www.hel.fi/air-protection
www.hsy.fi/airquality

CLEAN AIR FOR HELSINKI

HOW WE CAN WORK TOGETHER TO IMPROVE AIR QUALITY

City of Helsinki
Environment Centre

HSY

Contents

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YOU are holding a brochure about **HELSINKI'S AIR QUALITY** and the new Air Quality Plan.

Air quality is of vital importance to us all – after all, we can't last long without breathing.

We would like everyone to be able to breathe the cleanest air possible in our city. This is important as there is a growing body of research showing the major impacts impurities in the air can have on our health.

The air quality in Helsinki is quite good for a big city, but there is still room for improvement. The Air Quality Plan sets out what we intend to do about this.

Decisions made by the City are not the only way to make a difference; we can all have an impact on air quality through our own choices.

I often travel by bike, and in my fireplace at home I only burn well-dried and clean wood. How are you influencing our shared air?

Esa Nikunen,
Director General of the City of Helsinki Environment Centre

WHAT KIND OF AIR ARE WE BREATHING?

AIR POLLUTION can cause serious harm to human health. The air quality in Finland is relatively good, but air pollution is still estimated to cause 1,600 premature deaths a year in Finland.

SENSITIVITY to air pollution varies between people, and most do not suffer symptoms. Population groups who are more susceptible, however, can begin to suffer from symptoms even at relatively low concentrations. Those who are most susceptible to the health impacts of air pollution are children, asthmatics of all ages, and elderly people suffering from coronary artery disease or chronic obstructive pulmonary disease.

THE MOST HARMFUL FORM OF air pollution is fine particles. Health risks are mostly caused by long-term exposure to impurities in the air. The majority of the impurities found in air outdoors also find their way indoors, where people spend the majority of their time.

AIR QUALITY is being measured constantly. HSY (the Helsinki Region Environmental Services Authority Municipal Federation) has 11 measuring stations in the Helsinki Metropolitan Area, five of which monitor the air quality in Helsinki. These stations help us to measure the air quality of traffic areas, areas of single-family dwellings and harbours, as well as the city's general air quality.

40 %

of residents suffer symptoms caused by street dust

$PM_{2,5}$

Fine particles are defined as those with a diameter of less than 2.5 micrometres. These are generated by traffic exhaust gases, street dust and burning wood in areas of single-family dwellings. Fine particle emissions can also be transported long distances, for example from industrial areas, energy production facilities and wildfires.

Fine particle concentrations rise from time to time in heavily trafficked areas and dense single-family dwellings areas.

PAH

Benzo[a]pyrene is a carcinogenic PAH (polycyclic aromatic hydrocarbon) compound.

Its concentrations rise in particular in the evenings and at weekends in areas of single-family dwellings, when a lot of wood is being burned.

NO_2

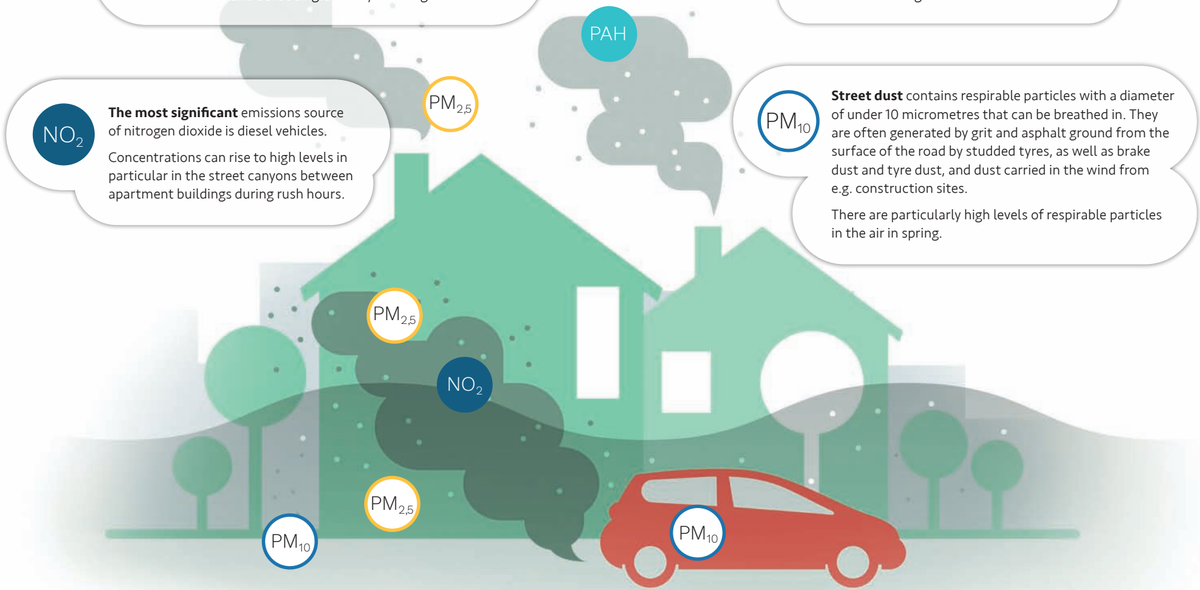
The most significant emissions source of nitrogen dioxide is diesel vehicles.

