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Webinar 4: Opportunities to Scale Up Economic and Market-Based Instruments to Address Air Pollution

Primer on Air Pollution Issues and Trends

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25 August 2021





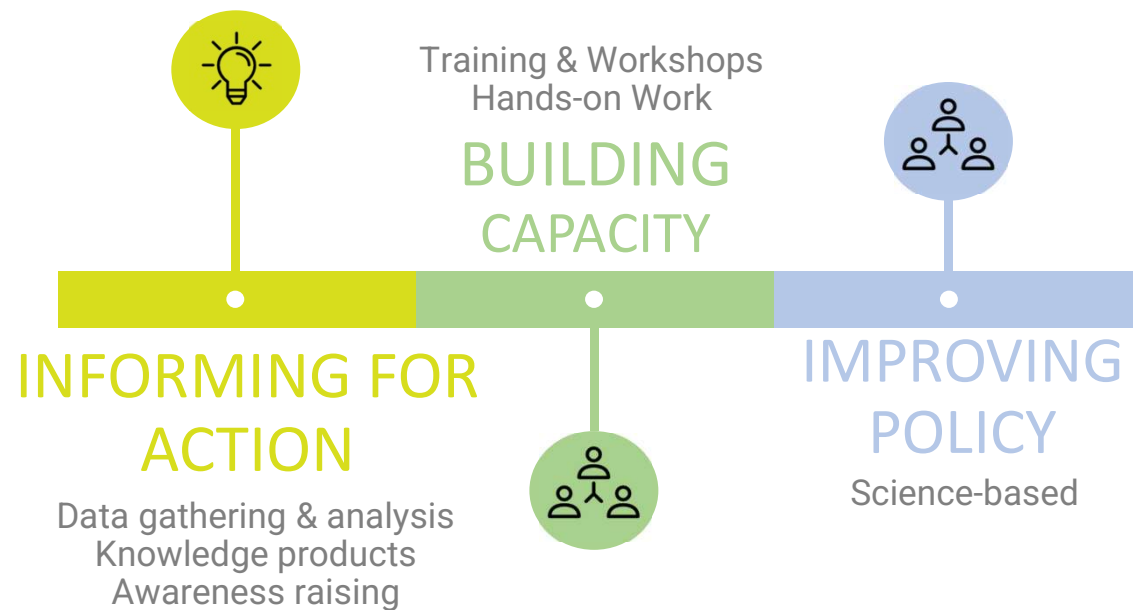
AIR QUALITY AND CLIMATE CHANGE PROGRAM



SUSTAINABLE TRANSPORT



About Clean Air Asia



www.cleanairasia.org

90% of Asian cities do not meet WHO annual air quality guideline for PM_{2.5}

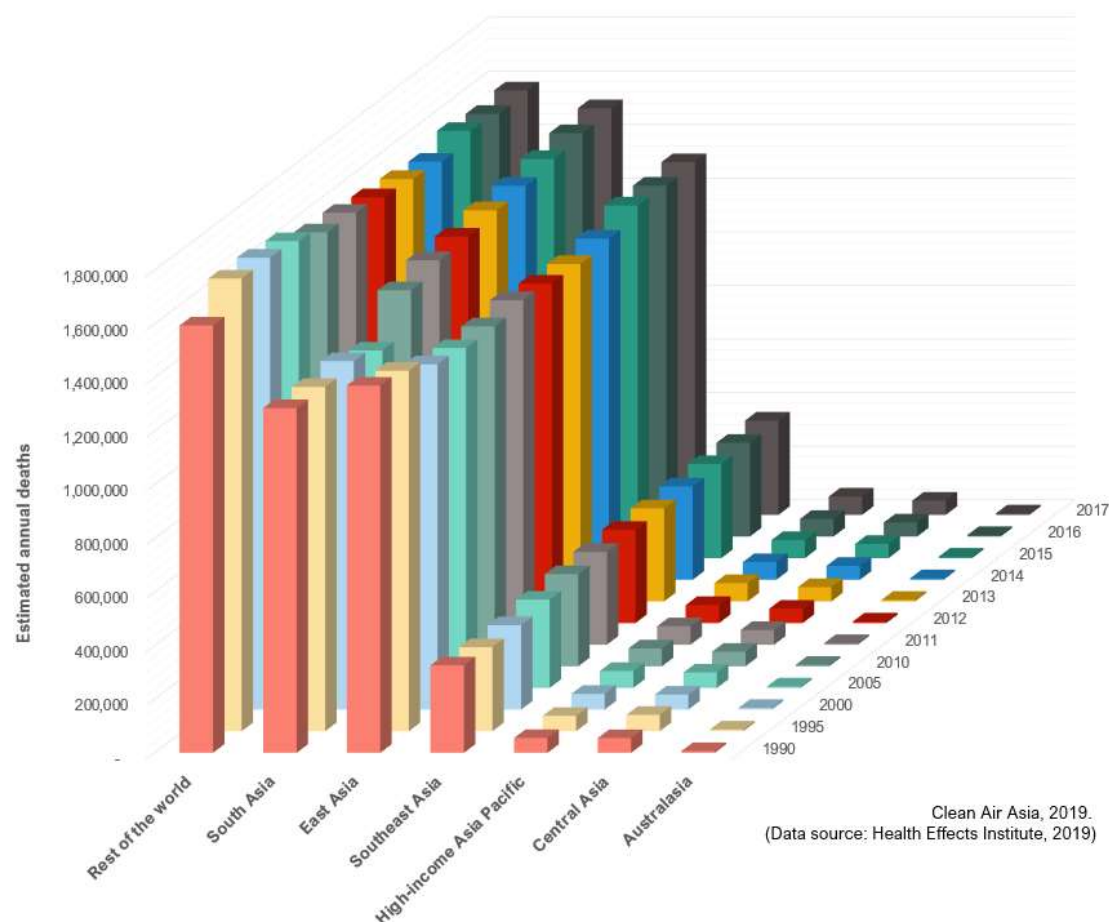
Distribution of Asian Cities relative to PM_{2.5} concentrations



