

Commentary

Imagining an air quality framework that works: How do we mainstream offsets?

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Air quality management (AQM) in South Africa faces significant challenges in balancing the constitutional right to clean air with economic development pressures. Civil organisations and communities demand their constitutional right to clean air while local governments face other pressing priorities, such as basic services and economic development (Naiker et al. 2012; Garland 2023). Therefore, imagining an air quality management framework that works within the civil and political context of South Africa is deemed imperative.

Current air quality management relies heavily on policy and legislation with robust compliance and enforcement measures dominated by Command and Control (CaC) approaches. This approach lacks innovation and does not encourage incentive-driven thinking (Mukwevho et al. 2022). There is an excessive reliance on legal recourse as the primary incentive to comply, which may not be sustainable or encourage proactive measures from industry. While recognising the significant role of CaC approaches, it is recommended to explore and adopt additional approaches beyond CaC for further enhancement (Mukwevho et al. 2022), which may lead to the industry sharing the responsibility with the government of ensuring clean air for all. The government has initiated adopting alternative approaches like market-based instruments, including a carbon tax. However, these measures can intensify financial burdens on industries, thereby complicating efforts to reduce emissions in a manner that is considerate of socio-economic development needs.

In the context of sustainable development, air quality offsetting emerges as a promising approach to incentivise emission reduction while supporting economic growth. In South Africa, offsetting is implemented by polluting industries as a condition of postponement of compliance with the Minimum Emissions Standards (Langerman 2019). This takes the form of interventions to reduce poor air quality in low-income settlements by focussing on counterbalancing adverse environmental impacts without requiring that the offset reduces the same pollutant emitted by the industry (DEA 2016; Langerman 2019). It is argued that organisations are more inclined to engage in environmental initiatives when these offer incentives for specific objectives, and they are open to modifying abatement activities of the facilities and behaviours within the business to align with these objectives (Frondel et al. 2008). An unintended consequence is that offsets are typically seen as stopgap measures with fixed

and limited time frames as opposed to control technology projects with significant capital investment for development and implementation lifetimes in the order of decades. Control technology subsequently disincentivises the industry to take offsets seriously.

Therefore, the questions that we are asking are: 1) *What are the benefits of air quality offsets and 2) To what extent should offsets be integrated into our existing CaC instruments?*

First, we must appreciate the complexity of air pollution in its totality. We need to acknowledge that air quality management is not only about industrial air pollution, as is commonly perceived, but we also need to consider the significance of other major pollution sources such as waste, domestic combustion and traffic. Many households in South Africa, especially those in low-income settlements, are exposed to indoor PM exceeding ambient PM concentrations (Language et al. 2016; Morakinyo & Mokgobu 2022; Wernecke et al. 2015). Adesina et al. (2020) illustrated that increased indoor and ambient PM₄ concentrations during the winter primarily result from solid fuel combustion and not from nearby power plants.

Secondly, we need to recognise the potential benefits of air quality offsets and explore practical examples that have proven beneficial. Adesina et al. (2020), Langerman et al. (2018) and Murray et al. (2023) argue that the introduction of air quality offset initiatives is a valuable augmentation to the arsenal of strategies aimed at reducing emissions, as it brings in additional contributors and financial resources to support the drive towards clean air. In addition, offsets represent a cost-efficient means of directing limited resources toward mitigating exposure to harmful pollutant levels.

The complex nature of air pollution and the necessity to evaluate the impact of sectoral mitigation measures on pollution levels and socio-economic factors calls for an integrated approach to air quality management. Such an approach should be underpinned by a rigorous scientific method, particularly in the prioritisation of offsets and the determination of activities that are eligible for offsets, ensuring optimisation across several dimensions, including:

- Reduction of emissions,
- Improvement of ambient air quality,

- Minimisation of economic costs,
- Generation of co-benefits, and
- Enhancement of health outcomes.

A key tool for such optimisation emerges as Integrated Assessment Modelling (IAM). Ideally, through IAM, the intricacies of management measures and their impacts, including offsets, can be assessed and optimised. In doing so, activities qualifying for offsets can be identified and directed toward the focus of interventions.

In practical terms, this approach would enable a strategic reallocation of resources to areas where the most significant environmental and health benefits can be realised, concurrently ensuring economic efficiency. The industry could then opt to mitigate their emissions to the techno-economically viable extent and utilise offsets to compensate for any shortfall in meeting minimum emissions standards.

Adesina et al. (2020) argue that full implementation of the air quality offset programme could yield significant advantages for local communities, including reducing indoor PM concentrations and enhancing thermal comfort, particularly during the winter months. Evidence suggests that these mitigation methods driven by offsets may enhance their overall quality of life (Langerman 2019).

Our commentary suggests that the current process undertaken by the Department of Forestry, Fisheries and the Environment (DFFE) to review the *National Framework for Air Quality Management* presents the best opportunity to integrate air quality offsets into the CaC legal framework. The core aim of the framework is to identify mechanisms, systems, and processes that promote an integrated approach to air quality management. This encompasses tactics for preventing and decreasing pollution at its origin and managing its environmental consequences, extending from local to global issues. Integrating air quality offsetting into the national framework, therefore, is advisable, seeing the current South African air quality management system faces various challenges, including a fragile economy, limited lifetime of infrastructure, the short timeframe of extensions of compliance with the minimum emission standards and the focus on reduction of emissions. Air quality offsets provide an opportunity to holistically enhance quality of life whilst combating poor air quality.

How can offsets become a legitimate part of an air quality management framework? Offsets integration can be done in a manner that requires it to prioritise emission reduction, maintenance, co-benefits, and contribution to ambient air quality improvement. For offsets to be viable, there needs to be clear strategies which will ensure that realistic programs, long-term implementation, regular maintenance (funded by the implementing industry), monitoring, and independent evaluation of their performance are conducted. Lastly, the option to implement air quality offsets, particularly by industry, should not take away their responsibilities to meet minimum emission standards but provide an additional tool to ensure clean air for all.

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