Concentrations can rise to high levels in particular in the street canyons between apartment buildings during rush hours.

PM_{10}

Street dust contains respirable particles with a diameter of under 10 micrometres that can be breathed in. They are often generated by grit and asphalt ground from the surface of the road by studded tyres, as well as brake dust and tyre dust, and dust carried in the wind from e.g. construction sites.

There are particularly high levels of respirable particles in the air in spring.



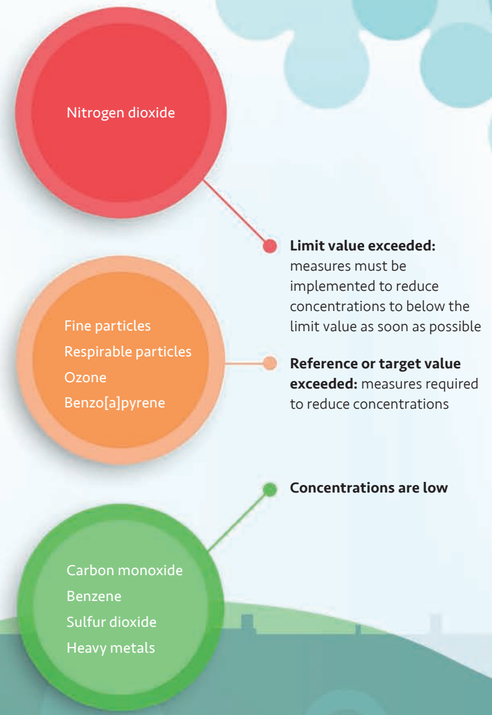
AIR QUALITY IN HELSINKI

IN HELSINKI the air quality is better than that of many large European cities, but even here impurities in the air cause health problems. Due to traffic emissions, the health-based nitrogen dioxide limit value is exceeded in heavily-trafficked street canyons between tall buildings. There is also a risk that the limit value for respirable particles, or street dust, can be exceeded.

IN HELSINKI and elsewhere in the dense single-family dwelling areas in the Helsinki Metropolitan Area the emissions from fireplaces increase fine particles concentrations. Concentrations of the carcinogenic compound benzo[a]pyrene also rise above target values in places in single-family dwellings areas.

HELSINKI'S air quality has improved significantly over recent decades. Cogeneration of electricity and district heating, as well as efficient cleaning equipment, have significantly reduced the emissions generated by energy production, and today they no longer have a detrimental effect on the city's air quality. Traffic emissions have also been reduced thanks to developments in vehicle technology. Traffic levels have not grown in the inner city in Helsinki in decades, despite the increase in traffic in the region.

HELSINKI'S air quality has already improved significantly. Development of public transport and promotion of cycling and walking have had a role to play in decreasing vehicle traffic and traffic emissions. Lower emissions buses have also improved air quality. The City has developed and implemented efficient street dust prevention methods, which have been used to help keep street dust concentrations below the limit value.



WHAT IS THE AIR QUALITY PLAN?

THE QUALITY of the air we breathe affects the health and well-being of every resident. The municipality has an obligation to ensure good air quality for its residents. The City of Helsinki has drawn up an Air Quality Plan for 2017–2024. The objective is for the Plan to help reduce traffic emissions as rapidly as possible so that the nitrogen dioxide limit value is not exceeded. Another aim is to generally improve the air quality in Helsinki, as well as to reduce exposure to impurities in the air and health problems.