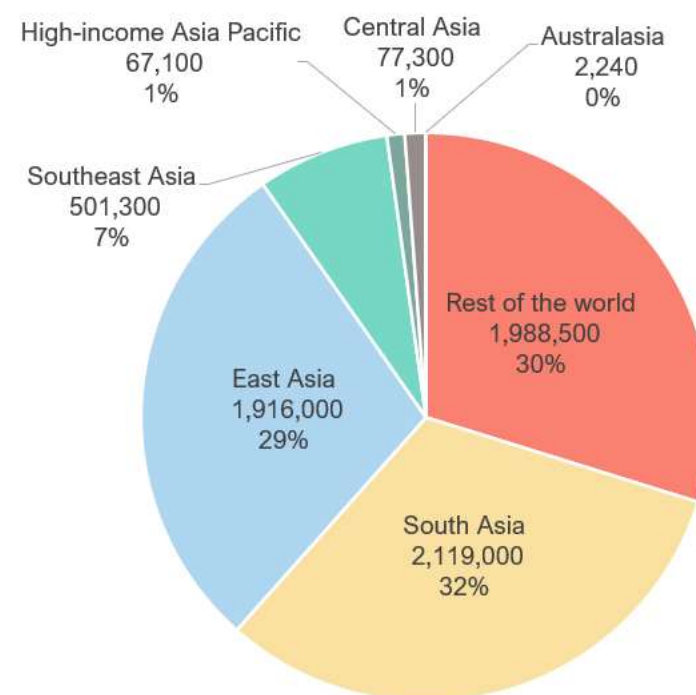
Data from official sources compiled by CAA for the latest year from 2007-2017
(Clean Air Asia, 2018)

Global Burden of Disease – Air Pollution

Global Deaths due to Air Pollution (Ambient and Indoor)

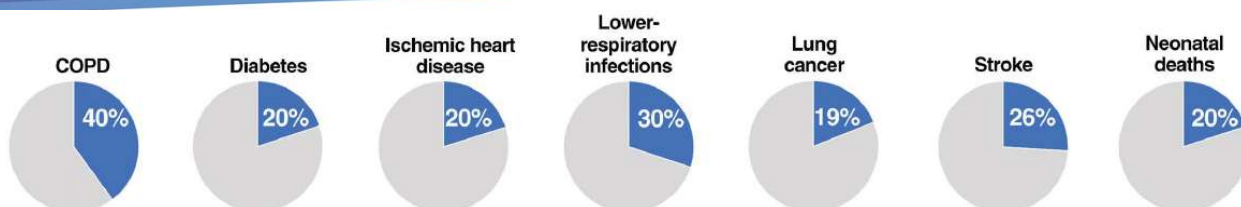


Premature deaths from total air pollution (2019)

