6. Noise pollution

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.

Provide details on:
1. Share of population exposed to noise values of $L_{(day)}$ above 55 dB(A);
2. Share of population exposed to noise values of $L_{(night)}$ above 45 dB(A).

Road noise - status

In the Eco-metropolis programme, the City of Copenhagen has the goals below for road noise for 2015:
- Copenhageners should be able to sleep peacefully, free from noise harmful to health from street traffic.
- All schools and institutions should be subject to only low traffic-noise levels during the day.

The City of Copenhagen has drawn up a Noise Action Plan which was politically adopted in spring 2010. The Noise Action Plan describes the status for noise impacts from road traffic in the City. It describes the initiatives that have been taken and will be taken to reduce road noise. The Noise Action Plan has been prepared on the basis of a map of traffic noise in the City. The map shows noise at a height of 1½m. It shows areas of the city with high or low noise impacts.
As can be seen from the map, the areas with high noise impacts are along the primary road network and in central and dense urban areas.

The City has around 71% of citizens exposed to noise levels of more than 55 dB(A) and about 76% are exposed to noise levels at night of more than 45 dB(A).

The Noise Action Plan has six focus areas:

- Noise-reducing asphalt
- Schools and daycare facilities
- Initiatives in existing housing
- Noise considerations in new housing
- Traffic planning
- Influencing transport structure

Noise-reducing asphalt
Noise-reducing asphalt is applied systematically in road maintenance and new road construction where traffic impacts are more than 2000 cars per day and where the speed limit is more than 40 km per hour. Since 2007, noise-reducing asphalt has been laid on 45km of roads in the City.

Schools affected by noise
Initiatives for schools affected by noise are coordinated in the City’s schools renovation plans. The renovation plans deal with full renovation of schools so that the physical framework is improved and they are fully modernised, including energy renovation. Where necessary and possible, noise considerations are incorporated, for example with respect to noise-insulating windows in classrooms facing busy roads.

Existing housing
Initiatives in existing housing. Collaboratively with the Danish Environmental Protection Agency, the City of Copenhagen has completed a project - a noise partnership - with the Folehaven housing association, which is on one of the busiest artery roads in Copenhagen. The project involved fitting noise-insulating windows towards the Folehaven road with sound shutters which also secure sound insulation when the window is open. During project evaluation, good sound insulation from the sound shutters was measured, and residents are very pleased with the result and the significant improvement in acoustics.

New housing
Urban regeneration and development of new areas for urban building must not include noise-sensitive land use in areas which are, or could be, exposed to noise impacts of more than L_{den} = 58 dB from road traffic and L_{den} = 64 dB from railways.

In new developments, where outside noise impacts will exceed the above limit values, building with a noise impact of up to L_{den} = 68 dB is permitted for road traffic. In this case it must be ensured that the level of noise indoors does not exceed L_{den} = 46 dB with open windows and 33 dB with closed windows. Furthermore, noise levels in outdoor recreational areas must not exceed L_{den} = 58 dB. The above limit values have been stipulated in accordance with the state guidelines for the area.
Traffic planning

For many years, the City has been diverting through traffic to the primary road network. As the map shows, this is where the housing subject to highest noise impacts is located. Noise from traffic is reduced by reducing speeds. A speed limit plan has been prepared for the road network in the City, which means that the speed limit on medium-size and smaller roads is reduced to 40 km per hour. Furthermore, work is under way to reduce limits on the primary road network from 60 km per hour to 50 km per hour. Speed limit zones of 40 km per hour have been introduced in local streets in the North West district, the island of Amager, the city centre and at Christianshavn.

Nørrebro is one of the busiest shopping streets in Copenhagen, and since 2008 it has been the framework for the largest traffic trial in Copenhagen for many years in which the street has been closed for through traffic. On the new Nørrebro priority is to improve conditions for cyclists, pedestrians and buses. Therefore cycle lanes and pavements are being widened and bus streets are being established as well as small squares. The asphalt on one stretch of Nørrebro has been painted red to warn road users that this stretch is a bus street which only busses and cyclists can use. Traffic intensity has fallen by about 50% and the road layout and conditions have been made permanent. This has meant a traffic noise reduction on Nørrebro and the roads crossing it. Traffic has been moved to main roads and noise levels here have risen by between 0 dB and 1 dB, but overall the number of dwellings with very high noise impacts (> 68 dB) has fallen by 200.

