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CEO

Council for Scientific & Industrial Research

By email: mtsedu@csir.co.za

Our ref: NL/RH

11 August 2017

Dear Dr Dlamini

CSIR'S COMPREHENSIVE ALTERNATIVE INTEGRATED RESOURCE PLAN (IRP) FOR ELECTRICITY: MISSING COSTS

1. We address you on behalf of the Life After Coal Campaign (made up of the Centre for Environmental Rights (CER), groundWork and Earthlife Africa Johannesburg). The CER made submissions, on 31 March 2017, on the Department of Energy (DoE)'s IRP Base Case and Assumptions and the draft IEP, a copy of which is available at <https://cer.org.za/wp-content/uploads/2016/08/CER-IRP-Base-Case-IEP-Comments-31-3-2017.pdf>.¹ The submissions of groundwork and Earthlife Africa are attached hereto. The purpose of this correspondence is to bring to your attention important information that emerged since we made our submissions, and to ensure that the CSIR takes this into account in preparing updated commented on and models for the IRP. We have addressed similar correspondence to the DoE.
2. The Life After Coal Campaign, together with Greenpeace Africa, welcomed the rigorous research undertaken by the energy unit of the CSIR in preparing the "comprehensive alternative" IRP, but criticised the failure of this alternative IRP to adequately take into account the health and water cost of existing and new investments in coal. We also criticised the Department's draft IRP for this failure. The critique of the CSIR's alternative IRP is available at <https://cer.org.za/news/joint-media-release-cost-of-health-and-water-impacts-of-coal-still-missing-from-energy-plans> and is summarised below.

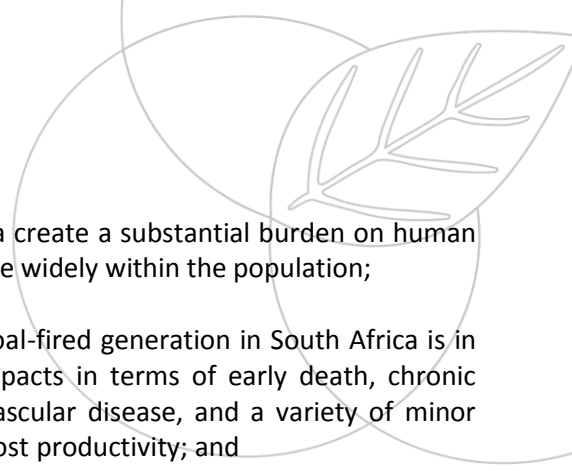
Health impacts

3. Distressingly, the CSIR's alternative IRP makes no mention of health costs at all.
4. The DoE's draft IRP includes some figures for the "cost of externalities", attributing costs for nitrogen oxides, sulphur oxides, mercury and particulate matter.²
5. However, a report by air quality and health expert Dr Mike Holland³ from the UK-based consulting firm Ecometrics Research and Consulting, which formed part of the comments on the draft IRP submitted by groundWork, found that:

¹ The annexure is here: <https://cer.org.za/wp-content/uploads/2016/08/Annexure-A.pdf>

² Table 11 Cost of Externalities, 4.2, p. 2

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- a. the health impacts of coal-fired power plants in South Africa create a substantial burden on human health, leading to premature death and increased illness quite widely within the population;
 - b. the total quantifiable economic cost of air pollution from coal-fired generation in South Africa is in the region of R33 billion per year.⁴ This is made up of impacts in terms of early death, chronic bronchitis, hospital admissions for respiratory and cardiovascular disease, and a variety of minor conditions leading to restrictions on daily activity, including lost productivity; and
 - c. these health impacts are likely most severe on the more disadvantaged members of society, particularly those whose underlying health condition is worst.⁵
6. A study conducted in 2012 on the external health and environmental costs of supplying coal to the Kusile coal-fired power station indicated a conservative annual damages cost for the health and environmental impacts (simply from the mining and transportation of the coal to Kusile) of R10.5 million, with a high annual damages cost of R15 million.⁶
 7. A 2014 report on the health impacts and social costs of Eskom's coal-fired power stations concluded that atmospheric emissions from those stations were then causing an estimated 2,200 premature deaths per year, due to exposure to fine particulate matter (PM_{2.5}). This included approximately 200 deaths of young children. The economic cost to society was estimated at R30 billion per year, including premature deaths from PM_{2.5} exposure and costs from the neurotoxic effects of mercury on children.⁷

Water impacts

8. Neither the CSIR nor the DoE have included in their calculations the full costs of coal mining and power generation on South Africa's precious freshwater resources. This includes coal mining, coal washing, post-mine acid mine drainage, and acid rain.
9. These costs, much of which will have to be incurred in perpetuity, have not yet been quantified, even by the Department of Water & Sanitation, but are estimated to be significant. The Anglo American eMalahleni Water Reclamation Project to treat mine water cost R1.4 billion in investment capital for phase 1 and phase 2,⁸ highlighting the unreported cost of coal.
10. The draft IRP Base Case indicates a water consumption of 1.15 litres/kWh (246 TWh/yr energy produced and 282 billion litres/yr water consumed). This is contradicted by the actual water consumption by Eskom for

³ Dr Michael Holland has been involved in the quantification of the impacts of air pollution from power systems since 1990, when he worked at the heart of the influential EC-US Fuel Cycles Study funded by the European Commission, EU Member States and the US Department of Energy. Following completion of the initial study in 1995 this work continued in Europe as the ExterneE Study until 2005. Since 1996 Mike has provided cost-benefit analysis of air quality and industrial policies for a variety of organisations including not only the European Commission, but governments in the UK, France, Sweden, China and a number of other countries. He has also provided analysis for international organisations including the Organisation for Economic Cooperation and Development (OECD) and the World Bank.

