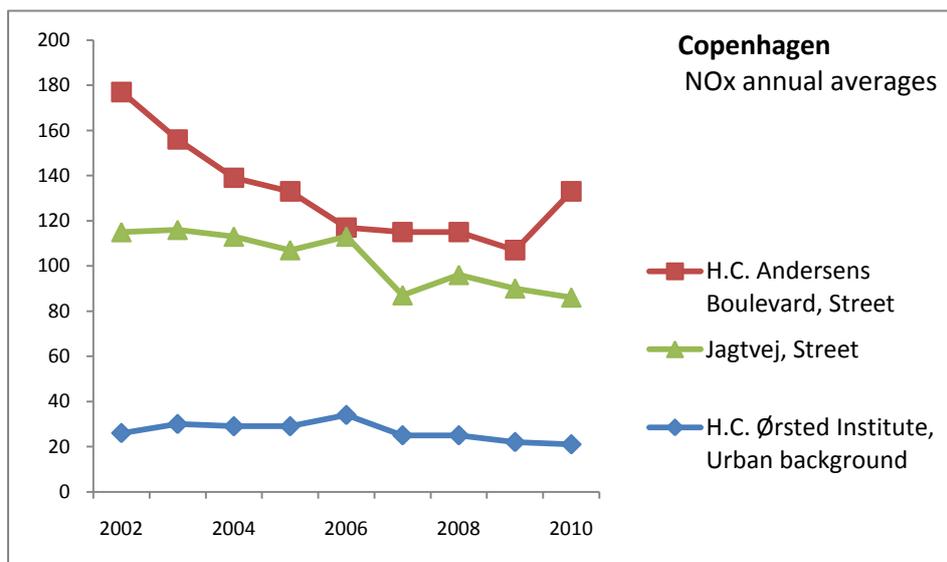
The annual limit value for NO<sub>2</sub> (40µg/m<sup>3</sup>) was exceeded at one street station in Copenhagen (H.C. Andersens Boulevard)

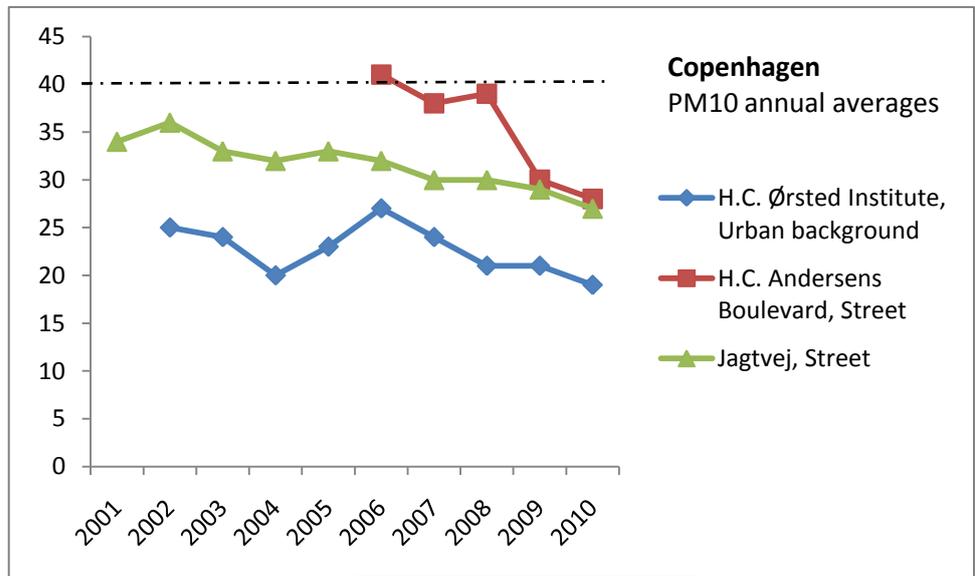
**Trends**

The graphs below show the time series for the annual average values of NO<sub>2</sub>, NO<sub>x</sub> and PM10.



The dashed line indicates the limit value that enters into force in 2010.

