



Centre for Environmental Rights

Advancing Environmental Rights in South Africa



Department of Energy

192 Visagie Street

Pretoria

Per email: IRP.Queries@energy.gov.za
IEP.Queries@energy.gov.za

Copied to:

The Minister of Energy

By email: kate.dire@energy.gov.za

Tshepo Madingoane

Energy Planning

Department of Energy

By email: Tshepo.Madingoane@energy.gov.za

Our ref: NL/RH
31 March 2017

Dear Sirs

WRITTEN COMMENTS ON THE INTEGRATED RESOURCE PLAN UPDATE: ASSUMPTIONS, BASE CASE RESULTS AND OBSERVATIONS, REVISION 1 AND ON THE DRAFT INTEGRATED ENERGY PLAN

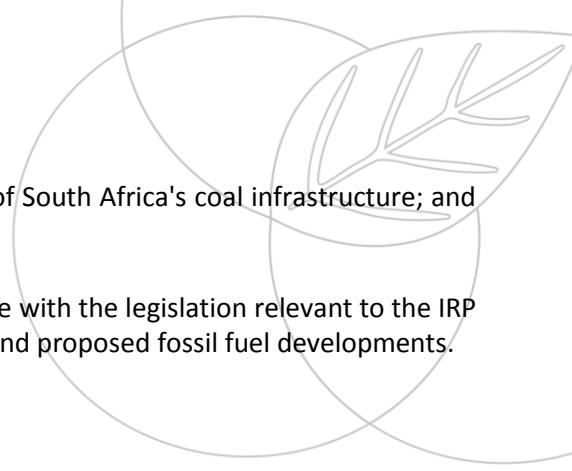
1. In this document, the Centre for Environmental Rights (CER) makes submissions on the Integrated Resource Plan Update: Assumptions, Base Case Results and Observations, Revision 1 (“IRP Base Case”) and on the draft Integrated Energy Plan (“draft IEP”) published by the Department of Energy (DOE) on 25 November 2016.
2. The CER is a non-profit organisation of activist lawyers, which assists communities and civil society organisations in South Africa realise our Constitutional right to a healthy environment by advocating and litigating for environmental justice.¹
3. The CER, along with environmental justice organisations, groundWork² and Earthlife Africa Johannesburg,³ also forms part of the Life After Coal/Impilo Ngaphandle Kwamalahle Campaign, which aims to discourage investment

¹ Registration number 2009/020736/08, <http://cer.org.za/>.

² groundWork is a non-profit environmental justice campaigning organisation working primarily in South Africa, in the areas of Climate & Energy Justice, Coal, Environmental Health, Global Green and Healthy Hospitals, and Waste. See more information at: www.groundwork.org.za.

³ Earthlife Africa Johannesburg is a non-profit organisation that seeks to encourage and support individuals, businesses and industries to reduce pollution, minimise waste and protect natural resources. See more information at: www.earthlife.org.za.

2nd Floor, Springtime Studios,
1 Scott Road, Observatory, 7925
Cape Town, South Africa
Tel 021 447 1647, Fax 086 730 9098
Email info@cer.org.za, www.cer.org.za



in new coal-fired power stations and mines; accelerate the retirement of South Africa's coal infrastructure; and enable a just transition to renewable energy for the people.

4. The CER makes submissions on the above drafts based on our experience with the legislation relevant to the IRP Base Case and draft IEP and in representing clients affected by existing and proposed fossil fuel developments.

Background

5. The Integrated Energy Plan (IEP) is intended to be a plan for South Africa's broader energy mix, as regulated by the National Energy Act, 2008 (NEA), whereas the Integrated Resource Plan for Electricity (IRP) is specifically a plan for South Africa's electricity mix. Planning for the electricity sector is planning for a subsection of the energy sector. These two plans should therefore be aligned with one another, and electricity planning should follow and fall within South Africa's wider energy plans, as set out in the IEP.
6. The first IRP was promulgated by the DOE in March 2011 ("IRP 2010-2030").⁴ It was intended to be a living plan that would continuously be revised and updated as necessitated by changing circumstances;⁵ however, no new plans have been promulgated since. While the DOE prepared and published a draft IRP Update in 2013, it was not adopted by the Cabinet or government. It is not clear why this update stalled, but many suspect that it was due to the substantially reduced and delayed proposed allocation for nuclear power as compared with the IRP 2010-2030.
7. As for the IEP, the NEA places an obligation on the Minister to develop and, on an annual basis, review and publish the IEP in the Gazette.⁶ We note, however, that section 6 of NEA, which places this obligation on the Minister has not yet been promulgated. To date, no final IEP has ever been adopted. A draft was published for comment in July 2013, but no further steps were taken to have it finalised.
8. The IRP Base Case and draft IEP were published for comment towards the end of November 2016, just before the December holiday period. Following objections from various stakeholders to the unreasonable period provided for comment, including the Life After Coal/Impilo Ngaphandle Kwamalahle Campaign (dealt with below), the comment period was extended from 15 February 2017 to 31 March 2017.
9. Given that the current process seeks public comment on both the draft IEP and the draft IRP at the same time, all comments focused on the IRP should be assumed to apply to any relevant sections of the IEP as well.
10. The draft IEP recommends, *inter alia*, that:
 - 10.1. new electricity generators should be brought online through a competitive bidding process, where the ability to generate electricity at low cost is a key criterion;
 - 10.2. the implementation of a new nuclear programme should be conducted in a manner that poses the least cost to the energy system;
 - 10.3. South Africa should continue to pursue a diversified energy mix which reduces reliance on a single or a few primary energy sources, and coal should continue to play a role in electricity generation; however investments need to be made in new and more efficient technologies;
 - 10.4. incentive programmes and special focused programmes to promote further development in solar technology, as well as solar roll-out programmes should be pursued, as solar photovoltaic (PV) and concentrated solar power (CSP) with storage "present excellent opportunities to diversify the electricity mix, to produce distributed generation and to provide off-grid electricity. Solar technologies also present the greatest potential for job creation and localization; and

⁴ Electricity Regulations on the Integrated Resource Plan 2010 -2030, published as Government Notice R400 in *Government Gazette* 34263 on 6 May 2011.

⁵ Para 11, IRP 2010 – 2030.

⁶ Section 6(1), the National Energy Act.

10.5. wind also presents an alternative source of power; however this is limited to windy areas on the coast.⁷

11. In short, the IRP Base Case proposes, *inter alia*:

- 11.1. an increased percentage contribution to installed capacity to the energy mix from renewable technologies wind and solar PV, but with annual build constraints for new capacity for wind (1600MW) and PV (1000MW);⁸
- 11.2. a drop in percentage share of installed capacity for coal by 2050, but coal will still make up a significant percentage (18.85%) of South Africa's installed capacity by 2050;⁹ and
- 11.3. coal and nuclear will contribute the most to the energy share by the year 2050 as "base load options".¹⁰

12. Various organisations, as well as the Ministerial Advisory Council on Energy (MACE), have already made submissions (oral and/or written) on the draft IEP and IRP Base Case. Most of the comments and presentations highlight the technical and economic inaccuracies contained in both documents. Our comments, however, relate specifically to the legal requirements which must be met by both the IEP and the IRP, in order for these documents to be in line with South African law and, importantly, the Constitution of the Republic of South Africa, 1996 ("the Constitution").
13. It must also be pointed out that the focus of these comments will be mainly on the aspects of the IRP Base Case and the draft IEP pertaining to coal-fired electricity generation, given the work of the CER and partner organisations, as well as the Life After Coal/Impilo Ngaphandle Kwamalahle Campaign, on this subject. Although these comments do not deal in detail with the inclusion of nuclear power as a proposed element of South Africa's energy mix, we record that we oppose the inclusion of nuclear energy in the IRP and IEP. The CER, and partner organisations, as well as the Life After Coal/Impilo Ngaphandle Kwamalahle Campaign, have always maintained that wind and solar renewable energy sources are the only acceptable and necessary, lawful alternatives to coal.
14. In these comments, we highlight the present inconsistency of the draft IEP and IRP Base Case with various pieces of legislation, namely:
 - 14.1. the Constitution;
 - 14.2. the National Environmental Management Act¹¹ (NEMA);
 - 14.3. the National Electricity Regulation Act¹² (ERA); and
 - 14.4. the NEA.¹³
15. The above mentioned inconsistencies are based mainly on the fact that:
 - 15.1. the IRP Base Case and draft IEP provide for further and increased reliance on coal as an energy source, despite the harmful impacts of coal for human health; climate change and the environment in general, and despite the social, environmental and economic risks of such reliance;
 - 15.2. the IRP Base Case and draft IEP fail to give adequate consideration to the external social and environmental costs of the proposed energy sources; and
 - 15.3. the IRP Base Case has unjustifiably constrained and limited the provision for renewable energy in South Africa's electricity mix.

⁷ P16 – 22, Executive Summary Recommendations, Draft IEP.

⁸ S5, p24, IRP Base Case.

⁹ Ibid.

¹⁰ Ibid, p25, IRP Base Case.

¹¹ Act 107 of 1998.

¹² Act 4 of 2006.

¹³ Act 34 of 2008.

16. We discuss these inconsistencies in further detail below, but first address the public participation procedure followed to date in respect of both the draft IEP and the IRP Base Case.

Public Participation Process

17. It is clear from the Constitution, including the rights to just administrative action¹⁴ and of access to information,¹⁵ that the state has an obligation to ensure that there is adequate public consultation and engagement with the public at all stages of developing the IRP and IEP.

18. This is particularly so, given the significance of energy planning for all South Africans. Decisions on South Africa's future energy, and particularly electricity sources, will have significant impacts for the health; wellbeing; and livelihood of all people in South Africa. It is therefore vital that a full, fair and meaningful opportunity for comment on the IRP Update and IEP be provided. A failure to provide such opportunity would violate the requirements of lawfulness, reasonableness and procedural fairness required by the Promotion of Administrative Justice Act, 2000 (PAJA) and/or the constitutional requirements (in section 195 of the Constitution) to encourage the public to participate in policy-making and to foster transparency.

19. It is in the interest of equality and the advancement of human rights and freedoms – values promoted by the Constitution¹⁶ – that the public are not only fully consulted, but also that all public input is given due and full consideration on finalising the IRP and IEP.

20. We attach, marked **A**, a copy of the request for an extension submitted on behalf of numerous civil society organisations. In this letter, we called for an extension for the comment period to 31 March 2017, and stated that thereafter, at least a further 60 days are required for comment on the scenarios; and once the policy-adjusted IRP has been determined, at least a further 30 days for comment on that. A request was also made for appendices referenced in the documents, which were supposed to be made available on DOE's website, and for copies of various documents that are required in order to make meaningful submissions on the IRP Base Case and the IEP.¹⁷

21. In this regard we point out our concerns that:

- 21.1. the public was given little over a week to consider the IRP Base Case and draft IEP (a document of over 300 pages) prior to the commencement of the first series of public participation workshops in Johannesburg, Durban, Cape Town and Port Elizabeth from 7 to 15 December 2017 – at which the public were invited to make presentations. This, we contended, and continue to contend, was unreasonable and unfair;
- 21.2. public consultation meetings were only held in major cities¹⁸ within South Africa, but not in the towns where communities most impacted by the energy decisions made in terms of the IRP Update and IEP (and where the majority of South Africa's energy-generation activities) are based – these being the towns within the Highveld; Vaal Triangle; South Durban basin and Waterberg, where the refineries and coal-fired power stations are located and where additional polluting industries will be located. People in these areas are continuously being negatively impacted by and suffering violations of their constitutional

¹⁴ S33 of the Constitution.

¹⁵ S32 of the Constitution.

¹⁶ S1 of the Constitution.

¹⁷ These documents are: the study commissioned by the Department's Nuclear branch; Eskom's and Kelvin coal-fired power station's detailed decommissioning plans and timelines, as well as cost estimates; a list of coal mines that would be closed as a result of Eskom decommissioning, including details regarding the costs to rehabilitate the coal mines and who would bear this cost; the terms of reference for the pre-feasibility study to extend the lives of Eskom's stations and all other records relating to Eskom's Fleet Renewal Strategy;¹⁸ and correspondence from the Department of Environmental Affairs to the DOE "indicating that carbon budget methodology must be used instead of emissions decline constraints".

¹⁸ Consultation meetings were, according to the DIE website, held in: Bloemfontein; Mmabatho; Durban; Port Elizabeth; Cape Town; Nelspruit; Polokwane; Kimberley; Cape Town; and Gauteng.

environmental right as a result of these polluting industries. For this reason we submit that it was a fatal flaw to fail to hold consultation meetings in towns and areas such as: Middelburg; Witbank; Delmas; Sasolburg; Vereeniging; Secunda; Wentworth and Austerville (South Durban); Lephalale; and Steenbokpan;

- 21.3. the DOE has also not been open and transparent in providing all the information required for the public to comment on the IRP Base Case; for example, the initial IRP Base Case was missing a number of important appendices referred to in the document, and these missing documents were also not readily available on the DOE's website – a concern which was raised in the annexure A letter. While a revised IRP Update was published a few days after the initial one, it had removed the references to the missing appendices - instead of providing access to these appendices as many stakeholders had requested. We request that the missing appendices be provided in order to provide a meaningful comment opportunity; and that an explanation be given for the removal of these appendices. We also continue to request access to the other relevant documents¹⁹ (as requested in the annexure A letter) in order to be able to make meaningful submissions on the IRP Base Case and the draft IEP;
- 21.4. due to the short commenting period initially proposed, with the deadline of 15 February 2017, the DOE agreed, after numerous requests for extensions and opposition to the unreasonably short comment period from both civil society and industry, to extend the commenting period to 31 March 2017. However, it is not clear whether further additional commenting opportunities (as requested in the attached letter referred to above) will be afforded to the public. We understand that the IRP Base Case, in particular is still in the very early stages, as it is only the base case and assumptions that have been made available, and that the DOE plans for further versions to be produced, based first on the different scenarios applied and then a final "policy-adjusted" version of the IRP Update. It is, however, not clear whether and to what extent the public will be given an opportunity to consider and comment on these subsequent versions of the IRP Update.

22. We submit that refusing further comment opportunities on the draft IEP and IRP Update would clearly be a fatal flaw. Clarity must be given as to when and at what stages, civil society will have a further opportunity to make representations on subsequent versions of the draft IEP and IRP Update before they are finalised. Moreover, and importantly, the public must be provided with the missing appendices and other relevant documents requested, as well as a fair and reasonable period for the consideration and comment of the further drafts of the IEP and IRP Update.

