Case studies in Air Pollution management

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Ulaanbaatar, Mongolia 13 May 2019

UNIVERSITY OF BATH

Ireland’s Smoky Coal Ban

Background

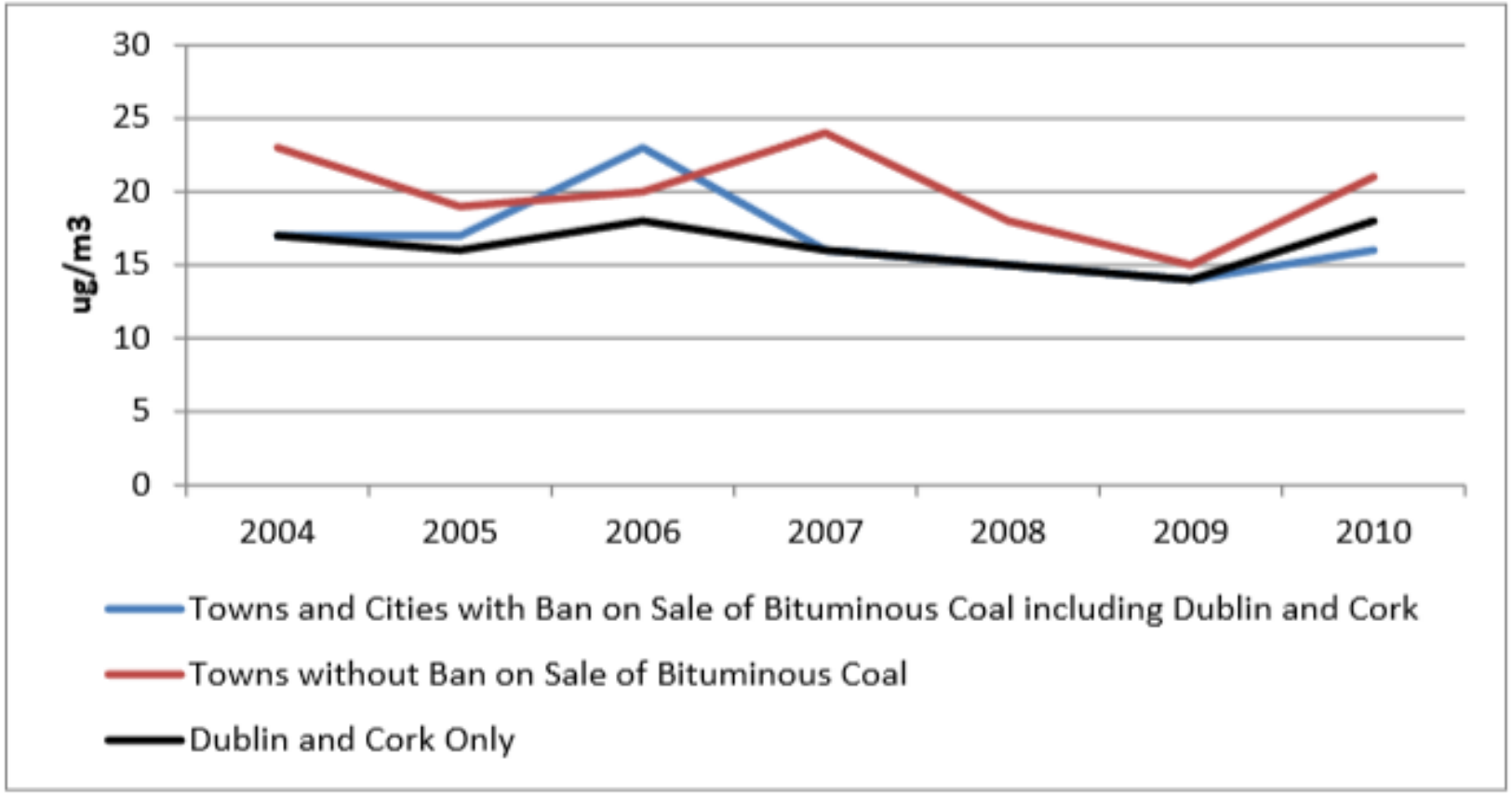

Figure 1 Annual Average PM_{10} Levels in Towns and Cities with a Coal Ban and Those without 2004 – 2010

Source: EPA Submission on the Review of the Smoky Coal Regulations, submission to the Department of Environment, Community and Local Government's public consultation, 2012.

