



PROMOTING INNOVATION IN THE GREEN ECONOMY IN LATIN AMERICA AND THE CARIBBEAN BY INCLUDING QUALITY INFRASTRUCTURE

### Air Quality Monitoring in Cities

Context:

- The Problem(s)
- Global GE Perspective

Air quality is usually measured through concentration levels of small and fine particulate matter (PM<sub>10</sub> and PM<sub>2.5</sub>). PM<sub>10</sub> and PM<sub>2.5</sub> include pollutants such as sulfate, nitrates and black carbon, which penetrate deep into the lungs and into the cardiovascular system, posing great risks to human health. As urban air quality declines, the risk of stroke, heart disease, lung cancer, and chronic and acute respiratory diseases, including asthma, increases for the people who live in them. Ambient air pollution is the greatest environmental risk to health - causing more than 3 million premature deaths worldwide each year.

More than 80% of people living in urban areas that monitor air pollution are exposed to air quality levels that exceed the World Health Organization (WHO) limits. While all regions of the world are affected, populations in low-income cities are the most impacted. 98% of cities in low- and middle income countries with more than 100 000 inhabitants do not meet WHO air quality guidelines. According to the [latest urban air quality database](#), from 2008-2013 global urban air pollution levels increased by 8%, despite improvements in some regions.

Most sources of urban outdoor air pollution are well beyond the control of individuals and demand action by cities, as well as national and international policymakers to promote cleaner transport, more efficient energy production and waste management. Reducing industrial smokestack emissions, increasing use of renewable power sources, like solar and wind, and prioritizing rapid transit, walking and cycling networks in cities are among the suite of available and affordable strategies. Air quality monitoring in cities can be a tool to determine whether the actions being taken are being effective and benefitting citizens' health and quality of life through improving the air they breathe.

Situation in Latin America and the Caribbean

- Leading countries in LAC

Polluted air is a major health hazard in developing countries. According to a [2013 report](#) published by the [Clean Air Institute](#) (CAI), over 100 million people in Latin America breathe polluted air. The authors looked at levels of particulate matter (PM<sub>10</sub> and PM<sub>2.5</sub>), ozone (O<sub>3</sub>), nitrous oxide (NO<sub>2</sub>), and sulphur dioxide (SO<sub>2</sub>) in the region. They compared the levels of those compounds with the World Health Organization (WHO)'s Air Quality Guidelines, and found that:

- Most of the countries measured for PM<sub>10</sub> and PM<sub>2.5</sub> in 2011, all exceeded the WHO's recommended level.
- Ozone measurements in 2011 in Santiago (Chile), Mexico City and Quito exceeded the WHO's recommended level.
- Of the 13 countries that measured for NO<sub>2</sub>, 7 exceeded the WHO's recommended level

According to CAI, Monterrey, Guadalajara, Mexico City, Cochabamba (Bolivia), Santiago (Chile), Lima (Perú), Bogotá y Medellín (Colombia), Montevideo (Uruguay) y San Salvador (El Salvador) are the 10 cities with the most polluted air in LAC. In all of them, the levels of pollution are above WHO levels.



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Encouragingly, the researchers also found that many countries have some standards in place to limit these emissions:

- Approximately half of the countries included in the study have PM2.5 standards.
- All of the countries that have any standards in place (16) have PM10 standards.
- 13 of the countries have Ozone (8 hour) standards.
- All 16 countries have SO2 (24 hour) standards.
- 15 of the 16 countries have (annual) NO2 standards. \*

Chile is mentioned as a leading country in this area, for [having regulation on the emissions of NO2, SO2 and PM2.5](#) from vehicles, and by requiring the use of cleaner, ultra-low sulfur diesel fuel nationwide. [Mexico](#) is also moving forward towards vehicle efficiency and fuel quality standards that will make Mexico’s new vehicles comparable to those sold in the U.S. and Europe. [Costa Rica is also advancing](#) in this area, with programs to promote more efficient vehicle technologies, restrict the import of old vehicles, improving fuel quality, etc., all contemplated in the country’s National Energy Plan. In terms of energy, renewables are taking off throughout the region – [Brazil](#), [Chile and Mexico](#) tend to get the most attention for it, but other countries are also making progress, such as [Peru](#), [Panama](#) and [Costa Rica](#).

At the regional level, there is an effort from the Forum of Ministers of Environment for LAC in developing a Regional Action Plan on Atmospheric Pollution for Latin America and the Caribbean. This forum will seek to coordinate action at the regional level and seek support from UN entities such as UNEP and WHO in strengthening capacities in the region, developing studies and prioritizing action. The plan includes 1-technical assistance, training and capacity strengthening, 2-policy dialogue, cooperation and coordination, 3-assessment methodologies of policies, plans and projects, 4-research, 5-awareness raising and 6-regional plan monitoring and evaluation.

Links to QI:

- Relevant standards (ISO)
- QI service gaps

There is an ISO technical committee related to Air Quality (ISO/TC 146/SC 4) which is responsible for standards such as ISO 4225 and 4226 (General aspects and measurement of Air Quality), ISO 7186-1 and 2 (Air Quality Exchange of Data), and other standards related to measurement and assessment of air quality (ISO 8756, 9169, 9359, 11222, 117771, 13752, 14956 and 20988). Apart from standards regarding air quality directly, there are other areas where standards can help for improving air quality, such as those assessing fuel quality, combustion efficiency. Standards supporting the development of renewable energies and more efficient technologies are also important in contributing towards improved air quality.

As mentioned before, in order to improve air quality and in order to meet air quality standards, efforts in this sector must go beyond standards. Policy regulations and technical regulations must also ensure that standards are enforced, that the appropriate technology shifts are being promoted to reduce the burning of fossil fuels and that the measurement equipment used to determine pollution levels is calibrated.



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### (Preliminary) Conclusions

There is still work to do in mainstreaming air quality monitoring in LAC. There are still countries where there is no data available to analyse trends and determine whether they comply with international recommended levels, or whether their air quality is improving or diminishing. In this area, there is opportunity in developing technologies or monitoring methods that are low cost and low tech, since technical capacities and funds are usually the biggest limitations in developing countries.

On the other hand, the greatest opportunities for QI to impact air quality in cities (beyond monitoring) are related to development of cleaner technologies and renewable energies to reduce the use of fossil fuels, working together with policy makers in order to promote or demand their adoption in LAC countries. As several LAC countries are already advancing in some of these actions, there is an opportunity to match and support these projects with air quality monitoring to assess whether they are also having effect in this area.

A recommendation for taking action would be to work closely with the stakeholders developing the Regional Action Plan on Atmospheric Pollution for Latin America and the Caribbean, in order to introduce QI components and services into it.

### Bibliography and links

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*Real time Air Quality Index in the World*

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<http://www.who.int/mediacentre/news/releases/2016/air-pollution-rising/en/>