UNECE

Clean Air for Life

UNITED NATIONS

Clean Air for Life

More information:
Secretariat Convention
on Long-range Transboundary Air Pollution
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http://www.unece.org/env/lrtap/welcome.html

Acknowledgements
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Air Pollution: Why should we care?

Air pollution harms human health, affects food security, hinders economic development, contributes to climate change and degrades the environment upon which our very livelihoods depend.

The monetary value placed on the health impact of air pollution – estimates of US $1.6 trillion for the European region of the World Health Organization (WHO) alone – serves to quantify a problem that goes well beyond financial matters. Children are particularly vulnerable to the devastating impacts of air pollution as their respiratory systems are still developing. But so are the elderly and frail, and it is increasingly understood that air pollution spares no one.

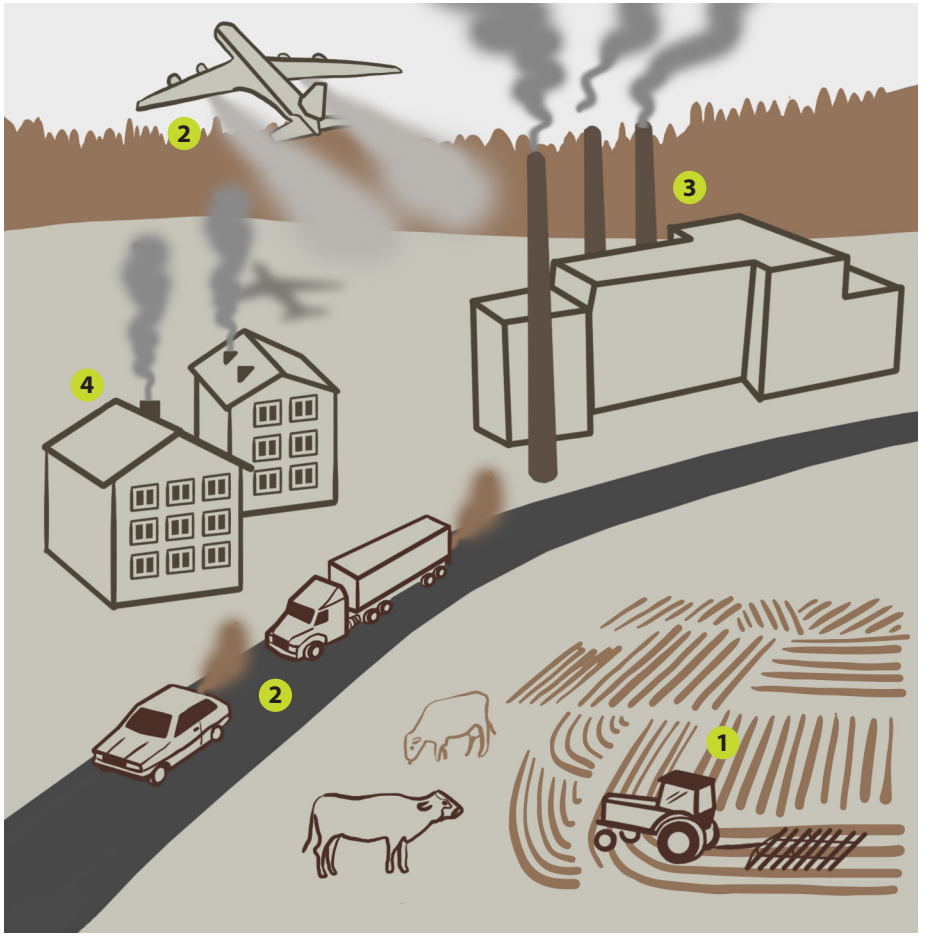
Activities in sectors such as transport, waste, energy and agriculture are responsible for releasing either primary air pollutants or chemical substances reacting with others and forming "secondary" pollutants in the atmosphere.

While numerous sectors are involved and the impacts are felt not only locally, but also globally, responses are all too often taken on a narrow sectoral basis, failing to consider the urgency of addressing air pollution as an international and pressing problem with multiple and far-reaching impacts.

The exponential rise of urbanized areas is also a significant factor in increased air pollution. Today the majority of our population lives in cities that on the one hand tend to be sources of air pollution, but on the other are also where the impacts of air pollution are most felt.

