CBI Economics

Economic and health impacts of Clean Air Zones

CBI Economics analysis commissioned by the Clean Air Fund

Benefits of improving air quality in the UK

Improving air quality in the UK

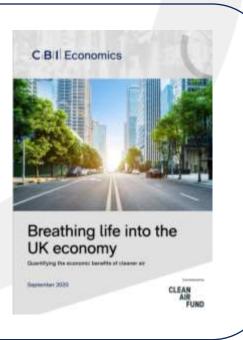
Clean air matters because it contributes towards people's health and the natural environment.

However...

- The WHO has recently set more ambitious guidelines than the UK on what clean air limits should be; and
- The UK is meeting its legal limits for all pollutants except nitrogen dioxide

Breathing life into the UK economy

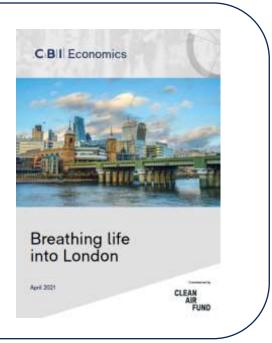
Quantifying the economic benefits of meeting WHO air quality guidelines in the UK



Breathing life into

Quantifying the economic benefit of reducing nitrogen dioxide in eight cities

UK cities



How does cleaner air impact the economy?

Air quality affects our health and the environment, which impacts the ability of businesses to operate and as a result the productive capacity of the economy.

Figure 1: The impact of improved air quality on the economy

Health outcomes
Cleaner air will reduce morbidity and mortality associated with air pollution related health conditions

Improved air quality

Environmental outcomes

Cleaner air will reduce environmental damage to ecosystems, land, buildings and machinery

Ability to work

- Additional working days through reduced sickness absences
- Additional working years through fewer deaths
- Increased productivity at work

Availability of land

- Increased quantity of land available for economic activities
- Increased quality of land available for farming

Efficiency of buildings and machinery

- Reduced cost of repairing machinery
- Increased efficiency of buildings and machinery

£ Economic benefit

An increase in the productive capacity of the economy

The economic and health benefits of meeting WHO targets

In 2018, the UK was not meeting the more ambitious air quality guidelines set by the WHO, except for ozone.

Figure 2: UK compliance assessment

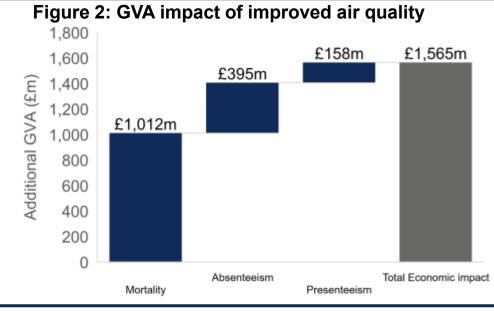
Pollutant		UK	WHO
	24 hour mean	✓	×
PM ₁₀	Annual mean	\checkmark	×
PM _{2.5}	24 hour mean	NA	×
	Annual mean	\checkmark	×
O ₃	Annual mean of daily max 8 hour	√	√
NO ₂	1 hour mean	×	×
	Annual mean	×	×
SO ₂	24 hour mean	√	×

17,000
deaths
prevented
per year



More ambitious targets, in line with the WHO could deliver benefits to the health of the workforce by preventing deaths and adding working days by reducing sickness.

By preventing deaths and sickness, clean air in line with WHO guidelines could deliver a £1.6bn boost to the UK economy each year.



Methodology

Improved air quality

Estimate the change in air quality by city

Estimate baseline air concentrations

Estimate counterfactual pollutant concentrations based on the climate scenario

Calculate the change in pollutant concentrations by city

2

Improved labour market outcomes

Quantify the impact of the change in air quality on the working population by city

Define the relationship between air pollution and health outcomes for each impact channel, using Concentration Response Functions (CRFs)

Estimate the baseline population metrics in each city, using the CRFs

Calculate counterfactual population metrics in each city

Adjust baseline and counterfactual estimates to reflect those in the working population and calculate the resulting impact on the working population in each city

3

Economic benefit

Estimate the economic benefit of the working population impacts by city

Combine the impacts to population with baseline GVA to estimate the additional GVA gained

Combine the population impacts with the average wage to estimate the average income gained per household

Undertake the analysis with lower and higher estimates of key assumptions to test the robustness of the results

City spotlight: Introducing a CAZ in Birmingham

Several cities have been mandated to introduce CAZs, including Birmingham, with the Council introducing a CAZ on 14 June 2021.

