

## Air pollution situation in Estonia

Air is one of the most important resources of our life. A human-being can survive without air for some minutes only. Pollutants emitted into the air cause climate change, acidification, depletion of ozone layer, deterioration of urban air quality, which all have damaging effect to human health and living environment.

**Air quality.** The quality of external air is depending on: 1) various chemical compounds (some of them are harmful, some neutral, but there are harmful ones on the environment, for example CO<sub>2</sub>); 2) noise; 3) dust; 4) vibration; 5) ionising radiation (radiation that influences on alive tissues); 6) non-ionising-radiation, for example UV-radiation and electromagnetic fields.

The influence of these chemical and physical parameters expresses on human health, deteriorate on diminishing of plant production, on decreasing of ozone layer and on change of climate.

Air problems in Estonia are mainly connected to oil-shale based energy production. On the website of Estonian Environment information centre (<http://www.keskkonnainfo.ee>) you can find information on emissions of pollutants released into air by stationary and mobile pollution sources.

*Stationary pollution source* is an individual pollution source of persistent location, including a pollution source which is periodically transferred or a group of pollution sources in one territory.

*Mobile pollution source* stands for pollution source without permanent location, which at the same time with release of pollutants also can change its location using gaseous, liquid or solid fuel.

Proceedings and overviews found on this web page are compiled on the basis of reports and statistical data presented by enterprises with ambient air pollution permit.

Register of Air Pollution Sources is maintained on the basis of the Ambient Air Protection Act on reporting of activities related to the pollution of ambient air.

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Register of Air Pollution Sources includes data about stationary and area sources of pollution. Stationary source of pollution is a single source of pollution with permanent location, including source of pollution liable to displacement after a certain period of time, or group of sources of pollution located on single production territory and belonging to single possessor.

For stationary sources of pollution information can be obtained about:

- emissions of pollutants (by companies, counties, sectors of economy, total of Estonia)
- use of fuels (by counties, total of Estonia)
- use of solvents, paints and adhesives

Data originates from environmental authorities, reports on activities related to the pollution of ambient air. Area (diffuse) source of pollution is small stationary source of pollution not subject to reporting requirements and source of pollution covering certain larger area (agriculture, forest, and transport, household). Emissions are calculated by administrative units (county) on the basis of data from the Statistical Office and emission factors (emission per production/energy unit).

Information can be obtained about emissions by counties and by sources of pollution.

The emissions of pollutants are regulated with strict control and by the system of permits.

Environmental taxes. According to the Law of Environmental Pollution the taxes are fixed which must be paid for pollution of environment. These taxes are established per one ton of following pollutants:

- sulphur dioxide SO<sub>2</sub> and other an-organic sulphur compounds
- carbon mono-oxide CO
- solid particles except heavy metals and the heavy metal compound
- nitrogen compounds
- volatile organic compounds except mercaptans
- mercaptans

- heavy metals and compounds of heavy metals
- carbon dioxide CO<sub>2</sub>.

More about the protection of external air can you find on [www.envir.ee/7290737](http://www.envir.ee/7290737)

**Standards of Ambient Air.** The Technical Committee of Ambient Air Quality was founded in 04.07.2005 to take over the Standards of Ambient Air. There are 20 Standards in 2007, 6 one in 2006 and 5 one in 2005 established, look on [www.envir.ee/529657](http://www.envir.ee/529657)

Air pollution is produced by industry, by transport, by electric power stations and by agriculture. Also the housekeeping can pollute the air. For example, air pollutes by burning coal or wood in fireplace and therefore don't use fireplace too often. Don't burn rubbish in the garden. In many local places this is forbidden by law. Make a fire infrequently. Smoke from an open fire pollutes air because it contains various detrimental and polluting gases.

### **Air pollution from transport.**

Air pollution tends to be worse in urban than in rural areas due to motor traffic. Pollution of atmosphere and quality of air on the basis of the survey in Tallinn can you find (in Estonian only) [www.utlib.ee/ekollekt/diss/mag/2005/b175253666/urb.pdf](http://www.utlib.ee/ekollekt/diss/mag/2005/b175253666/urb.pdf)

To diminish car exhaust gases we have to use more qualitative fuel, more economical cars and gasneutralizers, that change harmful gases by catalyst to the environmental friendly gases H<sub>2</sub>O, CO<sub>2</sub>, N<sub>2</sub>, but catalysts are expensive.