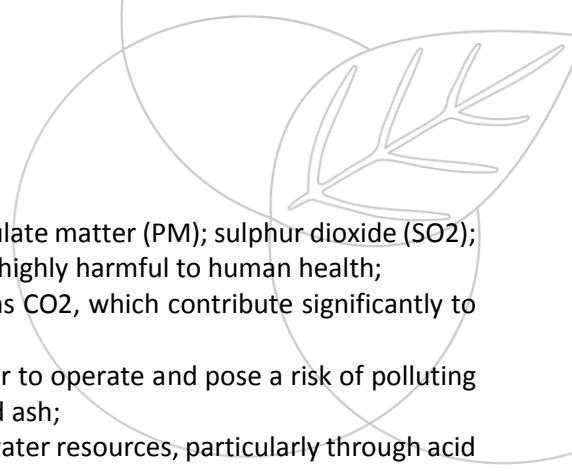
23. We request the DOE to ensure that the above concerns are fully addressed and to provide the clarity and documents requested.

The Constitution

24. Section 24 of the Constitution entrenches the right to an environment that is not harmful to health or well-being; and to have the environment protected, for the benefit of present and future generations.
25. It is worth noting that the Freedom Charter of the African National Congress also recognises the need to protect the well-being of the people of South Africa from the harmful impacts of industrial activity, stating that "*(a) all other industry and trade shall be controlled to assist the well-being of the people*".²⁰
26. We point out, in relation to coal-fired power as a proposed and continued electricity source, that:

¹⁹ These documents are: the study commissioned by the Department's Nuclear branch; Eskom's and Kelvin coal-fired power station's detailed decommissioning plans and timelines, as well as cost estimates; a list of coal mines that would be closed as a result of Eskom decommissioning, including details regarding the costs to rehabilitate the coal mines and who would bear this cost; the terms of reference for the pre-feasibility study to extend the lives of Eskom's stations and all other records relating to Eskom's Fleet Renewal Strategy;⁸ and correspondence from the Department of Environmental Affairs to the DOE "indicating that carbon budget methodology must be used instead of emissions decline constraints".

²⁰ See http://www.historicalpapers.wits.ac.za/inventories/inv_pdfo/AD1137/AD1137-Ea6-1-001-jpeg.pdf.



- 26.1. the pollutants emitted when burning coal – which include particulate matter (PM); sulphur dioxide (SO₂); nitrogen oxides (NO_x); mercury; and carbon dioxide (CO₂) – are highly harmful to human health;
- 26.2. coal-fired power stations emit greenhouse gases (GHGs), such as CO₂, which contribute significantly to climate change;
- 26.3. coal-fired power stations require large volumes of water in order to operate and pose a risk of polluting water in the areas in which they operate and store their coal and ash;
- 26.4. the mining of coal causes significant and long-term pollution of water resources, particularly through acid mine drainage; and
- 26.5. the mining and transporting of coal results in further air emissions which are harmful to human health, including emissions from spontaneous combustion on coal mines and discard heaps; and coal dust that causes significant impairment of health, and methane (CH₄) emissions, the second most important gas which causes climate change.

27. We note that the IRP Base Case proposes a reduction in South Africa’s reliance on coal as an electricity source. However, we also note that the IRP Base Case still envisages that coal will make up a significant and majority portion of South Africa’s electricity mix by the year 2050. This would be a blatant contradiction and contravention of both the constitutional right to a healthy environment; and the constitutional right to have the environment protected for the benefit of present and future generations, based on:

- 27.1. the significant health impacts of burning coal as an electricity source; and
- 27.2. the significant climate change impacts of burning coal as an electricity source, as outlined below.

- i. The health impacts of coal-fired power stations

28. A 2014 report on the health impacts and social costs of Eskom’s coal-fired power stations concluded that atmospheric emissions from those stations “*are currently causing an estimated 2,200 premature deaths per year, due to exposure to fine particulate matter (PM2.5). This includes approximately 200 deaths of young children. The economic cost to the society is estimated at 30 billion rand per year, including premature deaths from PM2.5 exposure and costs from the neurotoxic effects of mercury on children.*”²¹
29. The above study also shows that not only do coal-fired power stations have devastating health impacts, but they also give rise to significant additional expenses, which are incurred by people living in close proximity to power stations, as mentioned above. These communities generally reside in low-income settlements, and the pollution of the power stations will give rise to further impacts upon their physical, psychological, developmental, cultural and social interests.
30. On an international scale, a 2014 report by the World Health Organisation (WHO) confirmed that “*in 2012 around 7 million people died - one in eight of total global deaths – as a result of air pollution exposure. This finding more than doubles previous estimates and confirms that air pollution is now the world’s largest single environmental health risk. Reducing air pollution could save millions of lives.*”²² A recent report titled ‘Beyond coal: scaling up clean energy to fight poverty’ states that “[c]oal’s environmental and climate impacts present a clear threat to people living in poverty. Air pollution from coal causes some 670,000 premature deaths a year in China and 100,000 in India. A one gigawatt plant in Indonesia could cause 26,000 premature deaths over its lifespan.”²³ Similar devastating impacts are being felt in South Africa, as a result of our reliance on coal as an electricity source.

²¹ Myllyvirta, ‘Health Impacts and Social Costs of Eskom’s Proposed Non-compliance with South Africa’s Air Emission Standards’ (2014)

<http://www.greenpeace.org/africa/Global/africa/publications/Health%20impacts%20of%20Eskom%20applications%202014%20final.pdf>.

²² <http://www.who.int/mediacentre/news/releases/2014/air-pollution/en/>.

²³ P4, <https://www.odi.org/publications/10589-beyond-coal-scaling-clean-energy-fight-global-poverty>.

31. An assessment using epidemiological data recently commissioned by groundWork shows that Eskom's existing coal fleet results in 2,239 attributable deaths per year as well as a heavy burden of illness. The monetised costs of death and disease add up to around R33 billion (\$2.4 bn) per year. This does not include the impact of the coal mines that supply Eskom. The study, which will be attached to groundWork's submissions,²⁴ emphasises that "*air pollution most affects those whose underlying health condition is worst, and hence that any improvement in air quality will most benefit those who are most disadvantaged*". This is a prime example of the environmental injustice which is prevalent in many parts of South Africa.

32. The health impacts caused by some of the pollutants emitted by coal-fired power plants, such as PM, SO₂, nitrogen dioxide (NO₂) (a component of NO_x) and mercury are the following:

- 32.1. SO₂ and PM are known to cause asthma²⁵ and other respiratory problems, including reduced lung function in children;²⁶
- 32.2. short and long-term exposure to fine PM (PM2.5) results in increases in both mortality (deaths) and morbidity (disease). Recent evidence links long-term exposure to PM2.5 to several health outcomes, including atherosclerosis, adverse birth outcomes and childhood respiratory disease;²⁷
- 32.3. exposure to PM is known to be carcinogenic to humans and associated with increased cancer incidence, especially cancer of the lung;²⁸
- 32.4. NO₂ exposure can cause serious damage to the tissues of the upper respiratory tract, fluid build-up in the lungs and death at high exposure levels;²⁹ and
- 32.5. coal naturally contains mercury, and coal-burning is the largest source of human-caused mercury emissions. When coal is burned, roughly two-thirds of its mercury is released into the air as gas or particles,³⁰ with the remaining third being retained in a toxic residue called coal ash. Airborne mercury can remain aloft for six months to two years before falling to the ground in precipitation, dust, or simply due to gravity. Mercury deposition rates vary greatly depending on many factors, but coal-fired power plants have been shown to cause local mercury pollution hotspots in regional waterbodies, with fish and animals responding rapidly and proportionally to local sources of mercury.³¹ In several studies, the highest levels of airborne mercury from power plants deposited to soils within five kilometers of the plants.³² Trace amounts of mercury can contaminate large bodies of water and remain in the soil for decades. For example, the equivalent of one gram of mercury deposited from the atmosphere into a 20-acre lake each year can make the fish unsafe to eat. Once in the ecosystem, mercury naturally converts to methylmercury, a highly toxic compound that builds up in organisms and increases in concentration with each level of the food chain.³³ According to the 2014 report on the health impacts and social costs of Eskom's coal-fired power stations as referenced above, Eskom's current mercury emissions are associated with the loss of 45,000 IQ points each year.³⁴

²⁴ A copy can be provided on request if required.

²⁵ WHO Air Quality Guidelines Global Update 2005, 2006.

²⁶ P143, 'Multiple Threats to Child Health through Fossil Fuel Combustion: Impacts of Air Pollution and Climate Change', available at <https://ehp.niehs.nih.gov/wp-content/uploads/125/2/EHP299.alt.pdf>.

²⁷ REVIAAP Study Report, WHO, 2013. Available at http://www.euro.who.int/_data/assets/pdf_file/0004/193108/REVIHAAP-Final-technical-report-final-version.pdf?ua=1.

²⁸ <http://www.who.int/mediacentre/factsheets/fs313/en/>.

²⁹ Physicians for Social Responsibility, *Coal's Assault on Human Health*, (November 2009), p. 9, <http://www.psr.org/assets/pdfs/coal-assault-executive.pdf>.

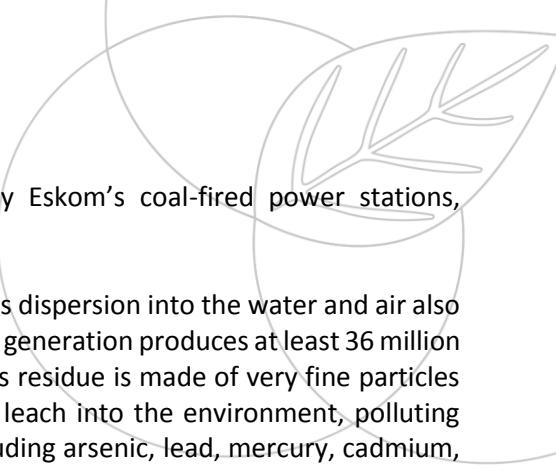
³⁰ V.K. Rai et al., *Mercury in Thermal Power Plants- A Case Study*, *Int. J. Pure App. Biosci.*, 1 (2): 31-37 (2013), p. 33.

³¹ Hubbard Brook Research Foundation, *Mercury Matters* (2007) at 3 and 9.

³² Jose Rodriguez & Nikos Namos, *Soil as an archive of coal-fired power plant mercury deposition*, *Journal of Hazardous Materials* (May 5, 2016, published online January 13, 2016).

³³ United States National Parks Service, *Effects of Air Toxics/Mercury on Ecosystems*, <http://www.nature.nps.gov/air/aqbasics/mercury.cfm>, (accessed January 30, 2016).

³⁴ P15, http://cer.org.za/wp-content/uploads/2014/02/Annexure-5_Health-impacts-of-Eskom-applications-2014-_final.pdf.



33. In 2012, it was estimated that 20.2 tons of mercury was emitted by Eskom's coal-fired power stations, representing 77% of total mercury emissions in the country.³⁵
34. The storage of post-combustion waste from coal-fired power plants and its dispersion into the water and air also threatens human health and ecosystems. In South Africa, coal-fired power generation produces at least 36 million tonnes of solid waste residue annually. Called "fly ash" or "coal ash", this residue is made of very fine particles that are corrosive and contain toxic metals and soluble salts which can leach into the environment, polluting surface and ground water. Coal ash typically contains heavy metals, including arsenic, lead, mercury, cadmium, chromium and selenium. If these leak into the environment, they pose significant health risks.³⁶ When stored in dry heaps, fly ash can be dispersed into the air, causing a variety of human health impacts when inhaled, including cancer, heart damage, lung disease, and respiratory distress.³⁷
35. Health impacts from coal-fired power stations cannot be considered in isolation; they must be considered cumulatively, particularly when considering areas such as the Highveld, where there are 12 coal-fired power stations (including Kusile, once built). The health impacts of these cumulative emissions are, as demonstrated above, severe. These impacts are even worse when emissions from the other numerous polluting industries in the area are taken into account.
36. The WHO confirms that "*by reducing air pollution levels, countries can reduce the burden of disease from stroke, heart disease, lung cancer, and both chronic and acute respiratory diseases, including asthma. The lower the levels of air pollution, the better the cardiovascular and respiratory health of the population will be, both long- and short-term.*"³⁸
37. Air emissions of PM10, PM2.5, SO2, NO2, and other pollutants are governed by national ambient air quality standards (NAAQS), which establish health-based limits on air pollutants.³⁹ It is also worth mentioning that our NAAQS are significantly weaker than those recommended by the WHO, as well as the standards set in the United States and the European Union.
38. The Highveld was declared an air quality priority area under the National Environmental Management: Air Quality Act, 2004 in 2007,⁴⁰ due to the air pollution concerns and the need to bring ambient air quality into compliance with NAAQS. Regrettably, there has been little - if any - improvement in the overall air quality in the Highveld, since the declaration nearly 10 years ago, and the health impacts remain a serious concern. This is borne out by

³⁵ groundWork, The Health Impact of Coal: The responsibility that coal-fired power stations bear for ambient air quality associated health impacts (20 May 2014), <http://www.groundwork.org.za/specialreports/groundWork%20The%20Health%20Impact%20of%20Coal%20final%2020%20May%202014.pdf>, at p. 5, citing Roos B., Mercury Emissions from Coal-fired Power stations in South Africa (University of Johannesburg 2011). However, Roos's estimates are much lower than other experts. For example, Myllyvirta (2014) estimated 26973 kg for 2008 and Scott (2011) estimated 39.4 tons for 2009, which he estimates to be a 45% increase from 2000. See Scott 2011. Reducing Mercury Emissions from Coal Combustion in the Energy Sectors in South Africa. United Nations Environment Programme, Department of Environmental Affairs; Lauri Myllyvirta, *Health impacts and social costs of Eskom's proposed non-compliance with South Africa's air emission standards*, Greenpeace 2014, available at <http://www.greenpeace.org/africa/Global/africa/publications/Health%20impacts%20of%20Eskom%20applications%202014%20final.pdf>.

³⁶ See Physicians for Social Responsibility, *Coal Ash: Hazardous to Human Health*, <http://www.psr.org/resources/coal-ash-hazardous-to-human-health.html>; Physicians for Social Responsibility and Earthjustice, *Coal Ash: The toxic threat to our health and environment* (September 2010), <http://www.psr.org/resources/coal-ash-the-toxic-threat-to-our-health-and-environment.html>; Physicians for Social Responsibility and Earthjustice, *Coal Ash: The toxic threat to our health and environment*, p.20.

³⁷ Physicians for Social Responsibility, *Coal Ash: Hazardous to Human Health*, <http://www.psr.org/assets/pdfs/coal-ash-hazardous-to-human-health.pdf>.

