

Air Pollution Series

Actions on Air Quality in Europe and Central Asia

Executive Summary

UN 
environment
programme

50 
1972-2022

The challenge with air pollution

Air pollution is the single greatest environmental risk factor for premature death globally. In response to the global threat posed by air pollution, the United Nations Environment Programme (UNEP) has been increasing its engagement in air quality issues since 2014. One of the UNEP engagements on air quality is to produce a recurring global summary of the air quality problem and its trends, as well as the policies and instruments implemented to reduce it. The first global summary was published in 2016 and the second is to be published in Autumn 2021. In support of this global summary, there are six regional reports (Africa, Asia-Pacific, Europe and Central Asia, Latin America and the Caribbean, North America and West Asia).

The purpose of the European and Central Asian report is to provide detailed information on emission trends and actions taken in Europe to improve air quality between 2016 and 2020, which will support the second UNEP global summary of policies and programmes to reduce air pollution. The pollutants that form the focus of the report are sulphur dioxide, nitrogen oxides, non-methane volatile organic compounds, ammonia and fine particulate matter (PM_{2.5}). To a minor extent, the report also presents an update on trends and policies for emissions of arsenic, cadmium, lead and mercury.

Although air pollution problems are more severe in other regions, they still cause problems in the pan-European region, despite the significant progress that has been made since the peak pollution years of the 1970s and 1980s. In 2018, there were some 417,000 premature deaths in Europe caused by fine particulate matter in ambient air (European Environment Agency 2020). Over the last few winters, some cities in South-Eastern Europe even had the worst air quality in the world.¹



Parking symbol for electric cars being charged
Photo credit: © Shutterstock/ moreimages

Key sources of air pollutants in Europe

Thanks to the continued strengthening of policies drawn up under the United Nations Economic Commission for Europe Convention on Long-Range Transboundary Air Pollution (referred to in this report as the "Air Convention"), European Union (EU) policies and legislation and national legislation, emissions of the most monitored air pollutants have decreased. This trend has continued in Western, Central, Eastern and South-Eastern Europe since 2010, but emissions are increasing in Central Asian countries. Looking at the entire European and Central Asian region covered in this report, there is one pollutant that stands out: ammonia. Ammonia emissions increased in all subregions between 2010 and 2017, and there is no sign of them slowing down.

If we focus on emitting sectors rather than subregions, large combustion plants are the largest emitters of sulphur dioxide and heavy metals, road transport is responsible for most of the nitrogen oxides and carbon monoxide, and residential heating produces the highest emissions of fine particulate matter. Unsurprisingly, agriculture is almost solely responsible for emissions of ammonia.

