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# Air Quality in Kosovo: Towards European Standards

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# Air Quality in Kosovo: Towards European Standards


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Zhvillimi i Qëndrueshëm
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## Introduction

Air pollution causes **9 million deaths in the world every year**, which is the equivalent to ¼ of total deaths[1]. Globally, mortality due to air pollution reaches up to 120 deaths for 100,000 inhabitants, while at the European level, it is up to 133 deaths for 100,000 inhabitants. In Pristina, data provided by the Kosovo Environmental Protection Agency (KEPA) show that the air in "unhealthy" 50% of the time, "very unhealthy" 20% of the time, and "hazardous" 5% of the time[2]. When categorized as very unhealthy or hazardous, the entire population may or is likely to experience serious health effects[3].

Quality of the air is part of the acquis that countries have to comply with before entering the European Union as it is part of the **chapter 27 of the negotiations**. The chapter 27, labeled as the Environment chapter, stipulates that:

> "*EU environment policy aims to promote sustainable development and protect the environment for present and future generations […]. The acquis comprises over 200 major legal acts covering horizontal legislation, water and air quality, waste management, nature protection, industrial pollution control and risk management, chemicals and genetically modified organisms (GMOs), noise and forestry. Compliance with the acquis requires significant investment*"[4].

Air pollution is thus one of the issues that Kosovo will have to work on to ensure its membership in the European Union.

Legally, the EU defines pollution as *"the direct or indirect introduction, as a result of human activity, of substances, vibrations, heat or noise into air, water or land which may be harmful to human health or the quality of the environment, result in damage to material property, or impair or interfere with amenities and other legitimate uses of the environment"*[5].

Air pollution can thus be defined as *"any substance emitted into the air from an anthropogenic [produced by human activity], biogenic [natural emissions from the living world: forests, swamps], or geogenic source [natural emissions from the non-living world: volcano, natural fire], that is either not part of the natural atmosphere or is present in higher concentration than the natural atmosphere […] may cause a short-term or long-term adverse effect"*[6]. It is important to highlight that human activity also interferes with increased natural emissions, as is for instance the case of human activity influencing natural emissions with the use of fertilizers in agriculture, hence resulting in increased biogenic emissions.

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[1] SCUTTI, S. "Pollution linked to 9 million deaths worldwide in 2015", CNN (2017): https://edition.cnn.com/2017/10/19/health/pollution-1-in-6-deaths-study/index.html
[2] TECHENE, F. "Pristhina is breaking records – for air pollution", Prishtina Insight (2017): https://prishtinainsight.com/prishtina-breaking-records-air-pollution/
[3] "Air Quality Monitor for Pristina", U.S Embassy in Kosovo: https://xk.usembassy.gov/embassy/pristina/air-quality-monitor-pristina/
[4] "Chapters of the acquis", European Neighbourhood Policy and Enlargement Negotiations: https://ec.europa.eu/neighbourhood-enlargement/policy/conditions-membership/chapters-of-the-acquis_en
[5] Directive 2010/75/EU of the European Parliament and of the Council on industrial emissions (integrated pollution prevention and control)
[6] DALY, A and ZANNETTI, P, "An introduction to air pollution – definitions, classifications, and history", ASST and the EnviroComp Institute (2007): http://www.envirocomp.org/books/chapters/1aap.pdf

This research paper provides an assessment of where Kosovo stands regarding European Union standards on air quality, which is complemented with a set of concrete recommendations as to what actions need to be taken to fulfill EU criteria and facilitate the EU accession process.

## Air quality at glance

### 1. Main pollutants and sources of pollution

Air pollutants can be classified in two categories. The first category relates to the primary pollutants, which are emitted directly through the atmosphere. The other categories are secondary pollutants, which are not directly emitted from sources but are rather emitted in the atmosphere from primary pollutants through reactions[7].

The main pollutants we can find in Europe are the following:

| | |
|---|---|
| **Particulate matter (PM)** | Fine dust, emitted by road vehicles, shipping, power generation and households, and from natural sources such as sea, salt, wind-blown soil and sand; it is both a primary and secondary pollutant. |
| **Carbon dioxide ($CO_2$)** | Product of the combustion of fuel such as natural gas, coal and wood. |
| **Sulfur oxides ($SO_x$)** | Emitted by power generation, industry, shipping and households, it contributes to the creation of PM. |
| **Nitrogen oxides ($NO_x$)** | Emitted by road vehicles, shipping, power generation, industry and households, it contributes to the creation of PM and $O_3$. |
| **Ammonia ($NH_3$)** | Emitted by activities linked to manure and fertilizers management in agriculture and the use of fertilizers, it contributes to the creation of PM. |
| **Volatile organic compounds (VOC) and Non methane volatile organic compounds (NMVOC)** | Emitted from solvents in products and industry, road vehicles, household heating and power generation, it contributes to the creation of $O_3$. |
| **Methane ($CH_4$)** | Emitted by natural sources such as wetlands, as well as human activities such as leakage from natural gas systems and the raising of livestock, it contributes to the creation $O_3$ and greenhouse gas. |
| **Ground level ozone ($O_3$)** | Secondary pollutant produced by complex chemical reactions of $NO_x$ and VOCs in sunlight. |

Most common pollutants found in Europe[8]

While, according to the European Environmental Agency, the main sources of pollution are[9]:

- **Transport** (road, air, rail sea and inland water transport)
- **Commercial**, institutional and households
- **Energy** (production and distribution)
- **Industry** (energy use in industry, industrial processes and product use)
- **Agriculture**

[7] Ibid
[8] "Questions and answers on the EU Clean Air Policy Package", European Commission (2013): http://europa.eu/rapid/press-release_MEMO-13-1169_en.htm
[9] "Air Quality in Europe", European Environmental Agency Report No 12/2018 (2018): https://www.eea.europa.eu/publications/air-quality-in-europe-2018

- **Waste**

In Kosovo, the main sources of pollution are the following[10] [11]:

- Kosovo Energy Corporation (KEK): **The two coal (lignite)-burned thermal power plants** in Obiliq, that are active all year, continuously contributing to the exposure of population to CO2, SO2, NO2, O3, PB, dust, smoke, diovins and PM,
- **Road transport**, mainly within cities. High intensity of traffic and its common congestion in city centers, combined with increased population density, lead to the high contribution of transport to total population exposure,
- **Wood and coal** as the main sources of household energy, district heating systems (Termokos),
- **Industries**: complex in Mitrovice, Ferronikeli in Gllogovc, cement factory SharrCem in Hani i Elezit, factory of industrial chemistry and rubber Ballkan in Suhareke, basic heavy industry which actually is not operating (Gjakovë, Pejë, Gjilan),
- **Agriculture,**
- **Waste.**

[10] "Healthier Kosovo", World Health Organization, United Nations Development Program and United Nations Volunteers (2017): http://www.ks.undp.org/content/dam/kosovo/docs/HK/EH_Kosovo_Joint_Programme_Final.pdf

[11] "State of the Air Report", Ministry of Environment and Spatial Planning and Kosovo Environmental Protection Agency (2017): http://www.ammk-rks.net/repository/docs/raporti_i_ajrit__anglisht_18122012.pdf

## 2. Impact of air pollution

Air pollution has manifold negative impacts and those mainly pertain to health, environment, but also on economic prospect.