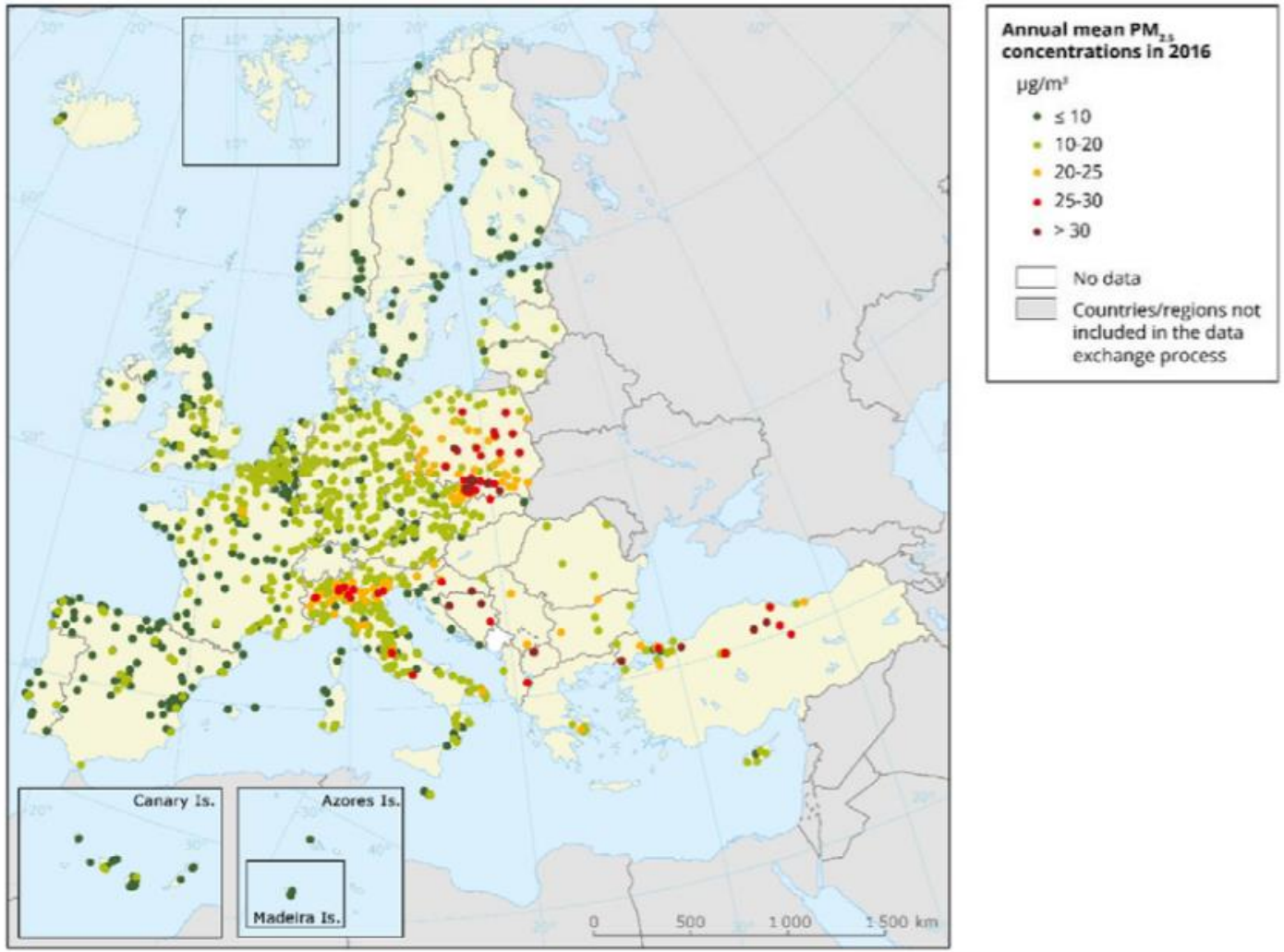

Figure 4.1 Concentration of $PM_{2.5}$ in Ireland in 2016 with relation to other European States (source: EEA)