THE THEMES OF THE PLAN are the factors with a significant impact on Helsinki's air quality: traffic, street dust and small-scale combustion of wood.

BY REDUCING emissions that pose health problems, from traffic, street dust and small-scale combustion, exposure to air pollution and the resulting health problems will be significantly reduced. The promotion of sustainable means of transportation and the reduction of passenger car traffic both contribute to the reduction of fuel consumption, thus reducing carbon dioxide emissions and emissions that worsen air quality. At the same time these measures will also reduce exposure to traffic noise and the health problems posed by noise.

Our goal is to make Helsinki more pleasant and the living environment healthier

TRAFFIC THE MAIN CULPRIT FOR POOR AIR QUALITY IN HELSINKI

PEOPLE move around the city, between homes, workplaces, schools, daycare centres, hobbies and services. Smooth and comfortable ways to get from one place to the next are a necessity.

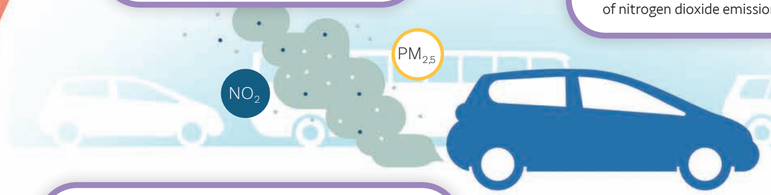
VEHICLE TRAFFIC has a major impact on air quality, as traffic emissions are released at the same height as the air we breathe. Traffic emissions weaken air quality in particular in Helsinki's heavily-trafficked street canyons, where nitrogen dioxide limit values are exceeded. Traffic also increases street dust and fine particle concentrations. Fine particles, nitrogen dioxide and street dust place a burden on the respiratory system, heart and blood vessels. Traffic noise causes problems related to health and comfort.

DESPITE developments in vehicle technology, air quality has not improved as expected. Nitrogen dioxide emissions from diesel cars are, in actual fact, much higher than permitted. In contrast, emissions from the newest buses are very low. Rail traffic, walking and cycling are low-emissions means of transport.

How does transportation weaken air quality?

Vehicle emissions contain fine particles and nitrogen dioxide, amongst other things.

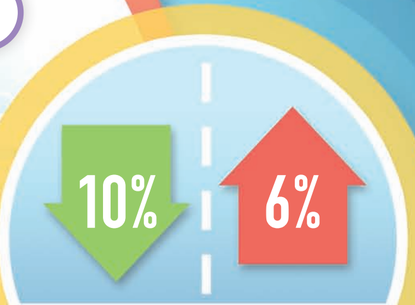
Diesel vehicles are the main source of nitrogen dioxide emissions.



Exhaust gases and street dust collect in the air in the streets between tall buildings. Nitrogen dioxide concentrations may surpass health-based limit values.

In open areas emissions can be spread out by the wind.

Vehicle emissions have a decisive impact on air quality. Concentrations are at their highest during rush hours.



From 2006 to 2014 traffic in Helsinki has reduced in the inner city by approximately 10% and grown at the city's borders by approximately 6%.

MAKE A DIFFERENCE

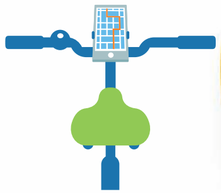
CHOOSE TO CYCLE OR WALK
whenever possible.

CREATE A CARPOOLING GROUP.
You can save both nature and money.

If you're purchasing a new car,
PAY ATTENTION TO ITS EMISSIONS.

ELECTRIC CARS and
CHARGEABLE PLUG-IN HYBRIDS
are good choices.

VENTILATE YOUR HOME FROM THE INNER COURTYARD SIDE,
or at times when there is less traffic.



The best public transport and cycling routes can be found using the **JOURNEY PLANNER (REITTIOPAS.FI)**

Use public transport for your whole journey or
LEAVE YOUR CAR AT A PARK-AND-RIDE LOCATION.

Get to know the cycle routes in your local environment. Find the best cycle routes to the shop, station, work and hobby locations.

THE CITY ACTS

Air protection requires cooperation between the City and residents. The following measures in the City of Helsinki's Air Quality Plan have been assessed as effective ways to reduce traffic emissions..