### a) Air pollution and health implications

Air pollution risks for health are mostly linked with PM concentrations, especially the PM2.5, that was classified as **carcinogenic** by the International Agency for Research on Cancer (IARC). PM2.5 penetrate deeper into the lungs, and are known to contribute to **respiratory diseases**, **cardiovascular diseases and lung cancer**. Carbon dioxide also contributes to lung diseases, as well as ozone, which also to decrease lung function and, aggravate asthma[12].

On the other hand, air pollution is a major cause of premature deaths and various diseases, mainly heart diseases, stroke, lung disease and cancer and asthma[13]. Maternal exposure to ambient air pollution also has impact on fertility and health of newborns and children. There is also evidence that exposure to air pollution could be associated with type 2 diabete, obesity, systemic inflammation, ageing, Alzheimer's disease and dementia. At the same time, it is the **single largest environmental health risk in Europe**.

In Kosovo, a study was conducted by the World Health Organization (WHO) on exposure to PM, in order to calculate health effects on the population[14]. This study shows that the **crude death rate due to air pollution in Kosovo is 6 people out of 1,000 deaths**. In Pristina, this study correlates the number of people admitted to the hospital monthly for cardiovascular disease, with the concentration of PM in the air. It shows that admissions are higher during winter, which is also when the emission of PM is the highest. Air pollution in Kosovo is estimated to cause 835 premature deaths per year.

Other effects of air pollution in Kosovo include acute respiratory diseases, worsening of the condition of patients suffering from heart, respiratory diseases and asthma, cancer caused directly by pollutants, impacts on the eye or nose irritation as well as stress and loss of general welfare[15]. Each year, air pollution causes 310 new cases of chronic bronchitis, 600 hospital admissions and 11,600 emergency visits[16].

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[12] Questions and answers on the EU Clean Air Policy Package, European Commission (2013): http://europa.eu/rapid/press-release_MEMO-13-1169_en.htm

[13] "Air Quality in Europe", European Environmental Agency Report No 12/2018 (2018): https://www.eea.europa.eu/publications/air-quality-in-europe-2018

[14] FABERI, M. and RAMADANI, Q. "Assessment of the current public health vulnerabilities due to climate change in Kosovo", UNDP (2014): http://www.ks.undp.org/content/dam/kosovo/docs/SLED/Assessment%20of%20the%20current%20public%20health%20vulnerabilities%20due%20to%20climate%20change%20in%20Kosovo%20Final.pdf

[15] DRESHAJ, A., MILLAKU, B., SHALA, S., SELIMAJ, A. and SHABANI, H. "Sources of air pollution, environmental impacts and exploitation of natural resources in Kosovo" CBU international conference on innovations in science and education (2017): https://www.researchgate.net/publication/320491788_SOURCES_OF_AIR_POLLUTION_ENVIRONMENTAL_IMPACTS_AND_EXPLOITATION_OF_NATURAL_RESOURCES_IN_KOSOVO

[16] "Kosovo Country Environmental Analysis: cost assessment of environmental degradation, institutional review, and public environmental expenditure review", World Bank: http://siteresources.worldbank.org/INTKOSOVO/Resources/KosovoCEA.pdf

## b) Air pollution and environment

Air pollution also has important environmental impacts and it affects directly vegetation and fauna[17].

Nitrogen oxides and ammonia emissions are leading to **eutrophication** of freshwaters. Eutrophication is when large amounts of nutrients stimulate the growth of plants and algae more than the usual supply of nutrients should have. This lead to changes in the diversity of species as the dense growth of plants in water will kill fish, marine animals and affect other plants[18].

Nitrogen oxides and sulfur oxides from the burning of fossil fuels are causing **acidification** of soils and acid rain as they combine with water in the atmosphere and fall back into the ground. It will then make soils and bodies of water unsuitable for life provoking a biodiversity loss.

Ozone damages **agricultural crops, forests and plants** by reducing vegetation's uptake of carbon dioxide, and has negative impacts on **biodiversity and ecosystems**. The fact that ozone is being destroyed by chemicals and is not protecting the Earth from the sun's ultraviolet is both harming for human and environment. Air pollutants like ozone and PM constituents are also contributing to **global warming**.

Air pollution is also damaging **the built environment,** and thus building and artworks, through corrosion, biodegradation, soiling, weathering and fading of colors. Acid rain speeds up the decay of building, statues and historical landmarks[19].

## c) Economic impact

These effects on health and environment also create considerable **market costs:** reduced labor productivity, additional health expenditure, crop yield losses. These costs are projected to lead to a global annual economic cost of 1% of the global GDP by 2060. In the EU, this cost may be of 2.7%, while it will be of 2% in the rest of Europe[20].

In addition, air pollution also leads to **non-market costs** created by the increased rate of morbidity and diseases. These costs, also called welfare costs, are how much people are willing to pay to reduce health risks. In 2015, welfare costs linked to premature death were estimated to be of 3 trillion dollars. In 2060, the OECD projected that it will be of 18-25 trillion. The welfare costs associated with illness are projected to go from 300 billion to 2.2 trillion in 2060[21].

In total, premature deaths and chronic illnesses provoked by Western Balkan coal plants pollution cost both health systems and economies between 6.1 and 11.5 billion of euros. The EU bears most

[17] "Air Quality in Europe", European Environmental Agency Report No 12/2018 (2018): https://www.eea.europa.eu/publications/air-quality-in-europe-2018
[18] "How does air pollution affect the environment?", Reference: https://www.reference.com/science/air-pollution-affect-environment-d088916c095b24ea
[19] Ibid
[20] "The economic consequences of outdoor air pollution", OECD (2016): https://read.oecd-ilibrary.org/environment/the-economic-consequences-of-outdoor-air-pollution_9789264257474-en#page17
[21] Ibid

of the burden (between 3.1 and 5.8 billion), while Western Balkans are estimated to pay between 1.9 and 3.6 billion every year[22].

In Kosovo, the cost of health effects caused by outdoor air pollution in urban areas has an estimated impact ranging from €37 to €158 million per year, which is the equivalent to 0.89 to 3.76% of the country's GDP.[23]

[22] MATKOVIC, V., JONES, D., MOORE, C., MULLUVIRTA, L., GIERENS, R., KALABA, I., CIUTA, I. GALLOP, P. and RISTESKA, S. "Chronic coal pollution: EU action on the Western Balkans will improve health and economies across Europe", Europe beyond coal campaign (2019): https://www.env-health.org/wp-content/uploads/2019/02/Chronic-Coal-Pollution-report.pdf

[23] "Kosovo Country Environmental Analysis: cost assessment of environmental degradation, institutional review, and public environmental expenditure review", World Bank: http://siteresources.worldbank.org/INTKOSOVO/Resources/KosovoCEA.pdf

## Legal framework

### 1. European legislation on Air Quality

The European legislation on air quality is the following[24]:

- The **Directive 2008/50/EC** on ambient air quality and cleaner air for Europe, merging (and thus repealing) all previous legislation except the fourth Daughter Directive
- The **Directive 2004/107/EC**, relating to arsenic, cadmium, mercury, nickel and polycyclic aromatic hydrocarbons in ambient air (also called the Fourth Daughter Directive)
- The **Commission Implementing Decision 2011/850/EU,** laying down rules for directives 2008/50/EC and 2004/107/EC regarding the reciprocal exchange of information and reporting on ambient air quality
- The **Directive 2015/1480/EC,** amending annexes to directives 2008/50/EC and 2004/107/EC concerning reference methods, data validation and location of sampling points for the assessment of ambient air quality

According to this legislation, the limit of concentration for each of the pollutants is stated in the table below:

| Pollutant | Concentration | Period | Permitted exceedances each year |
|---|---|---|---|
| PM2.5 | 25 µg/m$^3$ | 1 YEAR | / |
| PM10 | 50 µg/m$^3$ | 1 DAY | 35 |
| | 40 µg/m$^3$ | 1 YEAR | / |
| Sulfur dioxide ($SO_2$) | 350 µg/m$^3$<br>Alert: 500 µg/m$^3$ | 1 HOUR | 24 |
| | 125 µg/m$^3$ | 1 DAY | 3 |
| Nitrogen dioxide ($NO_2$) | 200 µg/m$^3$<br>Alert: 400 µg/m$^3$ | 1 HOUR | 18h |
| | 40 µg/m$^3$ | 1 YEAR | / |

[24] "Air Quality – Existing legislation", European Commission (2018): http://ec.europa.eu/environment/air/quality/existing_leg.htm

| | | | |
|---|---|---|---|
| Carbon monoxide (CO) | 10 μg/m$^3$ | 8 HOURS max | / |
| Ozone ($O_3$) | 120 μg/m$^3$<br>Alert: 240 μg/m$^3$ | 8 HOURS max | 25 a year, averaged over 3 years |

Air quality standards according to the European legislation[25]

## 2. Legislation in Kosovo and degree of compliance with EU laws

In Kosovo, laws that have been adopted create a well-developed legislative framework that incorporates EU norms into the national legal framework.

The law on Environmental Protection No. 03/L-025 aims to *"promote the establishment of healthy environment for population of Kosovo by bringing gradually the standards for environment of European Union"*[26]. The law on Air Protection No. 2004/30 recognizes the need to harmonize environmental standards in Kosovo with those of the EU[27], in order to *"regulate and guarantee the rights of citizens to live in a healthy and clean air environment, whilst protecting human health, fauna, flora and natural and cultural values of the environment"* (law on Air Protection from Pollution No. 03/L-160[28]).

The law No. 03/L-043 on integrated prevention pollution control aims to prevent or reduce emissions polluting the air, water and land[29]. Both environmental impact assessment No. 03/L-214[30] and Law No. 03/L-024[31] assess effects of a project on the air.

Finally, the administrative instruction on limited values of air quality Nr. 02/2011, which aims to "define and establish objective for environmental air quality designed to avoid, prevent or reduce harmful effect on human health and the environment", established the Ministry of Environment and Spatial Planning as the competent authority for assessing air quality, and set the reference methods and criteria that are specified in the EU Directive 2008/50/EC and 2004/107/EC[32].

The administrative instruction 15/2010[33] defines criteria for the implementation of the air quality monitoring system. Administrative instructions 21/2013 and 08/2016 define allowed norms of discharge on air by polluters.

[25] "Air quality standards", European Commission (2018): http://ec.europa.eu/environment/air/quality/standards.htm
[26] "Law No. 03/L-25 on environmental protection", Assembly of Republic of Kosovo
[27] "Law No. 2004/30 on air protection", Assembly of Republic of Kosovo
[28] "Law No. 03/L-160 on air protection from pollution", Assembly of Republic of Kosovo
[29] "Law No. 03/L-043 on integrated prevention pollution control", Assembly of Republic of Kosovo
[30] "Law No. 03/L-214" on environmental impact assessment", Assembly of Republic of Kosovo
[31] "Law No. 03/L-024 on environmental impact assessment", Assembly of Republic of Kosovo
[32] "Registry of the secondary legislations in power approved by the government and the ministers", Republic of Kosovo (2019): http://kryeministri-ks.net/wp-content/uploads/2019/04/REGJISTRI-I-AKTEVE-NENLIGJORE.-P%C3%ABrditesuar-m%C3%AB-17.04.2019.pdf
[33] Ibid

More recently, the Strategy on Air Quality 2013-2022 set the measures to be implemented for the next ten years: implementation of the existing air legislation, reduce emissions from individual sources, reduce emissions from mobile sources, reduce greenhouse gas emissions, and reduce emissions from public activities[34].

The air standards of Kosovo are thus the same as those of the European Union in the legislation; but the degree of implementation of the laws differs significantly. Respectively, Kosovo lags behind in terms of the implementation and compliance with own legislation.

[34] Ibid

## Quality assessment

### 1. State of the air in Kosovo

Only the main pollutants are controlled in Kosovo: particulate maters (2.5 and 10), ozone ($O_3$), carbon monoxides (CO), sulfur dioxide ($SO_2$) and nitrogen dioxide ($NO_2$). The results of the monitoring systems are, in all documents, compared with the 2008/50/EC European Directive.

According to the Air Quality Report from November and December 2016 and January 2017, the concentration of $SO_2$, CO, $NO_2$ and $O_3$ did not exceed the limit values, though their concentration is still higher during those months compared to the rest of the year[35].

But exceedances are recorded concerning particulate matters. As the monitoring system took a long time to be implemented and is not always functioning, it is hard to know exactly the concentration of PM in Kosovo. Taking into account the annual reports on the state of environment[36] and on the state of the air[37] from the Ministry of Environment and Spatial Planning together with the Kosovo Environmental Protection Agency, we come to the following findings:

| Year | Annual average value of PM10 (µg/m$^3$) | Exceedance days |
|---|---|---|
| 2015 | **40.38** | 73 |
| 2016 | **30.0** | 53 |

Concentration of PM10 and days exceeding the limit value in Kosovo throughout the years. According to the Directive 2008/50/EC, the limit value for PM10 is 40 µg/m$^3$ per year, and 50 µg/m$^3$ per day. 35 days of exceedance are allowed.

The lack of data from the monitoring system does not allow us to analyze the concentration of PM10 before 2015, which gives us only very few empirics.

In 2015, the concentration of PM10 throughout the year was of 40.38 µg/m$^3$, which is only slightly above the limit value of 50 µg/m$^3$. It then gets under the limit value in 2016. But the daily value is more frightening, especially in winter. In 2016, there has been 73 days during which the daily limit value of 50 µg/m$^3$ was exceeded. Even if there are fewer exceedance days in 2016, there is still 53

[35] "Air quality report for the time period of November – December 2016 and January 2017", Kosovo Environmental Protection Agency (2017): http://www.ammk-rks.net/repository/docs/Report_on_air_quality_november_january.pdf

[36] "Annual report state of the environment in Kosovo", Ministry of Environment and Spatial Planning and Kosovo Environmental Protection Agency (2017): https://www.ammk-rks.net/repository/docs/Raporti_i_mjedisit_2016_web_format_eng_22817.pdf

[37] "State of the air report", Ministry of Environment and Spatial Planning and Kosovo Environmental Protection Agency (2012): http://www.ammk-rks.net/repository/docs/raporti_i_ajrit__anglisht_18122012.pdf

days, which is 18 day more than the 35 authorized exceedance days. And most of the days where the limit is exceeded, it does so by far. During the month of January 2017, seven days showed the double of the PM10 authorized concentration (100 μg/m$^3$). The maximum value registered was on the 29$^{th}$ of January: 254.9 μg/m$^3$ [38], which is more than 5 times the daily limit value.