Figure 3: Birmingham Clean Air Zone



CAZ Area

	UK limit value	Average NO ₂	Maximum NO₂	Compliance assessment
NO ₂ annual mean	40 μg/m³	31 μg/m ³	55 µg/m³	Non-compliant
NO ₂ 1-hour mean	200 μg/m³	N/A	133 μg/m ³	Compliant

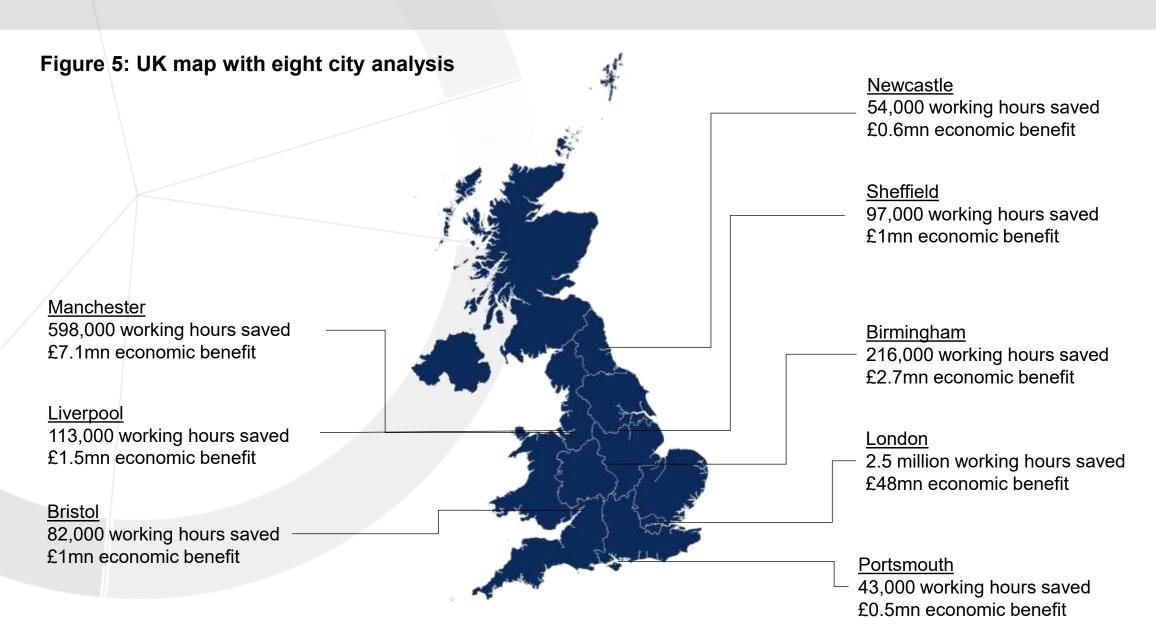
City spotlight: Economic benefits of tackling NO₂ in Birmingham

The impacts of the Clean Air Zone can be large. A 5 μg/m³ reduction in NO₂ brings with it health and economic benefits.

Figure 4: Economic and health benefits of reducing NO₂



The impact across other UK cities were substantial



The final benefits of reducing NO₂ are likely to be greater

In this analysis, we did not consider all impact channels and so the health and economic benefits of cleaner air are likely to be great. Taking Birmingham as an example, in terms of health benefits:

- A larger share of the UK's population will be exposed to cleaner air than just those living inside Birmingham's Ring Road
- Improving air quality will reduce a host of primary health conditions associated with air pollution
- Improving air quality will reduce health conditions where air pollution is a secondary factor
- Reducing emissions from vehicles is expected to lead to a reduction in other pollutants

In terms of economic benefits:

- The resulting days lost from work in the event of a hospital admission will be higher than just the days spent in hospital
- The value of unpaid work not carried out as a result of conditions related to NO₂ emissions cannot be estimated

What next?

Our analysis covered seven other cities, some of which have implemented a Clean Air Zone – such as Birmingham – and others like Greater Manchester that have reviewing the implementation of their CAZ.

Several interesting areas to explore in related to this policy change:

The role of electric vehicles



Distributional impacts



Wellbeing improvements



Impact on buildings and machinery



Thank you

Please do get in touch with any questions:

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