Source: EPA Air Quality Ireland 2017

Trends in PM2.5 concentrations in Ireland

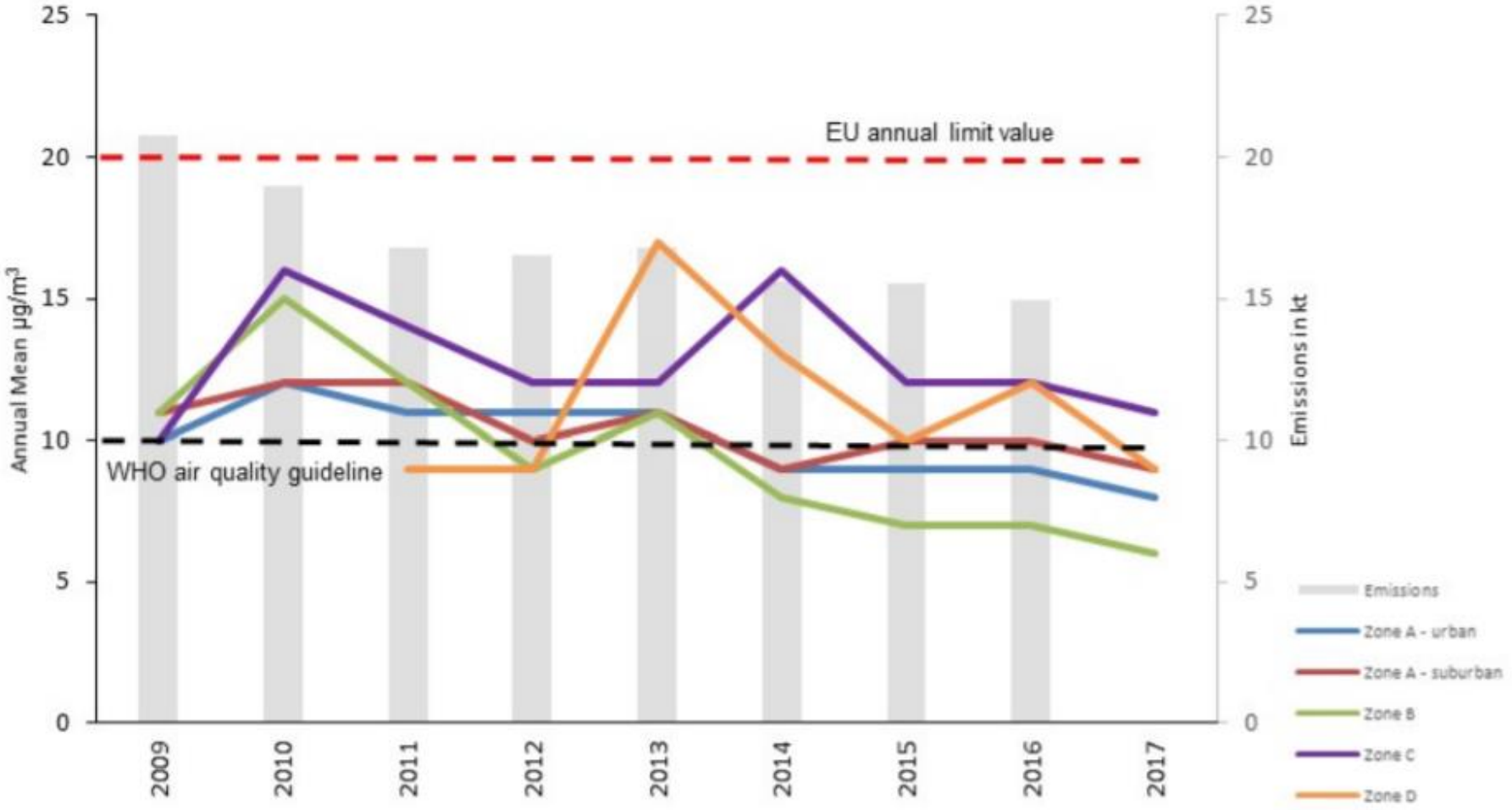

Figure 4.2 Annual mean $PM_{2.5}$ concentrations at selected monitoring stations 2009 - 2017

Source: EPA Air Quality Ireland 2017

Government delays plans for smoky coal ban following legal threats from industry

The introduction of the long-promised measure had been scheduled for September

Fri, Apr 5, 2019, 00:28 | Updated: Fri, Apr 5, 2019, 00:38

Jack Horgan-Jones

A coal depot in Shanghai. The ban on smoky coal was first promised in 2015. Photograph: Qilai Shen/Bloomberg

Pollutionwatch
Air pollution

Pollutionwatch: wood and peat burning brings return of air pollution to Dublin

A rise in the number of homes burning 'green' fuel in Dublin has had a big effect on air pollution

Gary Fuller
@drgaryfuller
Thu 27 Sep 2018 21.30 BST

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▲ Wood, along with peat, has been marketed as a carbon-neutral biofuel, but both have a big impact on air pollution. Photograph: Rolf Bruderer/Getty Images/Blend Images