### **Air pollution from radioactive waste**

On the territory of the Republic of Estonia is not any working nuclear power station and according to the program of energy management building of these stations is not planned. There aren't also any training reactors and any other buildings and plants that recycle nuclear fuel, however in Estonia is an old military nuclear object in Paldiski which is a relic from Soviet Union and in Tammiku, North-Eastern Estonia is a storage of radioactive waste which is not in correspondence with nowadays regulations.

Amounts of radioactive waste and their activities that arise from industry, medicine and scientific research are small in Estonia at present time. Only action that produces waste containing natural radionuclides is production of rare earths by Silmet Group Limited Company.

### **Climate change**

Climate changes are becoming an important and serious problem of life quality for present and future generations of human beings and for all the alive nature. This problem is especially urgent in developed countries of EU and in USA.

From the physical point of view the necessities and comfort of life we obtain from the conversion of power (energy). The conversion and utilisation of energy takes place when burning of fuel in a car engine (transport, agriculture), burning fossil fuels in industry, in nuclear reactors etc. I thermodynamics is proved that an inevitable consequence of energy conversion is the discharge of heat. We have no option in his respect. The unwanted release of thermal energy into environment is known as thermal pollution.

There are several approaches to lessening the problem of thermal pollution, for example, use of alternative energy sources (wind power, tidal power and solar power). Another solution is to distribute heat exhaust more widely by depositing as much as possible into the atmosphere rather than into bodies of water, but this solution is strongly effected by human activities.

Excessive heat transmits through atmosphere into outer space mainly in the form of thermal radiation, which is long wavelength electromagnetic radiation. As a result of human activities enormous amounts of so-called greenhouse gases are emitted into atmosphere. These gases diminish transparency of atmosphere for long wavelength of thermal radiation and therefore distribution of excessive heat into outer space is prevented and global warming takes place. This situation is similar to the situation in

greenhouse. The roof of the greenhouse is transparent for the short wavelength radiation of Sun. This radiation warms the air and the soil in the greenhouse and a part of this radiation is used in photosynthesis. But we must consider that the interior of greenhouse (soil and air) also emits thermal radiation and the transparency of the roof for this radiation is less than for the radiation of Sun and so a local warming takes place. This local warming may be dangerous for plants if we don't distribute excess heat by convection, opening the windows.

The atmosphere plays a role of greenhouse roof for the Earth. When the transparency of atmosphere is spoiled by greenhouse gases, the excessive heat can't be effectively directed into outer space and the global warming takes place. This global warming is accompanied with changes in global and local climate. May be, the most dangerous greenhouse gas which is caused by human activities is carbon dioxide (CO<sub>2</sub>). This gas is mainly emitted by burning fossil fuels- coal, oil and natural gas. Part of excessive CO<sub>2</sub> is absorbed by plants and trees. Therefore, reasonable management of world forests is very important. Unreasonable and greedy clear cutting, fires caused from carelessness- all this enlarges the content of carbon dioxide in the atmosphere.

Greenhouse gases are also methane and nitrogen dioxide, which are emitted from dumping grounds, cattle farms and from some fertilisers. Greenhouse gases are also fluorine gases and freon. These gases are produced in industry and used on refrigerators, air conditioners and even in air cushions of sport footwear. Fluorine gases may be emitted into atmosphere from leaks and during wrong removal of equipment.

Carbon dioxide is the most significant gas that affects on climate change. Estonia promised to diminish the amount of CO<sub>2</sub> in 2012 by 8% in proportion to the level in 1990. Main possibility to achieve this goal is to use another species of fuel and naturally economical consuming. Great effect gives hereby the diminishing of heat wastage and expedient use of electricity. Alternative energy sources like wind and hydro energy and use of reproductive fuels like wood and turf will be used more and more in Estonia.