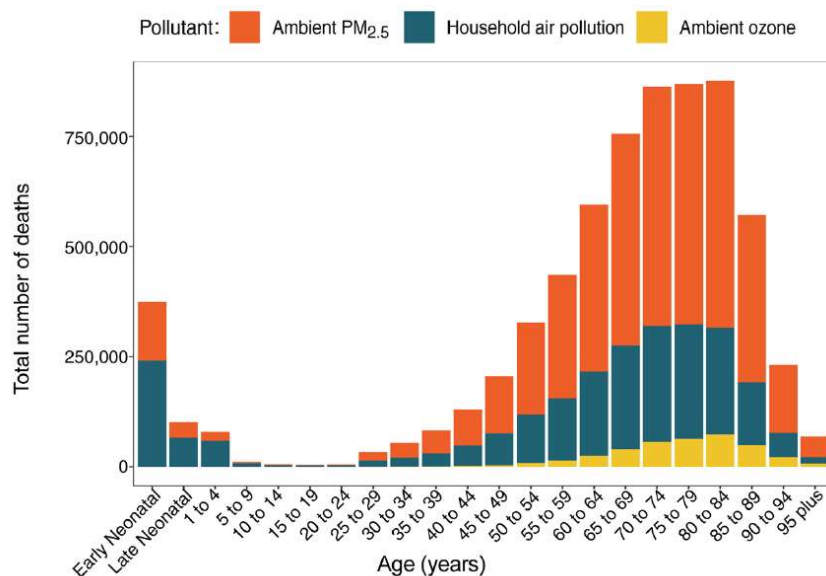


Clean Air Asia (2020); Data source: Health Effects Institute (2020)

Global Burden of Disease – Air Pollution



- 6.7 million premature deaths in 2019 (12% of total)



<https://www.stateofglobalair.org/data/#/health/plot>



Each year, 4.5 million people in Asia die prematurely from illnesses caused by breathing polluted air (HEI, 2020)

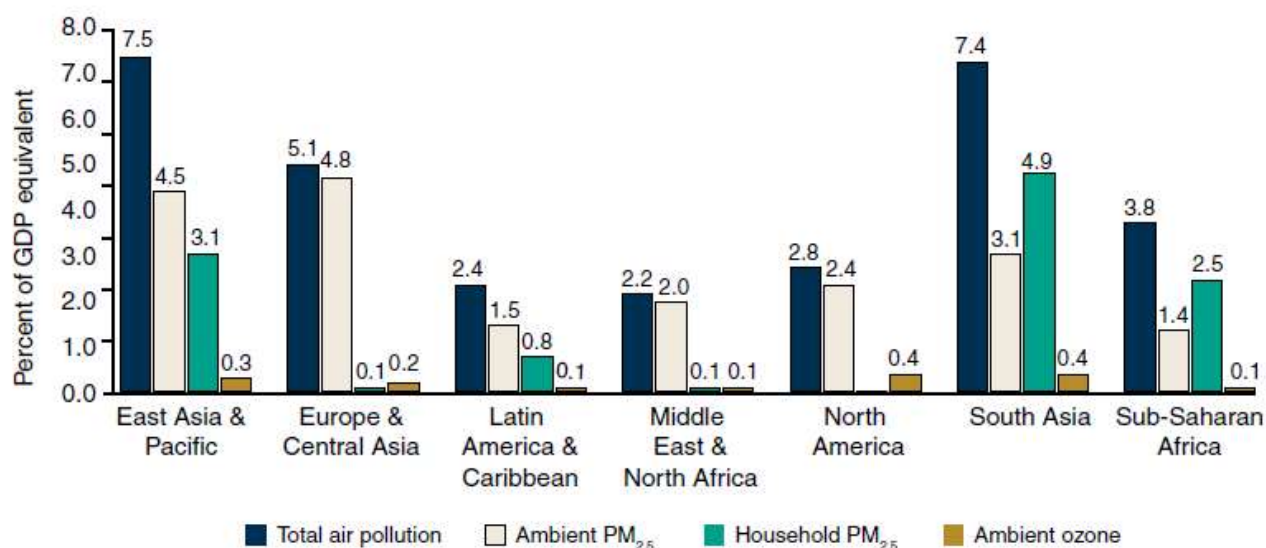
Economic cost of air pollution



- As early as 2013, it was already estimated that air pollution cost the world's economy **~\$5.11 trillion in welfare losses** (World Bank, 2016)
- By 2060, the projected annual number of lost working days are projected to reach **\$3.7 billion** (~\$1.2 billion in 2015).

In terms of global costs associated with premature deaths due to air pollution, projections show \$3 trillion in 2015 to **\$18-15 trillion** in 2060 (OECD, 2016)

FIGURE ES.1 Welfare Losses Due to Air Pollution by Region, 2013



Sources: World Bank and IHME.

