

IN THE HIGH COURT OF SOUTH AFRICA

GAUTENG DIVISION, PRETORIA

Case number: 21559/18

In the matter between:

EARTHLIFE AFRICA NPC

First Applicant

**THE TRUSTEES FOR THE TIME BEING
OF THE GROUNDWORK TRUST**

Second Applicant

and

THE MINISTER OF ENVIRONMENTAL AFFAIRS

First Respondent

**CHIEF DIRECTOR: INTEGRATED
ENVIRONMENTAL AUTHORISATIONS,
DEPARTMENT OF ENVIRONMENTAL AFFAIRS**

Second Respondent

**THE DIRECTOR: APPEALS AND LEGAL REVIEW
DEPARTMENT OF ENVIRONMENTAL AFFAIRS**

Third Respondent

THABAMETSI POWER COMPANY (PTY) LTD

Fourth Respondent

EXPERT AFFIDAVIT

I the undersigned,

JESSE ALEXANDRA SARAH BURTON

do hereby make oath and say that:

- 1 I am an adult female appointed as a consultant at the University of Cape Town ("UCT"), and working as an energy researcher in the Energy Systems, Economics, and Policy group at the UCT's Energy Research Centre ("ERC").

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2 The ERC is a multi-disciplinary research centre which pursues excellence in technology, policy and sustainable development research, education and capacity building programmes at a local and international level. The objectives of the ERC include, *inter alia*: to undertake independent and objective research of both national and global interest in order to deepen knowledge and understanding of energy and development needs, problems, challenges and innovative solutions; and to undertake research on linkages between energy and other themes, including economic and social development and impact, environment and climate change.

3 I hold a Masters degree in Energy Studies from UCT.

4 I have been producing work for the ERC for approximately 5 (five) years.

5 Prior to that, from 2012 to 2016, I worked as course convenor of the 'Introduction to energy policy and sustainable energy engineering' course at the ERC.

6 A copy of my *curriculum vitae* is attached marked "**JB1**".

7 I am the co-author of the following reports:

7.1 a May 2018 report by the ERC titled "An assessment of new coal plants in South Africa's electricity future: the cost, emissions and supply security implications of the coal IPP [Independent Power Producer] programme" ("**Coal IPP Report**");

7.2 a February 2019 report by ERC titled "Least-cost integrated resource planning and cost-optimal climate change mitigation policy: Alternatives for the South African electricity system" ("**ERC Alternative Electricity Systems Report**");

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7.3 a September 2018 report by the Institute for Sustainable Development and International Relations and Climate Strategies, to which ERC was a contributor, titled "Implementing Coal Transitions: Insights from case studies of major coal-consuming economies" ("**Coal Transitions Report**"); and

7.4 a November 2018 report by Climate Transparency, titled the "Brown to Green Report 2018".

8 I am advised that the reports (either in full, or relevant excerpts) will be attached to the supplementary founding affidavit in the matter. I therefore do not attach them to this affidavit in order to avoid burdening the papers.

9 I confirm the content of the above reports and the expert opinions expressed therein, which are based on the facts and data reflected in the reports. I confirm that the methodology relied upon in the reports is robust and credible. The reports rely on internationally-recognised modelling methodologies and platforms.

10 In summary, I confirm the following as findings of the Coal IPP Report, in relation to the proposed Thabametsi coal-fired power station ("**Thabametsi**"):

10.1 Thabametsi is not needed to meet South Africa's medium-term electricity demand, as alternate electricity sources i.e. wind, solar photovoltaic ("**PV**") and flexible gas generation are more economical;

10.2 Thabametsi would cost South Africa an additional R12.57 billion, in comparison to a least-cost electricity system. A least-cost electricity system is an electricity-infrastructure plan that balances supply and demand at lowest cost, taking into account security of supply;

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- 10.3 Thabametsi will increase greenhouse gas emissions in the electricity sector by 136.1Mt carbon dioxide equivalent (“CO₂eq”) over the 30 (thirty) year period of the power purchase agreement;
- 10.4 Thabametsi would frustrate South Africa’s commitments under the Paris Agreement, through raising the costs of mitigating emissions by requiring significant greenhouse gas emission reductions in the power and other sectors; and
- 10.5 the additional expensive electricity to be obtained from Thabametsi – in accordance with a 30 (thirty) year power purchase agreement - will also place increasing pressure on Eskom, which will be forced to buy the electricity at a fixed price throughout the duration of the power purchase agreement, which price is substantially higher than current prices for alternative supply options from renewable solar PV and wind. In turn this will place pressure on consumers and municipalities through rising electricity tariffs.
- 11 In short, based on my work on the Coal IPP Report, and in my opinion as an energy expert, I confirm that Thabametsi will, in fact, cause significant harm to South Africa, not only in terms of unacceptable environmental and climate impacts, but economic costs as well, which will be imposed on electricity consumers and South African society as a whole.
- 12 Further, the findings of the other reports referred to above, namely, the ERC Alternative Electricity Systems Report, the Coal Transitions Report and the Brown to Green Report confirm the following:

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- 12.1 the transition away from fossil fuels to renewable energy must take place urgently in order to ensure that South Africa adequately reduces its greenhouse gas emissions, in line with its climate change commitments and obligations;
- 12.2 there is strong scientific consensus on the dangers posed by climate change; fossil fuels are the greatest contributor to global warming. In the case of coal, there is significant evidence that it will require a global phase-out by 2050 at the latest. It is highly likely that as part of the global effort to address climate change, South Africa will be required to increase its mitigation efforts between 2020 and 2030 and onwards;
- 12.3 rapid decarbonisation of the electricity sector is also necessary to avoid additional mitigation costs to the rest of the economy, where mitigation is more challenging and costly; and
- 12.4 The ERC's most recent analysis of a least-cost electricity pathway for South Africa (the ERC Alternative Electricity Systems Report) shows that South Africa's future electricity supply (modelled to the year 2050) will come primarily from wind and solar PV. By 2030, renewables (wind, solar, micro-hydro, and biomass) produce 42% of electricity, and this increases to 90% by 2050 (wind and solar together would contribute 38% and 88% in 2030 and 2050 respectively). This trend is consistent with modelling analyses done by other institutions in South Africa, including the Council for Scientific and Industrial Research ("CSIR").
- 13 Thus, in short, the above research, modelling and reports all confirm the harmful impacts of, and warn against, the construction and operation of the Thabametsi power station.

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JESSE ALEXANDRA SARAH BURTON

Thus signed and sworn to before me at Cape Town on this 13th day of June 2019 by the deponent who has acknowledged that she knows and understands the contents of this affidavit, that she has no objection to taking the prescribed oath and that the prescribed oath is binding on her conscience.



COMMISSIONER OF OATHS

NAME: TRACEY DAVIES

CAPACITY: NON-PRACTISING ATTORNEY

ADDRESS: GROUND FLOOR, SPRINGTIME STUDIOS

AREA: 1 SCOTT RD, OBSERVATORY 7925

“JB1”

Jesse Alexandra Sarah Burton

Researcher, Energy Research Centre, University of Cape Town, Rondebosch, 7700, South Africa

Senior Associate, E3G, London, United Kingdom

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E-mail: Jesse.Burton@uct.ac.za / jesse.burton.uct@gmail.com / Jesse.Burton@e3g.org

Skype: jesse-burton Twitter: Jesse_Burton

Research outputs

Book chapters and journal article

- Burton, J, Lott, T, Rennkamp, B. (2018) 'Sustaining Carbon Lock-in: Fossil Fuel Subsidies in South Africa'. In van Asselt, H & Skovgaard, J. *The politics of fossil fuel subsidies and their reform*. Cambridge: Cambridge University Press
- Baker, L and Burton, J (2018) 'The politics of procurement and the low carbon transition in South Africa' in A. Goldthau, M. Keating and C. Kuzemko (eds.) *Handbook of the International Political Economy of Energy and Natural Resources*. Edward Elgar.
- Thomas Spencer, Michel Colombier, Oliver Sartor, Amit Garg, Vineet Tiwari, Jesse Burton, Tara Caetano, Fergus Green, Fei Teng & John Wiseman (2017): The 1.5°C target and coal sector transition: at the limits of societal feasibility, *Climate Policy*, DOI: 10.1080/14693062.2017.1386540.
<https://doi.org/10.1080/14693062.2017.1386540>