- **Implementation of vehicle traffic pricing is being investigated and promoted.** In many cities this has proved effective in reducing the amount of traffic and streamlining the remaining traffic, which improves air quality. Reducing the amount of vehicle traffic effectively reduces climate emissions and noise too. **Parking pricing** is also used to reduce the amount of traffic in the inner city, particularly during rush hours.
- **Helsinki Region Transport's (HSL) bus fleet is being developed** to become more environmentally friendly, by investing e.g. in electric buses. Diesel buses are being adapted to use renewable waste-based biofuels. Introduction of hybrid and electric buses will also reduce noise.
- **The environmental zone** limits the emissions generated by HSL's buses and HSY's waste collection vehicles in the city centre. Adherence to tighter emissions restrictions is required in the environmental zone.
- **The electric car charging network** is being expanded and utilised for the needs of commercial vehicles and working machines.
- **Numbers of vehicles running on alternative fuels,** such as electricity, gas, ethanol and second generation waste-based biofuels are being increased in the fleets of the City and its contracting parties.
- **Air quality perspectives are to be taken into account in urban planning.** Transportation needs can be reduced by making the city structure denser. However, at the same time we may encounter the challenger of worsening air quality as the dilution of air pollution weakens. Residents will be protected from exposure to air pollutants by means of city planning.

THE PLAGUE OF STREET DUST IN THE SPRING

IN THE SPRING when snow and ice melt, the road surfaces dry and the air quality in the city worsens as the traffic and wind raise up into the air we breathe the street dust that has accumulated during the winter.

IN THE STREET DUST the large, visible particles primarily cause dirt and make the environment less pleasant. The smaller particles in the street dust, those which we can breathe in, are transported along the trachea and bronchial tubes. These cause respiratory problems and infections, as well as irritation, and increase numbers of asthma and chronic obstructive pulmonary disease attacks requiring hospital treatment. Coinciding with the street dust season is the start of the pollen season, which can exacerbate the symptoms sufferers have to cope with. High street dust concentrations are also linked to serious health problems, such as the worsening of cardiovascular and respiratory diseases.

Where does street dust come from?

- 40–50% from paving surfaces,
- 25% from gritting materials,
- 4–10% from road salting,
- the rest from other sources.

How does street dust impair air quality?

Most street dust is generated in winter, but it is released into the air in the spring when the snow melts and road surfaces dry.

Street dust is made up of material that has come loose from the road surface, gritting materials, brakes, tyres, studs etc.

Dust is also emitted from construction sites.

Dry and windy weather spreads street dust.

Studded tyres erode the road's surface and create dust.

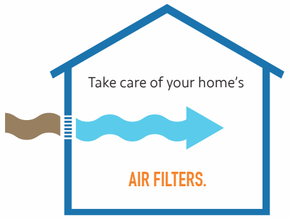
Dust suppression reduces emissions by

40–60%

MAKE A DIFFERENCE

ALWAYS MAKE SURE GRIT IS DAMP
when you remove it.

MOVE YOUR CAR IN GOOD TIME WHEN STREET CLEANING IS SCHEDULED.



Don't use leaf blowers
FOR GRIT REMOVAL.

OPT FOR PUBLIC TRANSPORT,
cycling and walking.

Switch to summer tyres in good time.
CHOOSE NON-STUDDED WINTER TYRES
instead of studded tyres.

Use washed and sifted material for gritting.
Have your say in the kind of
GRITTING MATERIAL
used by your housing association.

You can find more air quality information at www.hsy.fi/airquality and see what kind of air is being breathed in right now in the Helsinki Metropolitan Area.

THE CITY ACTS

The City of Helsinki focuses on reducing street dust and the problems it causes. Dust prevention measures observed as being effective will be complemented by the development of new ways to reduce the generation of dust and remove and suppress dust that has already been generated.