It is worthwhile noting that the World Health Organization recommendation for the limit value are even lower than what the EU is implementing, stating the yearly limit should be of 20 μg/m$^3$.

| **Year** | **Annual average value of PM2.5 (μg/m$^3$)** |
|---|---|
| 2015 | **30.18** |
| 2016 | **27.81** |

Concentration of PM2.5 throughout the years. According to the Directive 2008/50/EC, the limit value for PM2.5 is 25 μg/m$^3$ [39].

Here again, the lack of data due to the late implementation of the monitoring system only gives us a few data to analyze. We can only notice that during the years 2010 and 2011, where the monitoring system was only recording data from the Pristina Rilindja station, and in 2015 and 2016 with a functioning system in the whole country, the concentration of PM2.5 is always above the yearly limit value of 25 μg/m$^3$.

Comparing to the WHO guidelines on air pollution, the results are even more dangerous. The World Health Organization[40] recommends a concentration below the level of 10 μg/m$^3$ per day for PM2.5. During the month of January 2017, at least 29 days showed a concentration of PM2.5 above this limit.

[38] "Air quality report for the time period of November – December 2016 and January 2017", Kosovo Environmental Protection Agency (2017): http://www.ammk-rks.net/repository/docs/Report_on_air_quality_november_january.pdf
[39] Ibid
[40] "Ambient (outdoor) air quality and health", World Health Organization (2018): https://www.who.int/news-room/fact-sheets/detail/ambient-(outdoor)-air-quality-and-health

## 2. Emissions of pollutants by sector

Energy, industry, transportation, agriculture and waste are considered as major sources of pollution. Operators who have their own monitoring system within their industrial areas provide their own data. Information from KEC, Sharrcem and Ferronikeli are available on the Annual Report on the State of the Environment in Kosovo from 2011-2012[41], 2015[42] and 2017[43], and on the State of the Air report from the year 2012[44].

Information on pollution from the transportation and agriculture sectors are available, but there is no such thing on pollution coming from waste.

According to the European Directive 2001/80/EC and the Administrative Instruction No. 06/2007 on air emission rules and norms from non-portable sources of large combustion, the limit from polluters are the following:

- For sulfur dioxide ($SO_2$): 400 µg/Nm$^3$
- For nitrogen oxides ($NO_x$): 500 µg/Nm$^3$
- For dust: 50 µg/Nm$^3$

### 1. Kosova Energy Corporation (KEK)

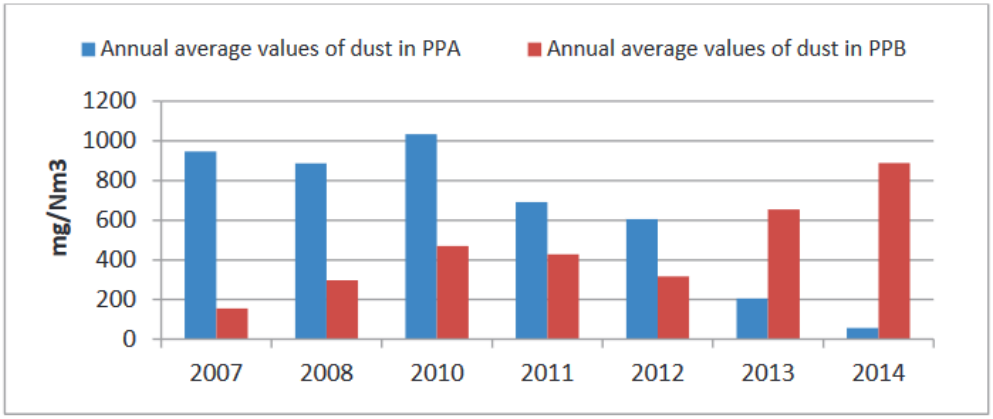



*Figure 18. Annual average values of dust in PPA and PPB during 2007 – 2014*[21]

Since 2007, emissions of dust from the power plant A (PPA) are decreasing, mostly due to the fact that the electro-filters have been changed with the financial help of the European Union. In 2014,

[41] "Report on the State of Environment 2011-2012", Ministry of Environment and Spatial Planning and Kosovo Environmental Protection Agency (2013): http://www.ammk-rks.net/repository/docs/Web_anglisht.pdf
[42] "Report State of the Environment 2015", Ministry of Environment and Spatial Planning and Kosovo Environmental Protection Agency (2015): http://www.ammk-rks.net/repository/docs/Anglisht-final.pdf
[43] Annual report state of the environment in Kosovo", Ministry of Environment and Spatial Planning and Kosovo Environmental Protection Agency (2017): https://www.ammk-rks.net/repository/docs/Raporti_i_mjedisit_2016_web_format_eng_22817.pdf
[44] "Report on the State of Environment 2011-2012", Ministry of Environment and Spatial Planning and Kosovo Environmental Protection Agency (2013): http://www.ammk-rks.net/repository/docs/Web_anglisht.pdf

the emission were just around the maximum allowed value (50 μg/Nm$^3$) for the first time[45]. On the contrary, the increase of dust emissions from the power plant B PPB) can be explained as the result of the aging of electro-filters. The maximum allowed values are being exceeded more and more each year.

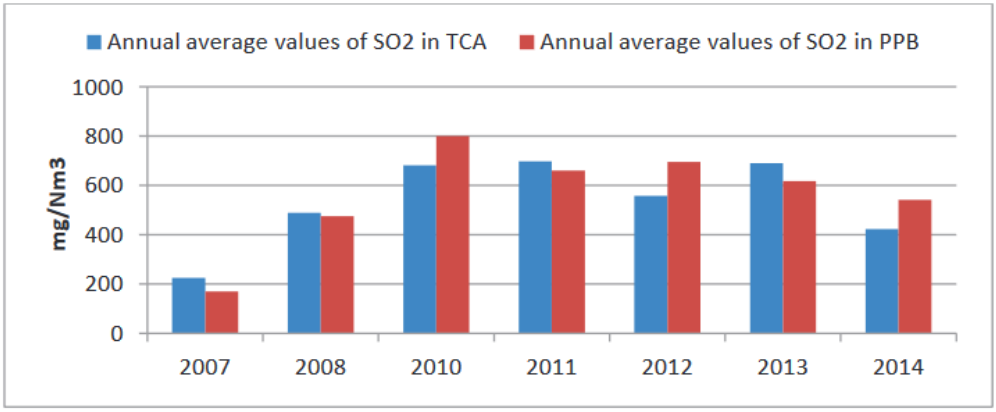



*Figure 19. The annual average values of $SO_2$ in PPA and PPB during 2007 – 2014*[22]

Emissions of SO2 from both PPA and PPB are exceeding the limit value of 400 μg/m$^3$ since 2008. Although these emissions are decreasing since 2010, the rate of improvement is really slowly. However, emissions from PPA are just above the limit value in 2014.