³⁸ <http://www.who.int/mediacentre/factsheets/fs313/en/>.

³⁹ National Environmental Management: Air Quality Act 39 of 2004, Sec. 9.

⁴⁰ GN 1123, GG 30518, 23 November 2007.

the Department of Environmental Affairs' (DEA) own reports, including its recent draft mid-term review of the Highveld Priority Area Air Quality Management Plan, copies of which can be made available on request. This cannot be allowed to continue, as it constitutes a serious violation and failure by government to protect the basic fundamental rights of communities living in the Highveld.

39. The 2 other declared air quality priority areas in South Africa - where the air quality is of concern and needs to be brought into compliance with NAAQS - are the Vaal Triangle Airshed Priority Area⁴¹ and the Waterberg-Bojanala Priority Area.⁴²
40. It is notable that all 3 priority areas are the areas in which Eskom's power stations; numerous coal mines and the Sasol refineries, together with numerous other polluting industries, are located. Despite the poor air quality in these areas, with its impacts on human health and the environment, the National Air Quality Officer granted postponements of compliance with the minimum emission standards (MES) for all (but one – Kusile, for which an application was not made) of Eskom's coal-fired power stations, for Sasol's operations in Sasolburg and Secunda, and for several other industries. It is also worth pointing out that South Africa's MES are substantially weaker than those in many other countries; including in developing countries.⁴³
41. Not only is the air quality within the priority areas not improving, but as new coal-fired power stations are authorised to go ahead in the Highveld and the Waterberg - for example the Khanyisa and Thabametsi independent power producer (IPP) coal-baseload power stations appointed as preferred bidders under the first window of the Coal Baseload IPP Procurement Programme (CBIPPPP) – the air quality is, inevitably going to get worse. This will have increased and long-term impacts on the communities living within those areas.
42. On 19 December 2012, the Minister of Energy issued a determination calling for 2500MW of new coal-fired power to be procured by DOE from IPPs and sold to Eskom. This gave rise to the CBIPPPP. Presently, we are aware of more than 10 proposed IPP coal plants (some still at early stages of the environmental authorisation process, others already issued with environmental authorisations). To date there has only been one bid window, where only 2 IPPs submitted bids and both were appointed preferred bidders – these being Thabametsi and Khanyisa – although the environmental authorisations for both have been challenged by civil society organisations. We understand that there will be further CBIPPPP bid windows. Most of these IPP power stations are proposed for the Highveld or the Waterberg Bojanala Priority Areas.
43. The Khanyisa IPP power station for example, would be built in a heavily populated-residential area, within the Highveld Priority Area. The area is, and has been for nearly 10 years, seriously out of compliance with the NAAQS.⁴⁴ Moreover, Khanyisa's coal ash storage practices pose a high risk to a highly-stressed river basin, which provides substantial ecosystem goods and services. The health and environmental concerns relating to the proposed Khanyisa IPP power station are raised in written objections submitted by groundWork against the application for a licence to generate electricity from the National Energy Regulator or South Africa (NERSA).⁴⁵
44. Similar concerns exist around the proposed Thabametsi power station to be based near Lephalale, Limpopo and in close proximity to Eskom's Medupi and Matimba power stations and Grootegeluk coal mine – all of which are already significant sources of air pollution with health impacts for Lephalale communities. The area is also severely water-scarce.⁴⁶

⁴¹ GN 365, GG 28732 of 21 April 2006.

⁴² GN 495, GG 35435 of 15 June 2012.

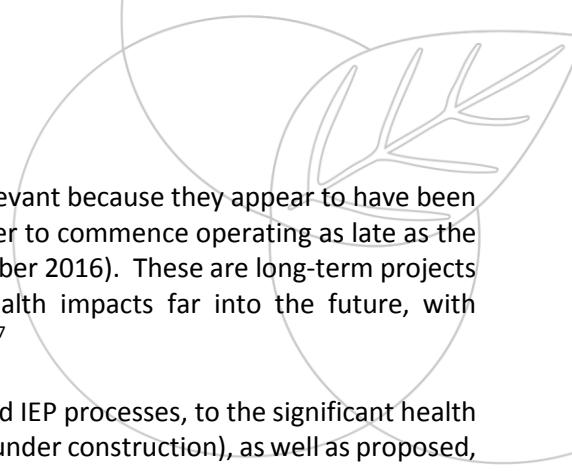
⁴³ Should you require evidence of this, please let us know.

⁴⁴ Highveld Priority Area Declaration, available at

<http://www.saaqis.org.za/documents/Highveld%20Priority%20Area%20Declaration.pdf>.

⁴⁵ A copy of these objections is available on request.

⁴⁶ Should you require evidence of this, please let us know.



45. The impacts of these new proposed IPP coal-fired power stations are relevant because they appear to have been included in the IRP Base Case, in addition to further new coal-fired power to commence operating as late as the year 2041 (according the DOE's IRP Base Case presentation of 22 November 2016). These are long-term projects which are intended to operate and cause significant detrimental health impacts far into the future, with Thabametsi and Khanyisa each having anticipated lifespans of 40 years.⁴⁷
46. The DOE must ensure that adequate consideration is given, in the IRP and IEP processes, to the significant health impacts of existing and upcoming (such as Medupi and Kusile, which are under construction), as well as proposed, coal-fired power stations (such as Thabametsi, Khanyisa and further IPPs) – in addition to impacts for the environment, water availability and climate change.
47. If proper consideration is given to the health impacts of coal-fired power and the persistent non-compliance with NAAQS within the priority areas,⁴⁸ then we submit that no new coal-fired power stations can be allowed in South Africa's planned energy mix.

ii. The climate change impacts of coal-fired power stations

48. In a recent judgment in the case of *Earthlife Africa Johannesburg / the Minister of Environmental Affairs & Others*⁴⁹ ("the Thabametsi case") - which relates to a review of the Minister's appeal decision in respect of the environmental authorisation of the proposed Thabametsi coal-fired power station – the Minister of Environmental Affairs was ordered to consider the climate change impacts of the proposed Thabametsi IPP power station, before making a decision on Earthlife Africa Johannesburg's appeal of the environmental authorisation. The court confirmed the significance and relevance of climate change impacts of coal-fired power stations and the need to adequately assess those impacts before a decision can be made as to whether a coal-fired power station can be authorised.
49. Climate change impacts are much broader than simply GHG emissions. Although GHG emissions are a very relevant component and contributor to climate change impacts, the impacts themselves include: increased water scarcity (through decreases in precipitation); increased extreme weather events such as droughts and flooding; and increased temperatures.⁵⁰ An assessment of such impacts must consider not only the GHG emissions of the proposed activity and the contribution it will make to climate change through its emissions, but it must also consider the extent to which the activity will increase the country's and the surrounding area's vulnerability to climate change by, for example, utilising and polluting limited water. It must also consider how the activity itself will be affected by the impacts of climate change over its anticipated lifespan (sometimes referred to as its resilience to climate change).

50. The court in the Thabametsi case held, *inter alia*, that:

- 50.1. “[c]limate change poses a **substantial risk to sustainable development in South Africa**. The effects of climate change, in the form of rising temperatures, greater water scarcity, and the increasing frequency of natural disasters pose substantial risks. Sustainable development is at the same time integrally linked with the principle of intergenerational justice requiring the state to take reasonable measures protect the environment “for the benefit of present and future generations” and hence adequate consideration of climate change. **Short-term needs must be evaluated and weighed against long-term consequences**” (emphasis added);⁵¹

⁴⁷ Thabametsi's environmental impact report proposes a 40 year lifespan for the plant. Khanyisa's NERSA licence application stipulates a design life of approximately 40 years for the plant.

⁴⁸ Should you require evidence of this, please let us know.

⁴⁹ *Earthlife Africa Johannesburg v the Minister of Environmental Affairs and 4 others* (NGHC), case number: 65662/16.

⁵⁰ P8, National Climate Change Response White Paper, available at https://www.google.co.za/webhp?sourceid=chrome-instant&ion=1&espv=2&ie=UTF-8#q=national+climate+change+response+white+paper&*.

⁵¹ Para 82.

50.2. “coal-fired power stations ... **not only contribute to climate change but are also at risk from the consequences of climate change**. As water scarcity increases due to climate change, this will place electricity generation at risk, as it is a highly water intensive industry” (emphasis added);⁵²

50.3. The proposed power station is likely to “aggravate the impact of climate change in the region by contributing to water scarcity, raising in turn questions about the viability of the power station over its lifetime”;⁵³

50.4. **Policy instruments developed by the Department of Energy cannot alter the requirements of environmental legislation for relevant climate change factors to be considered.**” (Emphasis added);⁵⁴

51. The Thabametsi case is the first court case in South Africa, where consideration was given to, and a ruling was made on, the significance of the impacts of climate change for South Africa. Internationally, a plethora of litigation is arising wherein governments are being held liable for not doing enough to protect their people from the harmful impacts of climate change or for taking sufficient action to reduce GHG emissions.⁵⁵

52. South Africa’s own National Climate Change Response Policy acknowledges that South Africa as a country is “extremely vulnerable and exposed” to the impacts of climate change.⁵⁶ South Africans are already affected by climate change, and young people and future generations will be the most affected, as the impacts of climate change progress.

53. Yet, the commitments presently made by South Africa, in its Nationally Determined Contribution (NDC) under the Paris Agreement,⁵⁷ to curb GHG emissions, are nowhere near sufficient to ensure against the catastrophic impacts of climate change. South Africa has acknowledged that a temperature increase of 2 °C globally would equate to 4 °C in South Africa; yet our current commitments would see a rise in temperature exceeding 3–4°C globally (meaning that this would be much higher in South Africa).⁵⁸ This will be disastrous for South Africa.

54. The draft climate change impact assessment report submitted by Thabametsi (“the Thabametsi report”), highlights the numerous design and technology inefficiencies of the DOE CBIPPPP requirements, stating that “improved thermal efficiencies and lower emissions intensities for coal fired power plants can be achieved through the use of supercritical steam technologies. However, such technologies are not feasible for the plant, which is designed to meet the DoE’s Coal Baseload IPP key requirements in relation to capacity (individual projects are restricted to 600 MW), redundancy (which should be maximised, reflected in the selected configuration of four 150 MW boilers and two 300 MW steam units per 600 MW phase for Thabametsi), and low cost of generation (CFB plants are able to use lower quality, cheaper coal).”⁵⁹ This demonstrates that the IPP coal plants are not as efficient as they could be, and these plants will be emitting more GHGs than they would, had more carbon-efficient requirements been prescribed by the DOE. Instead, the new CBIPPPP will be as carbon-intensive and dirty as the current Eskom plants. The Thabametsi report points out that the emissions intensity of electricity to be generated by Thabametsi is “very similar to the current grid emissions factor for South Africa”, and Thabametsi only represents an improvement in emissions intensity compared to Eskom’s three oldest plants, Camden, Hendrina and Komati, which are soon due for decommissioning.⁶⁰

⁵² Para 25.

⁵³ Para 44.

⁵⁴ Paras 95 and 96.

⁵⁵ See ‘Climate Justice: The International Momentum Toward Climate Litigation’, Boom, Richards and Leonard. Available at <https://www.boell.de/sites/default/files/report-climate-justice-2016.pdf>. See also <https://www.csmonitor.com/Environment/Inhabit/2017/0329/Courts-now-at-front-line-in-battles-over-climate-change>.

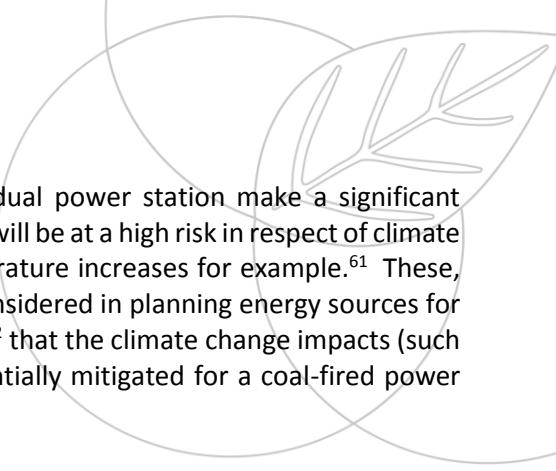
⁵⁶ P8, National Climate Change Response White Paper, available at https://www.google.co.za/webhp?sourceid=chrome-instant&ion=1&espv=2&ie=UTF-8#q=national+climate+change+response+white+paper&*.

⁵⁷ See <http://www4.unfccc.int/ndcregistry/PublishedDocuments/South%20Africa%20First/South%20Africa.pdf>.

⁵⁸ See <http://climateactiontracker.org/countries/southafrica.html>.

⁵⁹ Thabametsi GHG Impact Report, p2 available at <http://www.savannahsa.com/projects/project.php?project=438>. See also p30-31.

⁶⁰ P51, Thabametsi GHG Impact Assessment, ERM, January 2017. Available at <http://www.savannahsa.com/projects/project.php?project=438>.



55. In Thabametsi's report, it is confirmed that not only would this individual power station make a significant contribution to South Africa's GHG emissions, but the power station itself will be at a high risk in respect of climate change and is highly vulnerable to the risks of water scarcity and temperature increases for example.⁶¹ These, and the impacts listed above, are the kinds of impacts that need to be considered in planning energy sources for South Africa. It is worth noting, as is pointed out in Thabametsi's report,⁶² that the climate change impacts (such as water scarcity) and GHG emissions of burning coal cannot be substantially mitigated for a coal-fired power station.

56. The dangers of climate change and the country's vulnerability to these impacts cannot be ignored, and the DOE is under a duty to ensure that South Africa's future energy mix does not contribute to and worsen the extent of these impacts, bearing in mind that the climate change impacts of coal cannot be substantially mitigated. As such, no further coal-fired power can be allowed to go ahead. To do so would be catastrophic for the future of South Africa and a clear violation of section 24 of the Constitution.

iii. The obligation to protect the health and wellbeing of South Africans and to preserve the environment for present and future generations

57. While the IRP Update proposes the inclusion of nuclear and new coal power, in a study by the Council for Scientific and Industrial Research (CSIR) titled "*Least-cost electricity mix for South Africa by 2040*",⁶³ the CSIR concluded, *inter alia*, that a "re-optimised" energy scenario - in which renewable energy would dominate the energy mix – would provide the least-cost energy mix for South Africa and would also significantly reduce South Africa's CO2 emissions and water use by up to 60%. This would see major environmental and health benefits, as well as socio-economic benefits.

58. The desire to exploit South Africa's natural resources for the "development" of South Africa's economy and energy supply cannot be absolute; development must always be relative to its tolerance by the environment and cannot result in the violation of constitutional rights. Should the generation technologies proposed in the IRP Base Case and the IEP be accepted – which would include new baseload coal - it would result in unsustainable CO2 emissions and water use which, in effect, would result in severe impacts for the health and well-being of the public.