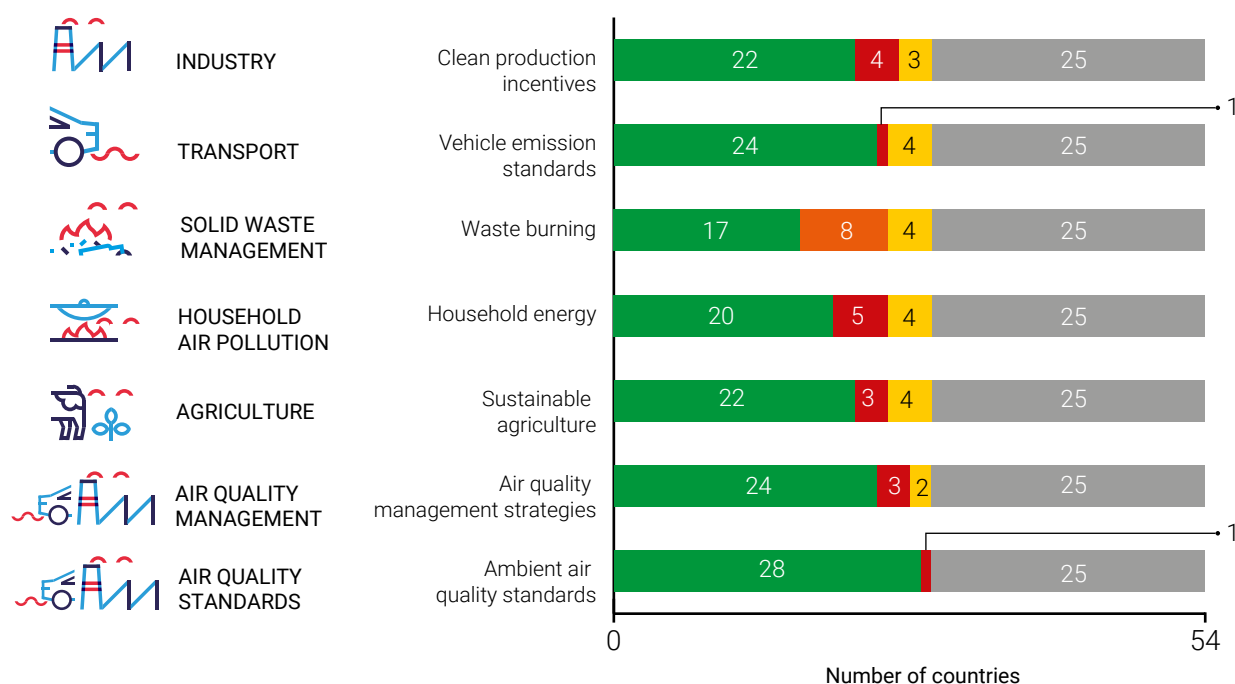
Actions taken in Europe

Several actions have been taken in European countries to further improve air quality and, since 2016, there have been several indications that efforts are increasing (Figure 1).

¹ <https://rs.n1info.com/english/news/a582617-air-visual-belgrade-most-polluted-world-city/>

Figure 1. Progress towards adoption of key actions that can significantly improve air quality²

Where is Europe and Central Asia in taking action to improve air quality?



Source: UNEP survey data

1. Sectoral Measures

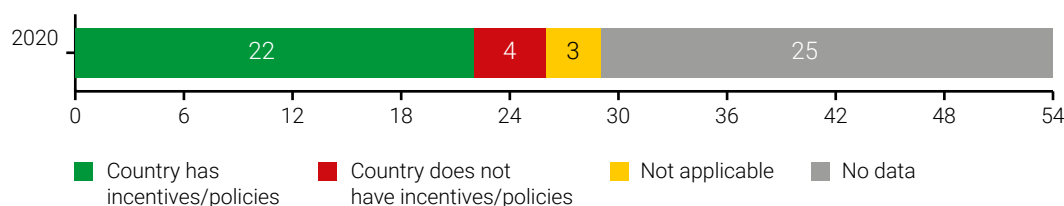
There is no clear trend in emissions across Europe with regard to countries' own reporting of their industrial emissions. Except for Western and Central Europe, industrial emission trends are mixed and vary by pollutant and region

In order to reduce emissions of air pollutants and heavy metals from industrial production, 76 per cent of the 29 respondents had incentives and/or policies to promote cleaner production, energy efficiency and pollution abatement in industry (see Figure 2) in 2020. At least two countries have started to implement clean production incentives since 2016.

The emission trends reported by countries for the transport sector are similar to those for the industrial sector, varying from positive to negative depending on region and pollutant. The most significant apparent deviation is the sharp increase in sulphur dioxide emissions in South-Eastern Europe

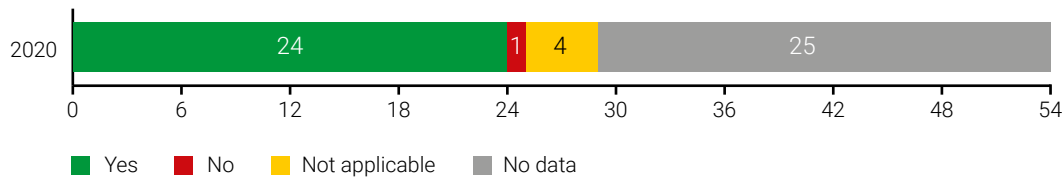
With regard to pollutant sources in transport, at least 43 countries mandate specific vehicle emission standards for newly sold vehicles. Of these, one country did not report mandatory emission standards in 2016 and four countries have implemented more strict mandates since 2016, and all respondents now report having at least Euro 4 (or equivalent) vehicle emission standards. Other measures commonly adopted over the last five years include the promotion of electric mobility and increased efforts in terms of vehicle inspection and maintenance programmes.

