

IN THE SPOTLIGHT:

Air Quality in Poland, what are the issues and what can be done? ¹

Poland continues to be a European air pollution hotspot: 36 of the 50 most polluted cities in the European Union (WHO, 2018). In some cities, average ambient concentration levels of fine particulate matter (PM_{2.5}) are twice as high as the maximum levels allowed under European Union (EU) law.

The impact of air pollution on health is substantial, particularly for children and the elderly. Nearly one in nine of the premature deaths linked to fine particle pollution in the EU was found in Poland². Fine particulate matter are tiny particles in the air that are dangerous to human health since they can travel deeply into a person's respiratory track. They have the potential to cause lung and heart diseases, organ damage and to ultimately result in premature death.

Poor air quality contributes nearly a quarter of bronchitis cases among children — leading to over 200,000 cases every year. The morbidity burden is highest in the voivodeships where residential heating triggers high levels of air pollution in the winter: Śląskie, Wielkopolskie, Mazowieckie, Śląskie, Łódzkie, and Małopolskie. Pollution is also damaging for the economy, contributing to 8 percent of total lost workdays.

Poland has done well in reducing the emissions of some air pollutants — most notably sulphur dioxide (SO₂) and nitrogen oxide (NO_x). Poland was one of the early reformers under the Environmental Action Plan in the 1990s, adopting economic and institution strengthening that severed the link between the emission of air pollutants, economic and

industrial growth. But fine particulate emissions levels remain stubbornly high. The earlier achievement of reducing SO₂ and NO_x emissions in the 1990s were mainly due to power sector and heavy industry reforms, addressing the large, pooled pollution sources. But progress in addressing disaggregated sources such as single-family housing and transport has been limited.

Air quality is at its worst during winter heating season and varies by geography. For example, valley locations can suffer the most, especially when inversion layers further trapping emissions in these locations. Household heating emissions make the winter season significantly more vulnerable to air pollution, especially in the South and Southwest due to more mountainous terrain and cities in valleys.

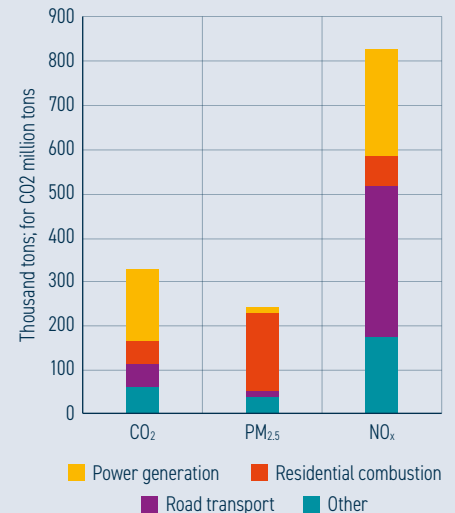
At the center of Poland's air quality challenge is a heavy dependence on coal for heating. Significant amounts of coal are used for both home and commercial heating, and in industry and power production. The amount of coal used has declined since the 1980s, and there has been an increase in natural gas and renewable energy sources. However coal, which is generally a more highly polluting energy source, is still dominant. Poland is expected to account for about 50 percent of hard coal use by small consumers in Europe in 2020³.

Household heating is the most important contributor fine particulate pollution. The residential sector is the most important source of air pollution at the national level. Between 2005 and 2015, the share of PM_{2.5} emissions coming from households barely changed,

holding constant at 47–48 percent. Household heating also contributes the most Benzo[a]Pyrene, a highly carcinogenic pollutant.

FIGURE B.1 Residential heating contributes the most to PM_{2.5} pollution

Total national emissions of air pollutants and CO₂ by key sectors in 2015 in Poland



Source: World Bank (2019)

But coal is only part of the problem facing the residential heating sector. Poland's heating technologies and housing stock need upgrading. Modern heating technology could significantly help to reduce emissions from coal. But the use of inefficient and outdated boilers also allows many households to mix fuels depending on their availability, for example burning low-grade fuelwood and trash. For poorer households, this flexibility can cushion them from changing fuel prices and can ease the financial burden. More effective insulation can help but, as households switch fuel sources, poorer households

Beyond supporting better air quality, improvements to the housing stock has the added bonus of offering thermal comfort to families, improving their health, reducing the time spent feeding older boilers and lead to more valuable houses. Older boilers need to be manually fed, requiring a continuous need to replenish fuel feeders and the heat cannot be regulated in the same way as with more modern heating.