59. Notably, a recent report by the United Nations, titled 'Report of the Special Rapporteur on the issue of human rights obligations relating to the enjoyment of a safe, clean, healthy and sustainable environment', acknowledges that the loss of biodiversity undermines human rights, for example by reducing agricultural and fisheries outputs, negatively affecting health or removing filters from the water cycle. It states that by conserving biodiversity, states contribute to the achievement of the Sustainable Development Goals on food security, health and water, among others.⁶⁴ It is therefore important that steps and decisions are taken by government, which ensure the protection and preservation of South Africa's water, air and climate in order to ensure that the section 24 right is fulfilled. Planning for new coal-fired power developments would not be in line with this requirement.

60. A lock-in to large, expensive and harmful infrastructure, such as baseload coal and nuclear, which will be obsolete in the future, will also have long-term environmental, social and economic impacts - to the severe detriment of future generations (as discussed in more detail under paragraphs 123 to 132 below), thereby infringing human rights.

⁶¹ PXI. Thabametsi Climate Resilience Assessment, ERM, January 2017. Available at <http://www.savannahsa.com/projects/project.php?project=438>.

⁶² Table 6.1, p51 – 53, Thabametsi Climate Resilience Assessment, ERM, January 2017. Available at <http://www.savannahsa.com/projects/project.php?project=438>.

⁶³ http://www.ee.co.za/wp-content/uploads/2016/11/RE-Futures-Windaba-CSIR-3Nov2016_FINAL.pdf

⁶⁴ Available at <https://documents-dds-ny.un.org/doc/UNDOC/GEN/G17/009/97/PDF/G1700997.pdf?OpenElement>.

61. We therefore submit that the proposed energy mix, to the extent that it provides for significant capacity to come from coal, is inconsistent with section 24 of the Constitution and would result in a breach of this right. We strongly recommend that the DOE reconsiders the proposed energy mix in the interest of protecting the right to an environment that is not harmful to the health and wellbeing of the people of South Africa. In particular, renewable energy should not be constrained and there can be no new coal or nuclear power; including the amounts “hardcoded” into the base case – such as Khanyisa and Thabametsi (the 2 current CBIPPPP preferred bidders).

National Environmental Management Act

62. NEMA was enacted to give effect to section 24 of the Constitution. This is national legislation binding on all state bodies, to develop, *inter alia*, a framework for integrating good environmental management into all development activities.⁶⁵

63. In this regard, it is fundamental that the energy planning for the IRP and IEP include a study of the environmental impact of the proposed energy choices. While such assessments must be done when specific projects have been proposed; these impacts also need to be assessed earlier on in the process. In our experience, decision-makers often argue that it is too late to go back and revisit the decision to use coal in the energy portfolio and that it is unfair to developers who have relied on the national policy calling for coal in the energy mix. This is indeed the approach followed by the DEA and the power station proponent (Thabametsi) in their opposing arguments in the Thabametsi case. Although the assessments of impacts must certainly be done at project-level and on a case-by-case basis, it is also imperative that the global impacts of burning coal and other fossil fuels for example, are comprehensively studied at the planning stage, for both the IRP and IEP.

64. For purposes of these submissions, reference is made to two particularly relevant provisions of NEMA. The National Environmental Management Principles (section 2); and the duty of care (section 28).

i. The National Environmental Management Principles

65. The National Environmental Management (NEM) Principles contained in section 2 of NEMA are guidelines by reference to which any organ of state, including DOE, must exercise any function when taking any decision which may significantly affect the environment.⁶⁶

66. The relevant NEM Principles require, among other things:

- 66.1. that development be socially, environmentally and economically sustainable;⁶⁷
- 66.2. that a risk-averse and cautious approach is applied, which takes into account the limit of current knowledge about the consequences of decisions and actions;⁶⁸
- 66.3. that negative impacts on the environment and on people’s environmental rights be anticipated and prevented;⁶⁹
- 66.4. that environmental justice must be pursued so that adverse environmental impacts shall not be distributed in such a manner as to unfairly discriminate against any person, particularly vulnerable and disadvantaged persons;⁷⁰
- 66.5. responsibility for the environmental health and safety consequences of a policy, programme, project, product, process, service or activity exists throughout its life cycle;⁷¹

⁶⁵ Preamble, NEMA.

⁶⁶ Section 2(1), NEMA.

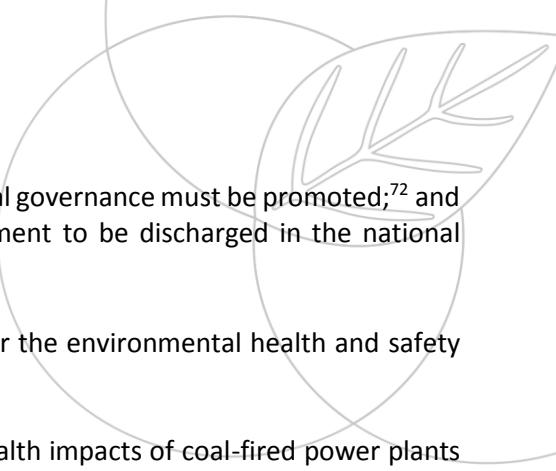
⁶⁷ Section 2(3), NEMA.

⁶⁸ Section 2(4)(a)(vii), NEMA.

⁶⁹ Section 2(4)(a)(viii), NEMA.

⁷⁰ Section 2(4)(c), NEMA.

⁷¹ Section 2(4)(e), NEMA.



- 66.6. participation of all interested and affected parties in environmental governance must be promoted;⁷² and
- 66.7. global and international responsibilities relating to the environment to be discharged in the national interest.⁷³

67. The DOE is obliged to consider the NEM Principles, and is responsible for the environmental health and safety consequences which may result from the IRP Update and IEP.

68. In line with what has already been addressed above in relation to the health impacts of coal-fired power plants and the need for proper public participation in relation to both documents, the DOE has an obligation to ensure that any negative impacts from South Africa's current and future energy sources are anticipated and prevented; that development is environmentally, socially and economically sustainable; and to promote the participation of all interested and affected parties in the process. Providing for further coal-fired power in South Africa's energy mix would not be aligned with these principles.

69. We focus, in more detail on 3 of the NEM Principles, namely: the need for development to be socially, environmentally and economically sustainable; the need to apply a risk-averse and cautious approach; and that global and international responsibilities must be discharged in the national interest.

Development to be environmentally, socially and economically sustainable

70. The Constitutional Court in the case of *Fuel Retailers Association of Southern Africa v Director-General: Environmental Management, Department of Agriculture, Conservation and Environment, Mpumalanga Province and Others*,⁷⁴ considered the NEM Principle of sustainable development. It held, *inter alia*, that:

- 70.1. “[t]he practical significance of the integration of the environmental and developmental considerations is that environmental considerations will now **increasingly be a feature of economic and development policy**” (own emphasis);⁷⁵
- 70.2. “the principle of integration of environmental protection and socio-economic development is therefore fundamental to the concept of sustainable development”;⁷⁶ and
- 70.3. “whenever a development which may have a **significant impact on the environment is planned, it envisages that there will always be a need to weigh considerations of development**, as underpinned by the right to socio-economic development, against environmental considerations, as underpinned by the right to environmental protection” (own emphasis).⁷⁷

71. Clearly, on this basis, DOE must fully weigh and comprehensively consider the environmental and social impacts of the various energy choices in the IRP and IEP. Even economically there is little argument to be made that would favour coal and nuclear, in comparison with renewable energy (solar and wind) energy sources, as demonstrated below.

A risk-averse and cautious approach

72. While it is important to ensure that the generation technology selected is capable of meeting the expected energy demands in South Africa, the precautionary principle means that the DOE is required to take a risk-averse approach, and to anticipate and prevent any negative impacts on the environment and people's environmental

⁷² Section 2(4)(f), NEMA.

⁷³ Section 2(4)(n), NEMA.

⁷⁴ 2007 (6) SA 4 (CC) <http://www.saflii.org/za/cases/ZACC/2007/13.pdf>.

⁷⁵ Para 52, at <http://www.saflii.org/za/cases/ZACC/2007/13.pdf>.

⁷⁶ Para 53, Ibid.

⁷⁷ Para 61, Ibid.

right. In addition, the DOE is required, in terms of the NEM Principles,⁷⁸ to apply a cautious approach when considering the future energy mix for South Africa.

73. Since 2011, South Africa has introduced the Renewable Energy Independent Power Producer Procurement Programme (REIPPPP Programme).
74. 6 422 MW of electricity have been procured from 112 renewable energy IPPs in seven bid rounds and 13 098 GWh (gigawatt hours) of energy has been generated by renewable energy sources procured under the REIPPPP since the first project became operational.⁷⁹ During this process, the cost of solar PV has dropped from R3.65/kWh in the first bidding window to R0.62/kWh (kilowatt hour) in the fourth expedited bidding window.⁸⁰ Similarly, the price of wind power has dropped from R1.51 to R0.62 per kWh in the same timeframe.⁸¹ Therefore, in terms of cost as well as generation capacity, renewables offer a safe, clean, affordable and reliable option.⁸²
75. Conversely, it is common cause that coal-fired power stations – as a result of concomitant extraction, storage and burning of coal – have significant impacts for air quality, water, climate change, and consequently for human health and the environment, as explained above. The price for new coal IPPs are also 40% higher than solar PV and wind, coming in at R1.03/kWh.⁸³
76. Deploying nuclear energy would also be contrary to the risk-averse and cautious approach necessitated by NEMA. Nuclear is often promoted as a means to curb GHG emissions; however, there are still significant risks associated with nuclear power, from an environmental; health; and cost perspective.⁸⁴ The mining of uranium required as fuel for nuclear energy generation, for example, creates serious health and environmental problems, including groundwater contamination.⁸⁵
77. The cost of nuclear reactors built between 1974 and 1996 went up, not down, over time;⁸⁶ while renewable energy prices continue to decrease substantially (see paragraph 74 above).
78. The DOE should therefore carefully and critically consider all the risks associated with the various energy technologies, and choose technologies which are risk-averse and have the fewest negative impacts on the environment and on human health. Failure to do so will result in blatant disregard of the NEM Principles contained in NEMA.

⁷⁸ Section 2(4)(a)(vii), NEMA.

⁷⁹ P2, IPPPP Overview, 31 December 2016, available at file:///C:/Users/nloser/Downloads/20170215_IPP%20Office%20Q3_2016-17%20Overview.pdf.

⁸⁰ <http://www.polity.org.za/article/eskom-wrong-about-renewable-energy-costs-2017-01-17>.

⁸¹ <http://www.polity.org.za/article/eskom-wrong-about-renewable-energy-costs-2017-01-17>.

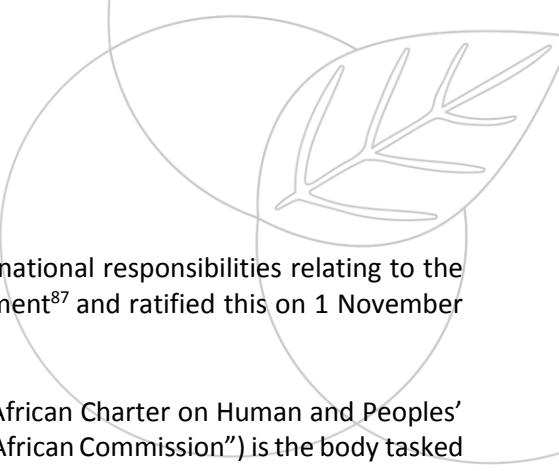
⁸² See 'Need for base load power is a pro-Eskom fabrication', 24 February 2017, at <https://www.businesslive.co.za/bd/opinion/2017-02-24-need-for-base-load-power-is-a-pro-eskom-fabrication/>; 'SA needs to change to smart grid', 25 January 2017, at <https://www.businesslive.co.za/bd/opinion/2017-01-25-sa-needs-to-change-to-smart-grid/>; and 'Renewables will make more sense than megaplants', 8 December 2016, at <https://www.businesslive.co.za/bd/opinion/2016-12-08-renewables-will-make-more-sense-than-megaplants/>.

⁸³ <http://www.polity.org.za/article/eskom-wrong-about-renewable-energy-costs-2017-01-17>.

⁸⁴ <https://www.nirs.org/wp-content/uploads/mononline/nukesclimatechangereport.pdf>.

⁸⁵ <http://www.psr.org/resources/dirty-dangerous-and-expensive-the-truth-about-nuclear-power.pdf>.

⁸⁶ <http://www.psr.org/resources/dirty-dangerous-and-expensive-the-truth-about-nuclear-power.pdf>



Global and international responsibilities

79. The NEM Principles also require the DOE to consider its global and international responsibilities relating to the environment. Specifically, South Africa has signed on to the Paris Agreement⁸⁷ and ratified this on 1 November 2016.⁸⁸
80. South Africa is a member of the African Union, and is a signatory to the African Charter on Human and Peoples' Rights (ACHPR). The African Commission on Human and Peoples' Rights ("African Commission") is the body tasked with promoting and protecting human and collective peoples' rights and interpreting the Charter. In 2009, the African Commission adopted Resolution 153: Resolution on Climate Change and Human rights and the Need to Study its Impact in Africa.⁸⁹ Thereafter, in 2014, Resolution 271 was adopted, the Resolution on Climate Change in Africa,⁹⁰ which reiterated the importance of understanding the impact of climate change in Africa. Most recently, in April 2016, the African Commission adopted Resolution 342: Resolution on Climate Change and Human Rights in Africa.⁹¹ In this resolution, the African Commission reiterated that the United Nations Framework Convention on Climate Change obliges States Parties to "*...protect the climate system for the benefit of present and future generations of humankind, on the basis of equity and in accordance with their common but differentiated responsibilities and respective capabilities*". This resolution also states that there must be a study done on climate change impacts on human rights in Africa. The Working Group on Extractives as well as the Working Group on Economic and Social Rights are tasked with undertaking and presenting the study within 2 years, the deadline for this then being April 2018.
81. South Africa's ratification of the Paris Agreement signifies (or at least should signify) a commitment to a rapid transition away from fossil fuels. Moreover, in terms of section 231(2) of the Constitution, the Paris Agreement is now binding on the Republic, as such, the South African government is obliged to adhere to its provisions.
82. South Africa has committed to, *inter alia*:
 - 82.1. pursue efforts to ensure temperature increase remains below 1.5°C;
 - 82.2. emissions in a range between 398Mt and 614Mt CO2-eq between 2025 to 2030;⁹²
 - 82.3. decline emissions in absolute terms from the year 2035; and
 - 82.4. prepare, communicate and maintain successive NDCs every 5 years,⁹³ which must represent a progression beyond the current NDC and reflect South Africa's highest possible ambition.⁹⁴
83. South Africa's NDC⁹⁵ outlines South Africa's international commitments in the context of the Paris Agreement and states, *inter alia*, that:
 - 83.1. "*South Africa is firmly committed to working with others to ensure temperature increases are kept well below 2°C above pre-industrial levels, which could include a further revision of the temperature goal to*

⁸⁷ This is a universal agreement on climate change agreed to at the 21st annual conference of the parties (COP21) in Paris in December 2015.