Influencing transport structure

In order to reduce road noise, the transport structure is being influenced so that fewer people use their cars and more people cycle or use public transport. This is described in more detail in section 2, Local Transport. The City promotes use of less noisy vehicles, e.g. in its own procurement. Since 2009 the City has operated city busses; small electric busses which operate in the Medieval city centre. Eight hydrogen cars are operated by the City; 23 electric cars and a number of electric works vehicles. The City also makes noise requirements in tendering procedures, for example for waste collection. Section 10 has a more detailed description of electric and hydrogen vehicles.

Recharging stations have been set up for electric cars in 22 places in the City and electricity from those located on public roads is free. Electric and hydrogen cars are exempt from parking charges in Copenhagen. The City also has a parking strategy which includes the objective to expand paid parking for petrol and diesel cars and to reduce commuting by car.

Noise from railways is less of a problem in Copenhagen and noise from the Metro and airport comply with current limit values.

Industrial noise - status

Noise from enterprises is regulated in Denmark by the Environmental Protection Act, with fixed noise limits which must be complied with. Enterprises are inspected to ensure they satisfy the limit values. The City can issue improvement notices on noise limits if breaches of the limit values are ascertained. The City can also order enterprises to document compliance with noise limit values. The Environmental Protection Act enables municipalities to adopt regulation for selected areas. The City of Copenhagen has prepared special provisions describing the regulation. The provisions are specific to enterprises, installations and activities. For example there are regulations on certain environmental conditions for building and construction work, regulations on environmental requirements in connection with establishment and operation of refrigeration and ventilation plants and regulations on environmental requirements for the design and operation of restaurants. The last regulations contain requirements for both fittings and operations, e.g. settings
adjustments and limits on permanent music equipment. The combination of an older, dense housing stock and a lively, diverse night life with about 3,500 restaurants is a special challenge for the authorities. This challenge has not been relieved by the introduction of the smoking ban in August 2007, which has meant that many restaurant guests have moved out onto the street.

As a large number of the complaints received by the City are conditional upon behaviour at the relevant enterprise, in Copenhagen a method focusing on complaints and the complainants’ experience has been developed and it is sought to resolve matters by encouraging dialogue between the parties. This is done on the basis of the philosophy that the experienced noise is most important and that if the parties can resolve one problem together, then they can resolve the next.

Specifically, the City has set up a complaints patrol with two employees who daily drive around the city and check out the complaints received since the day before. Complaints made during working hours can be transferred directly to the complaints patrol. The location is visited and the problems identified. This helps considerably to satisfy complainants and demonstrates that they are taken seriously, heard and understood.

This change in the approach of the City has meant that it is not unusual for citizens to send complementary mails to the City.

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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.

In the Eco-metropolis programme, the City of Copenhagen has the goals below for road noise for 2015:

- Copenhageners should be able to sleep peacefully, free from noise harmful to health from street traffic.
- All schools and institutions should be subject to only low traffic-noise levels during the day.

The City assesses that approximately 30,000 Copenhagen dwellings (corresponding to app. 10% of all dwellings in Copenhagen) will have to be soundproofed if the limit for noise harmful to health during the night recommended by the WHO is to be complied. Approximately 8,400 of these dwellings are estimated to be particularly exposed and should be afforded top priority.

The City estimates that more than 100 of the city’s institutions and more than 50 schools (corresponding to respectively app. 1/5 of all institutions and just under half of all schools) will be located in areas where noise levels are too high, given the City’s plans to reduce noise form road traffic are implemented.