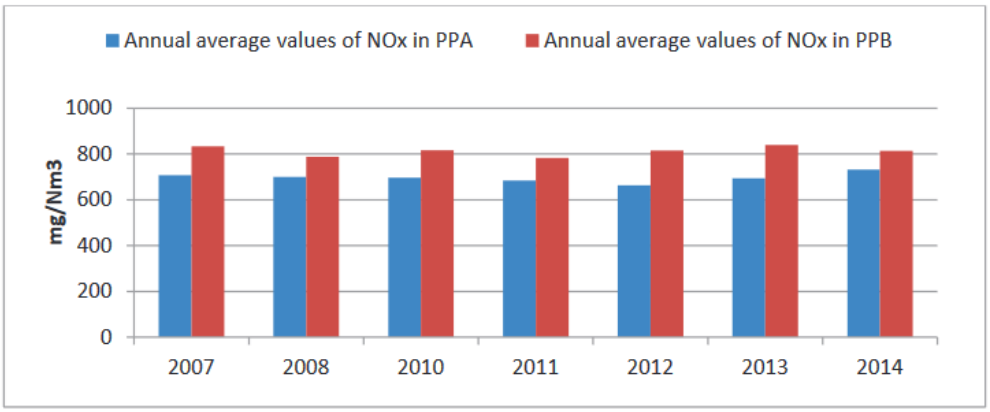



*Figure 20. The annual average values $NO_x$ in PPA and PPB during 2007 – 2014*[23]

Emission of $NO_x$ from both PPA and PPB are quite the same over the year. Both are exceeding the limit of 500 μg/Nm$^3$ by far.

## 2. Sharrcem

According to their data, Sharrcem emissions of dust, $SO_2$, $NO_x$ and $CO_2$ are below the limit values since 2012.

[45] "Report State of the Environment 2015", Ministry of Environment and Spatial Planning and Kosovo Environmental Protection Agency (2015): http://www.ammk-rks.net/repository/docs/Anglisht-final.pdf

### 3. Ferronikeli

In 2012, Ferronikeli handed its data in $\mu g/m^3$ (it is normally in $\mu g/Nm^3$), which does not allowed for comparison of results with the maximum allowed value.

Emissions of dust went from 90 $\mu g/Nm^3$ to 50 in 2014, so just about the maximum allowed value.

Emissions of $NO_x$ are below the limit value since 2013. Exceedance levels are recorded in the emissions of $SO_2$. In 2013, the emissions went up to 850 $\mu g/Nm^3$, and 600 $\mu g/Nm^3$ in 2014. The maximum value authorized is 400 $\mu g/Nm^3$.

### 4. Transportation

The public transportation in Kosovo is poorly developed. Cars remain the main mean of transport: their numbers went from 50,000 in 2006 to more than 270,000 in 2014, and there are 343,631 motor and non-motor vehicles registered in Kosovo in 2018[46]. This has substantially increased the pollution of the air from the sector of road transportation. According to the Greenhouse Gases Inventory, road transport contributes by 12% of the total emissions in the energy sector and is the second most polluting sector of the country after the industry[47].

### 5. Agriculture

Since 2000, the agricultural sector is facing two major problems: on the one hand the expansion of the urbanization, and on the other hand the growth of the population and thus the increased need for food. This led the agriculture sector to use more and more fertilizers and pesticides.

Some pesticides remain for years in water and soil, thus harming the environment, and can also be toxic for people that are exposed (cancer, adverse effects on reproduction). The population that is directly in contact, agricultural workers, is the most endangered, with people in the area when and after pesticides are spread, but even people which are not in the area can be affected, at a lower risk, through food and water[48].

[46] "Transport and Telecommunication Statistics, Q4 2018", Kosovo Agency of Statistics (2019): http://ask.rks-gov.net/en/kosovo-agency-of-statistics/add-news/transport-and-telecommunication-statistics-q4-2018
[47] "Report State of the Environment 2015", Ministry of Environment and Spatial Planning and Kosovo Environmental Protection Agency (2015): http://www.ammk-rks.net/repository/docs/Anglisht-final.pdf
[48] "Pesticide residues in food", World Health Organization, (2018): https://www.who.int/en/news-room/fact-sheets/detail/pesticide-residues-in-food