Figure 2. Countries with incentives or policies promoting cleaner production, energy efficiency and pollution abatement for industries



Source: UNEP survey data

² From the analysis of UNEP data, a set of key policy actions were identified that, if adopted, would significantly improve air quality. The figure indicates how many countries have adopted these policies (green), are on their way to adopting them (orange) or have yet to adopt or implement them (red). Grey indicates that no data were available. For the Europe and Central Asia analysis yellow indicates countries with incomplete survey responses.

Figure 3. Countries with national vehicle emission standards

Source: UNEP survey data

Emissions from waste management are relatively low in the European and Central Asian region compared to other sectors

The survey results indicate that waste management practices vary across Europe. Only 17 of the countries (11 EU member states) indicated that open burning of waste is strictly regulated, while eight countries reported that open burning is regulated but still practised (three EU member states) (see Figure 4). EU member states are subject to agricultural waste burning regulations under the National Emission reduction Commitments Directive and the Common Agricultural Policy, as well as the EU Waste Framework Directive (Directive 2008/98/EC). The existence of these EU regulations means that at least 38 European countries have strict (but somewhat flexible) bans, corresponding to six more countries than in 2016. Nevertheless, open burning of waste is still practised in several European countries.

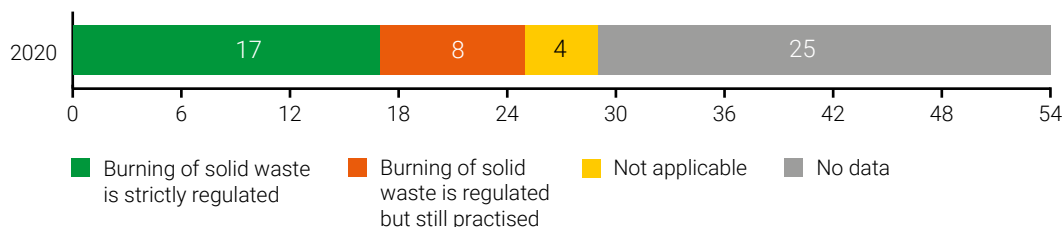
With the dual use of fuel in the residential sector, it is worth noting that residential heating in Europe is the main source of air pollution while residential cooking plays a less significant role

Together with road traffic, emissions from residential heating are one of the main sources of human exposure to pollution. With regard to actions to reduce emissions

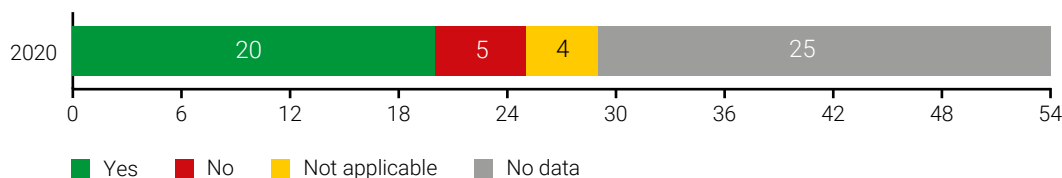
from residential heating, the survey indicates that 70 per cent of respondents reported having national programmes promoting the use of clean energy for cooking and heating, a rate unchanged from 2016 (see Figure 5). The most common focus of these programmes is on increased energy efficiency in buildings. Actions to reduce emissions in households are also the most diverse compared to actions in other sectors and there are several interesting examples worth mentioning: Monaco is introducing bans on certain fuels by 2022 as well as new energy regulation for buildings; Norway is phasing out the use of oil boilers for heating in larger buildings by banning them from 2020; and anti-smog resolutions are to be implemented in different subnational regions/agglomerations in Poland.