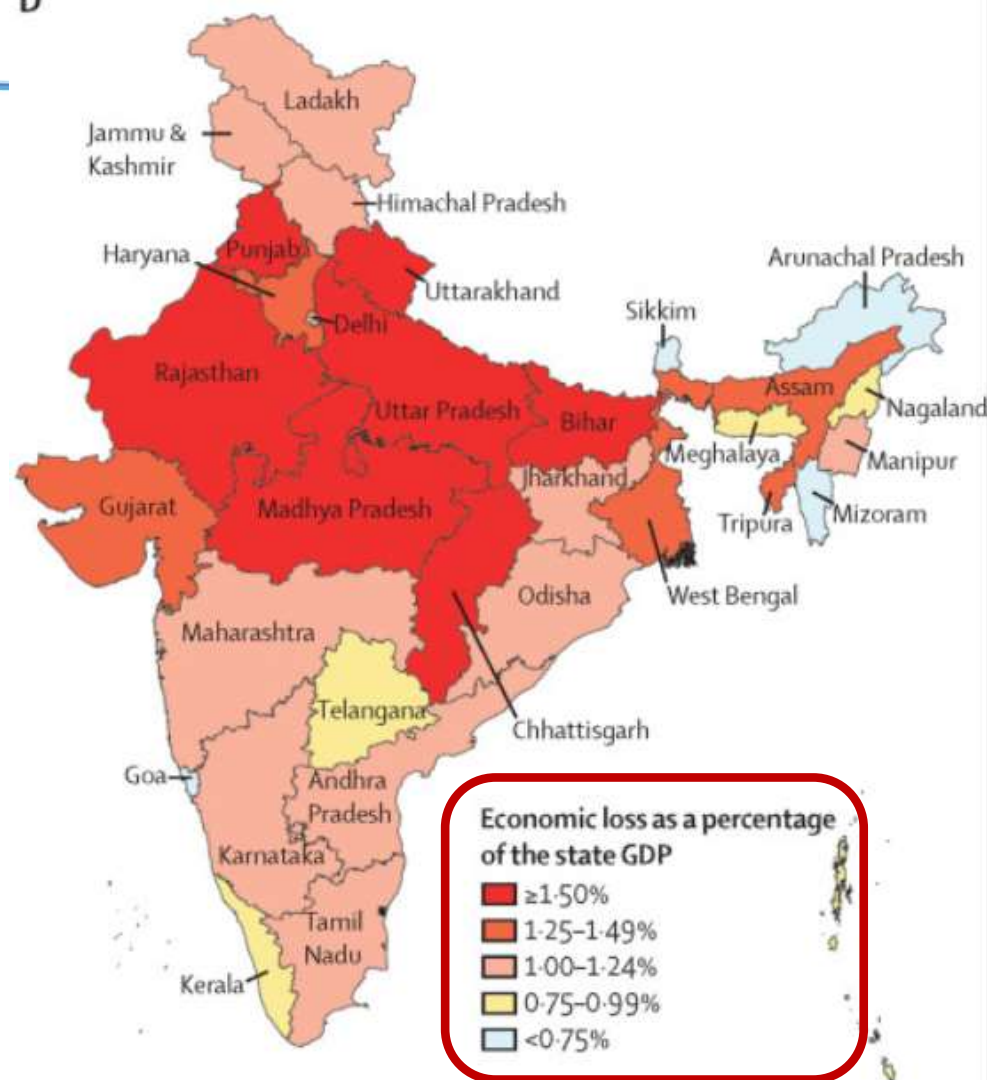
Note: Total air pollution damages include ambient PM_{2.5}, household PM_{2.5}, and ozone. GDP = gross domestic product.

Economic cost of air pollution: India

- Lost output from premature deaths and illness related to air pollution is equivalent to 1.36% of India's GDP in 2019.
- In addition, health care cost of air pollution-related disease treatment is 0.44% of India's GDP.

Source: Pandey, A., Brauer, M., Cropper, M., Balakrishnan, K., Mathur, P., ... Dandona, L. (2021) Health and economic impact of air pollution in the states of India: the Global Burden of Disease Study 2019, *The Lancet Planetary Health*, Volume 5, Issue 1