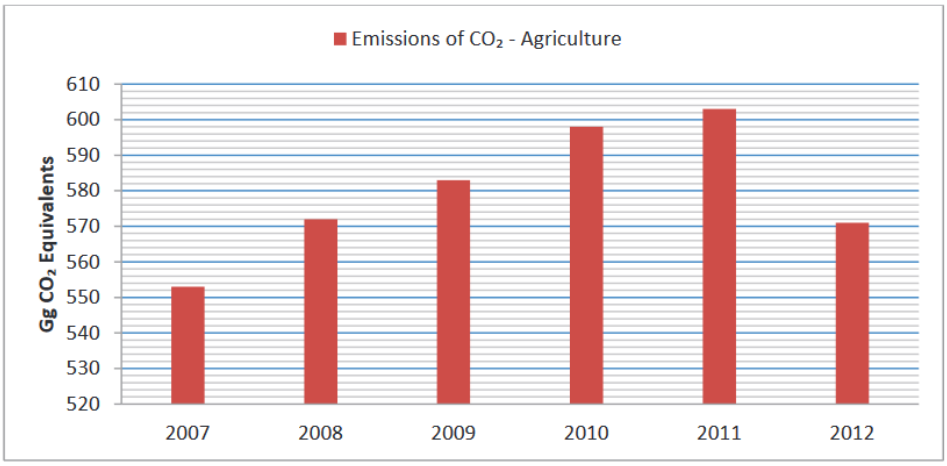



*Figure 31: Trend of emissions of $CO_2$ in the agricultural sector*

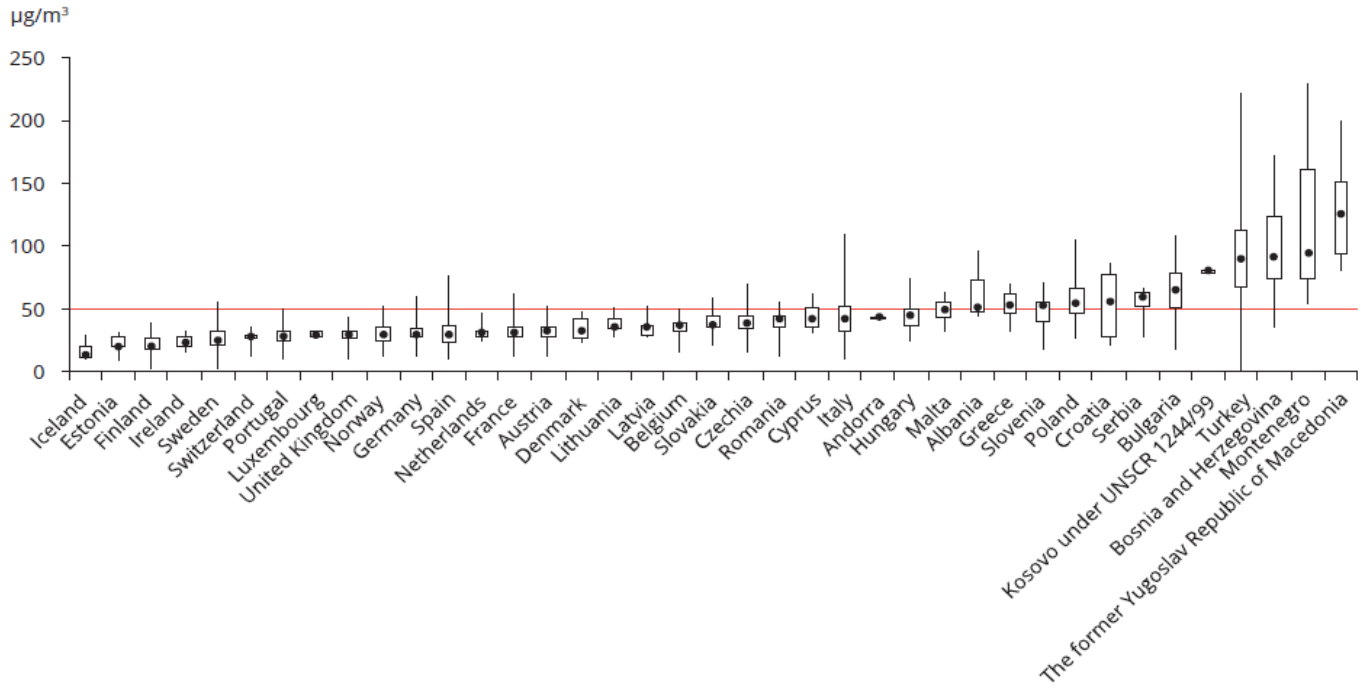
No data could be found on the emission of pollutants from waste.

### 3. Comparative assessment vis-à-vis EU and Western Balkans average

Even if the EU standards are above what the World Health Organization recommends, member states of the EU, just like Kosovo, still have trouble to comply with those[49]. It is not possible to see pollution from $SO_2$ nor CO, as Kosovo did not report its measurements.

#### 1. PM10

**Figure 3.1 $PM_{10}$ concentrations in relation to the daily limit value in 2016**




In 2016, 19 member states had stations reporting exceeding values of PM10, including Germany, Spain, France, Italy, Bulgaria, and Poland.

On the other hand, if we are looking at the value recommended by the WHO for PM10, all member states are exceeding it, except for Estonia and Ireland.

Until now, 16 infringement cases have been started by the European Commission against Belgium, Bulgaria, Czech Republic, Germany, Greece, Spain, France, Hungary, Italy, Latvia, Portugal, Poland, Romania, Sweden, Slovakia, and Slovenia for failure to meet the PM10 limit values of the European Union. An infringement procedures means that the European Commission took legal action against those countries for failure to implement EU law after sending them a letter and giving them a 2 months period to take measures. In 2017, the Commission decided that Italy, Hungary and Romania failed to ensure such measures and to have them referred to the European Court of Justice[50], which may impose financial penalties.

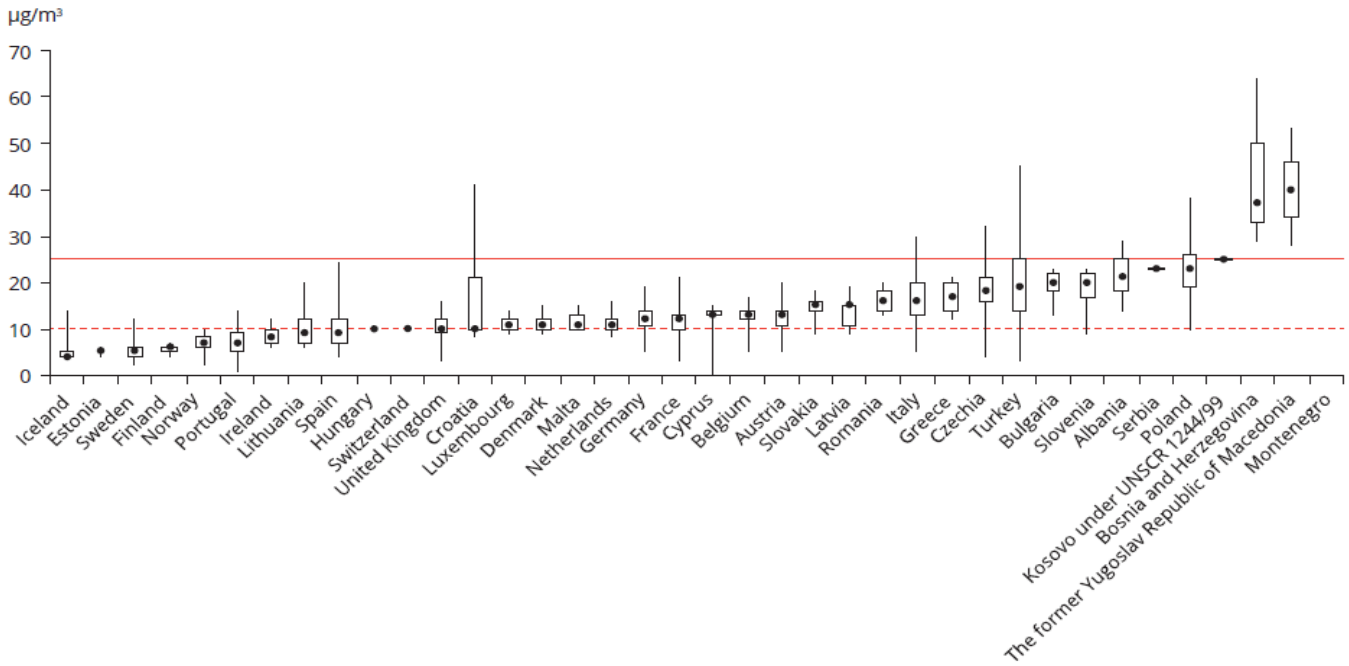
[49] "Air Quality in Europe", European Environmental Agency Report No 12/2018 (2018): https://www.eea.europa.eu/publications/air-quality-in-europe-2018

[50] "Air quality: Commission takes action to protect citizens from air pollution", European Commission (2018): http://europa.eu/rapid/press-release_IP-18-3450_en.htm

Concentrations of PM10 are much higher in the Western Balkans compares to the EU countries. If Albania and Serbia are just above EU standards, North Macedonia still has a yearly concentration that is more than twice the limit value. The concentration in Kosovo can hardly be assessed, as the lack of data is also evidenced in the table, however it is not so far from the concentration of PM10 in Bulgaria.