Both goals are very ambitious and require a great deal of effort to meet. The City is well on the way with the noise reducing initiatives already mentioned, but in order to meet the goals, concentrated efforts on noise emissions from the individual vehicles are required. This involves, e.g. hydrogen and electric cars, which have noiseless motors, as well as development and use of low-noise tyres. As described, many of the City’s initiatives help reduce traffic noise, but the significant reductions need statutory requirements from the state and the EU before large noise results are achieved for individual vehicles.

However, as mentioned above, for new housing there are requirements relating to
indoor noise from roads as well as noise impacts in outdoor areas.

Lessons learned
Work to reduce noise from traffic is difficult and requires significant financial resources.

However, Copenhagen has been successful in laying noise-reducing asphalt on roads which are routinely repaired and which have adequate traffic.

The City has a large number of initiatives to reduce traffic noise:
- a road network plan in which traffic will be concentrated on the major road network, thereby relieving many residential roads.
- speed limits
- influencing transport structure, with cycle traffic and public transport in focus.

The project for sound shutters in Folehaven and the Nørrebrogade project are examples of successful reduction of traffic noise in housing.

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<td><strong>Noise-reducing asphalt</strong></td>
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Noise-reducing asphalt will continue to be laid during road maintenance and construction of new roads with noise impacts from more than 2,000 cars/day and where the speed limit is more than 40 km per hour.

**Schools affected by noise**
In the recently adopted budget for 2012, the parties agreed to continue work on full renovation of schools. This will require significant funds which the parties will procure from selling property etc. Where necessary and possible, noise concerns will be incorporated, e.g. consideration of sound insulating windows in classrooms facing busy roads.

**Traffic planning**
Work on traffic planning continues such as lower speed limits and physical speed reduction measures in various areas. For example speed limit zones have been established in the Vesterbro area of the city.

The City is working on preparing a strategy for heavy traffic. Focus will be on gathering as much heavy traffic as possible on road stretches best suited to this type of traffic. Work on the strategy is looking at the possibilities for speed limits at night to take account of noise concerns.

In the longer term, the City is planning to prepare an intelligent transport systems (ITS) strategy. Many of the ITS projects will be beneficial regarding noise, as passability will be improved, ensuring smoother traffic flows. Furthermore, it will be possible to set up variable speed-limit signs so that speeds can be reduced at night on stretches with high noise impacts.

Influencing the transport structure, the City is constantly working to reduce noise from traffic. This is being done by reducing the number of cars, motivating people to use cycles and public transport, as well as focusing on noise emissions from individual vehicles. Therefore, the City would like to see statutory regulation of areas
linked to motor noise and tyre noise so that requirements and not just recommendations are made regarding noise from vehicles and tyres. In order to reduce road noise, the City of Copenhagen would like to introduce congestion charges. Specifically, this should be in a toll ring around central Copenhagen. However, in this area the City still lacks the legislative foundation. Urban driving, at relatively low speeds means that noise from the motor and tyres is very significant for the overall noise level. In order to achieve significant reductions in the level of traffic noise, a large proportion of vehicles must be electric or hydrogen powered. From 2012, 200-300 electric cars will be procured for the City’s own use. The cars will be financed through using the City’s existing stock of cars more efficiently.

See section 10 on initiatives for electric and hydrogen cars.

The City is constantly working to optimise green transport. One of the larger taxi companies in Copenhagen has commenced a state-subsidised pilot project in which 20-30 electric cars have been procured for taxi services. This sector usually has a relatively conservative attitude and has traditionally purchased diesel cars.

Low-noise goods deliveries in peripheral hours is another potential focus area. This is the subject of a project for which the City of Copenhagen and the three next-largest municipalities in Denmark have applied to the Danish Transport Authority for funding in close collaboration with business enterprises and organisations. The project is about low-noise driving, low-noise loading and unloading, as well as behaviour in connection with these activities.

Copenhagen is continuing work on improving conditions for cyclists. There is concerted work on establishing more designated cycle paths, green cycle routes away from roads, and better parking facilities for cycles. Conditions on the busiest cycle paths are being improved. Future projects include a cycle ramp as an extension of the bridge from the harbour quay to the Dybbølsbro area to make it even easier to get from one part of the city to another.

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