man interferes heavily in the ecosystem worldwide. The interventions of man in the ecosystem are so big that many researchers consider it justified, to speak of a new geological era, the “Anthropocene”, in which life on Earth is affected in all areas by the activity of man (see for example /2/). This knowledge, which is also shared in the last decades by a large part of the population, supports for many the desire and efforts for a sustainable economy. The goal here is to sustain the natural resources on which our existence is based across as many generations as possible and if necessary even to improve them again.

To achieve this aim, the environmental aspects must already also be taken into account during the decisions on material and energy use i.e. in the development of the products. To achieve this, legal foundations were created in Germany in the last decades, as well as in the EU. This also affects numerous statutory regulations which must be observed during product development. In accordance with the call to preserve human livelihoods and living conditions, there was an industrial branch established, for example in the field of waste management in recent years, that ensures that a large proportion of products is again disposed of in an “environmentally friendly” manner. Environmental protection is thereby pursued beyond the limits of production facilities, so that, for example, investment costs can be increased. The first problem can often be counteracted during product development by the scheduled possibility of retrofitting. This is not easy, since future developments must already be considered and taken into account at the stage of product development. In this way at least the life cycle can be extended of many parts and components.

The second problem can often be diminished by a consideration of life cycle costs (LCC). In this, the ascertained expenditure for the useful life of the equipment is compared to the savings to be expected and other benefits. Cost advantages that are essential for a purchase decision often arise in spite of increased investment costs for long lasting products with a low need for consumable materials. Hence, the monitoring of life cycle costs plays a bigger and bigger role with cost management and delivers essential criteria for product comparison and decision-making. A problem in this case is that a complicated calculation is necessary that needs to be explained to the customer, which must be backed by convincing data on the lifetime and operating costs. This challenge must already be faced at the stage of product development.

In connection with the development of environmental legislation and the objective to recycle valuable materials again as much as possible, the field of “recycling-oriented product development and product design” was developed at the end of the eighties in the 20th century. In the course of this, recycling is already considered as a component of the technical product life cycle during product development and is planned as far as possible. In 1991, VDI Directive 2243 /3/ came out, of which a revised version has meanwhile become available. The Directive pursues the objective “in particular to give the developer and the designer information, guidance and decision support for the various phases of product development, in order to develop and select technical and economic possibilities and alternatives for improving the recyclability of technical products.”

Literature:
/1/ Encyclopaedia of Sustainability, at www.nachhaltigkeit.info

**Fine dust pollution decreases slightly**

A report by the Federal Environmental Agency

According to information from the Federal Environmental Agency, Nitrogen dioxide and fine dust still affect the air quality in Germany. Temporary measurement data from the states and the Federal Environmental Agency prove this for 2012. With Nitrogen dioxide, the pollution compared with the previous years remains consistently high. The average concentrations of fine dust - measured in PM10 - in 2012 in Germany lies at the level of 2008 and with it clearly under that of the preceding three years. Above all, in cities and metropolitan areas the limit values for fine dust and Nitrogen dioxide are still exceeded too frequently in the immediate vicinity of roads. According to UBA President Franzisk, the new figures on air quality in Germany point out that the emission of pollutants into the air absolutely must be reduced further.

The fine dust pollution in Central Europe still reduces the average life expectancy by almost half a year. Although air pollution in Germany has evidently decreased since 1990, further efforts are still needed. The focus is primarily on fine dust and nitrogen oxide. They arise from car exhausts but also in combustion processes in industry and above all in households from energy and heat generation. The increasing number of fireplaces meanwhile contributes, as can be proved by the fine dust pollution during the winter months. Studies point to an increase of up to five exceedances of the daily values. Moreover, the EU target value for benzopyrene is exceeded by several times. This is 1 nanogram per cubic metre, ng/m3. The substance - a polyaromatic hydrocarbon (PAK) – originates, inter alia, from the burning of wood. The states currently record air quality nationwide at 643 stations.

52 percent of the urban, traffic-oriented stations exceeded the allowable annual average value for Nitrogen dioxide (NO2) of 40 micrograms per cubic metre of air, µg/m3. On the other hand, the PM10 annual mean limit value for fine dust, which is also 40 µg/m3, was adhered to in Germany in 2012. The pollution of the air with fine dust last year was one of the lowest ever recorded. Exceedances of the daily average value especially occurred again at traffic-oriented stations. Even under the favourable weather conditions of last year,
the measured values at nearly 10 percent of the traffic-oriented stations, however, lay above the fine dust daily limit value. This is exceeded if more than 50 µg/m³ of fine dust are detected on more than 35 days in the year.