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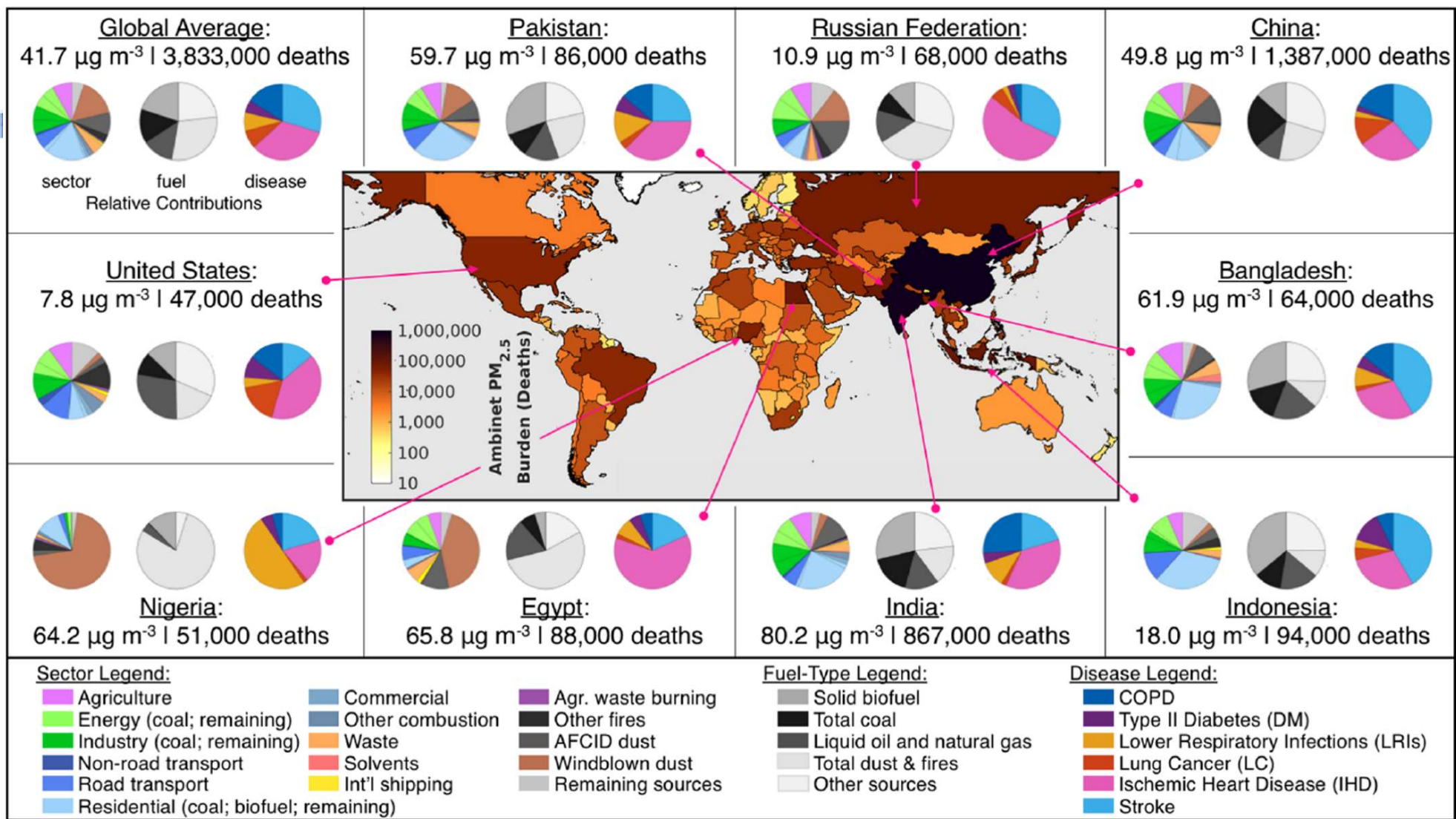
Air pollution sources

- Among the major sources of PM_{2.5} in South Asia is traffic (motor vehicles) at ~25% of PM_{2.5} and ~21% of PM₁₀.
- PM_{2.5} in China comes from motor vehicles at ~19%, but industry is not far behind at ~17%.

Source: Hopke, P. K., Dai, Q., Li, L., & Feng, Y. (2020). Global review of recent source apportionments for airborne particulate matter. *Science of The Total Environment*, 140091.

Table 2
Tabulation of the fractional apportionments by global region or country.

Source	Northern China	Southern China	Eastern Asia -Not China	Southern Asia	South-eastern Asia
No. of reports	205	41	27	46	14
PM _{2.5} (µg/m ³)	100.9	50.3	27.5	102.5	24.8
Mixed SIA (%)	31.0	31.0	42.3	34.3	23.9
Sea salt (%)	4.1	4.1	6.8	4.8	7.8
Dust (%)	8.9	8.9	7.2	9.8	19.1
Traffic (%)	19.3	19.3	17.6	25.2	23.0
Industry (%)	16.8	16.8	8.9	6.4	15.4
Biomass. burning (%)	10.3	10.3	10.1	14.9	16.3
Coal or no. 6 oil combustion (%)	10.9	10.9	14.5	7.1	13.8
Other (%)	10.5	10.5	11.9	10.8	23.9
PM ₁₀ (µg/m ³)	164.6	110.0	40.5	190.0	92.8
Mixed SIA (%)	22.3	28.9	0.0	17.5	
Sea salt (%)	6.9	6.0		16.5	
Dust (%)	30.5	15.2	44.0	33.5	
Traffic (%)	14.6	25.6	8.0	21.4	
Industry (%)	12.1	19.0		19.8	
Biomass. burning (%)	14.3	5.9		17.0	
Coal or no. 6 oil combustion (%)	20.2	17.3	25.0	12.9	
Other (%)	11.0	9.0	23.0	23.2	