Air pollution knows no political boundaries: emissions from sources in one country can be transported and deposited in neighbouring countries, sometimes even thousands of kilometres away. In 2010, for example, experts estimated that only 36 per cent of the concentrations of fine particulate matter ($PM_{2.5}$) in Georgia and only 23 per cent of those in Kyrgyzstan came from national sources. In 1979, realizing the need for a common transboundary response to the problem, some 30 Governments and the European Community signed the Convention on Long-range Transboundary Air Pollution (Air Convention) within the framework of the United Nations Economic Commission for Europe (UNECE).

Figure 1: Sources of air pollutants



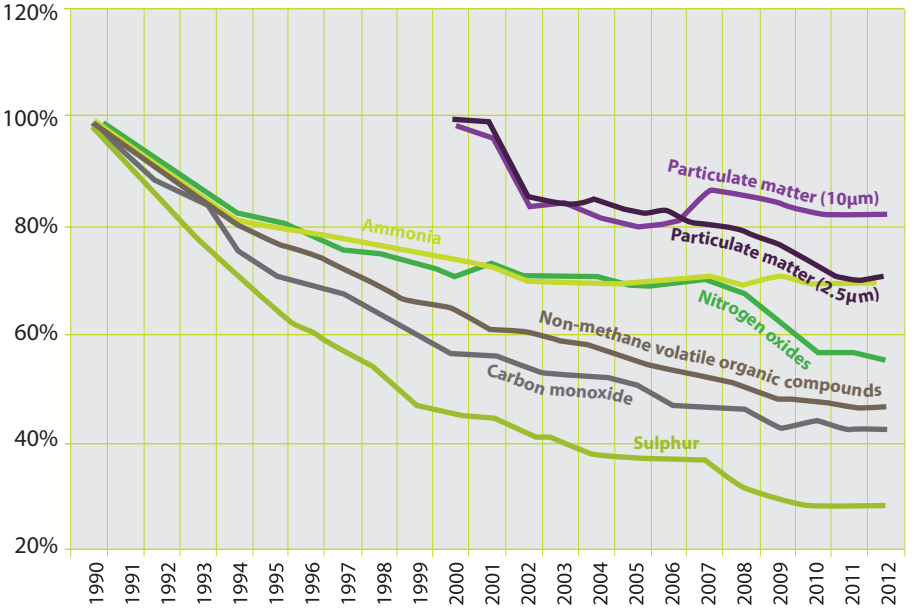
1. Around 90% of ammonia emissions and 80% of methane emissions come from **agricultural activities**.

2. More than 40% of emissions of nitrogen oxides come from **road transport**. Almost 40% of primary $PM_{2.5}$ emissions come from transport.

3. Some 60% of sulphur oxides come from **energy production and distribution**.

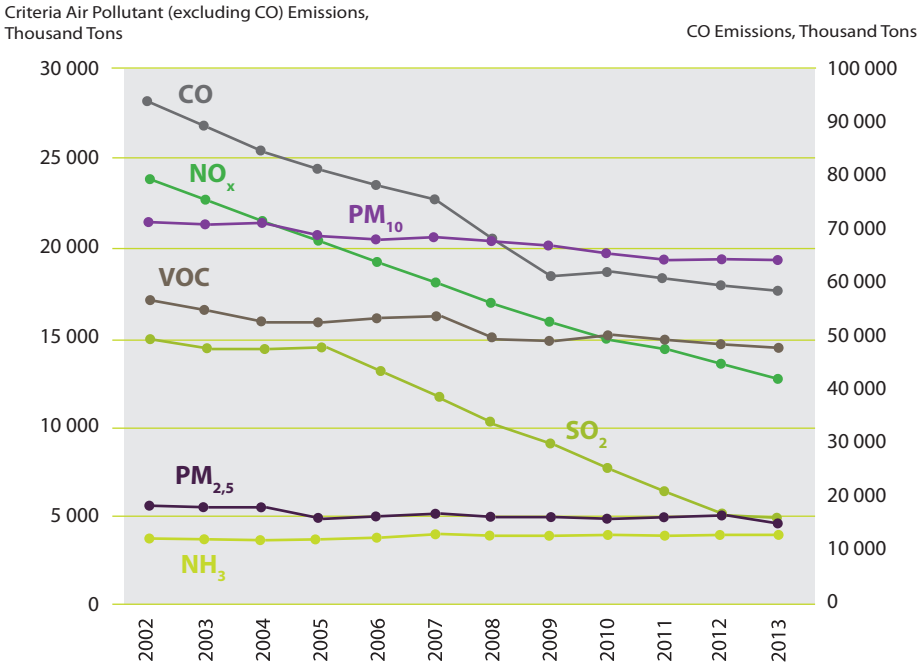
4. **Fuel combustion** is a key contributor to air pollution – from road transport, households to energy use and production. **Businesses, public buildings and households** contribute to around half of the PM2.5 and carbon monoxide emissions.

