



IEAGHG Information Paper: 2016-IP24; World Energy Outlook 2016 Special Report Energy and Air Pollution

The IEA has recently issued its latest report in the World Energy Outlook Series, the 2016 report on Energy and Air Pollution. For further details and a copy of the main report go to:

<https://www.iea.org/publications/freepublications/publication/weo-2016-special-report-energy-and-air-pollution.html>.

This is the first time that the IEA has focused on the issue of air pollution related to energy use. However the IEA considers that the scale of the public health crisis caused by air pollution and the importance of the energy sector to its resolution are the reasons why it now considers this a critical topic for the first time.

The report is based on new data for pollutant emissions in 2015 and projections to 2040, and provides a global outlook for energy and air pollution as well as detailed profiles of key countries and regions: the United States, Mexico, the European Union, China, India, Southeast Asia and Africa. The report proposes In a Clean Air Scenario, which is a pragmatic and attainable strategy to reconcile the world's energy requirements with its need for cleaner air.

The main highlights from the report are:

Clean air is vital for good health. Yet despite growing recognition of this imperative, the problem of air pollution is far from solved in many countries, and the global health impacts risk intensifying in the decades to come.

Around 6.5 million premature deaths each year can be attributed to air pollution

- Energy production and use are by far the largest man-made sources of air pollutants
- Technologies to tackle air pollution are well known

The IEA proposes a cost-effective strategy, based on existing technologies and proven policies, to cut pollutant emissions by more than half compared with to their main scenario. The measures proposed in the Clean Air Scenario are tailored to different national and regional circumstances, and include a suite of policy measures that – adapted in tailored combinations to reflect different national and regional settings – can bring about the targeted improvement in air quality. These measures aim to:

- Avoid pollutant emissions by providing energy services more efficiently or in a way that does not involve fuel combustion. Measures include higher efficiency standards, increased support to non-combustion renewable energy and alternatives to liquids fuels for transport, and improvements in public transport and urban planning.
- Innovate to reduce pollution abatement costs via technology improvements that will also reduce costs for the post-Paris energy transition.
- Reduce pollutant emissions to the atmosphere, via stringent emissions limits on combustion plants and vehicles, controls on industrial processes, fuel switching to less polluting fuels and strict regulation of fuel quality.

The Clean Air Scenario, with only a 7% increase in total energy investment over the period to 2040, produces a sharp improvement in health compared with our main scenario: premature deaths from outdoor air pollution are 1.7 million lower in 2040 and, from household pollution, 1.6 million lower than under a business as usual scenario.

Of particular relevance to IEAGHG is that the Well-designed air quality strategies will have major co-benefits for other policy goals: the Clean Air Scenario provides for an early peak in carbon dioxide emissions, a central objective of the Paris climate change agreement

The issue of aligning clean air policies with energy policy objectives and climate change is addressed in detail in Chapter 3 of the report, which is summarised in the following paragraphs.

The WEO Special Report is set against the backdrop of the Paris Agreement on climate change. The most common energy sector actions cited in the INDCs submitted to COP21 are energy efficiency and promotion of renewable energy. Both result in reduced combustion of fossil fuels, which helps to improve air quality as well as mitigate climate change. Whilst the INDCs proposed at COP21 are not enough to put the world on track to meet the well below 2°C objective, it is also considered that the INDCs also fall short of adequately addressing air quality concerns as well.

The report suggests that improved air quality and climate change can be co-benefits in many countries. The imperative of improving air quality is strong motivation for action that also has benefits for the climate i.e. a “win-win” situation. The Clean Air Scenario presented in the report aims to achieve this win-win scenario for air quality and climate change, with major cuts in key energy-related pollutants occurring hand-in-hand with reductions in energy-related CO₂ emissions. The Clean Air Scenario, it is suggested, conforms to one critical goal agreed in Paris, as it delivers an early peak in global greenhouse-gas emissions, around 2020. It is noted however that considerably stronger policy efforts would be required to raise the probability of this becoming a scenario that keeps the long term rise in global average temperatures to well below 2°C.

The report highlights two areas of clear cross-benefit (for air quality and climate change) are actions to reduce emissions of black carbon, a major component of Particulate Matter. It also notes that there are trade-offs between air quality and climate change objectives. Individual air pollutants have differing, and sometimes opposite, effects on climate change that must be taken into account to avoid unintended climate consequences. The choice of policy instrument to tackle air pollution can also have important implications for CO₂ emissions. For example, an exclusive focus on direct emissions controls, rather than the package of measures adopted in the Clean Air Scenario, could result in increased commitments to high-carbon energy infrastructure, such as coal-fired power plants. Given the long lifetime of such assets, such a “locked-in” high-emissions infrastructure would become a barrier to achieving the rapid decarbonisation in the power sector required to meet global climate change objectives. The IEA propose that the Clean Air Scenario helps avoid this lock-in, due to its focus on energy efficiency and renewable-based power generation.

The report also notes that the opposite situation also exists: measures to address climate change, adopted in isolation from the aims of air pollution abatement, and could lead to more air pollution. For example, an isolated focus on reducing CO₂ emissions by encouraging the use of wood stoves, diesel cars or biofuels, could worsen air quality and increase exposure to fine particles. Combustion of bioenergy (biomass for power generation and cooking/heating, or biofuels for transport) still produces air pollutants, even though it can contribute to the reduction of greenhouse gases.

This points to the need to quantify air quality co-benefits and vice versa when assessing climate policy options and co-optimising policy packages. The air quality co-benefits of climate change mitigation have been estimated to fall within the range of \$2 to \$196 per tonne of CO₂ (t/CO₂), with an average of \$49 t/CO₂, with the highest co-benefits found in developing countries.

Discussion

Clearly this is a first time foray into this area for the IEA but all credit to the new Director, Energy Climate Change and Air pollution are intimately linked as this report firmly indicates. Policies to minimise air pollution can have a double whammy and reduce greenhouse gas emissions as well.

In the report there is a reference to legacy or “locked in” high emission infrastructure, and the report also focuses on renewables and energy efficiency as technologies for reducing both air pollution and climate change. Since Paris there has been considerable reflection on what technologies might get us to below 2°C and a growing opinion that CCS will be a critical technology post 2030 to allow us to get to this new target.

I would remind members that our report of 2012, Emissions of Substances other Than CO₂ from Power Plants with CCS¹, clearly showed that when CCS technology is fitted on coal and gas fired power plant the emissions of SO_x, NO_x, particulate matter and trace elements are significantly reduced. A policy to retrofit existing fossil power plant to CCS and encourage all new build plant to incorporate CCS would be consistent with the “win-win” approach outlined in this report of reducing both air pollution and GHG emissions and hence climate change.

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¹ See IEAGHG, Emissions of Substances other Than CO₂ from Power Plants with CCS, “012/03, March 2012, : http://www.ieaghg.org/docs/General_Docs/Reports/2012-03.pdf