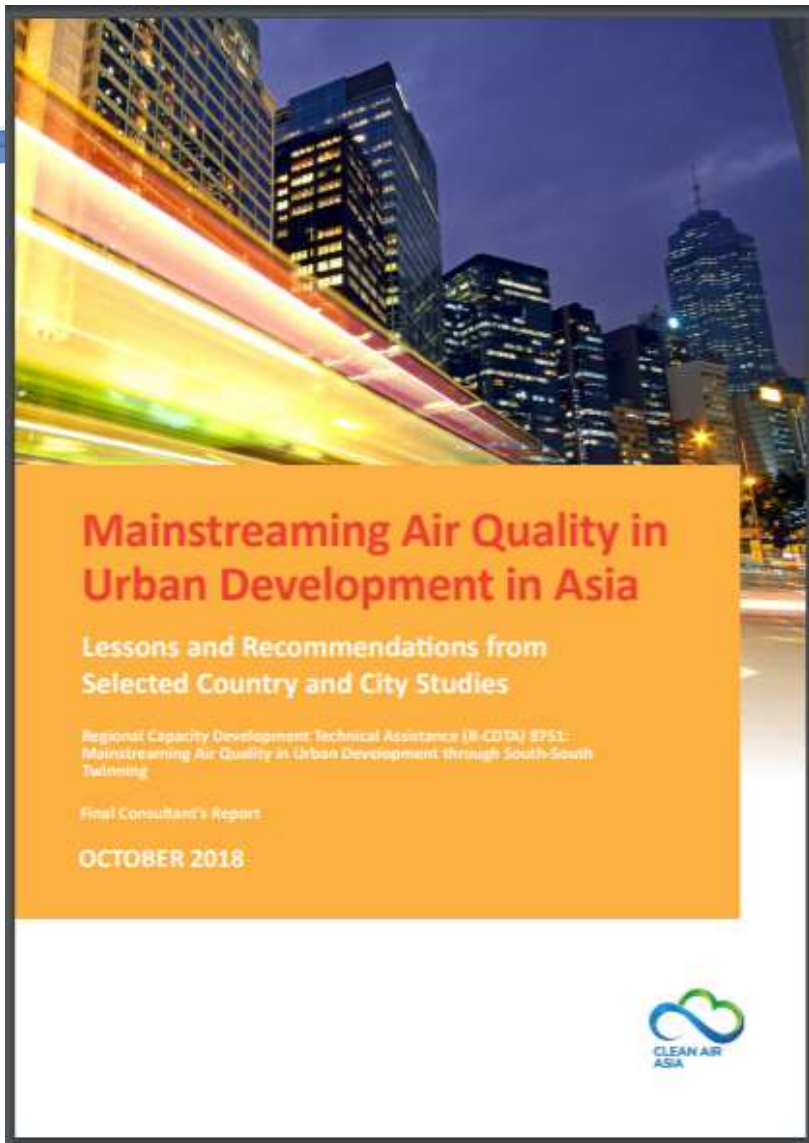
Source: McDuffie, E. E., Martin, R. V., Spadaro, J. V., Burnett, R., Smith, S. J., O'Rourke, P., ... & Brauer, M. (2021). Source sector and fuel contributions to ambient PM_{2.5} and attributable mortality across multiple spatial scales. *Nature Communications*, 12(1), 1-12.