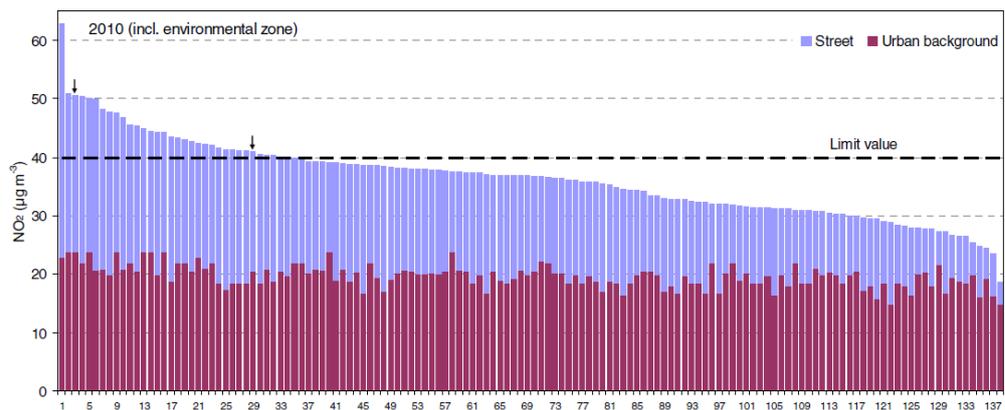




The dashed line indicates the annual limit value for PM10

#### Model calculations for Copenhagen

Model calculations indicate that the limit value for NO<sub>2</sub> was exceeded at several streets in Copenhagen in 2010. The annual mean concentrations of NO<sub>2</sub> for Copenhagen in 2010 are shown in the figure below. In 2010 the limit value for the annual mean concentration was exceeded in 29 out of the 138 selected streets in Copenhagen. In 2009 the number of streets exceeding the limit value plus margin of tolerance was 48. The average concentration at all streets has been reduced from 2009 to 2010 by about 4 µg/m<sup>3</sup>. The reasons for the reduction between 2009 and 2010 are the reduction of the NO<sub>x</sub> emissions due the requirements of the low-emission zone and the normal renewal of the vehicle fleet. The streets where the limit value were exceeded all have a daily traffic intensity of more than about 12,000 vehicles per day.



The EU limit value for NO<sub>2</sub> is set at 40µg/m<sup>3</sup> and must be complied with as of 1 January 2010. In Copenhagen, two street air monitoring stations and a background monitoring station form the basis for assessing air quality. Over a number of years, Copenhagen has experienced problems with meeting the limit value for NO<sub>2</sub> and the Danish Environmental Protection Agency is responsible for assessment and control of air quality and for ensuring that Denmark is complying with EU limit values

for air quality. The current Air Directive 2008/50/EC provides the member states with the possibility of being granted postponement in meeting the limit value for NO<sub>2</sub> for up to five years.

In the beginning of 2011, the Danish Environmental Protection Agency prepared an air quality plan for NO<sub>2</sub> for Copenhagen and three other cities. The plan describing a number of ongoing initiatives that help improve air quality to a greater or lesser extent. Against this backdrop, the Danish Environmental Protection Agency expects pollution levels for NO<sub>2</sub> in 2015 to be under the EU limit value, and Denmark will then be meeting the requirements of the Air Directive.

The Danish Environmental Protection Agency assesses that the initiatives below are having the greatest impact on NO<sub>2</sub> so that Copenhagen will be able to meet the EU limit value by 2015:

- Energy labelling of cars which was adopted in 2000 will increase awareness of energy efficient cars and result in an impact of 0.1µg/m<sup>3</sup>.
- In 2009 a new rule entered into force on new procurement of taxi vehicles which must as a minimum comply with energy class C and also comply with a tighter European standard than other new vehicles. This is expected to result in a reduction of 0.8µg/m<sup>3</sup>.
- Environmental requirements in the low emission zones will cause many busses and lorries to be replaced by new less polluting vehicles. This is assessed to give a reduction in NO<sub>2</sub> of 3.1µg/m<sup>3</sup>.
- Extension of exemption from taxes for electric cars (exemption from registration taxes) up to 2015 will result in purchases of 30,000 electric cars and an impact of 0.2µg/m<sup>3</sup>.
- Introduction of fuel consumption taxes for cars and vans will give a reduction of 0.1µg/m<sup>3</sup>.

