

South African Institute of Race Relations NPC

**Submission to the Portfolio Committee
on Environment, Forestry and Fisheries
regarding the
Climate Change Bill of 2022 [B9 -2022]
Johannesburg,
27th May 2022**

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1 Introduction

The Portfolio Committee on Environment, Forestry and Fisheries has invited public comment on the Climate Change Bill of 2022 [B9-2022] (the Bill) by 27th May 2022. This submission is made by the South African Institute of Race Relations (IRR), a non-profit organisation formed in 1929 to oppose racial discrimination and promote racial goodwill. Its current objects are to promote democracy, human rights, development, and reconciliation between the peoples of South Africa.

2 Purpose of the Bill

Under Clause 2 of the Bill, the main objects of the measure are to:

- provide for ‘the effective management of inevitable climate change impacts’,
- make ‘a fair contribution to the global effort to stabilise greenhouse gas concentrations in the atmosphere at a level that avoids dangerous anthropogenic interference with the climate system’, and
- ‘ensure a just transition to a low carbon economy and society, considering national circumstances’.¹

These goals are partly to be achieved through better climate adaptation strategies. But the main focus of the Bill is on reducing greenhouse gas emissions, particularly carbon dioxide (CO₂) emissions. This is to be done by setting binding carbon budgets for companies and others engaged in listed activities that emit one of more of the greenhouse gases that the

¹ Climate Change Bill, Clause 2

minister of the environment, forestry and fisheries (the environmental Minister) ‘reasonably believes’ cause or exacerbate climate change.²

This goal is clearly based on the Paris Agreement of 2015 and the subsequent focus on ‘net zero’ emissions developed by the Intergovernmental Panel on Climate Change (IPCC). It also reflects the key objective of the United Nations Framework Convention on Climate Change, which entered into force in 1994 and seeks to stabilise greenhouse gas concentrations ‘at a level that would prevent dangerous anthropogenic (human induced) interference with the climate system’.

3 The Paris Agreement and ‘net zero’ goal

In 2015 some 193 signatories to the Paris Agreement agreed on a goal of ‘limiting global warming to well below 2, preferably to 1.5 degrees Celsius, compared to pre-industrial levels’.³

The Paris Agreement does not itself require a reduction in CO₂ emissions or set a ‘net zero’ goal. In 2018, however, the IPCC said that, to limit global warming to 1.5 deg C, ‘global net human-caused emissions of carbon dioxide would need to fall by about 45 per cent from 2010 levels by 2030, reaching “net zero” by 2050’. Any remaining emissions, it went on, would ‘need to be balanced by removing CO₂ from the air’.⁴

A recent article in *Nature Climate Change* by Sam Fankhauser, Professor of Climate Change Economics and Policy at the Smith School at Oxford University,⁵ and others, puts it so: ‘Since the objective is to keep the rise in global average temperatures within certain limits,...this implies that there is a finite budget of carbon dioxide that is allowed into the atmosphere, alongside other greenhouse gases. Beyond this budget, any further release must be balanced by removal into sinks.’ The article adds that meeting the 1.5 deg C goal ‘with 50% probability’ translates into a remaining carbon budget of 400-800 billion tonnes of carbon dioxide (GtCO₂). Staying within this carbon budget requires CO₂ emissions to peak before 2030 and to fall to net zero by 2050’.⁶

As Fankhauser notes, the carbon budget thus calculated ‘applies to the global atmosphere, rather than individual entities’. The global carbon budget thus needs to be ‘translated into individual decarbonisation pathways for nation states, sub-national entities, companies, and other organisations’.⁷

² Clauses 23, 24, Bill

³ Andrew Kenny, ‘The Paris Climate Accord: Scientific folly’, *The Daily Friend*, 6 February 2021

⁴ Grantham Institute, London School of Economics, ‘Why is “net zero” so important in the fight against climate change?’, 21 January 2021

⁵ <https://www.smithschool.ox.ac.uk/person/professor-sam-fankhauser>

⁶ Sam Fankhauser et al, ‘The meaning of net zero and how to get it right’, *Nature Climate Change*, Vol 12, January 2022, pp15-21, at p15

⁷ *Ibid*, p16

The Paris Agreement leaves it to parties to define their own emission pathways, or nationally determined contributions (NDCs), to global net zero. Hence, ‘there is no official yardstick against which the adequacy...of nationally determined contributions is measured’. Instead, regular meetings and reviews are to be held to encourage governments to embrace more ambitious targets and so ‘ensure that national emissions pathways will gradually converge to a global net-zero state’.⁸