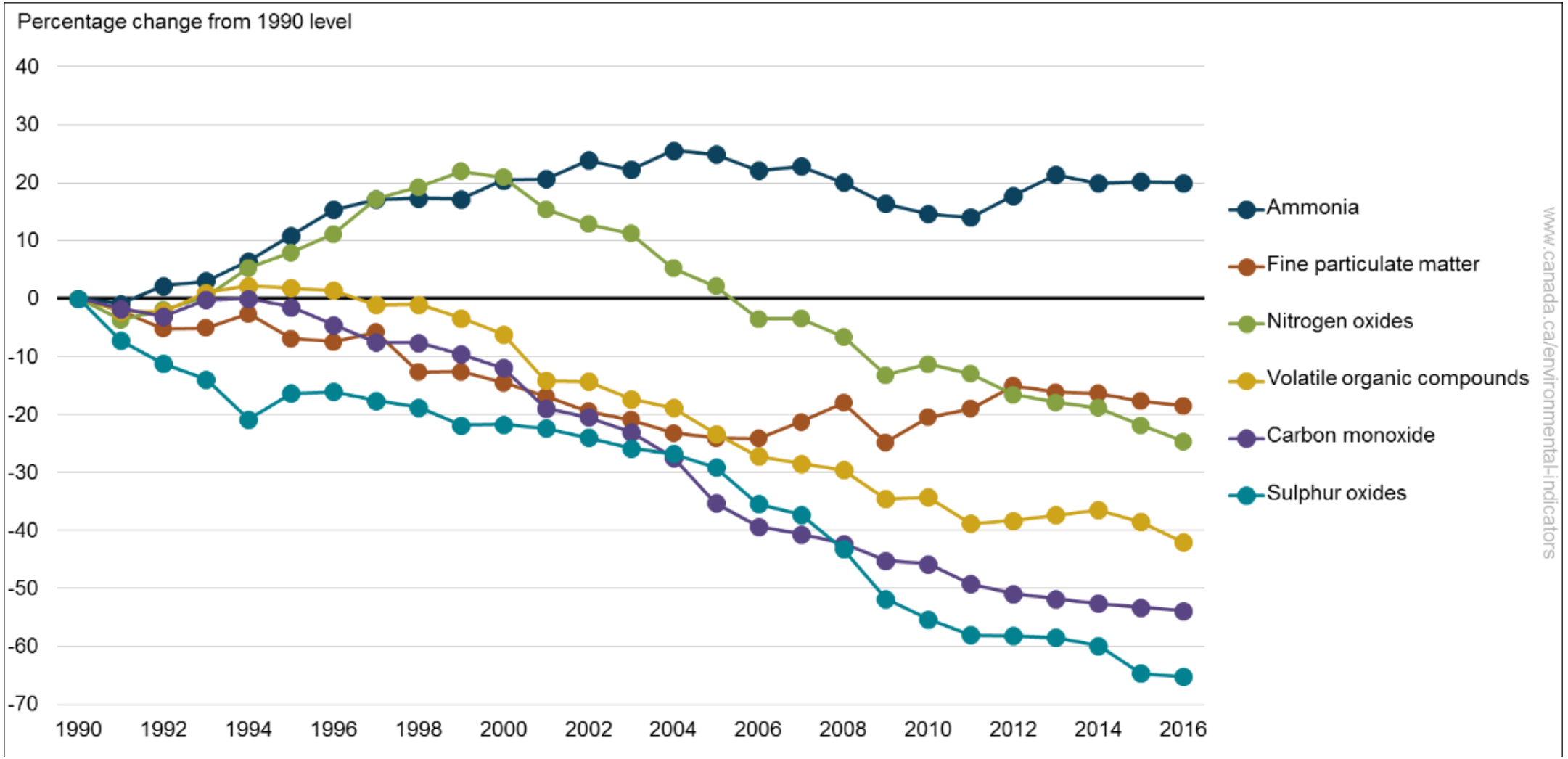
London's air pollution history - the Victorian pea-souper fogs, the deaths of 12,000 people in the 1952 smog and the Clean Air Acts that followed - are well known. Dublin, just 285 miles (460km) away, has a different history. Here it was smog in the 1980s that prompted a ban on the sale of bituminous, or "smoky" coal in 1990. Smoke pollution dropped by 70% and there were 17% fewer deaths from breathing problems. The ban was rolled out to other Irish towns and many of these also recorded a reduction in winter deaths.

Pollutionwatch: wood burning is not climate friendly

A new study has revealed that an old menace has returned to Dublin. Although the coal ban worked in the 1990s, it did not address smokeless coals and solid fuels. Wood and peat are marketed as slow-renewable, green or carbon-neutral biofuels, but their air pollution impacts can be significant. During three weeks in November and December 2016, Dublin breached World Health Organization guidelines for particle pollution on eight days. Chemical analysis of the pollution at these times showed the dominance of peat and wood smoke in the evenings. Overall, the home burning of solid fuel by just 13% of homes was responsible for 70% of the city's particle pollution.

Canada: Cooperation across borders

An environmental success story



Source: Environment and Climate Change Canada (2018)

CAAQS
(Canadian Ambient Air Quality Standards)

CAAQS

CCME developed Canadian Ambient Air Quality Standards (CAAQS) for $PM_{2.5}$, O_3, SO_2 and NO_2. All CAAQS consist of three interrelated elements:

- an averaging time period
- a numerical value
- the statistical form of the numerical standard.