Selected research reports and working papers

- Strambo, C., Burton, J., Atteridge, A. (2019). The end of coal? Planning a “just transition” in South Africa. Stockholm Environment Institute and Energy Research Centre. Workshop brief, available at <https://www.sei.org/publications/the-end-of-coal-planning-a-just-transition-in-south-africa/>.
- McCall, B., Burton, J., Marquard, A., Hartley, F., Ahjum, F., Ireland, G., & Merven, B (2019). Least-cost integrated resource planning and cost-optimal climate change mitigation policy: Alternatives for the South African electricity system. Energy Research Centre, University of Cape Town
- Burton, J, Caetano, T, McCall, B (2018) South Africa's coal transition: understanding the implications of a 2°C-compatible coal phase out plan for South Africa. Energy Research Centre, University of Cape Town
- Hartley, F, Burton, J, Cunliffe, G, Caetano, T, Ntuli, N, Fourie, R, Chiloane, L. (2018). Co-benefits assessment of the future development of employment in the power sector and skills needed in South Africa. Energy Research Centre, University of Cape Town
- Ireland, G & Burton, J (2018). An assessment of new coal plants in South Africa's electricity future: The cost, emissions, and supply security implications of the coal IPP programme. Energy Research Centre, University of Cape Town
- Steyn, G, Burton, J, Steenkamp, M (2017). Eskom's financial crisis and the viability of coal-fired power in South Africa: Implications for Kusile and the older coal-fired power stations. *Meridian Economics*, Cape Town: South Africa.
- Amit Garg, Jan Christoph Steckel, Jesse Burton, Julio Friedmann, Frank Jotzo, Gunnar Luderer, Pao-Yu Oei, Michiel Schaeffer, Samantha Smith, Fabby Tumiwa, Adrien Vogt-Schilb, Paola Yanguas-Parra, Xianli Zhu (2017). Chapter 5: Bridging the gap – Phasing out coal. In UNEP (2017) *The Emissions Gap Report 2017*.
- Burton, J, Caetano, T, Hughes, A, Merven, B, Ahjum, F, McCall, B. (2016). “The impact of stranding power sector assets in South Africa: Using a linked model to understand economy-wide implications.” Energy Research Centre, University of Cape Town, Cape Town

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Baker, L., Burton, J., Godinho, C., Trollip, H. (2015) "The political economy of decarbonisation: exploring the dynamics of South Africa's electricity sector". Energy Research Centre, University of Cape Town: Cape Town

Burton, J & Winkler, H (2014). "South Africa's planned coal infrastructure expansion: drivers, dynamics and impacts on greenhouse gas emissions" Energy Research Centre, University of Cape Town, Cape Town, South Africa.

Current research projects

Climate Transparency: Climate Transparency is a global partnership with a shared mission to stimulate a 'race to the top' in G20 climate action and to shift investments towards zero carbon technologies through enhanced transparency. It also includes a South African-specific analysis that examines the socio-economic impacts of and governance structures for an accelerated coal phase-out in South Africa.

Past research projects

Coal Transitions: Research and Dialogue on the future of coal. The project is developing credible and feasible trajectories and policy packages for deep transitions in the coal sector in six major coal using countries. The South African analysis comprises the development of a detailed coal mine database and energy systems and macro-economic modeling to understand the implications of meeting 2°C for the South African coal sector, coupled with the development of transition pathways for workers out of the coal sector (with IDDRI, Climate Strategies and 5 other country teams: <http://www.iddri.org/Projets/Coal-Transitions-Research-and-Dialogue-on-the-Future-of-Coal>)

Supply side fossil fuel policy and the political economy of coal in South Africa: The project examines the political feasibility of supply side climate change policy in South Africa, through analysis of the shifts in the nature of capital/ownership in the coal sector, finance and subsidies for coal mining, and just transition visions and transition policies for South Africa (with the Stockholm Environment Institute, funded by the Swedish Research Council)

Co-benefits of climate change mitigation policy: the study examines the net employment effects of various electricity build plans in South Africa, and explores options for developing pathways for fossil fuel workers into new sectors (with the Centre for Scientific and Industrial Research).

Alternative Integrated Resource Plan for South Africa: The study provides a technical analysis of the scenarios proposed in the draft IRP 2018 by using a similar modelling methodology, to better understand the IRP's key drivers, to test claims concerning least-cost options for the South African electricity sector in the IRP, and to provide additional insight into what would be required for a more ambitious decarbonization pathway for the sector in light of the Paris Agreement.

Education

2009-2011

MSc: Energy Studies

University of Cape Town, Energy Research Centre

Courses: Introduction to energy policy and sustainable energy engineering (73%)

Energy, poverty and development (67%)

Energy, markets and governance (76%)

Energy and climate change (78%)

Thesis topic: "The role of industrial policy in meeting climate change mitigation objectives in South Africa". The thesis examined the relationship between industrial policy incentives, the structure of the South African economy and climate change mitigation in the country, using the minerals-energy complex as a framework.

2007

Bachelor of Arts (Honours)

Rhodes University, Grahamstown

History (with Distinction)

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2004-2006 Thesis topic: "Weathering the change: the politics of climate change"
Bachelor of Arts
Rhodes University, Grahamstown
History (with Distinction), Classical Civilisations (with Distinction), Journalism and Media Studies.