Countries are being encouraged to ‘front load’ their emission reductions. Though the IPCC has ‘identified over 200 scenarios that are consistent with either 1.5 deg or 2 deg C global warming’, ‘front-loading’ – by making relatively deep cuts in CO₂ emissions early in the transition – is said to be ‘the most cost-effective way to reach a given temperature target’.⁹ Countries are also being encouraged not to rely too much on initiatives to remove CO₂ emissions from the atmosphere, as this could be costly and technologically difficult. Instead, writes Fankhauser, they should strive for ‘a net-zero carbon balance that combines a very low level of residual emissions with low levels of removals’, the latter to be achieved over many decades.¹⁰

More than 120 countries have now pledged to reach net zero ‘in some shape or form by around mid-century’, as Fankhauser writes. These, he says, ‘include China, the European Union and the US, the world’s three largest greenhouse gas emitters’.¹¹ However, whether China is truly committed to reaching net zero by 2060, significantly later than the EU and the US, is doubtful, as outlined in due course.

Few countries have enacted legislation turning the IPCC’s net zero goal into law. In 2019 the United Kingdom (UK) became the first to do so, changing the long-term target in its Climate Change Act of 2008 to net zero by 2050. As of January 2021, five other countries had passed net-zero legislation: Denmark, France, Hungary, New Zealand, and Sweden.¹²

However, there are many fallacies and flaws in the assumptions and reasoning underpinning the Paris Agreement and the net zero goal. South Africa needs to consider all of these very carefully before it joins the limited number of developed and wealthy countries that have incorporated the IPCC’s net zero objective into binding domestic legislation.

4 The flaws in the Paris Agreement and net zero goal

Various flaws in the Paris Agreement and the net zero goal are best assessed against the background of key data on global energy supply, important measures for evaluating different generation options, and the extent of future global energy needs, among other things.

4.1 *Today’s global electricity systems*

⁸ Ibid, p16

⁹ Ibid, p17

¹⁰ Ibid, p17

¹¹ Ibid, p16

¹² Grantham Institute, op cit, p2

In 2019, fossil fuels – oil, coal, and gas (listed in their order of importance) – made up some 80% of global primary energy production, which totalled roughly 170 000 Terrawatt-hours (TWh). Global electricity production made up around 40% of primary energy, with transportation, heating, and industry accounting for the remaining 60%. These percentages remained much the same in 2021, despite Covid-19 lockdowns and significant additions of wind and solar energy, though coal usage increased in the latter half of the year as energy shortages took hold in the United Kingdom (UK) and Europe.¹³

In 2021 coal and gas accounted for about 50% of global primary energy and about 60% of global electricity production. In the same year, variable renewables in the form of wind and solar accounted for about 3% of global primary energy and 8% of global electricity production. Despite trillions of dollars spent on installing wind farms and solar arrays since the first big climate change conference was held in Rio de Janeiro in 1992, the proportion of fossil fuels as part of total energy supply has remained generally constant at around 80% since the 1970s, when energy consumption was about half what it is now.¹⁴

4.2 Prime objectives for energy policy

Important objectives to guide the development of energy policy by all countries have been set out in a recent article by Dr Lars Schernikau, an energy economist, Professor William Hayden-Smith, of Washington University, Saint Louis, and Professor Emeritus Rosemary Falcon of the University of the Witwatersrand, Johannesburg. This peer-reviewed paper has been accepted for publication in June 2022 by the *Journal of Management and Sustainability*, an international double-blind peer-reviewed open access journal for academics and practitioners of sustainable management.¹⁵

Energy policy is enormously important and should have three objectives:¹⁶

- 1) affordability of supply;
- 2) security of supply; and
- 3) environmental protection.

In ensuring that energy policy promotes all three objectives, two methods of evaluating different options for electricity production are particularly instructive. These are the ‘full cost of electricity’ (FCOE) assessment and the ‘energy return on investment’ (eROI) analysis.¹⁷ Both methods can be applied to all energy sources but are particularly useful in evaluating variable renewable energy (VRE) in the form of wind and solar power.