Agricultural emissions of ammonia are still increasing or remaining stable in all parts of Europe, despite being regulated by both the Air Convention and the EU National Emission reduction Commitments Directive

Agricultural emissions are more difficult to control than other sources, mainly due to the large areas over which much of the emissions occur. Nevertheless, 75 per cent of respondents reporting that they promote sustainable agricultural practices (see Figure 6).

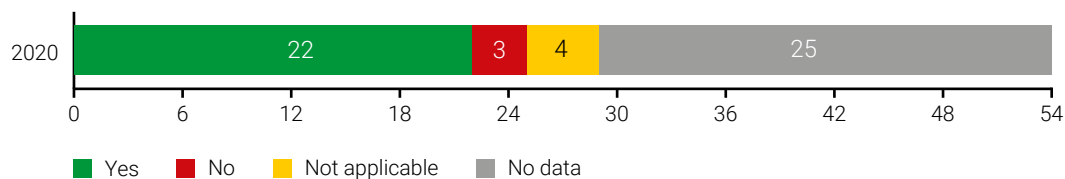
Figure 4. Countries with solid waste burning regulations

Source: UNEP survey data

Figure 5. Countries with national clean residential energy programmes

Source: UNEP survey data

Figure 6. Countries with incentives promoting sustainable agriculture practices (such as livestock manure management and use of organic fertilizers)



Source: UNEP survey data

For many of the key emission sectors, there has been active engagement in taking action to reduce emissions. The survey results indicate, however, that there is a need to step up efforts to reduce emissions from domestic solid fuel burning and waste management and, most importantly, to reduce ammonia emissions from the agricultural industry.

2. Non-sectoral air quality management actions

While action across the key sectors discussed above will significantly reduce air pollution, the 2016 assessment found gaps in the integration and strengthening of air pollution management strategies. In order to address these gaps and assess progress going forward, the 2021 report introduces two key air pollution management aspects in its analysis: (i) air quality management strategy; and (ii) air quality monitoring.

Within the European and Central Asian region, 83 per cent of countries state that they have a national air quality management strategy

All EU and Schengen Area member states fall under the Ambient Air Quality Directive and therefore need to have a strategy if they don't fall in line with the limit values for air quality. As such, at least 42 countries have air quality management strategies. In addition to national air quality frameworks, 69 per cent of the countries state that they have a subnational clean air action plan at the regional or city level, which are often associated with large urban and industrial regions. Some countries, such as Belgium, Switzerland and the Netherlands, have regional air quality plans for all regions in the country, while others, such as Spain, Serbia and Finland, have plans for one or more specific areas.

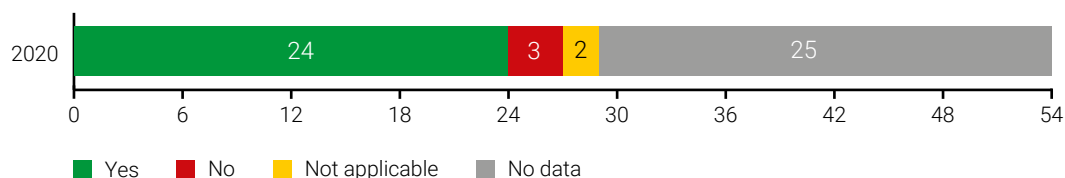
The survey responses show that almost all respondents have ambient air quality standards (see Figure 8). Given that the EU Ambient Air Quality Directive is in effect, all EU