Vehicles are also an important sources of air pollution. This source of pollution rises in prominence during the summer and may be particularly intense in urban hot-spots. Despite the efforts

to promote electric mobility, especially through electric buses, Poland has the oldest and sixth largest vehicle fleet in the EU, with 24.3 million cars. Many cars can only meet Euro 3 emissions standards, contributing to transport-based emissions being the second most important source of air pollution. And, unlike residential heating sources which are pressing issues in some cities, emissions from cars, buses and trucks are found across all cities and affect all urban populations. Another important difference between pollution from transport and from residential heating is the mobility of emission sources and the resulting spatial and temporal fluctuation of pollution dynamics depending on traffic patterns and behavior leading to highly variant pollution exposure profiles within an urban airshed.

The massive health and economic impacts of outdoor air pollution are a call for action. This requires shifting from a heavy reliance on coal to a more sustainable growth path that reduces the environmental and health impacts of coal reliance, including shifting towards using cleaner fuels and more efficient boilers in households, industry and power generation, and curbing transport emissions.

What would it take to lift the black fog over Poland's population?

The sources of pollution today are challenging to shift, since they require multiple actors — households heating their homes, industry, drivers, and the transport sector more broadly — to play their part. Due to the producers of air pollution being spread across the population and across areas, it will take multiple actors to shift the pollution sources — the 4.5 million homes that need upgrading, the authorities helping them with these investments, regulating actions and enforcing these regulations, and supply side actors.

Tackling air pollution successfully requires a mix of policies and investments, including complementary sticks and carrots. No single approach will be able to reduce air pollution from all sources. Air quality management is complex and highly decentralized, with a myriad of national, voivodeship, powiat and gmina level actors are working in this

space. A good starting point is to ensure that each of these structures has the resources, knowledge, and incentive to engage — and is held accountable against measurable outcomes.

Putting in place and enforcing regulations across all voivodeships on heating technologies would be a move in the right direction. Only eleven of the sixteen regions in Poland have adopted anti-smog resolutions, which require Single Family Buildings to replace non-compliant solid-fuel boilers (manually fed-coal boilers with low-quality coal, wood and trash used as fuel) with compliant more efficient boilers which include gas boilers, heat pumps, renewable energy-based systems and eco-design boilers.

Owners of single-family buildings need financial and advisory help in shifting their heating technologies and retrofitting their buildings. Doing a building retrofit and upgrading a boiler requires substantial upfront costs and the payment period for these investments can be long. Supporting households financially and through advice on the investments needed will be critical, in particular for poorer households who will struggle the most with financing. Seeing this challenge, the government launched the Clean Air Priority (CAPP) and Stop Smog Programs which, together with tax credits, aim to ease the burden on households of making these investments.

Retailers of heating equipment and retrofitting materials and the tradesmen who do the installations will need to be ready to meet this market demand, and to help their customers along the way. The supply-side for both heating equipment and thermo-modernization will have new customers coming their way as the anti-smog regulations take force across the country. These actors need to inform their customers of the regulatory shifts approaching and advise them on the technologies they can adopt, so that today's investments reflect new requirements. Some actors are already helping customers to apply for financial help from CAPP — providing them with a one-stop approach. What seems to be missing now however is an integrated approach, where customers can get advice and contract out their modernization and heating upgrade in one go. Filling these missing markets is both good for business

and good for air quality.

In the transportation sector, cities need to identify hot-spots through regular monitoring, and introduce targeted measures in these areas.

There's not enough known yet on pollution hot-spots in cities and on which populations are more affected. To get this granularity street-level monitoring needs to be expanded. Pollution linked to transport can be very geographically concentrated, so you need specialized monitoring approaches. With such data at hand, decision-makers could introduce targeted policies on air pollution, such as traffic zones, new routings, or enhanced public transport. Continuing the expansion of electric mobility is a step in the right direction. Strategic use of green spaces can both enhance livability and improve air quality. Without appropriate interventions, the high growth rate of vehicles across Poland is likely to increase the share of air pollution coming from the transport sector, especially affecting urban populations.

Poland can't afford to wait to take action on air quality. There are already a plethora of channels through which Poland can improve the livability of its cities, towns and villages. To be effective these shifts will need everyone to work together — nature doesn't care for administrative boundaries or bureaucracy. A town or village in a valley can clean up its act but the impact of their actions won't be fully felt until the surrounding area that feeds into the same airshed pulls its weight. The need for coordinated action is exactly why leadership and vision is needed to bring everyone along. The steps taken by the government in recent years are promising. In the next decade Poland needs to deliver on these shifts.

NOTES

1. This section draws heavily upon "Air quality management — Poland", a report produced by the World Bank in 2019. The brief was prepared by Reena Badiani-Magnusson, Janina Franco, Filip Kochan and Klas Sander. The graphics were designed by Piotr Ruczyński.
2. EEA (European Environment Agency). 2018. "Air quality in Europe — 2018 report." *EEA Report No 12/2018*. ISBN 978-92-9213-989-6 ISSN 1977-8449 doi: 10.2800/777411
3. Price-Induced Market Equilibrium System (PRIMES) Reference 2016 scenario. PRIMES is an EU energy system model.