Figure 2: Emission trends in the UNECE region (excluding Canada and the United States)



Source: Centre on Emission Inventories and Projections

Figure 3: US emission trends for the main air pollutants



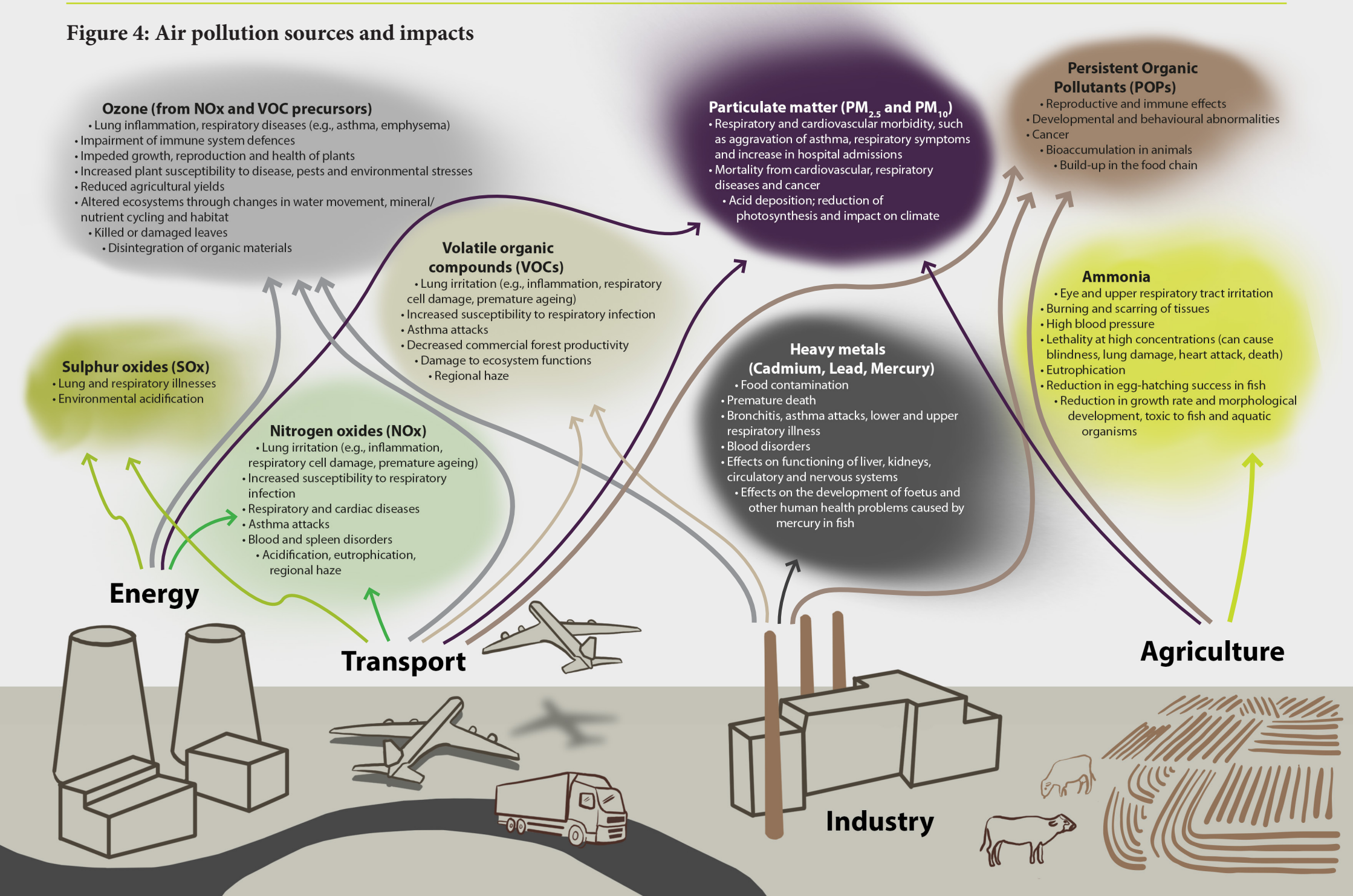
Source: US Environmental Protection Agency website

Solutions to air pollution exist and major strides have already been taken. Parties to the Air Convention and its protocols can be proud of the successes in reducing air pollution to date. The Air Convention provides a platform for integrating science and policy to address air pollution via a whole range of approaches and sector-specific measures that Parties are implementing to cut their emissions and meet the targets set within the Convention's protocols.