Relevant conferences & presentations

November, 2018. Workshop on mining and society in Emalahleni, University of the Free State, South Africa "The future of coal in South Africa"
September, 2018 Supply-side Fossil Fuels and Climate Policy, Oxford, United Kingdom: "The politics of fossil fuel subsidies in South Africa"
April, 2018 Symposia on the future of coal, Melbourne and Canberra, Australia: South Africa's coal transition
December, 2017 Fossil fuel subsidies workshop, Buenos Aires, Argentina: South Africa's coal subsidies
November 2017 Coal and the 2 Degree target, Dhanbad, India: South Africa's coal transition
June 2017 Trade and Industrial Policy Strategies Forum: mining and sustainable development
'A just transition for South Africa's coal economy'
October 2016 Reframing the minerals-energy complex: understanding the dynamics of the coal sector
September 2016 Supply-side Fossil Fuels and Climate Policy, Oxford, United Kingdom
'The emission implications of South Africa's elite transition'
June 2016 The politics of fossil fuel subsidies and their reform, Stockholm, Sweden
'Sustaining carbon lock-in: the political economy of fossil fuel subsidies in South Africa' (with Lott, T & Rennkamp, B)
September 2015 1st Global Conference on Stranded Assets, Oxford, United Kingdom
'Stranded assets in South Africa' (with Caetano, T)
July 2015 Our Common Future under Climate Change, Paris, France.
'South African coal infrastructure: drivers and emissions implications'
April 2012 Planet under pressure, London, United Kingdom.
Poster presentation (with Coetzee, K). 'Rhetoric versus reality: climate and energy policy in South Africa'

Courses attended

June 2012 United Kingdom Energy Research Centre (UKERC) PhD Summer School
Sept 2012 African Programme on Rethinking Development Economics (APORDE)
Department of Trade and Industry, Industrial Development Corporation and French Development Agency funded programme to train African heterodox economists.
Oct 2012 Managing Infrastructure Reform and Regulation in Africa: UCT Graduate School of Business.
The course covers power sector reform experiences, economic regulation (theory and application), tariff design, pro-poor regulation and standards.

Teaching

Jan 2012-2016 Course convenor of the 'Introduction to energy policy and sustainable energy engineering' course at the Energy Research Centre at the University of Cape Town. Responsibilities include teaching, curriculum development and course design, student assessment and academic oversight of the Masters-level course, including lecturing on global energy systems and technologies, coal markets, power sector reform, and energy policy. Responsible for approximately 10-15 Masters students per year with multi-disciplinary backgrounds.

Other lecturing experience in the energy and climate change course (fossil fuel infrastructure and climate change) and energy markets and governance (electricity markets). I co-taught the markets & governance course



and have guest lectured in the ETH/UCT Summer School on Energy and Development, Social Infrastructures (EBE Faculty), African Climate and Development Initiative (climate change mitigation), and at Stellenbosch University.

June 2013-July 2016 Postgraduate Programme Coordinator, Energy Research Centre at the University of Cape Town
Overall co-ordination of the postgraduate programme at the ERC: academic co-ordination and oversight, curriculum development, external examiner and lecturer for other courses at UCT, co-convenor of the Energy for Sustainable Urban Development course hosted by the ERC and Sustainable Energy Africa.

Jan 2010-May 2013 Masters programme tutor, Energy Research Centre, University of Cape Town

Postgraduate supervision

Co-supervisor MPhil Energy and Development Studies, Tawney Lott: "Political economy of liquid fuel subsidies and incentives in South Africa" (2016- 2017)
Co-supervisor MBA thesis, Marisane Thobejane: "Coal Supply security for Eskom" (2016)

External briefing papers and civil society contributions

Burton, J, Rennkamp, B. & Trollip, H (2014) "A case study of the implementation of South Africa's carbon tax policy using the GHG Protocol Policy and Action Standard". Energy Research Centre, University of Cape Town, Cape Town, South Africa.

Burton, J, Rennkamp, B. & Trollip, H (2014) "A case study of the Renewable Energy Independent Power Producers Procurement Programme using the GHG Protocol Policy and Action Standard". Energy Research Centre, University of Cape Town, Cape Town, South Africa.

Burton, J. (2011) "A carbon budget for South Africa". Background paper produced for the One Million Climate Jobs Campaign.

Burton, J. (2011) "Renewable energy and job creation in South Africa". Background paper produced for the One Million Climate Jobs Campaign

"South Africa's Mitigation Targets" Briefing paper no 22, produced for Earthlife Africa's Sustainable Energy and Climate Change Partnership.

Academic achievements

2013 Awarded a National Research Foundation Doctoral Scholarship
2011 and 2012 Awarded the Energy Research Centre Doctoral Scholarship
2010 Awarded the Dutkiewicz Scholarship for Energy Research
2007 Awarded an Honours Degree Scholarship by Rhodes University
Received Academic Colours, Rhodes University
Placed on Dean of Humanities' Merit List, Rhodes University

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