“The development away from district heating to more decentralised, small combustion systems in households and industry must not lead to higher dust levels than are produced by today’s main power stations. Here, with stricter rules for small combustion systems, Germany has made an important step”, says Flasbarth. How emissions can be specifically decreased in wood-fired, small combustion systems, is something that the Federal Environment Agency reveals in its brochure “Heating with Wood”.

Other needs for action exist where the breathing air of many people is polluted with fine dust and Nitrogen dioxide: in the cities and metropolitan areas. There, the emissions from transport can be reduced by environmental zones. If they are implemented with few exceptions and strictly with Stage 3, which only allows entrance with a green badge, they demonstrably have a positive impact on air quality. Meanwhile, since more than 80 percent of passenger cars and 50-60 percent of commercial vehicles get a green badge, environmental zones that still allow a yellow badge cause no essential improvement.

So that the air can improve further in metropolitan areas, it is necessary to reduce the large-scale pollution from agriculture. For this, the UBA is counting on a revision of the approval factors for intensive farming, as well as on the implementation of good agricultural practice, which includes, inter alia, the rapid incorporation of farmyard manure.

For further information
- Year of the air 2013: http://bit.ly/fs0213-02
- Current air quality data: http://bit.ly/fs0213-03
- UBA websites

### Prevention of the spreading of legionella

**H. Lyko**

#### Measures for prevention and monitoring

Inspired by the legionella infections in August that were triggered in the North Rhine-Westphalian town of Warstein by these pathogens spreading through the cooling system of an industrial enterprise, the VDI referred to the need of measures for prevention and monitoring in open recirculating systems. Up to now, open recirculating units in Germany - differently from abroad - have not been subject to any registration. Dr. Irene Tesseraux, chairperson of the Directive Panel “Measurement and evaluation of legionella” of the Commission on Air Pollution Prevention (KRdL) in the VDI, considers a register for evaporative cooling systems, such as are found on larger administrative and industrial buildings, to be absolutely necessary, so as not to waste valuable time searching via helicopters and aerial maps on the occurrence of infectious cases.

Rainer Kryschi, chairperson of the VDI Directive Panel “Hygiene requirements for evaporation cooling plants”, demanded the inclusion of such systems in the technical inspection regulations of the federal states.

Legionella in drinking water constitutes no health risk for people with intact immune systems. It can, however, become dangerous to people when they penetrate as a fine spray into the lungs. This was already shown by the legionella epidemic in January, 2010 in the Ulm area, where five people died. Alarming is the fact that the spreading of legionella can happen through the air across large distances - up to 10 km has been reported.

With various directives on air pollution and on the topic of construction and building technology, the VDI offers assistance for preventing the spread of legionella into the ambient air through water-bearing systems (see following Table).

In Warstein, an evaporative cooling system was the trigger for the spread of the dangerous pathogen, but finally it was found further ahead, in a water treatment chain. As is presented by evaluating the various press releases on root cause analysis, the pathogens appeared in the effluent of the wastewater treatment plant of a brewery, which was conducted into the municipal wastewater treatment plant. The effluent of this wastewater treatment plant enters the surface water bodies from which the above-mentioned industrial enterprise draws its cooling water.

#### Procedures for maintenance and inspection of air conditioners and air conduits

According to a report of TSI GmbH, the incident shows that either omitted or non-professional servicing of air conditioning equipment means that this can develop into a dangerous breeding ground for bacteria. Within an air-conditioning unit, there are many places that are well-suited for growth due to condensation and heat.

Antibacterial treatments are part of regular professional maintenance just as much as measurements that point to leakage in the pipe system. Also, measuring instruments like the TSI Biotrak, with which viable strains in the air can be determined, can contribute to this. With a vacuum blower that can be connected in a mobile manner to air conditioning lines, and also with a handheld meter, conduit systems and bleeders are tested for leaks.

To verify the air diffusion, anemometers or volumetric flow hoods are suitable. Thus, the exit velocity of the air can be measured on outlets. For this purpose, the measuring hood TSI AccuBalance uses a differential pressure measuring method.

After the source is discovered, above all the protection of the employees is vital. For this, filter masks are used for respiratory protection, inter alia. Training is vital for the use of masks. With the TSI PortaCount, TSI offers a globally used device with which the face seal of breathing masks can be quantitatively verified.

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<td>VDI/DVGW G223</td>
<td>Hygiene in drinking-water installations – Requirements for planning, execution, operation and maintenance</td>
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Table: Directives on air pollution and on the topic of construction and building technology that are helpful in the prevention of the spread of legionella