Pollutant	Averaging Time	Numerical Value			Statistical Form
		2015	2020	2025	
Fine Particulate Matter ($PM_{2.5}$)	24-hour	28 $\mu g/m^3$	27 $\mu g/m^3$		The 3-year average of the annual 98th percentile of the daily 24-hour average concentrations
	Annual	10.0 $\mu g/m^3$	8.8 $\mu g/m^3$		The 3-year average of the annual average of all 1-hour concentrations
Ozone (O_3)	8-hour	63 ppb	62 ppb		The 3-year average of the annual 4th highest of the daily maximum 8-hour average ozone concentrations
Sulphur Dioxide (SO_2)	1-hour	-	70 ppb	65 ppb	The 3-year average of the annual 99th percentile of the SO_2 daily maximum 1-hour average concentrations
	Annual	-	5.0 ppb	4.0 ppb	The average over a single calendar year of all 1-hour average SO_2 concentrations
Nitrogen Dioxide (NO_2)	1-hour	-	60 ppb	42 ppb	The 3-year average of the annual 98th percentile of the daily maximum 1-hour average concentrations
	Annual	-	17.0 ppb	12.0 ppb	The average over a single calendar year of all 1-hour average concentrations

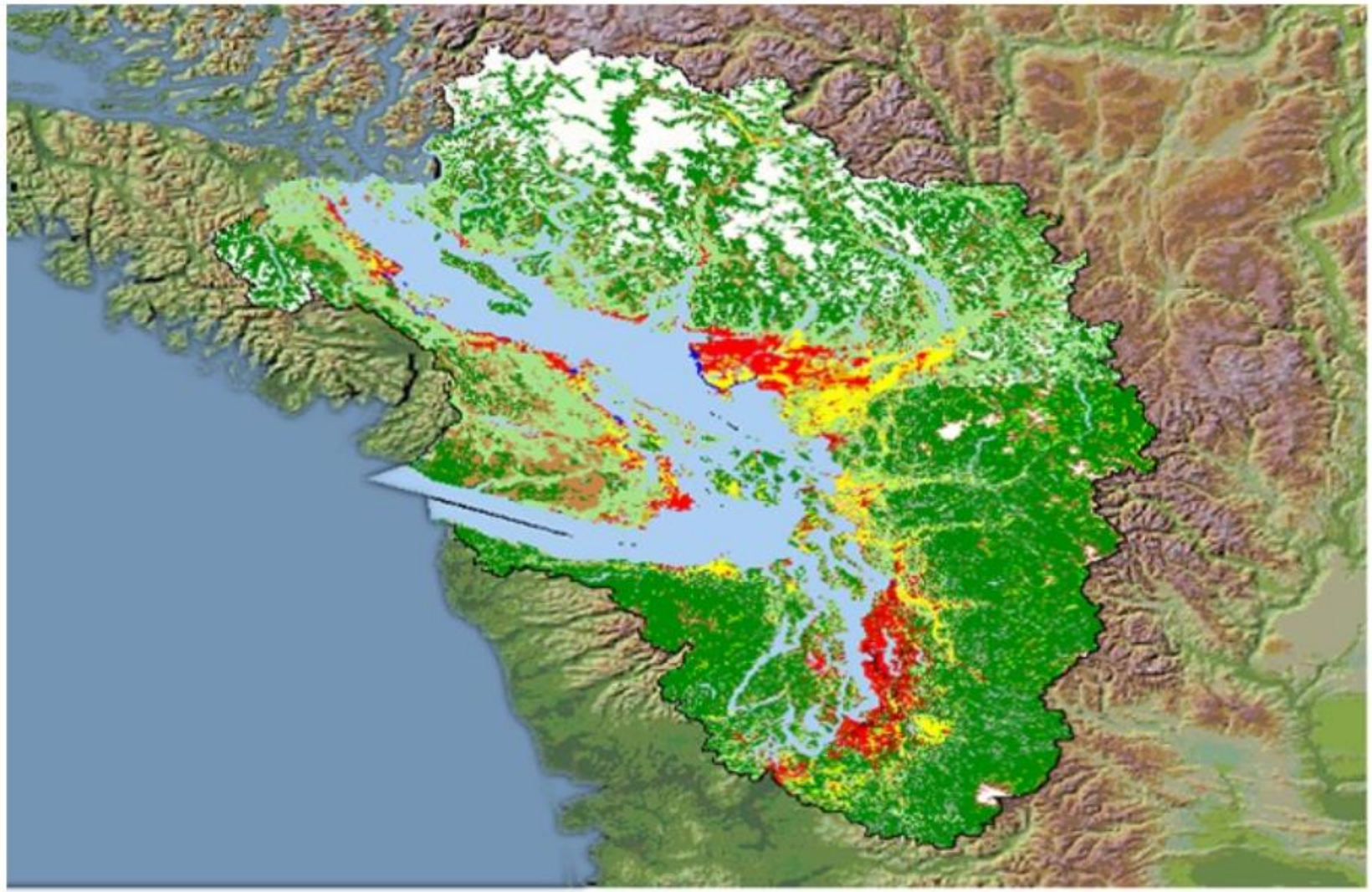
A National Air Quality Policy

Air Quality Management System

- In order to better protect human health and the environment, in 2012 ministers of the environment, with the exception of Québec, agreed to implement a new Air Quality Management System (AQMS) to guide work on air emissions across Canada.
- AQMS is a comprehensive and collaborative approach by federal, provincial and territorial governments to reduce the emissions and ambient concentrations of various pollutants of concern.
- AQMS provides a framework for collaborative action across Canada to further protect human health and the environment from harmful air pollutants through continuous improvement of air quality.

Great Lakes Basin Airshed Study Area: Southeast Michigan/Southwest Ontario Region

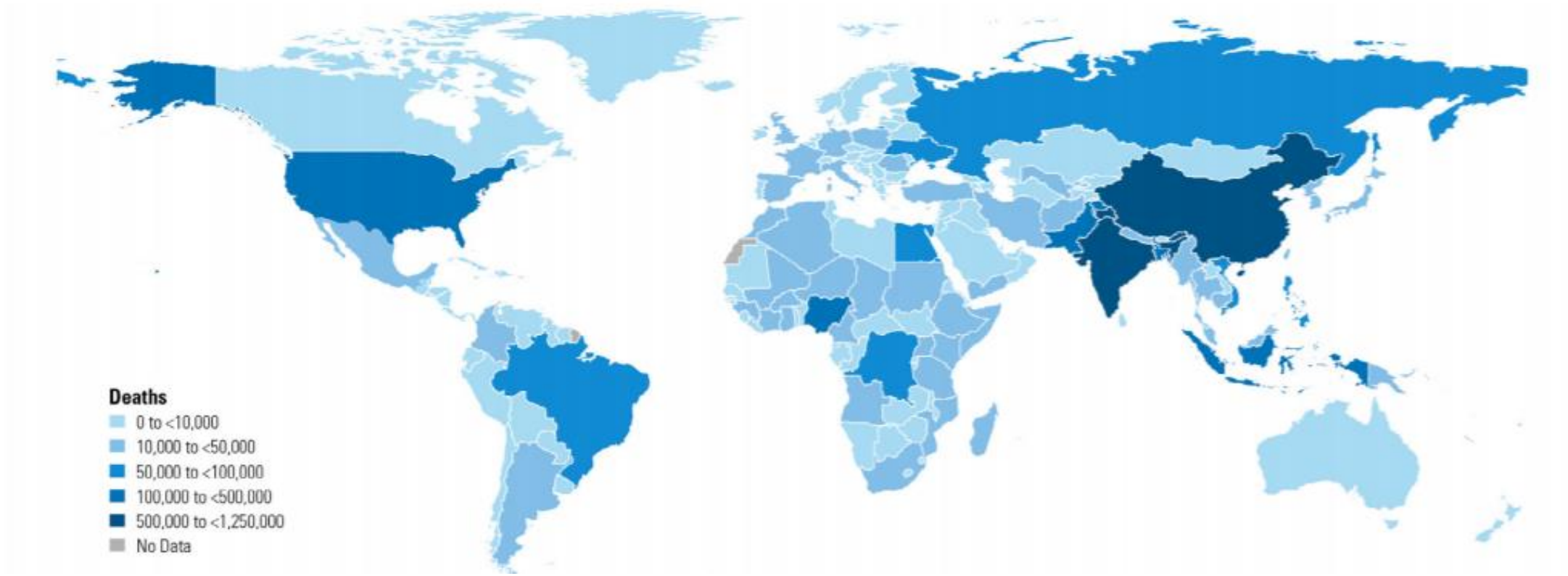
Georgia Basin/Puget Sound International Airshed