¹³ Lars Schernikau et al, ‘Full cost of energy (FCOE) and energy returns (eROI)’, accepted manuscript for publication at *Journal of Management and Sustainability*, Vol 12, No1, 1 June 2022 issue at Canadian Center of Science and Education, p1, https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4000800; <https://wattsupwiththat.com/2022/05/20/what-is-the-full-cost/>

¹⁴ Ibid, p1

¹⁵ Ibid

¹⁶ Ibid, p9

¹⁷ Ibid, pp4, 5

4.3 Full Cost of Electricity (FCOE)

The FCOE is a more comprehensive and accurate measure than the ‘levelled cost of electricity’ (LCOE), which is commonly used. The LCOE generally includes only three of the measures included in the FCOE, these three being 1) the cost of building, 2) the cost of fuel, and 3) the cost of operation (which sometimes includes carbon taxes). However, it leaves out many important costs which also need to be factored in.¹⁸

The FCOE measures the full cost of different energy systems to society, shorn of the impact of either taxes or subsidies.¹⁹ It is based on the recognition that ‘a functioning electricity system can...supply usable power only if electricity demand equals electricity supply at all times’ – and it takes account of ten cost categories.²⁰

An FCOE assessment of the full cost of wind and solar energy to society shows the following:

1) *cost of building:*

This begins with the mining of lithium, graphite, nickel and rare-earth minerals, extraction of which (according to the International Energy Agency or IEA) will need to rise by 4 200%, 2 500%, 1 900% and 700%, respectively, by 2040.²¹ Many other minerals will be needed too, as current green technologies depend on some 40 elements that are either mined directly or are the by-products of mining.²²

Much of this mining necessitates the excavation of vast quantities of rock, often at considerable depth. Most of these mining operations will have to be carried out using energy from fossil fuels. This is because wind and solar are too intermittent to supply all the electricity required not only for excavating rock but also for pumping water, cooling tunnels, hoisting mineworkers and loosened rock to the surface, crushing rock, and processing the residue to extract the minerals needed.²³

Once the necessary minerals have been mined (using electricity from fossil fuels) and transported (again, using fossil fuels) to factories in China and elsewhere, the necessary wind turbines, solar panels, and storage batteries (‘green machines’ for short) must then be manufactured – for which significant costs and many fossil fuels are again required. Once this has been done, adds Michael Shellenberger, author of *Apocalypse Never*, ‘gigantic quantities of iron ore, cement, glass, and plastics are transported to chosen sites by trucks using fossil fuels’, so that wind and solar farms can be created.²⁴ This is also a costly process,

¹⁸ Ibid, p6

¹⁹ Ibid, p5

²⁰ Ibid, pp4-5

²¹ Robert Lyman, *Magical Thinking: Why “Net Zero” is Neither Possible nor Desirable*, Executive Summary, <https://blog.friendsofscience.org/2021/06/09/magical-thinking-why-net-zero-is-neither-possible-nor-desirable/>

²² John Kane-Berman, ‘Clean energy’s dirty secrets’, *The Daily Friend*, 13 December 2020

²³ Ibid

²⁴ Ibid

for which electricity from fossil fuels must again be used to ensure swift and efficient progress.

Wind turbines merit particular mention here as they have such large building costs. Each complete turbine weighs some 1 700 tons and contains 1 300 tons of concrete, 295 tons of steel, 48 tons of iron, and 24 tons of fibreglass, along with the rare earths neodymium, praseodymium, and dysprosium. Each blade weighs some 36 800kg and lasts for some 15 to 20 years, after which it must be replaced. Like solar panels, these blades cannot be recycled.²⁵

Also relevant is the lower power density or ‘load factor’ of renewables. This means that large numbers of green machines are needed to generate relatively small amounts of electricity. This adds to overall building costs, as well as the quantity of the fossil fuels needed in their construction. According to Mark Mills, a senior fellow at the Manhattan Institute and a faculty member of the school of engineering and applied science at Northwestern University, ‘green machines entail, on average, a tenfold increase in the quantity of the raw materials extracted and processed to produce the same amount of energy’.²⁶

2) *cost of fuels*

This is a strength for wind and solar, which have zero fuel costs in themselves.

3) *cost of operating*

This includes the cost of operating and maintaining wind turbine farms, solar panel arrays, and storage batteries. These operating and maintenance costs are difficult to assess but (by way of example and in broad-brush terms), O&M costs for onshore wind are roughly the same as for coal, but much higher for offshore wind and significantly lower for solar arrays.

4) *cost of electricity transportation and balancing systems*

This includes the cost of transmission grids and load balancing, as well as charging stations for electric cars. Energy from wind and solar is variable and intermittent, making it particularly difficult to stabilise the transmission grid.