⁸⁸ See http://unfccc.int/paris_agreement/items/9444.php and https://www.environment.gov.za/mediarelease/southafrica_ratifies_parisagreement.

⁸⁹ See <http://www.achpr.org/sessions/46th/resolutions/153>.

⁹⁰ See <http://www.achpr.org/sessions/55th/resolutions/271>.

⁹¹ See <http://www.achpr.org/sessions/58th/resolutions/342>.

⁹² Page 6, NDC.

⁹³ Article 4(9), the Paris Agreement.

⁹⁴ Article 4(3).

⁹⁵ Available at <http://www4.unfccc.int/submissions/INDC/Published%20Documents/South%20Africa/1/South%20Africa.pdf>.

below 1.5°C in light of emerging science, noting that global average temperature increase of 2°C translates to up to 4°C for South Africa by the end of the century”;⁹⁶

83.2. *“near zero emissions of CO2 and other long-lived GHGs are needed in the second half of the century to avoid even greater impacts that are beyond adaptation capability”;⁹⁷ and*

83.3. *“South Africa’s INDC was formulated in the context of, inter alia, the environmental right set out in section 24 of the Constitution ... and the 2011 National Climate Change Response Policy (NCCRP) ... The full implementation of these policies and plans will bend the curve of South Africa’s GHG emissions towards a peak, plateau and decline trajectory range... In order to ramp up implementation of these policies and plans over time, South Africa is investing heavily in transforming its energy sector. At the heart of this part of the transition to a low-carbon energy sector is a complete transformation of the future energy mix”.⁹⁸*

84. In relation to the above commitments, it must be pointed out that:

84.1. although South Africa has, in its NDC, acknowledged its own vulnerability to a temperature increase of more than 2°C, the emission mitigation commitments made in the NDC would in fact result in a global temperature increase of 3 – 4 °C. Not only will this have disastrous implications globally but it will be catastrophic for South Africa;

84.2. coal-fired power stations are the single largest source of GHG emissions in South Africa, and these emissions cannot be substantially mitigated;

84.3. *“near zero emissions” are envisaged in the second half of the century and a “complete transformation of the future energy mix” is required according to this NDC; yet government and the IRP Base Case completely contradict these commitments by providing for new coal-fired power to come into operation from as late as 2041.⁹⁹ As set out above, these plants will have a lifespan of at least 40 years (Medupi has a design lifespan of 50 years¹⁰⁰) meaning that they will be emitting GHGs late into the second half of the century and beyond. This is simply not feasible or acceptable for a country, which urgently needs to be transitioning away from fossil fuels, and which in fact, does not need to rely on fossil fuels as an electricity source; and*

84.4. it is clear from the large percentage of South Africa’s electricity envisaged to still come from coal by the year 2050 that South Africa is, in fact, very far from a complete transformation of the future energy mix and there is a clear intention on the part of the DOE to there is a clear intention, evident from both the IRP Base Case and the draft IEP, to lock South Africa into further significant carbon emissions for the long-term future.

85. Based on the above, it is apparent that the draft IEP and the IRP Base Case, as they currently stand, contradict the country’s international commitments, particularly under the Paris Agreement and the urgent global obligation to reduce GHG emissions. It is therefore clear from the draft IEP and the IRP Base Case that the DOE is not discharging its global and international responsibilities in the national interest, as it would clearly not be in the national interest to allow coal-fired power generation to continue, given the health impacts and this country’s vulnerability to climate change.

⁹⁶ Page 1, NDC, available at

<http://www4.unfccc.int/ndcregistry/PublishedDocuments/South%20Africa%20First/South%20Africa.pdf>.

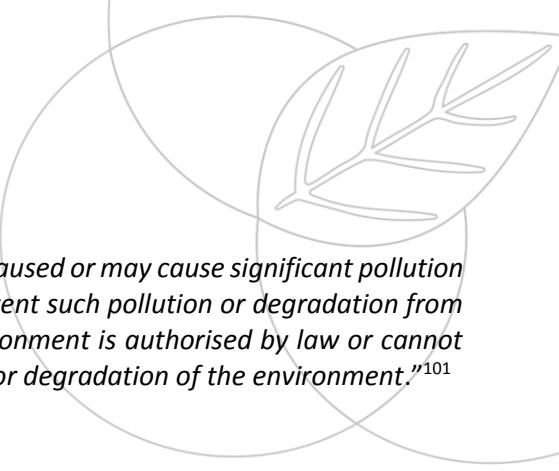
⁹⁷ Page 1, NDC.

⁹⁸ Page 2, NDC.

⁹⁹ Slide 18, DOE IRP Update Presentation, 22 November 2016, reflects coal PV with FGD as a new build option up until the year 2041.

¹⁰⁰ See

<http://www.eskom.co.za/Whatweredoing/NewBuild/MedupiPowerStation/Documents/BROCHUREmedupipowerstationproject.pdf>.



ii. The NEMA Duty of Care

86. Section 28 NEMA places a duty of care on every person who “*causes, has caused or may cause significant pollution or degradation of the environment [to] take reasonable measures to prevent such pollution or degradation from occurring, continuing or recurring, or, in so far as such harm to the environment is authorised by law or cannot reasonably be avoided or stopped, to minimise and rectify such pollution or degradation of the environment.*”¹⁰¹
87. This duty extends to all organs of state, including the DOE.
88. Given the potential risks of significant harm, which could arise from the various energy options to be selected and incorporated into South Africa’s energy and electricity planning, the DOE is under an obligation to ensure that the IRP and IEP do not result in continued or recurring pollution and environmental degradation.
89. Furthermore, given that many of the impacts of burning coal are long-term and cannot be substantively mitigated or remedied, the duty of care requires that no new coal-fired power stations can form part of South Africa’s energy mix.

Electricity Regulation Act

90. The objects of ERA, as set out in section 2, are to, *inter alia*:
 - (a) achieve the efficient, effective, sustainable and orderly development and operation of electricity supply infrastructure in South Africa;
 - (b) ensure that the interests and needs of present and future electricity customers and end users are safeguarded and met, having regard to the governance, efficiency, effectiveness and long-term sustainability of the electricity supply industry within the broader context of economic energy regulation in the Republic;... and
 - (g) facilitate a fair balance between the interests of customers and end users, licensees, investors in the electricity supply industry and the public.
91. The obligation to ensure that these objectives are met, rests with the state, and certainly the IRP and IEP must be aligned with these objectives.
92. One of the purposes of the ERA is to achieve the efficient, effective, sustainable and orderly development and operation of electricity supply infrastructure in South Africa.¹⁰²
93. The ERA serves as the governing legislation for the IRP; it defines the IRP as “*a resource plan established by the national sphere of government to give effect to national policy.*”¹⁰³ In terms of regulation 4 of the Electricity Regulations on New Generation Capacity, 2001, promulgated under the ERA, the IRP must be developed by the Minister, after consultation with NERSA and be published in the Gazette.
94. The IRP Base Case as it currently stands, cannot be regarded as efficient, effective or sustainable, and fails to meet the above objectives because:
 - 94.1. an unjustifiable constraint has been placed on renewable energy capacity;
 - 94.2. the IRP Base Case provides for continued and new reliance on coal-fired power as a significant, majority portion of South Africa’s electricity mix until the year 2050 at least – a costly, harmful and risky option for South Africa as demonstrated above and further below;
 - 94.3. inadequate consideration has been given to the need for least-cost planning, by disregarding, *inter alia*:

¹⁰¹ S28(1), NEMA.

¹⁰² Section 2(a).

¹⁰³ S1, definition of ‘integrated resources plan’, ERA.

- 94.3.1. the health and social costs associated with generation sources such as coal; and
- 94.3.2. the economic burden imposed by generation sources such as coal and nuclear, which run the risk of becoming costly stranded assets and a liability to the state.

95. These issues are addressed individually below.

i. The renewables constraint

- 96. The CSIR 'Least-cost electricity mix for South Africa by 2040' study,¹⁰⁴ referenced above, found that having 70% renewable energy by 2040 was not only technically feasible, but also the cheapest option for South Africa (being at least 40% cheaper than new baseload coal¹⁰⁵).¹⁰⁶ This would mean a more affordable and efficient, not to mention healthy, electricity supply for the public.
- 97. Unfortunately, the draft IRP is headed in the opposite direction. As mentioned, the IRP Base Case envisions that dirty coal and nuclear would contribute the largest share of energy by 2050, with coal contributing 31.6% and nuclear 30%. However, coal would contribute 80% of the energy share in 2020, 68.9% in 2030 and 50.8% in 2040.
- 98. Not only does the draft IRP embrace dirty coal, it intentionally sets arbitrary obstacles that would hinder South Africa from deploying renewables to their full potential:¹⁰⁷
 - 98.1. First, the IRP's Base Case scenario sets very low artificial build limits for solar PV and wind energy without any technical justifications, limiting new solar PV to 1000 MW per year until 2050, and 1600 MW per year for wind.¹⁰⁸ These arbitrary limits would result in solar PV capacity increasing less than 2% every 5 years until 2050, and wind increasing on average less than 3% every 5 years.¹⁰⁹ Because no such limits are set for other energy sources, the IRP Base Case conveniently relies on dirty and more expensive coal and nuclear energy to meet South Africa's energy needs.
 - 98.2. Second, the IRP Base Case uses incorrect and outdated tariffs for solar PV and wind energy, arbitrarily inflating the costs of renewables against dirty coal and nuclear options. As the CSIR has explained, the IRP Base Case estimates 2016 solar PV tariffs as R1.13 per kWh; wind as 0.98; and coal as 1.05.¹¹⁰ However, actual 2016 tariffs in South Africa were R0.62 per kWh for solar PV and wind, and 1.03 Rand for coal.¹¹¹ The IRP Base Case's estimates are also at odds with global prices for renewables. For example, new solar project development in India hit record low installation costs in February 2017, with bids as low as R0.60 per kWh, down 16% from 2016.¹¹² Globally, solar costs are declining at a rate of 10% annually.¹¹³
- 99. Indeed, in stark contrast to South Africa, many countries are rapidly adopting and installing renewable energy, indicating that the IRP's artificial build limits on renewables are not based on real constraints and not in the best interest of South Africa. For example:
 - 99.1. China installed a world record 33.2 GW (gigawatts) of solar in 2016, double its record 15 GW in 2015, which itself was double the highest ever annual record set when Germany installed 7.6 GW in

¹⁰⁴ http://www.ee.co.za/wp-content/uploads/2016/11/RE-Futures-Windaba-CSIR-3Nov2016_FINAL.pdf.

¹⁰⁵ http://www.ee.co.za/wp-content/uploads/2016/10/New_Power_Generators_RSA-CSIR-14Oct2016.pdf.

¹⁰⁶ http://www.ee.co.za/wp-content/uploads/2016/11/RE-Futures-Windaba-CSIR-3Nov2016_FINAL.pdf at page 29.

¹⁰⁷ These issues were raised by the CSIR during the 7 December public hearing on the draft IRP:

https://www.csir.co.za/sites/default/files/Documents/IRP%20Feedback%20-%20CSIR%20-%207Dec2016_v2.pdf.

¹⁰⁸ See *ibid*. See also, Section 5, p24, IRP Base Case.

¹⁰⁹ CSIR 7 December comments, p. 19.

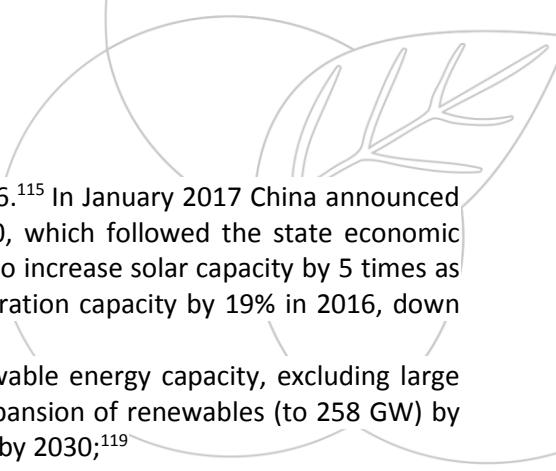
¹¹⁰ *Ibid*, p6. These tariffs are inflated to the April 2016 Rand, and include grid connection costs.

¹¹¹ *Ibid*. These tariffs were based on the IPP and Coal IPP Procurement Programme.

¹¹² Institute for Energy Economics and Financial Analysis, *IEEFA India: A Momentous Solar Event*, (February 10, 2017)

<http://ieefa.org/ieefa-india-momentous-solar-event/>.

¹¹³ Institute for Energy Economics and Financial Analysis, *IEEFA India: Latest Record-Low Bids Underscore Solar's Commercial Viability* (February 9, 2017), <http://ieefa.org/ieefa-india-latest-record-low-bids-underscore-solars-vast-commercial-viability/>.