India’s National Clean Air Programme

Some of the worst levels of air pollution in the world

Figure 9. Numbers of deaths attributable to air pollution in countries around the world in 2017.



Source: HEI State of Global Air 2019

The National Clean Air Programme

Press and Information Bureau, Government of India

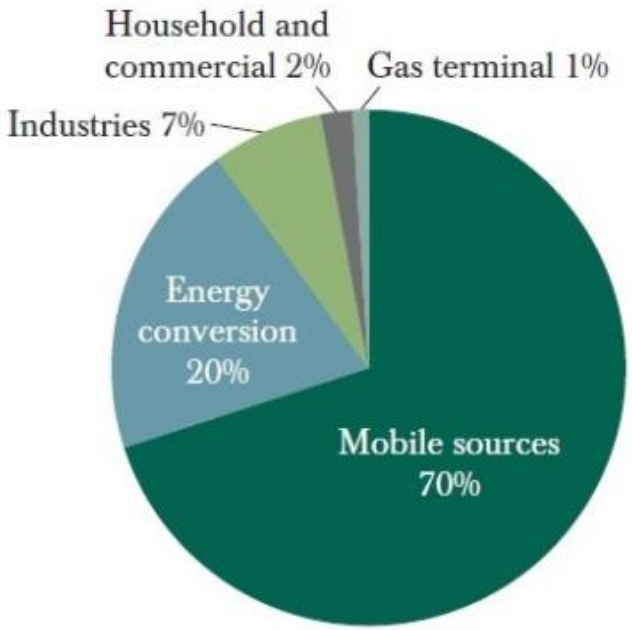
Example intervention - cookstoves

What will change?

Tehran – Traffic related air pollution

Heavy Duty Vehicles

FIGURE 5. SOURCES OF PM POLLUTION IN TEHRAN



Source: Shabhazi et al. 2016b

TABLE 2. TRANSPORT POLICY PRIORITIES FOR THE REDUCTION OF AIR POLLUTION IN TEHRAN

Air Pollution Minimization Measures	Time-frame	Financial Cost	Effectiveness	Challenges
HDV replacement programs, including scrappage	Short-term	Low	High	Can create environmental damage if not managed properly (dismantling and recycling process); or simply displace pollution if not scrapped.
Diesel Particulate Filter (DPF) retrofit for HDV	Short-term	Low-Medium	High	Hard to select the appropriate technology. Need to provide the right financial incentive.
Low Emission Zone expansion (incl. pollution charges and motorcycles)	Short-term	Low	Medium	Need to study its impact on congestion, danger of perverse incentive, and disproportionate impact on the poor.
Inspection and maintenance	Short-term	Medium	Medium	Good system is in place for cars. Need to expand to light and heavy vehicles.
Incentivize electric and hybrid vehicles	Medium-term	Medium	High	
Incentivize non-motorized transportation	Medium-term	Low	Medium	
Expand BRT lines and possibly LRT lines	Medium-term	High	Medium	
Expand metro lines	Long-term	High	High	
Strengthening monitoring, measurement and analysis capacity	Medium-term	Low	Low	

Source: The World Bank, 2018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Emerging themes:

- Ireland: Successful interventions, but may have unintended consequences
- Canada: Cross-border co-operation is led by good data
- India: Data gathering and monitoring of interventions vital
- Tehran: Need for good enforcement alongside good legislation