Working to reduce air pollution in an integrated manner also helps Parties meet other commitments, notably those related to climate change and biodiversity conservation. And the other way around, the implementation of climate and energy policies in most cases brings benefits to air quality.

Yet much more remains to be done. Technical measures are available to further reduce emissions, in particular from combustion installations, transport and farms. Therefore, enhanced cooperation is essential between the sectors contributing to air pollution, and actions are required at the local, national and international levels. There is a need for greater involvement from all countries in the UNECE region, in particular those in Eastern Europe, the Caucasus and Central Asia.

Figure 4: Air pollution sources and impacts



Air Pollution and Health

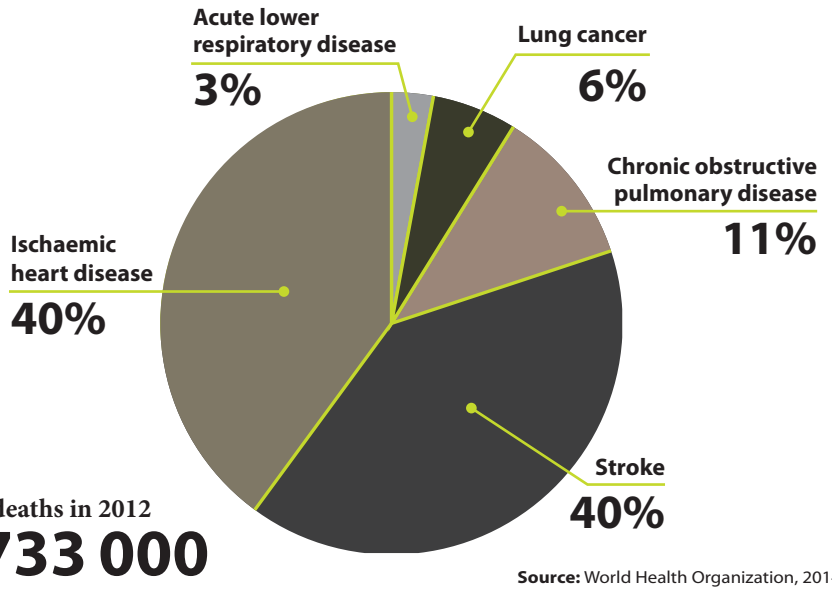
Around the world, every year 7 million people – equivalent to the entire population of Bulgaria – die prematurely because of combined indoor and outdoor air pollution (WHO, 2014). This represents more than the annual combined death rate of the "big" killer diseases – malaria, tuberculosis and AIDS.

The scientific evidence of disturbing links between air pollution and health continues to build. In accordance with recent WHO estimates, exposure to air pollution is a more important risk factor for major non-communicable diseases than previously thought. Air pollution is the largest contributor to the burden of disease from the environment. Air pollution causes and exacerbates a number of diseases, ranging from asthma to cancer, pulmonary illnesses and heart disease. The International Agency for Research on Cancer has classified outdoor air pollution and particulate matter, one of its major components, as carcinogenic to humans.

Individual studies on the health effects of air pollution for different countries estimate that mortality related to air pollution is even higher than what WHO finds. In France, the calculated number of deaths from ambient PM and ozone pollution in 2010 was over 17 000 (OECD, 2014). In the United Kingdom, in the city of London alone, air pollution (from $PM_{2.5}$ and NO_2) was estimated to cause nearly 9 500 early deaths in 2010 (Walton et al., 2015). In 2010, 94 500 premature deaths in the Russian Federation were caused by ambient particulate matter pollution (WHO, 2015). In Kazakhstan, the estimated mortality risk attributable to air pollution in general is 16 000 cases per year (Kenessariyev et al., 2013). The number of life years lost in South-Eastern Europe, Eastern Europe, the Caucasus and Central Asia due to outdoor air pollution is 20 per cent higher than in Western Europe (WHO and OECD, 2015).