2012.¹¹⁴ China's on-grid utility solar grew 34% over a year in 2016.¹¹⁵ In January 2017 China announced that it is to invest US\$361 billion in renewable energy by 2020, which followed the state economic planning bodies' announcement in the previous month that it is to increase solar capacity by 5 times as part of its latest five-year plan.¹¹⁶ China expanded its wind generation capacity by 19% in 2016, down from its world record of nearly twice that much in 2015.¹¹⁷

- 99.2. India has already installed 50 GW of cumulative installed renewable energy capacity, excluding large hydro.¹¹⁸ India's current draft energy plan calls for a five-fold expansion of renewables (to 258 GW) by 2027, far greater than South Africa's IRP Base Case goal of 57GW by 2030;¹¹⁹
- 99.3. The solar PV penetration in countries such as Germany, Spain and Italy is currently 2.5 times higher than the solar PV capacity which South Africa only plans to attain by 2050, according to the IRP Base Case;¹²⁰
- 99.4. Costa Rica has supplied 99% of its energy from renewables since 2015, with two-thirds from hydro and one-third from wind, solar and biogas.¹²¹ It is on track to be entirely carbon neutral by 2021;¹²²
- 99.5. Uruguay is 95% powered by renewables after less than 10 years of concerted effort;
- 99.6. Nicaragua also rapidly transitioned to renewable energy, meeting 54% of its energy needs with renewables in 2015;¹²³
- 99.7. Other Latin American countries such as Mexico¹²⁴, Chile¹²⁵ and Argentina¹²⁶ are embarking on ambitious renewable energy programs;
- 99.8. in Morocco, the world's largest solar plant is set to provide half the country's electricity by 2020;¹²⁷
- 99.9. Australia, currently highly coal-dependent, is about to witness a transformational move toward utility-scale solar to complement its wind developments;¹²⁸
- 99.10. Kenya is building Africa's largest wind farm, which will provide 20% of the country's installed capacity, adding to over 50% of the nation's power now coming from geothermal energy;¹²⁹
- 99.11. In respect of wind energy specifically, countries such as Germany, Spain and Ireland are today already at twice the wind generation capacity that South Africa has planned (according to the IRP Base Case) for 2050, and China, India and Brazil are already at 60% of the level of wind energy which South Africa expects to only have achieved by 2050;¹³⁰
- 99.12. at the United Nations Framework Convention on Climate Change twenty second Conference of the Parties UNFCCC's ("COP22"), representatives from forty seven of the world's most disadvantaged nations – including Bangladesh and Ethiopia – pledged to generate all of their future energy needs from renewables by 2040, pending financing.¹³¹

¹¹⁴ Institute for Energy Economics and Financial Analysis, *IEEFA Update: China Is Now Three Years Past Peak Coal* (February 28, 2017), <http://ieefa.org/ieefa-update-china-now-three-years-past-peak-coal/>.

¹¹⁵ *Id.*; http://www.stats.gov.cn/tjsj/zxfb/201701/t20170120_1455945.html.

¹¹⁶ <http://www.reuters.com/article/us-china-energy-renewables-idUSKBN14P06P>

¹¹⁷ Institute for Energy Economics and Financial Analysis, *IEEFA Update: China Is Now Three Years Past Peak Coal* (February 28, 2017), <http://ieefa.org/ieefa-update-china-now-three-years-past-peak-coal/>.

¹¹⁸ Institute for Energy Economics and Financial Analysis, *IEEFA India: Latest Record-Low Bids Underscore Solar's Commercial Viability* (February 9, 2017), <http://ieefa.org/ieefa-india-latest-record-low-bids-underscore-solars-vast-commercial-viability/>.

¹¹⁹ Institute for Energy Economics and Financial Analysis, *IEEFA India: A Momentous Solar Event*, (February 10, 2017) <http://ieefa.org/ieefa-india-momentous-solar-event/>.

¹²⁰ Page 4 of the CSIR Report, 1 December 2016.

¹²¹ Climate Reality Project, Follow the Leader: How 11 Countries Are Shifting To Renewable Energy (February 3, 2016), <https://www.climaterealityproject.org/blog/follow-leader-how-11-countries-are-shifting-renewable-energy>

¹²² *Ibid.*

¹²³ *Ibid.*

¹²⁴ <https://www.pv-tech.org/news/enel-breaks-ground-on-754mw-solar-plant-in-mexico>

¹²⁵ <https://www.bloomberg.com/news/articles/2017-03-30/company-that-offered-cheapest-solar-sees-prices-falling-more>

¹²⁶ <http://planetsave.com/2016/10/17/renewable-electricity-auctions-argentina-awards-400-mw-solar-renovar-program/>

¹²⁷ *Ibid.* See also, CSIR 7 December comments, p. 19.

¹²⁸ <http://www.abc.net.au/news/2017-03-29/australia-on-cusp-of-large-scale-solar-boom-experts-say/8377226>

¹²⁹ Climate Reality Project, Follow the Leader: How 11 Countries Are Shifting To Renewable Energy (February 3, 2016), <https://www.climaterealityproject.org/blog/follow-leader-how-11-countries-are-shifting-renewable-energy>.

¹³⁰ Page 6 of the CSIR Report, 1 December 2016.

¹³¹ See <http://voicesmotherearth.blogspot.co.za/2016/11/cop22-climate-summit-poor-nations.html>.

100. The above makes clear that if South Africa does not rapidly adjust its energy planning, we are going to get left behind, in a fast-moving and significant global trend. More importantly, it shows that there is no need to constrain renewable capacity, particularly not in a country such as South Africa with incredible renewable energy potential. The CSIR's 'Least-cost electricity mix for South Africa by 2040' study shows that in addition to coal now being an expensive energy source, it is not needed.¹³²

101. Solar and wind resources in South Africa are extremely abundant, and far exceed energy demand projections for 2030.¹³³ South Africa has the highest potential for wind energy in Africa,¹³⁴ and among the highest levels in the world.¹³⁵ Detailed maps of solar and wind potential by the International Renewable Energy Agency, Lawrence Berkeley National Laboratory and the University of California at Berkeley show that most of the country has particularly high concentrations of wind potential along the southern coastal regions and high solar potential in the northern interior.¹³⁶

102. In October 2016, a Stanford University study on renewable energy concluded, *inter alia*, that:

- 102.1. South Africa could provide 100% of its electricity needs from wind, water and sunlight, with electricity rates equal to business as usual rates of US\$0.096/kwh;¹³⁷
- 102.2. optimal percentages for end-use load for renewables by 2050 included roughly 42% from onshore wind, 6% from offshore wind, 17% from residential rooftop solar, 9% from commercial or governmental rooftop solar, 10% from solar plants, and 12% from concentrated solar plants, and 3% from waves.¹³⁸ This would provide over 300,000 construction jobs and nearly 300,000 operational jobs lasting 40 years or more;¹³⁹
- 102.3. total baseload needed by 2050 with renewables would be 42% less than "business as usual" due to reduced energy use from the higher work-to-energy ratio of electricity over combustion, eliminating energy use for upstream mining, transporting and refining of fuels, and efficiency policies;¹⁴⁰
- 102.4. only 0.15% of South Africa's land would be needed for all renewable infrastructure;
- 102.5. **South Africa would save US\$71.2 billion in health costs per year, roughly 5% of GDP;**¹⁴¹
- 102.6. **nearly 11,000 deaths from air pollution would be avoided each year;**¹⁴² and
- 102.7. **every person in South Africa would save an estimated US\$206 per year** from reduced energy costs by 2050, and over US\$12,000 per year in energy, health and climate costs combined.¹⁴³

103. The benefits of implementing renewable energy speak for themselves, and South Africa clearly has phenomenal potential for renewable energy.

¹³² Page 29 at http://www.ee.co.za/wp-content/uploads/2016/11/RE-Futures-Windaba-CSIR-3Nov2016_FINAL.pdf.

¹³³ Scientific American, *Can Wind and Solar Fuel Africa's Future?* (November 2, 2016) <https://www.scientificamerican.com/article/can-wind-and-solar-fuel-africa-s-future/>.

¹³⁴ *Id.*

¹³⁵ Mark Jacobson et al., *100% Clean and Renewable Wind, Water, and Sunlight (WWS) All Sector Energy Roadmaps for 139 Countries of the World* (October 24, 2016), <http://web.stanford.edu/group/efmh/jacobson/Articles/I/CountriesWWS.pdf>. (South Africa is listed among countries with the highest onshore and offshore wind potential on page 37.)

¹³⁶ Lawrence Berkeley National Laboratory, *Multicriteria Analysis Planning for Renewable Energy, SEAREZ*, <http://mapre.lbl.gov/rez/searez/> (Scroll down and to the right for energy resource maps of South Africa.) See also IRENA/LBNL, *Renewable Energy Zones for the Africa Clean Energy Corridor* (October 2015),

http://www.irena.org/DocumentDownloads/Publications/IRENA-LBNL_Africa%20RE%20_CEC_2015.pdf. For maps of ideal solar or wind development energy zones, see the interactive maps for South Africa at <http://irena.masdar.ac.ae/>.

¹³⁷ Mark Jacobson et al., *100% Clean and Renewable Wind, Water, and Sunlight (WWS) All Sector Energy Roadmaps for 139 Countries of the World* (October 24, 2016). <http://web.stanford.edu/group/efmh/jacobson/Articles/I/CountriesWWS.pdf>. A summary graphic for South Africa is available at <https://100.org/wp-addons/maps/embed-large.html#710>.

¹³⁸ *Id.*

¹³⁹ *Id.*

¹⁴⁰ *Id.*

¹⁴¹ *Id.*

¹⁴² *Id.*

¹⁴³ *Id.*

104. Furthermore, finance is increasingly available to address any network issues with regard to the integration of renewables. The first round of funding by the New Development Bank (formerly the BRICS bank) included a loan to Eskom for network and RE projects to enhance renewables integration.¹⁴⁴ This loan follows a €670-million guarantee from the World Bank's Multilateral Investment Guarantee Agency that backs loans to Eskom by international commercial banks with the purpose of enhancing its transmission infrastructure. In 2015, Eskom was lent about R4-billion for grid enhancement by the German development bank KfW.¹⁴⁵ Other BRICS countries such as China,¹⁴⁶ India,¹⁴⁷ and Brazil¹⁴⁸ are all taking action to build out network upgrades to integrate more renewable energy.

105. The DOE should therefore remove the irregular constraints placed on renewable energy, and ensure that the wind and solar energy element provided for in the IRP and IEP are unconstrained, as this is necessary to ensure the most efficient, effective and sustainable energy mix for South Africa, in compliance with its obligations under the ERA, as well as the Constitution.

ii. New and continued reliance on coal-based electricity

106. The CSIR's 'Least-cost electricity mix for South Africa by 2040'¹⁴⁹ study, which sets out scenarios for South Africa's future electricity mix, shows that there should be a decline in coal-based electricity production in South Africa from 2020. In contrast, the IRP Update shows new coal-fired power plants coming on line as late as 2041, with a plethora of future coal plants still to become operational in the 2020s – these being Medupi, Kusile, Thabametsi and Khanyisa – and more thereafter, if further bid windows under the CBIPPPP are opened.

107. If one considers the harmful impacts of the mining and burning of coal for human health, the environment and climate change, as set out above, the provision for further coal in South Africa's electricity mix would not be in line with safeguarding the interests and needs of present and future electricity consumers, and is out of line with global practice. As described above, countries are embracing renewables because they are cheaper and cleaner than coal. In this regard, we submit not only that the CBIPPPP IPP coal plants should not go ahead, but also that Eskom's Medupi and Kusile are not necessary.

108. Furthermore, it would mean a backward step in a rapidly-evolving electricity sector to have more coal-based electricity. As the impacts of climate change increasingly begin to manifest and with a binding global commitment to mitigate emissions having been made by South Africa, along with (presently) 141 other countries,¹⁵⁰ more and more countries across the world are pledging to phase out their reliance on coal. These are some examples:

108.1. China is making decisive and rapid shifts away from coal, with decline in coal consumption continuing a three year trend.¹⁵¹ The world's biggest coal consumer reduced its coal consumption by 4.7% in 2016, even as energy consumption that year grew by 1.4%, and GDP grew by 6.7%.¹⁵² Prior to 2016, the addition

¹⁴⁴ <https://cleantechica.com/2016/04/25/brics-bank-approves-811-million-funding-renewable-energy-projects/>.

¹⁴⁵ <http://mg.co.za/article/2016-04-21-brics-bank-backs-renewable-energy>.

¹⁴⁶ <http://www.afr.com/business/energy/electricity/china-state-grid-spends-us117-bn-to-connect-renewables-to-big-cities-20170112-gtqnqw>.

¹⁴⁷ <https://www.bloomberg.com/news/articles/2016-12-21/india-investing-1-8-billion-on-lines-to-transmit-solar-power>.

¹⁴⁸ <http://energy.economictimes.indiatimes.com/news/power/brazil-to-auction-power-transmission-licenses-on-april-24-requiring-4-2-billion-investment/57527994>.

¹⁴⁹ http://www.ee.co.za/wp-content/uploads/2016/11/RE-Futures-Windaba-CSIR-3Nov2016_FINAL.pdf.

¹⁵⁰ http://unfccc.int/paris_agreement/items/9444.php.

¹⁵¹ See, http://www.huffingtonpost.com/dr-kristen-mcdonald/kicking-the-coal-habit-mo_b_9723258.html and <https://cleantechica.com/2016/03/06/china-renewable-growth-soars-fossil-fuel-use-declines/>; Institute for Energy Economics and Financial Analysis, *IEFA Update: China Is Now Three Years Past Peak Coal* (February 28, 2017), <http://iefa.org/iefa-update-china-now-three-years-past-peak-coal/>.

¹⁵² Institute for Energy Economics and Financial Analysis, *IEFA Update: China Is Now Three Years Past Peak Coal* (February 28, 2017), <http://iefa.org/iefa-update-china-now-three-years-past-peak-coal/>.

of 200 GW of coal-fired power plants caused a record low capacity utilisation rate for the coal-fired power sector of 47.5%, down from 79% in 2011, which greatly increased the number of power plants considered to be stranded assets.¹⁵³ Coal use in China is being reduced for many reasons, including climate commitments, air quality goals, and water stress.¹⁵⁴ For example, China's central government has recently put in place unprecedented and far-reaching restrictive measures.¹⁵⁵ Over 300 GW of projects in various stages of development were put on hold until after the 13th Five Year Plan (2016–2020), including 55 GW of projects that were already under construction;¹⁵⁶

- 108.2. India has experienced a slow-down in coal plant development due, in large part, to the reluctance of financiers to provide funds to what they increasingly see as high-risk investments.¹⁵⁷ Construction at 13 sites, representing 13 GW of stranded assets, is now on hold.¹⁵⁸ Water stress in India is also impacting power plants, as 70% of its power plants are located in water stressed or scarce areas.¹⁵⁹ This leads to shut downs and lost power output during droughts and dry seasons, resulting in financial losses.¹⁶⁰ Indian coal plants also face increasing regulatory uncertainty in light of the Government of India's National Water Mission, which calls for a 20% improvement in water efficiency nationally through regulatory mechanisms;¹⁶¹
- 108.3. Finland's Cabinet has pledged to dramatically cut its coal use and to have a complete phase out from coal by 2030;¹⁶²
- 108.4. Canada's Alberta province has committed to end coal power by 2030;¹⁶³ and
- 108.5. the United Kingdom (UK) plans to phase out coal, with the last coal-fired power station shutting down by 2025.¹⁶⁴ Coal use in the UK is at record lows.¹⁶⁵ Scotland closed the last of its coal fired power plants in 2016.¹⁶⁶

109. These countries recognise that reducing coal is cheaper, better for health and the environment, and is technologically feasible.