- **Dust can be suppressed** by irrigating streets with a diluted saline solution in the spring, when night frosts may still prevent the streets from being washed.
- **New cleaning methods and practices** are being tested. The City aims to procure the best technology in terms of cleaning efficiency for its fleet.
- **Gritting will be reduced** whilst taking care to ensure that this does not endanger safety. Washed, sifted and durable crushed stone will be favoured for gritting. The grit removal procedures used at properties will be monitored in the spring.
- **To ensure dust prevention on large construction sites** the City is working together with construction firms and subcontractors.
- **The amount of dust generated by different materials will be taken into account** when planning new and restored railways. The dust generated by rails will be reduced with regular irrigation.
- **Growth in the proportion of non-studded winter tyres used** will be promoted in winter traffic. Use of non-studded tyres will also decrease noise problems.

FIREPLACES CREATE ATMOSPHERE – AND FINE PARTICLES

A FIRE IN A FIREPLACE creates a homely atmosphere and warms the house at the same time. However, burning wood also creates harmful emissions. Use of wood in single-family dwellings allows small particles that are harmful to health to be released into the atmosphere, and these worsen the air quality in densely built single-family dwelling areas in particular.

WHEN BURNING WOOD it is important to ensure good combustion and a sufficient air supply. Poor combustion creates lots of smoke, which has a negative effect on both neighbourly relations and health in dense single-family dwelling areas. The fine particles in smoke increase e.g. respiratory and heart problems and long-term exposure can increase morbidity. In instances of poor combustion particles also accumulate various compounds, such as the carcinogen benzo[a]pyrene. In certain locations in single-family housing areas within the Helsinki Metropolitan Area concentrations exceed the target value set by the EU.

FINE PARTICLES are dangerous to the respiratory system, heart and circulatory system. Benzo[a]pyrene increases the risk of cancer.

How does burning wood weaken air quality?

Approximately a quarter of combustion-based fine particle emissions in the Helsinki Metropolitan Area come from use of fireplaces. Of these, 50% are from standard fireplaces and 45% from wood-burning sauna stoves.

In single-family dwelling areas the air contains higher concentrations of fine particles and PAH compounds than elsewhere.

On windless days and in cold weather smoke hangs in the air and can get into apartments.

Of the benzo[a]pyrene emissions from wood combustion, wood-burning sauna stoves account for a significantly higher proportion than fireplaces.

Poor combustion generates more emissions, if the wood is not dry or clean, or if waste material is being burned.

Approximately 90% of single-family houses in Helsinki have fireplaces.

MAKE A DIFFERENCE

STORE WOOD DRY IN A VENTILATED WOOD SHED.
For fire safety reasons, wood should not be stored against the wall of a house.

When using a fireplace burn only
DRY AND CLEAN WOOD.

Electric sauna stoves and pellet-fuelled fireplaces are low-emissions alternatives.

Check the colour of the smoke coming from the chimney. The lighter the smoke, the more cleanly the wood is burning. Smoke should be light in colour soon after lighting the fire.

LIGHT THE FIRE CORRECTLY
and avoid incomplete combustion, where the fire does not get enough air.

MAKE SURE THAT THE CHIMNEY IS SWEPT REGULARLY.
Find out what condition your fireplace is in by asking your chimney sweep.

DON'T BURN WASTE
or other recyclable materials such as milk cartons. These can damage fireplaces and cause harmful emission.

THE CITY ACTS

The City of Helsinki and HSY reduce emissions generated by burning wood by informing people about burning-related regulations and advising residents on more skillful and energy efficient usage of fireplaces.

- **HSY measures the air quality in areas of single-family dwellings** and maps emissions relating to use of fireplaces. New measuring stations have been set up in areas of single-family dwellings.
- **Wood storage methods** in small urban plots are being improved through means such as the Urban Woodshed project. Storing wood dry improves energy efficiency when burning and reduces emissions of fine particles and climate change accelerating black carbon.
- **Burning waste is prohibited** under municipalities' environmental protection regulations and waste management regulations. Burning wood or any other solid fuel in fireplaces must not cause an unreasonable disturbance to neighbours or the local environment.

MANY PROGRAMMES AND STRATEGIES ALSO IMPROVE AIR QUALITY

In addition to the City of Helsinki's Air Protection Programme, there are a number of other strategies – focusing on traffic and climate protection, for example – that feature measures improving air quality.

Traffic

HELSINKI´S URBAN MOBILITY POLICY (LIIKE)
The objective of this plan is to ensure residents and commuters streamlined means of transport whilst reducing the harmful effects of traffic. The main emphasis is on sustainable modes of transport, i.e. walking, cycling and public transport.