Details of those targets achieved or not, to date (within the last 5 – 10 years). Provide a review of how both situations occurred and lessons learned.

Include:

1. Existence and implementation status of an air quality management plan;
2. Local measures taken to improve air quality and their effect on air quality
3. Information to the public (both inhabitants and tourists) on air quality levels (e.g. web pages, information screens) in order to increase public awareness and change behaviour.

The City of Copenhagen has resolved that Copenhagen has to be rightly known as the capital city with the best urban environment in the world by 2015, and among other things a clean and healthy big city (Eco-metropolis). One of the goals is that by 2015 the air should be so clean that Copenhageners' health will not be damaged.

In an attempt to limit air pollution from lorries and busses, in 2008 the City of Copenhagen introduced a low-emission-zone with tightened environmental requirements for heavy vehicles more than 3.5 tonnes. The City wishes to expand the low-emission-zone to include cars and vans, however, the City is not authorised to enforce this - it requires a legislative amendment. Diesel cars and vans, as well as older petrol cars, are significant air polluters and the air quality will be greatly improved if these vehicles are included in the low emission zone.

To limit air pollution, the City is regularly launching relevant initiatives such as green requirements in connection with procurement of vehicles and in connection with

tendering procedures of public transport, traffic management, parking restrictions, more and better cycle paths, whilst also setting environmental requirements for local planning and planning of new areas, guidance of enterprises in relation to introducing cleaner technology, etc.

The City of Copenhagen assesses the previously mentioned air quality plan of the Danish Environmental Protection Agency to be insufficient in relation to ensuring compliance with the limit value by 2015. There is also a need for new initiatives which develop technical solutions, limit traffic volumes and set environmental requirements for polluting vehicles. The City also assesses that it needs better instruments to regulate traffic and to expand the low emission zone requirements to also include e.g. other vehicles than heavy vehicles. This would enable increased efforts to minimise ultrafine particles smaller than 0.1 µm, which are thought to constitute the greatest problem as regards air pollution in the city today.

Denmark has a new government with a strong green profile and focus on the environment and climate. The government has declared that it will introduce a Congestion charging around Copenhagen and a dynamic low emission zone. The City of Copenhagen is looking forward to realising these initiatives.

The website of the City includes an air quality overview; an offer provided to citizens of Copenhagen. With this overview citizens can keep updated on current and future air quality in the city and perhaps take preventive measures. The website also includes information about the status of air quality, municipal initiatives and measures that the individual citizen can take to help reduce air pollution.

#### **Lessons learned**

In 2008 the City of Copenhagen was the first municipality in Denmark to introduce a low-emission zone requiring particle filters to be equipped on lorries and busses which are EURO 3 or older. Evaluation of the low emission zone in 2011 shows that:

- Exhaust-particle emissions (PM) have been reduced by 60 % from heavy-duty vehicles. A particle reduction corresponding to 16 % from all groups of vehicles.
- NOx has been reduced by 25 % for heavy vehicles. An NOx reduction corresponding to 8% for all groups of vehicles.

In order to achieve our goal we believe that

- A congestion charging should be introduced around Copenhagen.
- The low-emission zone should be extended to include vans and older petrol cars.

Plans to meet or revise key targets for the future and proposed approach to achieve these.

The City of Copenhagen is working on Copenhagen becoming a clean and healthy city with good air quality to the benefit of the residents and users of the city. New initiatives are required to realise this goal and the City of Copenhagen will work determinedly on:

- introducing congestion charges
- tightening requirements to the current low emission zone scheme such as in Germany.
- making the low emission zone dynamic. Introduction of a dynamic low-emission-zone scheme which ensures that low emission zone regulations are continuously updated to follow the cleanest technological opportunities without requiring detailed legislative amendment.