Subnational action on air quality

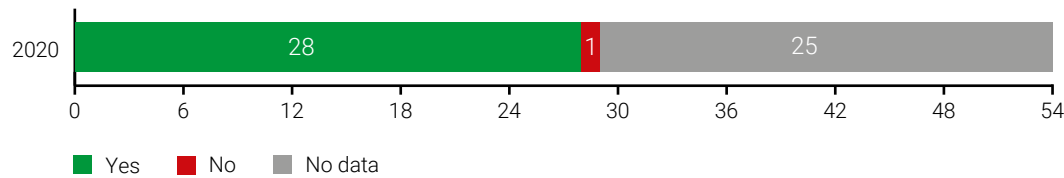
While many countries are establishing comprehensive air quality management planning programmes, many states, cities and businesses are taking action on their own. This has resulted in a wide array of air quality plans, citizen-science air quality initiatives, and integrated planning efforts that are sometimes breaking new ground for national governments to follow as "laboratories for innovation". For example:

- The EuroCities network of 139 cities in 39 countries across Europe supports cities in their efforts to improve the environment and work towards achieving sustainable development by sharing knowledge and expertise. The network has piloted innovative approaches to cleaner air, including low emission zones, socio-spatial pollution mapping, non-motorized transport and climate-neutral transportation zones.

Figure 7. Countries with a national air quality management strategy, framework or plan of action in place



Source: UNEP survey data

Figure 8. Countries with ambient air quality standards embedded within a legal instrument

Source: UNEP survey data

and Schengen Area member states should be considered to have air quality standards. With this assumption, the indication is that at least 46 countries in Europe have national ambient air quality standards. Out of the survey respondents, one country has implemented a standard since 2016. Air quality monitoring is well established among the respondents and includes PM₁₀, SO₂, NO_x and O₃ in all cases and PM_{2.5} in almost all cases.

Conclusions

There are large variations with regard to how engaged countries are in their efforts to improve air quality. EU member states and Norway, the UK and Switzerland, with the largest past emission reductions, are also those with well-developed air quality monitoring and assessment infrastructure. These countries also report the largest portfolio of additional actions to reduce emissions in a cost-effective manner, including investments in energy efficiency improvements and clean technologies.

Awareness of and progress in efforts to improve air quality assessment infrastructure in Eastern and South-Eastern Europe and Central Asia are improving, and there are several examples of knowledge-sharing initiatives and capacity-building efforts. In Eastern Europe in particular, air quality assessment infrastructure is now almost on par with that in Central and Western Europe.

To reduce the risk of an increased human health divide in the region due to air quality, it is important to ensure reliable air quality monitoring and assessment infrastructure in all countries, along with reporting on progress and the establishment of prospective emission scenarios. Many Eastern and South-Eastern European countries can focus on accelerating the introduction of low-emission road vehicles and reducing emissions from residential heating, and all countries need to increase efforts to reduce emissions of ammonia.

Convention on Long-range Transboundary Air Pollution (CLRTAP)

This 1979 convention was the first multilateral agreement to address transboundary air pollution. It created a regional framework to address environmental problems in the United Nations Economic Commission for Europe (UNECE) region related to transboundary air pollution and to better understand air pollution science. With 51 parties across the northern hemisphere at present, CLRTAP has contributed to a dramatic decline in air pollution emissions (particularly sulphur emissions) in the region, and economic growth and air pollution trends have been progressively decoupled.

More than 40 years after it was introduced, the convention continues to adapt successfully. This includes through amendments that have strengthened many of the protocols that parties to the convention continue to ratify and implement.

The convention's solid scientific underpinning was important in terms of air pollution abatement. It was established by developing a common knowledge base, including scientific infrastructure aimed at joint monitoring and modelling programmes, which includes an extensive international network of scientists from various disciplines. By providing a platform for scientists and policymakers to exchange information, the convention has led to innovative approaches and created mutual trust and learning. A new coordinating group of the countries in the Eastern Europe, the Caucasus and Central Asia (EECCA region) has enhanced these countries' joint efforts to ratify CLRTAP protocols. A capacity-building programme has resulted in notable progress in the EECCA countries' involvement in the convention's work, building on the long history of progress under CLRTAP.

(Source: US Department of State, UNECE's European Regional Report)



Smoking chimneys in Szczecin city at sunrise indicate burning of wood and coal in old home heating systems. Residents in many Polish cities complain of increasing health problems due to air pollution.
Photo credit: Shutterstock/ Maciej Bledowski