110. A recent report by Greenpeace, the US-based Sierra Club and research network CoalSwarm titled 'Boom and Bust 2017: Tracking the Global Coal Plant Pipeline',¹⁶⁷ finds that "*the amount of coal power capacity under development worldwide saw a dramatic drop in 2016, mainly due to shifting policies and economic conditions in China and India ... The drop occurred in all stages of coal plant development ...*".¹⁶⁸ It notes that the amount of new coal capacity starting construction was down 62% in 2016 on the year before, and work was frozen at more than a hundred sites in China and India.¹⁶⁹ Completely contrary to this global trend, and despite our world-leading

¹⁵³ *Ibid.*

¹⁵⁴ Adam Vaughan, Coal in 'freefall' as new power plants dive by two-thirds, The Guardian, (March 22, 2017), <https://www.theguardian.com/environment/2017/mar/22/coal-power-plants-green-energy-china-india#img-1>.

¹⁵⁵ Page 4, <http://endcoal.org/wp-content/uploads/2017/03/BoomBust2017-English-Final.pdf>.

¹⁵⁶ *Ibid.*

¹⁵⁷ Page 4, <http://endcoal.org/wp-content/uploads/2017/03/BoomBust2017-English-Final.pdf>.

¹⁵⁸ *Ibid.*

¹⁵⁹ World Resources Institute, Identifying the Global Coal Industry's Water Risks (April 15, 2014), <http://www.wri.org/blog/2014/04/identifying-global-coal-industry%20%99s-water-risks>.

¹⁶⁰ World Resources Institute, Identifying the Global Coal Industry's Water Risks (April 15, 2014), <http://www.wri.org/blog/2014/04/identifying-global-coal-industry%20%99s-water-risks>.

¹⁶¹ *Ibid.*

¹⁶² See <http://www.independent.co.uk/news/world/europe/finland-plans-completely-phase-out-coal-2030-a7438731.html>.

¹⁶³ See <http://www.theglobeandmail.com/report-on-business/industry-news/energy-and-resources/alberta-strikes-136-billion-deal-with-power-companies-to-end-coal-fired-electricity-by-2030/article33035325/>.

¹⁶⁴ See <https://www.theguardian.com/environment/2016/nov/09/britains-last-coal-power-plants-to-close-by-2025>.

¹⁶⁵ <https://www.newscientist.com/article/2123593-uk-s-co2-emissions-lowest-since-19th-century-as-coal-use-falls/>

¹⁶⁶ CNBC, Scotland Ends Coal Fired Electricity, (March 24, 2016) <http://www.cnbc.com/2016/03/24/scotland-ends-coal-fired-electricity.html>

¹⁶⁷ Available at <http://endcoal.org/wp-content/uploads/2017/03/BoomBust2017-English-Final.pdf>.

¹⁶⁸ P3, <http://endcoal.org/wp-content/uploads/2017/03/BoomBust2017-English-Final.pdf>.

¹⁶⁹ See <https://www.theguardian.com/environment/2017/mar/22/coal-power-plants-green-energy-china-india>.

solar and wind resources, South Africa is already falling significantly behind the move of both developed and developing countries towards renewable generation technology as a necessary and very viable alternative to coal.

111. The authors of the Boom and Bust 2017 report estimate that only about 20% of coal-fired power plants currently in the pre-construction phase will eventually be built, due to the falling cost of renewables and the difficulties financing coal plants.¹⁷⁰ Those that are then built, despite these inevitabilities, run the high risk of becoming stranded assets. This risk is addressed below.

112. This clearly demonstrates the need for South Africa to rapidly phase out coal. Apart from the fact that South Africa has now undertaken a binding commitment to do so, the evident shift away from coal by the rest of the world should be a clear indication that coal phase-out is necessary, inevitable, and in the best interests of the public and the environment.

iii. Failure to give adequate consideration to the least-cost planning option

113. Least-cost planning is a method of deciding the most cost-effective way to meet future energy needs, by looking at a range of alternatives and doing a cost-benefit analysis.¹⁷¹ In conducting such an analysis, it is important to ensure the external costs of coal are considered.

114. For example, under Minnesota state law of the United States, the Public Utilities Commission (PUC) is required to “*quantify and establish a range of environmental costs associated with each method of electricity generation*,” and utilities are required to use those costs “*when evaluating and selecting resource options in all proceedings before the [PUC], including resource planning and certificate of need proceedings*.¹⁷²”

115. The IRP Update does not adequately factor in the social and environmental costs of the water, land, and air pollution caused by coal-fired power stations and the health costs and loss of productivity caused by this. Nor does it take into account the heavy subsidies for coal and the significant expenditure incurred by the state in this regard.

116. Section 4.2 of the IRP Base Case titled ‘Cost of Externalities’ stipulates a Rand per kilogram price for certain air pollutants including PM and NOx – no cost is provided for CO2.¹⁷³ It is not clear what the stipulated amounts are based on. In any event, merely stipulating a price for some air pollutants is clearly not sufficient for the comprehensive externalities assessment that is required for the IRP Update and IEP, as stated in the paragraph above.

117. A 2015 report by the International Monetary Fund (IMF) entitled ‘How Large are Global Energy Subsidies?’ states, *inter alia*, that “*coal accounts for the biggest subsidies, given its high environmental damage*” and “*the considerable size of coal subsidies reflects the substantial undercharging for its environmental impacts*”¹⁷⁴ estimated that fossil fuel companies would benefit from US\$5.3 trillion dollars of global subsidies that year.

118. Even if the external costs of power stations are disregarded, coal-fired power remains a costly option for South Africa. The CSIR ‘Least Cost Energy Mix’ study states that the proposed “*re-optimised mix*” (with wind, solar and gas) is predicted to be “*R90 billion cheaper per year by 2040 than the Business-as-Usual scenario*”. Importantly,

¹⁷⁰ P14, <http://endcoal.org/wp-content/uploads/2017/03/BoomBust2017-English-Final.pdf>.

¹⁷¹ See <http://www.elaw.org/coal#coal-home-page-second-section>.

¹⁷² In the Matter of the Further Investigation into Environmental and Socioeconomic Costs Under Minnesota Statutes Section 216B.2422, Subdivision 3, OAH 80-2500-31888, MPUC E-999/CI-14-643, Minn. Office of Admin. Hearings (April 15, 2016).

¹⁷³ P23, IRP Base Case.

¹⁷⁴ <http://www.imf.org/external/pubs/ft/wp/2015/wp15105.pdf> at pages 7 and 20. See also pages 18, 19, 20, 21, 23, 27, 30 and 31.

this difference exceeds R100 billion per year when the cost of CO2 emissions, based on the proposed carbon tax, are included.¹⁷⁵

119. With the imminent implementation of the carbon tax, the burning of coal is going to become increasingly expensive. Without the ability to choose alternative energy options, the cost of this will, it seems, ultimately be borne by the consumer.

120. The price of electricity would be some 18% lower per kWh if South Africa followed the re-optimised, least-cost mix proposed by the CSIR, as compared to that of the “Business as Usual” scenario based on the 2016 draft IRP Update.¹⁷⁶

121. Further evidence of the high cost and financial burden to the state of large baseload coal-fired power plants can be seen with Eskom’s Medupi and Kusile coal-fired power stations, which are not only significantly delayed, but also hugely over-budget.¹⁷⁷

122. There is also the risk that these large-scale power stations will become stranded assets.

123. A 2016 Working Paper by Jesse Burton and others at the Energy Research Centre (ERC) titled ‘The impact of stranding power sector assets in South Africa’¹⁷⁸ looks at the implications of investing in power plants that are later underutilised, and the impact of ignoring non-electricity emissions on the costs of transition to a low carbon future. It finds, *inter alia*, that:

123.1. *“as mitigation trajectories for the electricity sector are lowered, the risk of stranding assets increases; from a 14Gt (gigatonne) constraint without stranding, to a 12Gt scenario where older plant is stranded capacity and new coal is run below its designed load factors, and yet further to a 10Gt constraint where assets are stranded and capacity is stranded. As is to be expected, stranding assets results in higher investment in the sector to meet demand, with higher electricity prices as a result of that”*¹⁷⁹

123.2. *“given the potential increase in global pressures to reduce emissions, further investment in coal-fired power carries with it the risk of stranded capacity, stranded assets, and thus higher electricity prices”*¹⁸⁰; and

123.3. if South Africa wants to meet its mitigation targets at ‘least cost’ i.e. as cheaply as possible, the most feasible way to do that is by not building new coal in the electricity sector. This is because it is cheaper to mitigate in the electricity sector than in other sectors such as transport and agriculture.¹⁸¹

124. Stranded assets cause stranded jobs. When coal plants can no longer affordably operate (and become stranded assets) or, at latest, when they are decommissioned (which may be well before the end of intended life-span), jobs will be lost. In a volatile fossil fuel sector, we are already seeing massive fluctuations and drops in employment opportunities at mines and power stations,¹⁸² along with tension from the labour sector in this

¹⁷⁵ Page 29 at http://www.ee.co.za/wp-content/uploads/2016/11/RE-Futures-Windaba-CSIR-3Nov2016_FINAL.pdf.

¹⁷⁶ <http://www.dailymaverick.co.za/article/2016-11-03-revealed-the-csirs-outlook-for-south-africas-future-electricity-mix/#.WEQBXLJ97IU>.

¹⁷⁷ See, for example, <http://www.dailymaverick.co.za/article/2016-07-07-medupi-kusile-and-the-massive-costtime-overrun/>.

¹⁷⁸ http://www.erc.uct.ac.za/sites/default/files/image_tool/images/119/Papers-2016/2016-Burtonetal-Impact_stranding_power_sector_assets.pdf.

¹⁷⁹ P28, at http://www.erc.uct.ac.za/sites/default/files/image_tool/images/119/Papers-2016/2016-Burtonetal-Impact_stranding_power_sector_assets.pdf.

¹⁸⁰ Ibid.

¹⁸¹ P17, at http://www.erc.uct.ac.za/sites/default/files/image_tool/images/119/Papers-2016/2016-Burtonetal-Impact_stranding_power_sector_assets.pdf.

¹⁸² See <http://www.biznews.com/rational-perspective/2015/04/09/eskom-has-cost-sa-r400bn-in-lost-wealth-thousands-of-jobs/>; <http://ewn.co.za/2015/08/18/Over-60000-jobs-could-be-lost-in-South-Africa>; and <http://www.cnbcfrica.com/news/southern-africa/2016/03/02/south-african-government,-mining-firms-agree-to-delay-16,000-job-cuts/>.

regard, as threats of ageing fleet closure have become cause for concern.¹⁸³ The fact of the matter is that coal-fired power plants have a limited lifespan and plans need to be put in place by the state to ensure that the jobs are absorbed by other sectors and to ensure a just and smooth transition into new employment opportunities in sectors such as renewable energy.

125. There is increasing evidence of rapidly expanding and sustainable employment opportunities in the renewable energy sector.¹⁸⁴ China appears to be leading in this regard, with already 3.5 million jobs in the renewable energy sector.¹⁸⁵

126. The latest DOE report, 'State of Renewable Energy in South Africa 2015' states that a total of 25 562 jobs were created over 3 years of policy-driven renewables development.¹⁸⁶

127. The IPP Office's IPP Overview Report for 2016 notes that the REIPP Programme "*[c]reated 29 888 job years (the equivalent of a full time employment opportunity for one person for one year) for South African citizens, or 33 916 jobs (FTEs)¹⁸⁷ for South African citizens*" by the end of 2016.¹⁸⁸ This number could increase significantly if renewable capacity would be increased.¹⁸⁹

128. It must also be pointed out that, while South Africa was previously faced with a crisis of inadequate capacity to meet demand, it now faces a different, and unanticipated problem of electricity oversupply as Eskom now appears to have a surplus of electricity,¹⁹⁰ and has reportedly had surplus capacity since May 2016.¹⁹¹

129. Electricity demand appears to have reduced, and Medupi and Kusile (which would make a significant contribution to capacity) have yet to become fully operational. The consequence of this is a potentially enormous excess supply around the mid-2020s, which could not make economic or environmental sense. Particularly as the impact of this will ultimately be felt by the consumer, given the reduced sales volumes and increased operating costs. The worst impacts will be on the households who are not able to defect from the grid with embedded generation technologies.

130. To proceed with plans for further coal capacity and nuclear, when these are in fact not needed, and without any regard to changed circumstances, would be reckless to say the least, particularly given the financial and environmental implications. It is fundamental that current circumstances around electricity demand; grid defection; and costs of different technologies be accurately considered and accounted for in the IRP Update and IEP.

¹⁸³ See <http://ewn.co.za/2017/03/29/num-threatens-strike-at-eskom-over-coal-plant-shutdowns>; <http://www.iol.co.za/news/south-africa/gauteng/days-of-coal-mines-are-numbered-as-eskom-shifts-focus-8378695>; and <https://www.businesslive.co.za/fm/features/2017-03-23-eskoms-coal-fired-power-struggle2/> as some examples.

¹⁸⁴ <http://climate-energy.blogs.panda.org/2015/05/25/with-9-2-million-employed-by-renewable-energy-is-the-jobs-myth-finally-bust/>; <http://earthlife.org.za/www/wp-content/uploads/2009/02/se-2-employment-potential-of-re.pdf>.

¹⁸⁵ See http://www.irena.org/News/Description.aspx?NType=A&mnu=cat&PriMenuID=16&CatID=84&News_ID=1450.

¹⁸⁶ <http://www.energy.gov.za/files/media/Pub/State-of-Renewable-Energy-in-South-Africa.pdf> at page 135.

¹⁸⁷ Full time equivalent, in this case "person months (reporting unit of IPP agreements) converted to FTEs".

¹⁸⁸ Executive Summary, p2, Quarterly Report, Overview of the IPPPP, December 2016 available at <https://www.ipp-projects.co.za/Publications>.

¹⁸⁹ <http://www.greenpeace.org/international/Global/international/publications/climate/2015/Energy-Revolution-2015-Full.pdf> at page 90.

¹⁹⁰ See http://www.miningweekly.com/article/eskom-in-desperate-search-for-industrial-customers-as-surplus-grows-2016-11-04/rep_id:3650. Although Eskom now appears no longer to publish these briefings on its site, its recent "system status briefings" also made clear that it had surplus capacity

¹⁹¹ Eskom's systems status briefing, showed that Eskom had 11000 MW of excess capacity daily. See

<http://www.eskom.co.za/Documents/SystemStatusMay2016.pdf> and <http://www.eskom.co.za/news/Pages/Jann24.aspx>.

131. Allowing a lock-in to unnecessary coal developments will be inconsistent with the objects of ERA, including those of promoting the use of diverse energy sources and energy efficiency; and promoting competitiveness and customer and end user choice.