**Information** presented or linked **on the website** [www.tartutarbija.ee](http://www.tartutarbija.ee)

1. Protection of ambient air [www.envir.ee/1029](http://www.envir.ee/1029)
2. Standards of ambient air [www.envir.ee/529657](http://www.envir.ee/529657)
3. Protection of ambient air and energetic diminishing program [www.envir.ee/10321](http://www.envir.ee/10321)
4. How can you influence on climate changes? (Estonian only) Kuidas saate teie mõjutada kliimamuutusi [http://ec.europa.eu/climate/campaign/control/turndown\\_et.htm](http://ec.europa.eu/climate/campaign/control/turndown_et.htm)
5. Air pollution and Estonian role in climate change (Estonian only) Kasvuhoonegaasid ja Eesti osa kliimamuutustes [www.roheline.ee/index2.php?option=com\\_content&task=view&id=281&Itemid](http://www.roheline.ee/index2.php?option=com_content&task=view&id=281&Itemid)
6. Transport and environment (Estonian only) Transport ja keskkond [www.mnt.ee/atp/?id=1071](http://www.mnt.ee/atp/?id=1071)
7. Relieve of climate change and air quality (Estonian only) Kliimamuutuste leevendamine ja õhu kvaliteet [www.envir.ee/orb.aw/cclass=file/action=preview/id=319158/KTK+3+Energia-transport2011.xls](http://www.envir.ee/orb.aw/cclass=file/action=preview/id=319158/KTK+3+Energia-transport2011.xls)
8. Protection of external air (in Estonian only) Välisõhu kaitse [www.envir.ee/290737](http://www.envir.ee/290737) and välisõhu kaitse.doc

Air pollution and waste (in Estonian only) Õhusaaste ja jäätmed [www.ekja.ee/failid/51.pdf](http://www.ekja.ee/failid/51.pdf) ore information can you find in the paragraph **Waste in Estonia- radioactive waste in Estonia**

## Air quality in Sweden

Atmospheric pollutants can cause illness and reduce human life expectancy. They also contribute to plant disease, corrosion, eutrophication, acidification and climate change.

### **Air pollution has impacts on human health**

Air pollution tends to be worse in urban than in rural areas due to motor traffic. The burning of wood for domestic heating purposes and in certain industries also impacts on air quality. Sweden is both an importer and an exporter of air pollutants, which are carried across national boundaries by the winds.

Particulates and ground-level ozone are the main air pollutants responsible for health problems today.

In recent decades air quality has been gradually improving as a result of new technology together with international conventions, agreements, laws and regulations.

Swedish environmental quality objectives and environmental quality standards are designed to improve air quality. Much remains to be done, however, as there are so many sources of air pollution. International cooperation is indispensable if we are to have clean air to breathe in the future.

Urban air pollutants can cause or exacerbate cardiovascular disease, cancer, allergies, asthma and lung disease.

Even though emissions have been declining, Swedish towns still suffer from air pollution, with some pollutants actually on the increase. The growth in motor traffic and the use of studded tyres during winter time are the primary causes of poor air quality in Swedish towns.

Because of the prevailing southerly and south-westerly winds in our region, Sweden is often on the receiving end of air pollution from elsewhere in Europe.

A hundred years ago the air in our towns was far more unhealthy than it is today.

### ***Ground-level ozone***

Ozone is a natural component of the air. At low altitudes ozone is formed by reactions taking place in sunlight between nitrogen oxides and hydrocarbons.

Certain chemical substances deplete the protective ozone layer that surrounds the earth. It is therefore most important that all countries prohibit the production and use of ozone-depleting substances as soon as satisfactory substitutes are available on the market. Sweden is playing a successful role in efforts to this end both at home and abroad.

The production and use of ozone-depleting chemicals has a global impact on the environment. International efforts to eliminate these substances are absolutely necessary in order to achieve the environmental objective of A Protective Ozone Layer. The most important instrument for these international efforts is the Montreal Protocol.

### ***A Protective Ozone Layer***

In Sweden action on ozone-depleting substances is linked to the specific environmental objective A Protective Ozone Layer, one of sixteen objectives designed to point the way to an ecologically sustainable society within one generation. This objective calls for concentrations of chlorine, bromine and other ozone depleting substances in the stratosphere do not exceed natural levels, and for the use of ozone-depleting chemicals in Sweden to be phased out within one generation.

### ***Action on the ozone layer by the Swedish EPA***

The Swedish EPA is acting to develop and enforce regulations on ozone-depleting substances both at home and internationally. It provides guidance and information for other agencies and drafts regulations where necessary. At the national level the Agency provides assistance with measurements of the thickness of the ozone layer.

The Swedish EPA has express responsibility for technical issues under the Montreal Protocol. This means that the Agency is involved in EU work and negotiations under the Protocol and assists progress in developing countries through participation in the multilateral fund established by the Protocol. The EPA is also a member of a SIDA-funded network for environmental officers working with the phase out ozone-depleting substances in Southeast Asia. Progress in developing countries is absolutely vital if the use of ozone-depleting substances is to be successfully phased out in the long term.