The main air pollutants affecting health are nitrogen oxides (NOx), sulphur oxides (SOx), ozone and particulate matter with the latter – especially particulate matter below 2.5 microns – being of greatest concern, as these tiny particles penetrate deep into the lungs, affecting both the respiratory and vascular systems. Both the extent and duration of the exposure influence health outcomes.

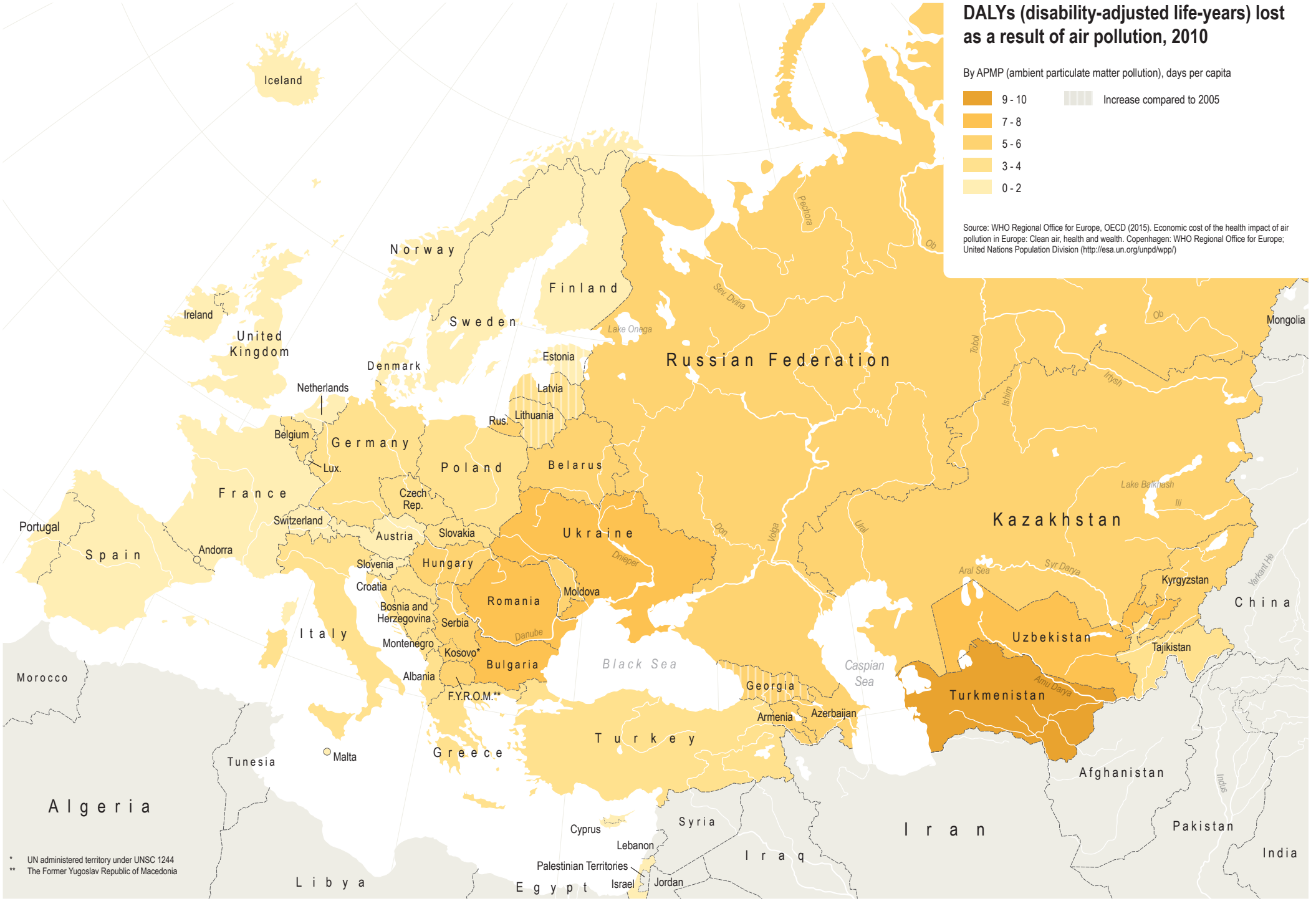
Figure 5: Deaths attributable to ambient air pollution