⁴ \$int2.37 billion annually converted at an exchange rate of ZAR14:USD1.

⁵ <http://cer.org.za/wp-content/uploads/2017/04/Annexure-Health-impacts-of-coal-fired-generation-in-South-Africa-310317.pdf>

⁶ The external costs of coal mining: the case of collieries supplying Kusile power station. Nonophile P Nkambule & James N Bignaut. Journal of Energy in Southern Africa, Vol 23 No 4, November 2012.

⁷ <http://cer.org.za/wp-content/uploads/2014/02/Annexure-5 Health-impacts-of-Eskom-applications-2014- final.pdf>

⁸ Naidu, T., 2012. *The eMalahleni Water Reclamation Project - A South African Case Study*. s.l., International Conference on Water Reuse for Drinking Purposes, slide at: available at <http://www.ewisa.co.za/misc/CONFERENCEWISA/RE%20USE%20DRINKING%20WATER/Thubendran%20Naidu%20eMalahleni%20Water%20Reclamation%20Project%20121010.pdf>

2016, which was 1.44 litres/kWh sent out,⁹ with a net annual water consumption of 314.685 million cubic metres.¹⁰

11. This casts further doubt on the credibility of the water consumption values used by both the DoE and the CSIR, and raises the question whether the water consumption values are deliberately underestimated, or were simply not based on the best available information on the actual water consumption values from the various power plants. The first option suggests a profound disregard to the ongoing water crisis in South Africa and the second suggests negligence in the scientific rigour.
12. Water is under-valued across tariff categories, particularly for large water users. Eskom's highly-favourable water tariff means that it pays far less for water than many other water users. The undervaluing of water and subsidising of Eskom's water tariff distorts the cost estimates of different electricity supply options. Should the true value of water be included in the energy plans, this would further justify a rapid transition away from coal-based energy to water-efficient renewable energy.¹¹

Climate impacts of nitrous oxide

13. Also subsequent to our 31 March 2017 comments, we commented on the draft climate change impact assessment for Thabametsi coal-fired power station, one of two preferred bidders in the Coal Baseload Independent Power Producer Procurement Programme (CBIPPPP). In obtaining expert assistance in preparing these submissions (available at <https://cer.org.za/news/media-release-thabametsi-climate-impact-assessment-reveals-staggering-greenhouse-gas-emissions>), we became aware that the circulating fluidised bed combustion (CFB) technology planned to be employed by Thabametsi, and various other independent power producers in the CBIPPPP, results in significant emissions of nitrous oxide (N₂O). In short, the CFB technology proposed for Thabametsi means that the plant will be significantly worse in terms of greenhouse gas (GHG) emissions than existing and older coal plants, and only about the same as the oldest sub-critical Eskom units. As a new plant – which should be comparable with other new coal plants – Thabametsi will be 60% worse than Eskom's new Medupi and Kusile power stations, from a GHG emission intensity perspective. So while Thabametsi is clearly not 'newer and better', it is, notably, much worse than South Africa's existing GHG emitters, which already significantly contribute to the country's GHG emissions. It is clear that the nitrous oxide emissions of CFB were not given adequate – or any – consideration in the CSIR's modelling. This failure must be remedied by the DoE and also in CSIR's updated models.

Nuclear costs

14. The Department and CSIR should also remedy the various other omissions from the costing model. In relation to nuclear costs, for example, the following costs must be quantified and included: the decommissioning cost; the used fuel storage and handling costs; and the cost of insurance risk cover.¹² It is wholly insufficient only to consider the cost of construction; the cost of operation, and the cost of fuel.
15. In the circumstances, we call upon the CSIR to include all of these “missing” costs in its modelling, as a failure to do so would not enable a fair, accurate, and reasonable assessment of the various energy options and the consequences of such options. The Constitution and the National Development Plan require the inclusion of these costs into future energy planning for South Africa. Failing to do so would underestimate the costs of coal and nuclear energy, and overestimate the cost of alternative options. Not considering impacts on

⁹ The trend from 2006 to 2016 has been an increase in water consumption from 1.3 litres/kWh to 1.44 litres/kWh.

¹⁰ Eskom Integrated Annual Report 2016.

¹¹ In 2010, South Africa spent R338 billion on net fossil fuel subsidies alone. \$28 Billion at today's exchange rate of R13/dollar. Stefanski, R., 2016. *INTO THE MIRE: A CLOSER LOOK AT FOSSIL FUEL SUBSIDIES*, Calgary: University of Calgary.

¹² See, for instance, the fairly conservative figures in NEA, OECD, 2016 *Costs of Decommissioning Nuclear Power Plants*, available at: http://www.keepeek.com/Digital-Asset-Management/oecd/nuclear-energy/costs-of-decommissioning-nuclear-power-plants_9789264255555-en#.WY1rwUjHIU#page1

health, water and the climate impacts undermines rational, defensible and lawful decision-making about our future energy mix. We have advised the DoE that we reserve our rights to challenge all energy plans that fail to give these costs adequate consideration.

16. Please acknowledge receipt of this letter, and advise us how CSIR proposes to address the crucial issues raised in this letter. Given the fact that comments on the draft IRP are currently under consideration and that indications are that the IRP will be finalised at the latest by February 2018, we would appreciate your urgent response.

Yours sincerely

CENTRE FOR ENVIRONMENTAL RIGHTS

per: 

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