

FACT SHEET

8 December 2017

Sulfur dioxide and oxides of nitrogen: health impacts and options for pollution control

Key points

- Exposure to sulfur dioxide or oxides of nitrogen can have serious health impacts.
- The Australian standards for sulfur dioxide (SO₂) and oxides of nitrogen (NO_x) are currently being reviewed by Commonwealth, state and territory governments.
- Coal-fired power stations are the main source of both toxic pollutants.
- The World Health Organisation recommends a standard for SO₂ that is ten times stricter than the Australian standard.
- Australians are exposed to concentrations of NO_x and SO₂ that exceed World Health Organisation standards, especially in communities closest to power stations.
- Australia has one of the world's oldest and most toxic fleets of coal-fired power stations. Several are due for retirement soon.
- Australia's coal-fired power stations emit far more toxic air pollution than necessary due to weak air pollution control laws, policies and programs.
- Stricter national air pollution standards may mean stricter pollution licences for many of Australia's coal-fired power stations.
- SO₂ emissions can be reduced by 90% by installing flue-gas desulfurisation units, or scrubbers. NO_x emissions can be reduced by installing selective catalytic reduction. None of Australia's largest ten coal-fired power stations have fitted either of these controls.

Sulfur dioxide (SO₂)

When eyes are exposed to liquid sulfur dioxide (for example, in an industrial accident) it can cause severe burns and result in loss of vision. On the skin it produces burns. Breathing it in can result in headaches, general discomfort and anxiety. Those with impaired heart or lung function and asthmatics are at increased risk. Repeated or prolonged exposure to moderate concentrations may cause inflammation of the respiratory tract, wheezing and lung damage. Experiments have shown it to be harmful to the reproductive systems of animals and cause developmental changes in their newborn. There is strong epidemiologic evidence for short term effects of SO₂ on child asthma at concentrations much lower than the current Australian ambient air quality standards. And air pollution travels, so 87% of the sulfur dioxide pollution recorded in Sydney can be traced to have come from power stations in the Hunter Valley, more than 100 kilometres away.

Oxides of nitrogen (NO_x)

Exposure to low levels of oxides of nitrogen can irritate eyes, nose, throat and lungs, and can lead to coughing, shortness of breath, tiredness and nausea. Breathing high levels of oxides of nitrogen can cause rapid burning, spasms and swelling of tissues in the throat and upper respiratory tract,

reduced oxygenation of tissues, a build-up of fluid in the lungs. Skin or eye contact with high concentrations of NO_x gases or liquid will likely lead to serious burns. People have even died.

Controlling SO₂ and NO_x pollution

Since 1998, science has advanced our understanding of the health effects of air pollution. Many countries have progressively lowered the permitted limits of these pollutants. In the USA, the 1990 Clean Air Act Amendments prompted many power plants to switch to low-sulfur coal or to install flue-gas desulfurisation units, also known as scrubbers. Subsequent tightening of SO₂ regulations has caused more plants to install scrubbers. Scrubbers are estimated to reduce SO₂ emissions by 90%.

World Health Organisation recommendations

In 2005, the World Health Organisation recommended nations adopt a 24-hour 7.6 parts per billion (ppb) standard for SO₂ – less than one-tenth the concentration allowable in Australia. Air monitoring by the NSW Office of Environment and Heritage in Muswellbrook shows daily SO₂ concentrations breached the WHO standard on 26 days between January and July this year.

What's happening in Australia?

Coal-fired power stations are Australia's main source of SO₂ and NO_x. The annual costs of associated health damage from the five coal-fired power station in the Hunter Valley have been estimated at around \$600 million per annum. The annual health costs of coal-fired power stations across Australia has been estimated at about \$2.6 billion a year. Pollution reduction technologies that have been available for many years and are used overseas to significantly reduce power station emissions are not in use in Australia.

Australia's first national air pollution standards were adopted in 1998. After 20 years, the standards for oxides of nitrogen and sulfur dioxide are being revised. The process involves all nine Australian state, territory and Commonwealth governments. It is being led by the Victorian Government.

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