groundWork
Environmental justice action
P.O. Box 2375, Pietermaritzburg, 3200, South Africa 6 Raven Street, Pietermaritzburg, 3201, South Africa
Tel: +27-33-342 5662 Fax: +27-33-342 5665 team@groundwork.org.za www.groundwork.org.za

CLEAR THE AIR: ESKOM'S COAL IS A KILLER BRIEFING

3 July 2014

South Africa relies heavily on the extraction and combustion of coal to produce electricity. Eskom, the country's parastatal energy utility, provides the country with 95% of its electricity, of which about 90% is from coal. Most of the coal production occurs in the Highveld region which has 12 coal fired-power stations, hundreds of coal mines and one of the worst air quality areas in the world. In 2007, the national Department of Environmental Affairs declared a large part of it a priority area (HPA), with the aim to regulate emissions to protect public health. This has had little effect.

Over the last 20 years, pollution from vehicles, industrial activity, mining and coal–fired power stations has placed an increased burden on the health of communities in the area. Many of the poorer people are already exposed to a significant health risk from indoor pollution due to burning coal and wood in their homes. The dangerously high outdoor pollution levels are further adding to their health risk.

A new study[1] produced for environmental justice organisation, groundWork, highlights the disease burden that communities in the HPA are carrying due to pollution from Eskom's electricity generation, and shows Eskom to be the primary driver of outdoor pollution health risk in the area.

The study shows that:

- Although emissions from big industry and domestic coal burning contribute to the poor air quality in the HPA, a disproportionate amount of the pollution is from coal-fired electricity generation, with 12% of particulate matter up to 10 micrometers in size (PM10), 73% nitrogen oxide (NO2) and 82% of sulphur dioxide (SO2) respectively attributed to Eskom.
- Outdoor pollution from household burning of coal has a considerable impact on the people's health in the area and is responsible for 12% of hospital admissions and 15% mortalities due to outdoor air pollution related respiratory illness.

[1] The study by Liziwe McDaid has drawn on available academic peer reviewed literature, government statistics and other reports, including Highveld Priority Area Air Quality Management Plan Executive Summary, to attempt to understand the contribution that the coal industry and Eskom makes to the health risk of the people of the Highveld Priority Area, to highlight the costs of such a health burden and to compare health risks with other South African locations.

- However, this is dwarfed by the impact from pollution caused by Eskom's coal-fired electricity generation which is responsible for 51% of hospital admissions and 51% of mortalities due to respiratory illnesses caused by outdoor air pollution. This is three times the impact from outdoor pollution due to domestic coal burning.
- Similarly, 54% of deaths from air pollution-related cardiovascular diseases can be attributed to Eskom's electricity generation compared to 16% attributed to domestic coal burning.
- The levels of air pollutants from electricity generation, such as SO2, NO2 and PM10, are significantly higher in the HPA than in other areas (Table 1). As a result, HPA residents are three times more likely to die of respiratory or cardiovascular diseases due to Eskom's pollution than residents of Tshwane.

Table 1. Distribution of annual emissions from electricity generation

	Joburg	Cape Town	Vaal Triangle	Tshwane	HPA
% PM_{10}	0%	0%	14%	7%	79%
% SO_2	0%	0%	14%	1%	84%
% NO_2	0%	0%	14%	2%	83%

- With 26% of households relying on coal as an energy source in their homes, compared to the national average of 7%, the health risk in the HPA from indoor pollution due to domestic coal burning is four times greater than the national average.

Air pollution generated throughout the entire life-cycle of coal – from extraction to burning – has a massive impact on human health. Coal pollutants negatively affect all major organs and systems of the body, in particular, respiratory system, cardiovascular functioning and brain development in children.

Sulphur dioxide severely affects the upper respiratory passages exacerbating asthma and causing coughing, vomiting, sore throat or chronic obstructive pulmonary disease, a lung disease characterized by permanent narrowing of airways. Increased exposure to particulate matter causes a decrease in respiratory function with both nitrogen dioxide and particulate matter adversely affect lung development in children, which often leads to the development of other pulmonary diseases later in life.

The cardiovascular system is also damaged by coal pollutants. The mechanism has not been definitely identified, but research has shown that pollutants produced by coal combustion lead to cardiovascular disease, such as arterial occlusion (artery blockages, leading to heart attacks) and infarction (tissue death due to oxygen deprivation, leading to permanent heart damage).

Mercury is a toxic pollutant that exists in trace amounts in coal and is released into the global environment on combustion. Mercury emissions from coal-fired power stations are estimated to account for about 75% of anthropogenic sources in South Africa. It enters the human system through

multiple pathways such as inhalation or eating fish, and acts on the nervous system, particularly in infants and young children, to cause loss of intellectual capacity and damage to heart and kidneys.

Children and infants are among the most susceptible to outdoor air pollution as their lungs continue to develop in childhood and playing outside means they are exposed to polluted air. The elderly are also susceptible, as are people who have illnesses that affect the functioning of their immune system, such as those with HIV/AIDS.

Since 2002, Eskom has increased its emissions of NO_2, SO_2 and PM_{10} by 44%, 22% and 74% respectively, and this trend is likely to continue upwards as the new coal-fired power stations under construction, namely Kusile in Mpumalanga and Medupi in Lephalale, come into operation.

South Africa's prescribed air quality standards are weaker than the World Health Organisation's (WHO) guidelines, and yet to date, exceedances in the HPA have been numerous. GroundWork's study reveals that the last 5 years in the HPA alone, an estimated 70-165 people's lives could have been saved if WHO guidelines were implemented.

Last year Eskom claimed that to implement pollution abatement technology across its fleet of coal-fired power stations would cost up to R200 billion and put through its application to postpone compliance with the country's minimum emission standards. Most recent studies show that the cost to the State's public health budget for illnesses related to coal combustion is almost equal that at R230 billion.

Conclusion

Government programmes of electrification and fuel efficient stoves are addressing indoor pollution to some degree. However with half the households in the area earning less than R1 600 per month, even if homes were electrified, many people are still not able to afford electricity. Electrification will also address outdoor pollution in affected areas to some degree. But in areas like the HPA, where Eskom's pollution is the primary driver of outdoor pollution, reducing domestic coal burning will have little impact on the ambient air quality health risk borne by affected communities.

In order to protect the health and lives of South African citizens in the HPA, existing coal fired power stations must implement pollution abatement measures to ensure air quality standards are adhered to.

Furthermore, the government needs to effect a just transition away from dirty, unhealthy fossil fuels such as coal and shift our electricity mix towards renewable energy that is affordable for those who have to burn fuel indoors.