2. **PM2.5:**

**Figure 3.3 $PM_{2.5}$ concentrations in relation to the annual limit value in 2016**



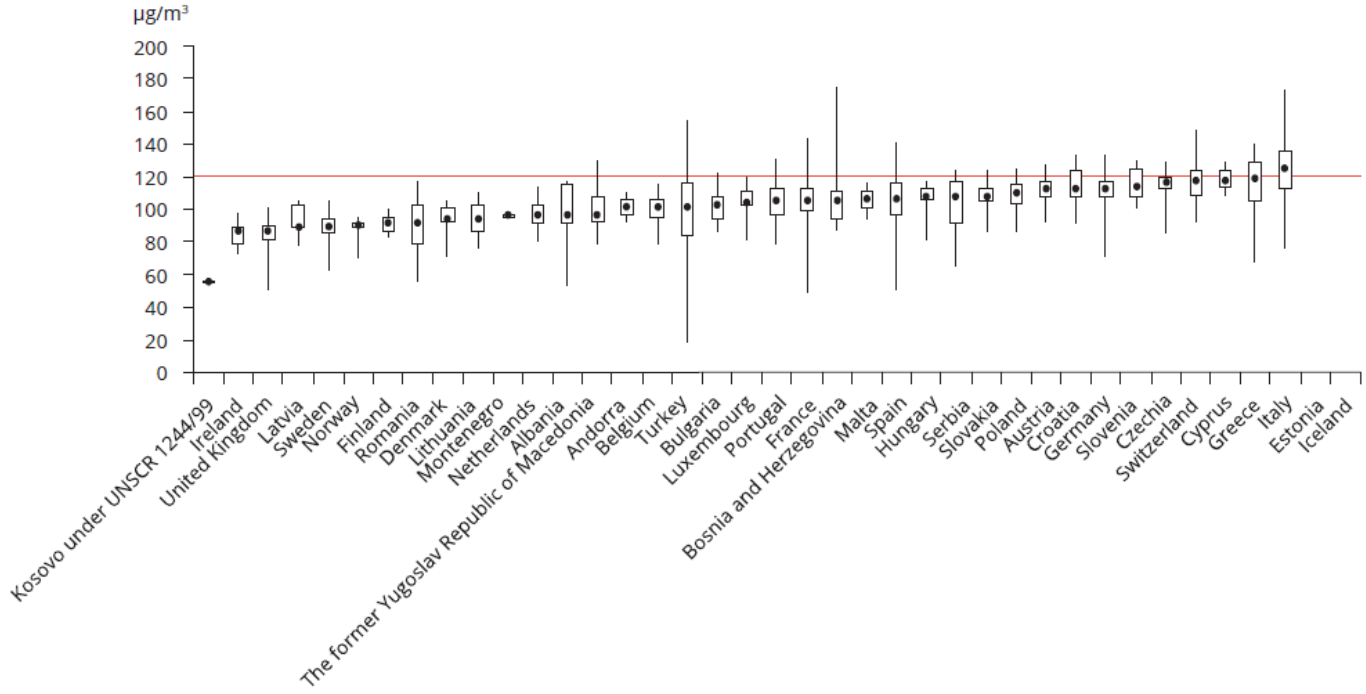

In 2016, 4 member states had stations reporting exceeding values of PM2.5: Poland, Czech Republic, Croatia and Italy.

Just like for PM10, concentration of PM2.5 are still higher in the Balkans, but only North Macedonia and Montenegro are above the limit value of the European Union. Data are still incomplete for Kosovo but it seems that the concentration is just about the 25 µg/$Nm^3$ limit, just as is the case with Albania and Serbia.

However, based on the WHO limit value for the concentration of PM2.5 in the air, all countries except Estonia, Finland and Hungary would report exceeded values.

### 3. $O_3$:

**Figure 4.1 $O_3$ concentrations in relation to the target value in 2016**

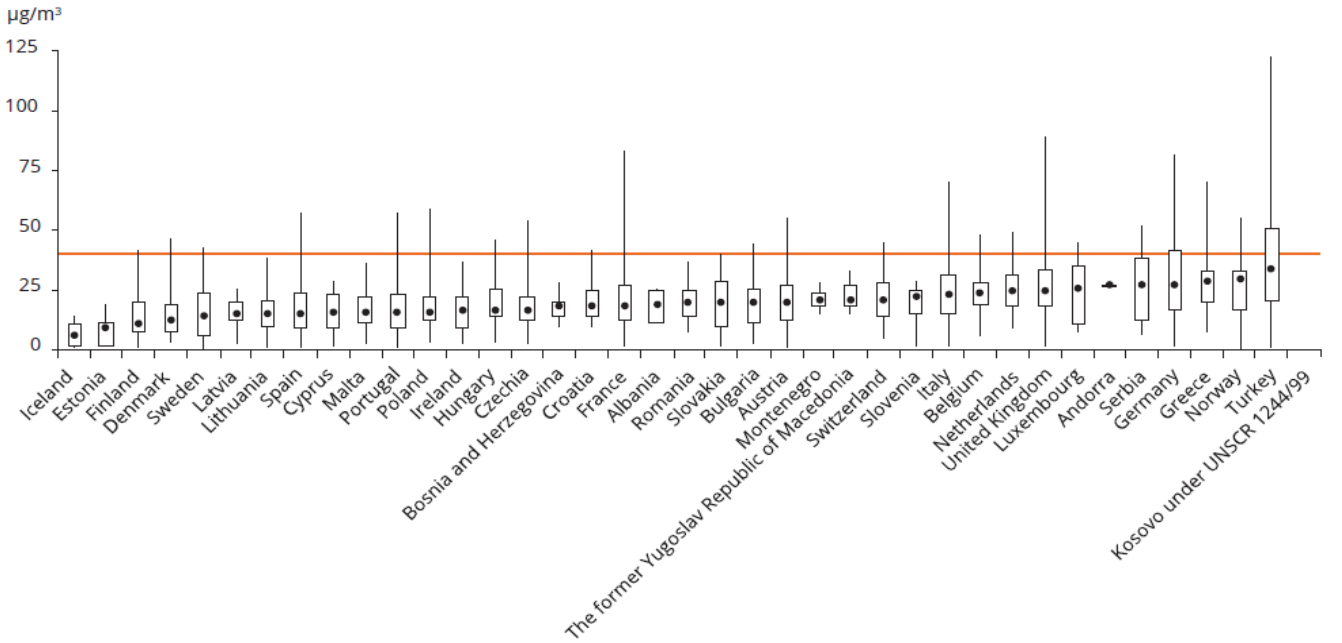



In 2016, 14 member states of the European Union out of the 28 showed exceedance of the concentration of O3. All countries show concentration of O3 between 80 and 130 µg/Nm$^3$.

The lack of data does not allow for comparison with Kosovo.

## 4. $NO_2$:

**Figure 6.1 $NO_2$ concentrations in relation to the annual limit value in 2016**




In 2016, 19 member states reported exceedances of $NO_2$.

Until now, 13 infringement cases have been launched by the European Commission for failure to meet the $NO_2$ limit values, against Austria, Belgium, Czech Republic, Germany, Denmark, France, Spain, Hungary, Italy, Luxembourg, Poland, Portugal and the UK. In 2017, France, Germany and the UK are referred in front of the European Court of Justice[51].

All Western Balkans countries have about the same range of concentration as EU countries. But the lack of data in Kosovo does not allow for any comparison.

In total, in 2016, the 16 Western Balkans power plants polluted as much as the 250 EU power plants in terms of emissions of $SO_2$ and PM2.5, and Kosovo B is the power plant emitting the more PM10 in Europe[52].