Common challenges to implementing integrated air quality management

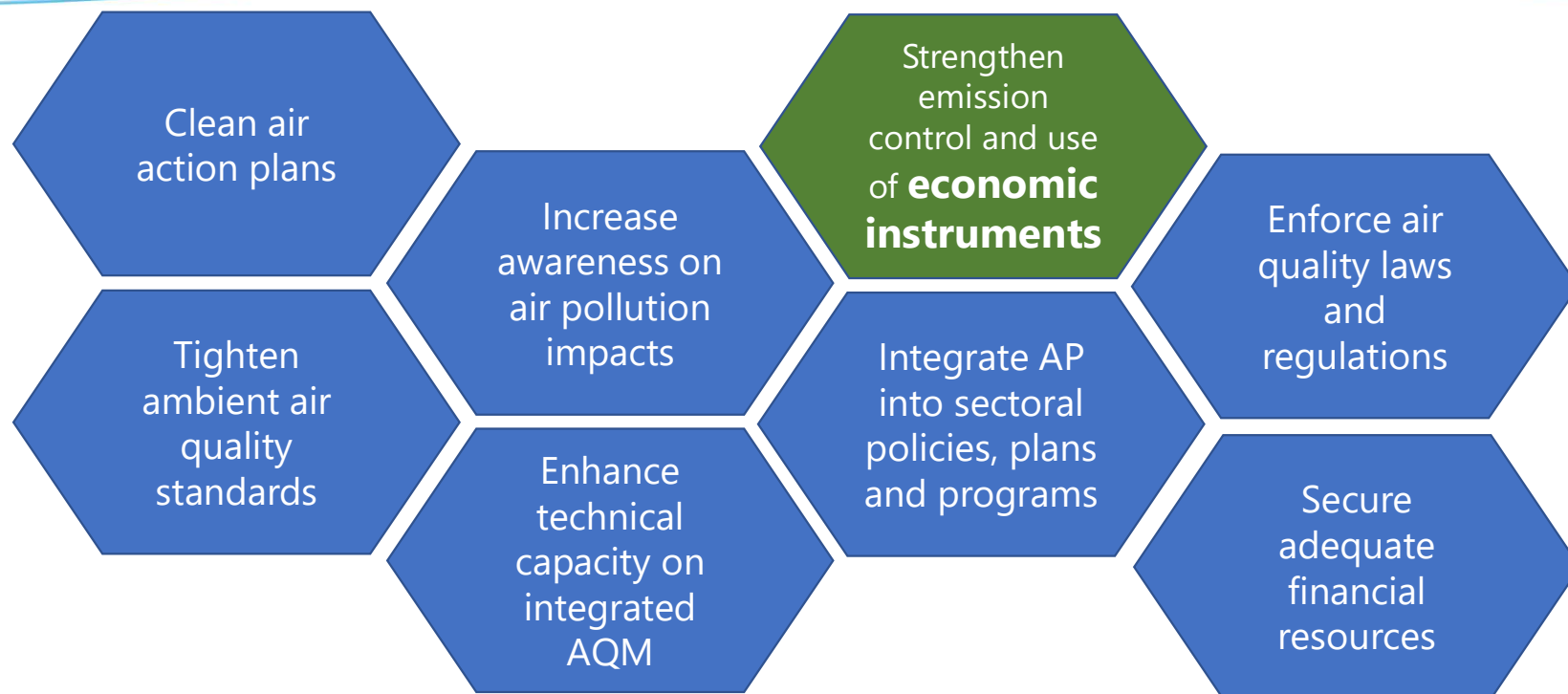


- Insufficient air quality information to inform policies, plans and programs
- Limited technical capacity
- Lack of coordination among stakeholders
- Leniency of national air quality standards
- Weak enforcement of air quality standards
- Insufficient financial resources and incentive schemes
- Lack of mainstreaming of air quality concerns in urban development

<https://www.adb.org/sites/default/files/project-documents/46250/46250-001-tacr-en.pdf>



Opportunities to improve air quality



Source: Clean Air Asia. 2018. ADB Consultant's Report on Mainstreaming Air Quality in Urban Development in Asia.

25 Clean Air Measures

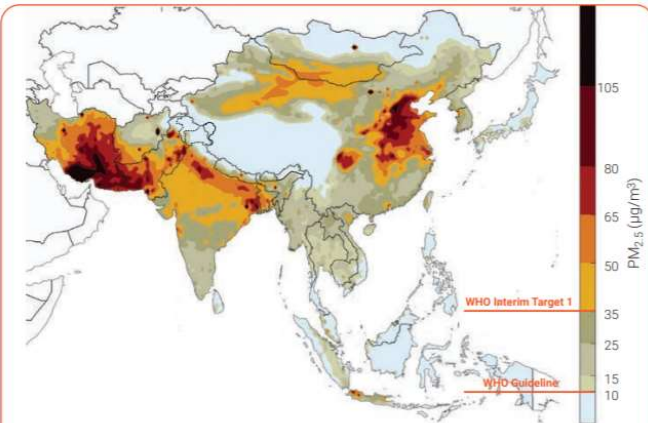


FIGURE 1.1: AMBIENT LEVELS OF PM_{2.5} IN ASIA IN 2015

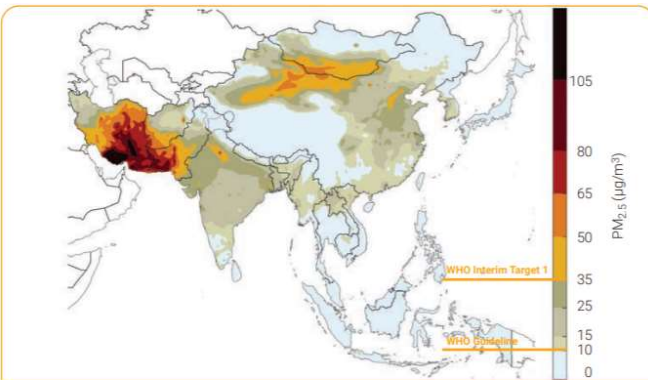


FIGURE 2.5: PM_{2.5} CONCENTRATIONS IN 2030 AFTER IMPLEMENTATION OF THE TOP 25 CLEAN AIR MEASURES

Source: UNEP, 2018. *Air Pollution in Asia and the Pacific: Science-Based Solutions*