The National Energy Act

132. The NEA requires South Africa to modernise its energy planning processes and adopt integrated energy planning.¹⁹² The NEA's goals include addressing supply and demand, but they go well beyond that. Modern energy planning recognises the critical role that energy plays in society and takes a holistic approach to planning. The International Atomic Energy Agency (IAEA) explains that "*[i]ntegrated energy planning is the systematic analysis of all the factors that influence the evolution of energy systems. It facilitates problem solving and makes it possible to explore linkages, evaluate trade-offs and compare consequences, thereby helping countries to develop an effective energy strategy that supports national sustainable development goals.*"¹⁹³ Integrated energy planning done well recognises the environmental, social and cultural impacts of energy production and distribution and supports a country's development, environmental, social and other goals.

133. The stated objects of the NEA are, *inter alia*, to:

"... (g) provide for optimal supply, transformation, transportation, storage and demand of energy that are planned, organised and implemented in accordance with a balanced consideration of security of supply, economics, consumer protection and a sustainable development;
(h) provide for certain safety, health and environment matters that pertain to energy;
(i) facilitate energy access for improvement of the quality of life of the people of the Republic;
... (k) ensure effective planning for energy supply, transportation and consumption; and
(l) contribute to sustainable development of South Africa's economy."

134. Section 6 (Chapter 3) of the NEA deals with integrated energy planning and regulates the IEP. It states, *inter alia*, that:

"(2) The Integrated Energy Plan must deal with issues relating to the supply, transformation, transport, storage of and demand for energy in a way that accounts for—
(a) security of supply;
(b) economically available energy resources;
(c) affordability;
(d) universal accessibility and free basic electricity;
(e) social equity;
(f) employment;
(g) the environment;
(h) international commitments;
(i) consumer protection; and
(j) contribution of energy supply to socio-economic development ...

(4) The development of the Integrated Energy Plan must take into account—
(a) sustainable development;
(b) optimal use of indigenous and regional energy resources;
(c) balance between supply and demand;
(d) economic viability;
(e) environmental, health, safety and socio-economic impacts; and

¹⁹² S6, the NEA.

¹⁹³ P6, 'Integrated Energy Planning for Sustainable Development', available at: <https://www.iaea.org/OurWork/ST/NE/Perspectives/assets/IEPSD%20Brochure%20WEB.pdf>.

(f) developmental requirements of the Southern African region

(6) The Integrated Energy Plan must—

- (a) serve as a guide for energy infrastructure investments;*
- (b) take into account all viable energy supply options; and*
- (c) guide the selection of the appropriate technology to meet energy demand ...”*

135. We note that, in terms of section 21, the NEA only comes into operation on a date determined by the President by proclamation in the Gazette, and different dates may be fixed in respect of different provisions of the Act. Section 6 has not yet been promulgated and is thus not yet in effect. The DOE is urged to urgently ensure that section 6 is promulgated.

136. In any event, as the IEP is being developed irrespective, it is important that it meet the requirements of the NEA, including section 6, as this is what the legislature intended the IEP to comply with.

137. The IEP is intended to cover all of the energy sectors, not just the electricity sector (as with the IRP, which focuses solely on electricity). It is also notable that electricity planning should follow energy planning. A failure to do this would constrain the purpose of integrated energy planning, which is to obtain a holistic perspective of the entire energy structure intertwined with sustainable development goals and other concerns including the environment and public health. We set out hereunder our comments on the draft IEP specifically.

Comments on the draft IEP

138. The draft IEP identifies the following as key objectives:

- 138.1. ensure security of supply;
- 138.2. minimise the cost of energy;
- 138.3. promote the creation of jobs and localisation;
- 138.4. minimise negative environmental impacts from the energy sector;
- 138.5. promote the conservation of water;
- 138.6. diversify supply sources and primary sources of energy;
- 138.7. promote energy efficiency in the economy; and
- 138.8. increase access to modern energy.

139. In order to meet all of these objectives, particularly the objectives of minimising the cost of electricity; and minimising the negative environmental impacts of the energy sector, it is necessary that the IEP calls for the urgent transition from coal-based energy to renewable energy sources such as solar and wind.

140. We point out that the draft IEP does not meet the objects of the NEA as listed above, nor does it meet the following requirements of section 6, as:

- 140.1. it contravenes the objects of the NEA listed above and in particular, it would not facilitate energy access for improvement of the quality of life of the people of the Republic, nor would it contribute to sustainable development of South Africa’s economy, as required by sections 2(i) and (l);
- 140.2. it does not deal with the supply of and demand for energy in a way that accounts for affordability; social equity, the environment or international commitments as required by section 6(2); and
- 140.3. it does not adequately take into account any of the factors listed in section 6(4) as required.

141. Our submissions in this regard pertain specifically to:

- 141.1. the recommendation that coal and nuclear power form part of South Africa’s energy mix without any adequate consideration and comparison of these energy sources; and

141.2. the external environmental costs do not appear to have been adequately accounted for in determining the costs of coal as an energy source.

i. *Inadequate consideration and comparison of energy sources*

142. The draft IEP (and the IRP Base Case) assumes nuclear and coal power will be part of the future energy mix without evaluating the options, particularly in comparison to other energy sources.¹⁹⁴ There is nothing in the law that suggests that the Minister has the authority to include nuclear and coal as a set part of the future energy mix simply because some investments have already been made.

143. The energy plans must be regularly re-evaluated because so many factors that should be taken into consideration are changing rapidly. It is wrong to assume that determinations made some years ago and an outdated IRP from 2010 are still the right decision when it comes to energy sources. If decisions once made are never reconsidered, South Africa will have many bad investments, being left to pay for stranded costs. This does not meet the legal requirement for evaluating all energy options as specified in the NEA.

144. We do not intend to repeat the submissions made above in respect of the environmental and health impacts of coal-fired power generation; the social and external costs of burning coal; and the negative economic impacts that this energy source will have. Based on these submissions as explained above, the IEP should not recommend the continued reliance on coal as an electricity source. Yet, this is what has been done.

145. Furthermore, in relation to nuclear, the draft IEP states, “[p]ower generation from nuclear needs to play a more significant role in the provision of new baseload generation, depending on the cost of nuclear reactors and the financing thereof. The first unit of the New Nuclear Build Programme should be brought on line by 2030, however additional capacity should be implemented at a scale and pace that will not have a negative impact on the economy and additional capacity can be brought online after 2030 in a well-spaced out manner”¹⁹⁵. The reference in the draft IEP to nuclear power as “clean” and renewable energy, on the same level as solar and wind,¹⁹⁶ is misguided and incorrect, given that nuclear energy is dependent on an exhaustible resource – uranium – to operate and generates harmful radioactive waste, which can certainly not be regarded as clean.

146. In evaluating the economic viability of energy sources as required by the NEA, the DOE should take into account difficulties in financing and risks associated with future regulation. In the Boom and Bust 2017 report referred to above, the authors estimate that only about 20% of coal-fired power plants currently in the pre-construction phase will eventually be built due to the falling cost of renewables and the difficulties of financing coal plants.¹⁹⁷ According to these statistics, there is a high chance that any coal plants planned for South Africa will never come on-line, making investment risky and likely to be wasted and result in stranded costs, unable to generate electricity.

147. The draft IEP even states that “*the impact of carbon emissions on the climate and environment is an inhibiting factor and once externality costs are taken into account coal no longer becomes an affordable option*”,¹⁹⁸ yet it nevertheless recommends that coal should “*continue to play a role in electricity generation*”.¹⁹⁹ In order for the draft IEP to be an effective guiding tool for the country’s energy decisions, it cannot simply make recommendations for coal and nuclear to form part of South Africa’s energy mix, without fully considering the risks and cost implications of those energy options, and making informed and rational decisions based on these considerations, particularly when true and accurate analyses show these options to be too costly and risky.

¹⁹⁴ P37, draft IEP refers to government’s commitment to nuclear; p18 states “given the long lead-times associated with construction of nuclear plants, planning with regard to the New Nuclear Build Programme should progress . . .”

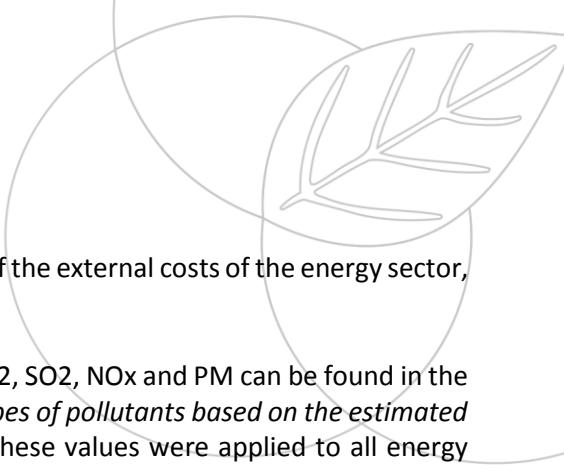
¹⁹⁵ Executive Summary, p18, draft IEP.

¹⁹⁶ P19, draft IEP.

¹⁹⁷ P14, available at: <http://endcoal.org/wp-content/uploads/2017/03/BoomBust2017-English-Final.pdf>.

¹⁹⁸ P171 – 172, draft IEP.

¹⁹⁹ Executive Summary, p17, draft IEP.



ii. The external costs

148. With regard to the IEP, there should be no Base Case that disregards any of the external costs of the energy sector, and external costs must be applied consistently for all energy sources.

149. A table setting values for the externalities costs for pollutants, such as CO₂, SO₂, NO_x and PM can be found in the draft IEP,²⁰⁰ stating that “*Externality costs were calculated for different types of pollutants based on the estimated cost of damage caused by those pollutants*”, but it is unclear whether these values were applied to all energy sources that emit these pollutants. For example, the draft IEP states that “*no externality costs will be imposed on imported refined liquid fuels. . . Should externality costs have to be included in the price of imported fuels, the cost of imported fuels will further increase and will in turn have a negative impact on the balance of payment.*”²⁰¹ The burning of liquid fuels in South Africa has a cost that is borne by society and the local environment. These costs must be determined as part of this energy planning process.

150. A report attached as Annexure C1 to the draft IEP addresses the external costs of energy production in South Africa. The report rightly states that “*a price of zero is too low*”, but then incorrectly states that “*a price that prevents any activity which produces an externality is likely to be too high.*”²⁰² The exercise that should be performed as part of the IEP to determine the true cost of each type of energy generation is to determine the *true* external costs, not the *acceptable* external costs. The draft IEP says that it uses the “cost of damage” approach to determine the externality costs.²⁰³ However, the draft IEP then refers to the reports in Annexure C to provide the details about how the external costs were reached, which is not an appropriate approach.

151. The draft IEP and associated reports find that there is not yet an accepted value assigned to the external costs of energy production for South Africa. However, the values assigned through the draft IEP process are much too low. For example, the IEP assigns a cost of R270 per metric ton to CO₂ emissions (approximately US\$22/metric ton). However, using the social cost of carbon as adopted by the United States federal government would put the value at US\$42/metric ton in 2020 and US\$46/metric ton in 2025,²⁰⁴ an amount much higher than that provided for in the draft IEP.

152. In addition, it is unclear whether the full external costs associated with nuclear have been considered. Regard must be given to the high costs associated with long-term storage and disposal of nuclear wastes and the risk of an accident, that would be borne by society. It is not clear whether these costs have been included in the calculation of operating costs of nuclear facilities.

153. It is vital that the **full** external costs of all proposed energy sources are accurately quantified; calculated and considered in the IEP.

Recommendations

154. In times of excess supply, additional coal and nuclear displaces future renewables deployment. Even if electricity demand were to increase as forecast in these draft documents, it is prudent to plan for flexibility, and not commit South Africa to harmful, expensive and inflexible technologies such as coal and nuclear, requiring mega-projects with long lead times and plant lives of some 50 years or more.

155. In the event of excess supply, it should be noted that the cancellation of a new and expensive coal-fired power plant such as Kusile would be more efficient (in terms of providing electricity as soon as possible) and make more

²⁰⁰ Table 0-5, p67, the draft IEP.

²⁰¹ P18 – 19, draft IEP.

²⁰² P8, *Energy System Externalities in South Africa*, Annexure C1, draft IEP.

²⁰³ P67, draft IEP.

²⁰⁴ See <https://www.epa.gov/climatechange/social-cost-carbon>. Note that these figures use 2007 US\$ figures and 2012 Rand figures. The US\$ figures should be converted to US\$49/metric ton in 2020 and US\$54/metric ton in 2025 with 2017 US\$ figures.

economic sense than proceeding with it, despite the investments that may already have been made. This is because the full costs (including external environmental and health costs) of power generated by a new coal plant such as Kusile are substantially higher than the costs of new renewable energy.

156. Locking South Africa for at least five decades into further expensive and unnecessary coal projects is inconsistent with the Constitution, NEMA, ERA and the NEA. It will certainly mean that South Africa will not be able to meet its commitments under the Paris Agreement or its obligations towards its own citizens to protect the environment for the benefit of present and future generations.

157. If South Africa is to diversify its electricity sources, we need to ensure that Eskom and DOE (and consequently the public) are not locked into paying for unnecessary and expensive coal or nuclear plants.

158. In the circumstances, and based on the above submissions, the following recommendations are made:

- 158.1. reasonable, adequate and further public participation opportunities in respect of both the IRP Update and the draft IEP must be provided, confirmed and clarified as soon as possible as recommended above;
- 158.2. the IRP and IEP must consider the **full** social and environmental costs (as well as the costs of necessary retrofits for abatement technology to ensure compliance with air emission standards) of the different energy options;
- 158.3. there must be a comprehensive and accurate comparison of all proposed energy sources before any recommendations are made as to what energy sources can be included in South Africa's energy planning;
- 158.4. the constraint in the IRP Base Case on renewable energy sources for solar and wind must be removed; and
- 158.5. no further new coal-fired power stations should be included in South Africa's energy mix (including the preferred bidders under the first bid window of the CBIPPPP).

159. Failure to abide by these recommendations would be a clear violation of section 24 of the Constitution and the further legal obligations outlined above, and appropriate remedial action will be considered in this event.

160. In conclusion, we trust that appropriate amendments will be made to the draft IRP Update and IEP, and that these updated documents will be made available for a fair and reasonable comment opportunity. We also again request copies of the documents referred to in our correspondence of 29 November 2016.

Yours faithfully
CENTRE FOR ENVIRONMENTAL RIGHTS

per: 
Robyn Hugo

Robyn Hugo
Attorney and Programme Head: Pollution and Climate Change
Direct email: rhugo@cer.org.za