Source: World Health Organization, 2014

Nearly every single individual in the European region is affected by air pollution with over 90 per cent of the residents being exposed to annual levels of outdoor fine particulate matter above WHO air quality guidelines. While the data for Eastern Europe, the Caucasus and Central Asia are less robust, there is cause for concern. In particular, trends in recent years indicate increasing emissions from a growing transport sector as a result of economic development and increasing purchasing power but also because of an ageing car fleet and poor quality fuel (WHO, 2004). Transport-related emissions may amount to more than 80 per cent of the air pollution in cities in Eastern Europe, Central Asia and the Caucasus (OECD, 2007).

In 2005, WHO published an update of its public health guidelines for different air pollutants, the first version of which was developed in 1987. To this day in the EU, however, concentrations of particulate matter and ozone are well above levels recommended by WHO, even though they have dropped in the last decade.


DALYs (disability-adjusted life-years) lost as a result of air pollution, 2010
By APMP (ambient particulate matter pollution), days per capita
9 - 10
7 - 8
5 - 6
3 - 4
0 - 2
Increase compared to 2005
Source: WHO Regional Office for Europe, OECD (2015). Economic cost of the health impact of air pollution in Europe: Clean air, health and wealth. Copenhagen: WHO Regional Office for Europe; United Nations Population Division (http://esa.un.org/unpd/wpp/)
Iceland
Norway
Finland
Sweden
Ireland
United Kingdom
Denmark
Netherlands
Belgium
Lux.
Germany
France
Switzerland
Portugal
Spain
Andorra
Czech Rep.
Austria
Slovakia
Poland
Belarus
Ukraine
Slovenia
Hungary
Croatia
Bosnia and Herzegovina
Serbia
Montenegro
Kosovo*
Albania
F.Y.R.O.M.**
Romania
Moldova
Bulgaria
Italy
Malta
Greece
Turkey
Black Sea
Caspian Sea
Georgia
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Ishim
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Kazakhstan
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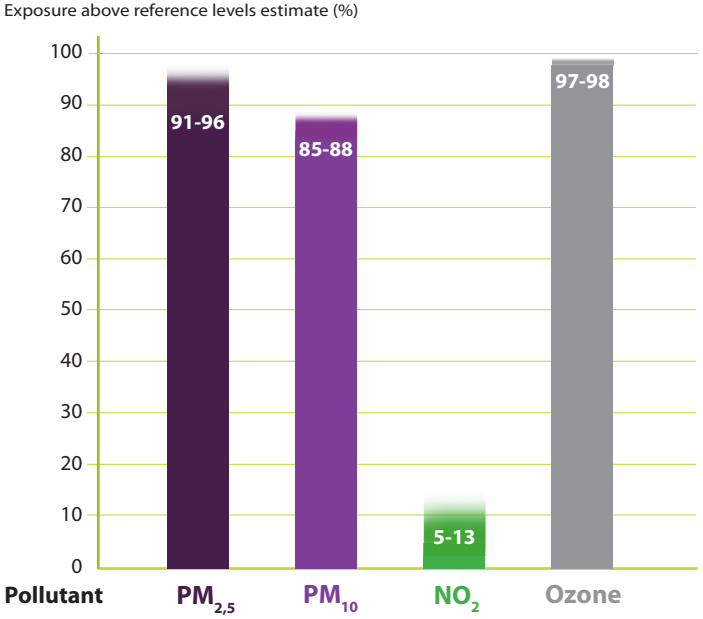
Amu Darya
China
Yarkant He
Afghanistan
Indus
Pakistan
India
Iran
Iraq
Syria
Lebanon
Palestinian Territories
Israel
Jordan
Cyprus
Egypt
Libya
Algeria
Tunesia
Morocco
Dnieper
Don
Volga
Ural
Danube
* UN administered territory under UNSC 1244
** The Former Yugoslav Republic of Macedonia

Figure 6: Percentage of the urban population in the EU exposed to air pollutant concentrations above WHO reference levels



The impact of air pollution on human health is of growing concern as research unravels more links between air pollution and serious medical problems among various age groups – diabetes, neuro-development disorders and preterm birth and low birth weight, among others (WHO, 2015)

预览已结束，完整报告链接和二维码如下：
https://www.yunbaogao.cn/report/index/report?reportId=5_1548