[51] Ibid

[52] MATKOVIC, V., JONES, D., MOORE, C., MULLUVIRTA, L., GIERENS, R., KALABA, I., CIUTA, I. GALLOP, P. and RISTESKA, S. "Chronic coal pollution: EU action on the Western Balkans will improve health and economies across Europe", Europe beyond coal campaign (2019): https://www.env-health.org/wp-content/uploads/2019/02/Chronic-Coal-Pollution-report.pdf

## Kosovo's fulfillment

In order to assess the progress of Kosovo in this matter, a chapter has been dedicated to environment in the yearly Country Report made by the European Union. Progress reports present the achievements that have been made by potential candidate countries as well as challenges that remain.

### 1. Achievements in the air quality sector

The first report was released in 2005[53]. The EU welcomes the fact that the Law on Air Protection was adopted in 2004 brought the Kosovo air legislation up to European standards. It also salutes the creation of an Environmental Impact department within the MESP, which role will be to prepare an Environmental Impact Assessment Plan, as well as the prospect to create an Environment Protection Agency and an Environmental Inspectorate.

In 2006[54], 2007[55] and 2008[56], the European Union reports no particular progress in the field of air quality.

Reports highlighted a major problem that has now been solved: the implementation of a monitoring system operational throughout the entire country, providing real-time data to the public. Indeed, if the MESP had procured the equipment to implement a mobile air quality monitoring control stations since 2009[57], the system took a very long time to be functioning. In 2010, only one station came into operation out of the four that were planned[58]. Three others came online the following year[59]. Additional stations were installed in 2013 so that the monitoring system is covering the whole territory of Kosovo. However, according to the report, the system's operation and maintenance need to be improved, and qualified technical staff needs to be recruited in order to process and publish the data[60]. In 2014, the air quality monitoring system is equipped, but reports on the state of air provide only basic information on only 10 locations. The lack of maintenance is also jeopardizing their accuracy[61]. In 2018, the air quality monitoring system with real-time data is finally operational.

[53] "Kosovo (under UNSCR 1244) 2005 Progress Report", European Commission (2005)
[54] "Kosovo (under UNSCR 1244) 2006 Progress Report", European Commission (2006)
[55] "Kosovo (under UNSCR 1244) 2007 Progress Report", European Commission (2007)
[56] "Kosovo (under UNSCR 1244) 2008 Progress Report", European Commission (2008)
[57] "Communication from the Commission to the European Parliament and the Council: Kosovo* - Fulfilling its European Perspective", European Commission (2009)
[58] "Kosovo* 2010 Progress Report", European Commission (2010)
[59] "Kosovo* 2011 Progress Report", European Commission (2011)
[60] "Kosovo* 2013 Progress Report", European Commission (2013)
[61] "Kosovo* progress report", European Commission (2014)

## 2. Challenges remaining regarding the acquis

Reports from the EU still highlight three major problems: defining responsibilities among actors, the creation of a polluters' inventory, and the creation of an air quality plan. These are problems which need to be solved in order to be able to increase institutional ability to implement the current legislation by having more knowledge and skills about the air pollution issue.

The second one is to clearly **define responsibilities** among actors in order to implement laws on environment. Until 2010, the EU deplored that there has been no progress on defining institutional roles and responsibilities in the field of air quality[62]. However, in 2012, the report indicated that the institutions to implement EU standards are in place, but that "their capacity to implement and enforce legislation at central and local levels needs to be strengthened"[63]. The same statement is made in 2018[64].

The third problem is the need to create a **polluters inventory** that the EU has been asking for since 2010[65], in order to accurately measure the main sources of pollution. The inventory is still not completed in 2015[66].

Finally, the last one is to create an **air quality plan**. Indeed, plans for areas where the levels of pollutants exceed limit values (especially or the biggest urban agglomerations) are needed so that actions can be taken when the quality of air poses a major threat to public health[67].

[62] "Kosovo* 2010 Progress Report", European Commission (2010)
[63] "Commission communication on a Feasibility Study for a Stabilisation and Association Agreement between the European Union and Kosovo*', European Commission (2012)
[64] "Instrument for pre-accession assistance (IPA II) – Revised Indicative Strategy Paper for Kosovo* (2014-2020), European Commission (2018)
[65] "Kosovo* 2010 Progress Report", European Commission (2010)
[66] "Kosovo* 2015 report", European Commission (2015)
[67] "Kosovo* 2018 Report", European Commission (2018)

## Conclusion and recommendations

Despite passing laws on air protection and having a similar legislative framework, Kosovo is thus still far from EU standards. The state of the air in the region is proven to be very harmful both to the population and the environment.

In order to see improvement regarding this issue, Kosovo can undertake some applicable solutions.

Here is a list of concrete recommendations in order to improve air quality policies and gradually align with EU standards:

1. **Household heating**

Municipalities can put in place stricter control of households heating by employing more inspectors, prohibiting lignite burning in stove, implementing fines for burning coal and waste, and should invest in renewables energies and central heating systems.

Municipalities can also implement incentives for replacing old household stoves with new ones using less polluting fuels for renewables alternatives.

2. **Road emissions**

About the vehicles: incentives should encourage a use of a more qualitative fuel, and strict fuel quality control and regulations should be put in place. A time limit should be implemented on the use of old vehicles polluting the most. The government should not go back on the law that forbids importing vehicles older than 10 years old and regular technical and emission controls of cars should be mandatory. There could be tax incentive to buy new cars, polluting less, and to recycle old ones.

Incentive should be put in place to encourage people to use alternative transport which produces less pollution on the environment. The government should invest in a better public transportation by developing the railway sector, and improving public transportation in urban areas (for example with the introduction of a one-way road, with the dedication of an entire line for buses only).

Finally, when level of pollution reach high level, rules could be implemented like in most of the European Union biggest cities: prohibiting circulation in city centers while allowing free public transport, implementation of road space rationing like alternate day travel based on odd or even number plates.

3. **Energy sector**

It is necessary that the government make informed energy choices, based not only on the economic aspect but rather on a cost-benefit analysis. This should include impact on health and environment.

Kosovo should invest more in renewable energy and energy efficiency.

Compliance with environmental European standards should have more importance regarding the process of building new energy capacities.

4. **Industry**

Incentives could be put in place to encourage the industry sector to focus on their environmental impact through the application of best practices (which can be done together with the European Union), especially concerning systems of waste management.

Kosovo should rely on economic instruments and implement it, such as the polluters pay principle, fine or charges when current environmental regulations are not enforce.

**5. Agricultural sector**

Kosovo should implement measures to control and monitor the usage of pesticides and fertilizers. In order to be able do that, it would be recommended to establish a monitoring system for soil quality.

Incentives could be implemented to support the production of organic products.

**6. Awareness-raising**

Greater access to information on air pollution is needed so that the public could participate in the decision making and be informed.

Improvements cannot be made without a political willingness to act. Meaningful involvement is necessary to make the state of the air in Kosovo a priority, including by providing the sector sufficient funding and better administrative capacity. The role of the judiciary in the environmental sector needs to be a lot stronger in order to enforce the existing legislation.