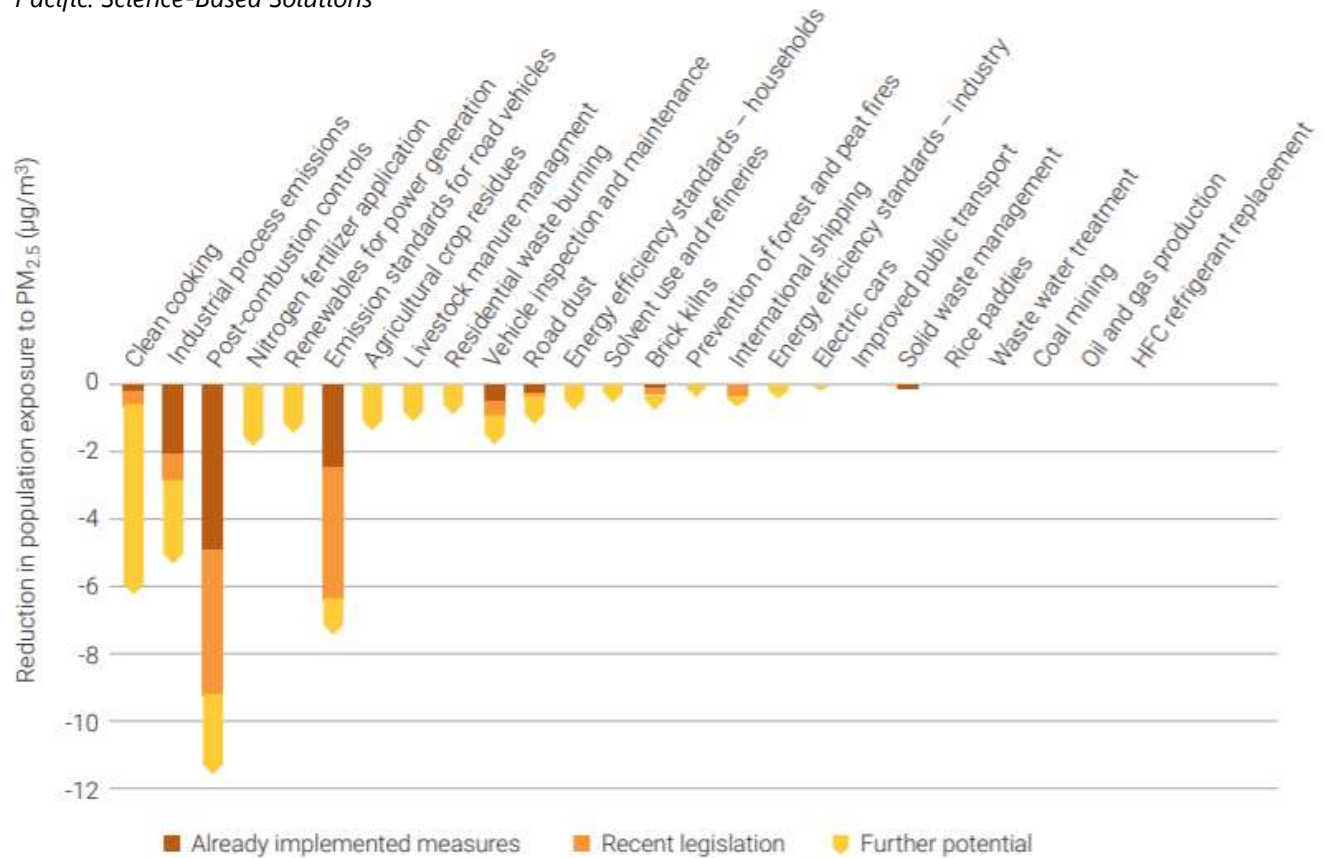


FIGURE 2.4: IMPACTS ON POPULATION-WEIGHTED EXPOSURE TO PM_{2.5} IN 2030 FROM IMPLEMENTATION OF 25 CLEAN AIR MEASURES, RANKED BY FURTHER POTENTIAL



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