CYCLING PROMOTION PROGRAMME
Helsinki has signed the Charter of Brussels, whereby the city will try to increase the proportion of journeys made by cycling to 15 per cent.

ACTION PROGRAMME FOR CITY LOGISTICS
The objective of this programme is to make transport in the inner city more effective whilst reducing costs, congestion, harmful environmental impacts and disruption to residents.

HELSINKI'S PARKING POLICY
The Parking Policy guidelines include supporting an ecologically sustainable and pleasant urban environment and transportation, as well as taking residents', companies' and other users' various needs into consideration in parking matters.

HLJ 2015
The Transportation System Plan of the Helsinki Region, drawn up by HSL, steers transportation choices towards public transport, walking and cycling. The Plan is updated at four-year intervals.

HSL'S PARK AND RIDE STRATEGY
By developing the park and ride scheme congestion can be decreased and the accessibility of public transport improved.

Climate

HELSINKI METROPOLITAN AREA CLIMATE STRATEGY
The joint objective of the municipalities of the Helsinki Metropolitan Area is to improve energy efficiency and reduce per capita greenhouse gas emissions by 39% compared to the 1990 level by 2030.

HELSINKI'S CLIMATE ROADMAP – CARBON-NEUTRAL HELSINKI 2050
Helsinki's Climate Roadmap presents the actions that are to be taken to ensure that Helsinki is carbon neutral by 2050. An intermediate goal is to reduce Helsinki's greenhouse gas emissions by 30% from the 1990 level by 2020.

Street dust

HELSINKI'S ENVIRONMENTAL PROTECTION REGULATIONS
Generation of dust caused by maintenance and cleaning work must be prevented through measures such as dampening the area to be cleaned, if necessary. Leaf blowers should not be used to remove grit. The nuisances posed by dust must be minimised in construction and demolition work.

Burning wood

HELSINGIN YMPÄRISTÖNSUOJELUMÄÄRÄYKSET
Burning wood or any other solid fuel in fireplaces must not cause an unreasonable disturbance to neighbours or the local environment. Burning waste at a property is prohibited, as is burning garden waste in gardens in densely built areas.

WASTE MANAGEMENT REGULATIONS
In the Helsinki Metropolitan Area and Kirkkonummi, waste management regulations prohibit disposing of waste by burning.

Test your air quality knowledge!

1. Which form of transport produces the largest amount of harmful nitrogen dioxide?

a) Petrol-powered vehicles
b) Diesel-powered vehicles
c) Hybrid buses

2. How should grit used for gritting of roads be removed?

a) Dry, with a brush
b) Damp, by sweeping
c) By blowing with a leaf blower

3. How should empty milk cartons be disposed of?

a) By burning in the fireplace or sauna stove
b) By putting them into the mixed waste
c) By putting them into the carton recycling container

4. What is the main source of the carcinogenic compound benzo[a]pyrene?

a) Burning wood in fireplaces and stoves
b) The grit used to grit roads and the resulting friction against the road surface
c) Car engines

5. How small do particles have to be to get into our alveoli?

a) Less than 10 micrometres
b) Less than 2.5 micrometres
c) Less than 100 micrometres

6. At what time of year are street dust levels in the air at their highest?

a) Spring
b) Summer
c) Winter

7. Which option best describes the environmental zone in force in Helsinki?

a) The area around a property, which the housing association is responsible for cleaning
b) An area where driving private vehicles is prohibited
c) An area in the inner city where the emissions limits for HSL's buses and HSY's waste collection vehicles are tighter

8. How many premature deaths are estimated to be caused by fine particles in Finland each year?

a) 1,600
b) 470
c) 80

9. How should wood to be burned in fireplaces be stored?

a) In an outdoor shed
b) In a sauna
c) Against the wall of a house

Correct answers: 1b, 2b, 3c, 4a, 5b, 6a, 7c, 8a, 9a

Did you know?

In 2025 approximately every third kilometre driven by HRT´s local buses will be driven using an electric bus.

In winter traffic in the Helsinki Metropolitan Area approximately a quarter of motorists use non-studded winter tyres, which cause less wear of the road surface than their studded counterparts.

Concentrations of sulfur dioxide, carbon monoxide and heavy metals, which previously worsened air quality, are well below limit and reference values.