In the UK, for example (as energy expert Andrew Kenny writes), the government has ‘poured astronomical amounts of money into an enormous fleet of modern wind turbines, onshore and offshore, with a total installed capacity of 22 058 MW... But on 15 June 2020, for instance, the UK’s huge number of wind turbines was producing 95MW of electricity... At other times, in an unpredictable way, wind might be producing over 10 000 MW. This presents an expensive nightmare for the engineers trying to control the UK grid.’²⁷

²⁵ Ron Clutz, ‘If That Tesla Battery Could Talk’, reclutz.com/2022/04/27

²⁶ John Kane-Berman, ‘Clean energy’s dirty secrets’, *The Daily Friend*, 13 December 2020

²⁷ Andrew Kenny, ‘Trying to stop information about nuclear power’, 20 June 2020

5) *cost of storage*

Because energy from wind and solar is intermittent, excess energy must as far as possible be stored to compensate for reduced energy on still or cloudy days. However, the necessary storage technology has yet to be developed, while doing so is a major (and possibly insuperable) technological challenge. This is a very serious obstacle to the increased use of wind and solar energy, as the utility of an electricity system depends, as earlier noted, on its capacity to meet demand at all times.

Pumped hydro, storage batteries, and hydrogen (with excess energy converted into hydrogen and then converted back) may increasingly be used, but all these options have considerable costs. In the case of storage batteries, for instance, these include the costs of mining, processing and transporting lithium and other essential minerals, the cost of assembling and operating the batteries, the cost of emissions, and the cost of recycling.²⁸

Take, by way of example, the minerals needed to produce a single electric car battery, weighing about 450 kilograms (kg). Such a battery needs roughly 11.4 kg of lithium, 27kg of nickel, 20kg of manganese, 14kg of cobalt, 90kg of copper, and 180kg of aluminium, steel, and plastic, all of which are required to make approximately 6 800 individual lithium-ion cells. Vast amounts of mineral-bearing rock must be mined and processed to extract the needed minerals: 13 600kg of ore for the cobalt, 2 270kg of ore for the nickel, and close on 11 400kg of ore for the copper, for example. In all, some 22 700kg of the earth's crust must be dug up to produce just one battery.²⁹

6) *cost of backup*

Because the energy generated by the wind and the sun often drops to zero, every wind farm and solar array requires 100% backup or storage, or a combination of both. In the absence of sufficient storage capacity, close to 100% backup from conventional fossil or nuclear power plants is needed. Yet the higher the share of wind and solar, the less such backup capacity needs to be used at those times when the wind is blowing and/or the sun is shining. However, as the utilisation of backup energy comes down, so the overall costs of that energy go up. The increase in cost is logarithmic, moreover, once the share of wind and solar in the overall system increases beyond a certain point.³⁰

7) *cost of emissions*

The cost of emissions must factor in the true cost of all air-borne emissions from power generation technology used all along the entire value chain. This must include all CO2 emissions from the fossil or nuclear fuels that must – given the variability of wind and solar – be used in mining, processing, and transporting, all the minerals and other materials used in wind turbines, solar panels, and storage batteries, as well as in constructing them.

²⁸ Schernikau, op cit, p4

²⁹ Ron Clutz, 'If That Tesla Battery Could Talk, rclutz.com/' 2022/04/27

³⁰ Schernikau, op cit, p5

8) *cost of recycling and other environmental impacts*

Neither wind turbine blades nor solar panels can be recycled and must instead be replaced when they reach the end of their lifetimes (15 to 20 years for blades – and about 25 to 30 years for solar panels, albeit with diminishing efficiency).³¹

Major environmental impacts result from the mining and processing of all the minerals and other materials needed for wind farms, solar arrays, and batteries. As regards the cobalt needed for batteries, much of this comes from the Democratic Republic of the Congo, where mines have few if any pollution controls. Often children are used to mine the cobalt – and many fall ill or die from handling this toxic material.³²

In addition, richer countries often use poorer countries (such as Ghana, Kenya and Mozambique) as dumping grounds for worn-out batteries, turbines, fibreglass blades, and solar panels. International energy agencies forecast that the quantity of worn-out and non-recyclable solar panels will constitute double the tonnage of today's global plastic waste by 2050. More than three million tons of unrecyclable turbine blades will also have to be disposed of.³³

Important too are the environmental impacts from the gradual decay of the batteries required for electric vehicles (EVs) and other storage needs. All batteries, whether rechargeable or single use, are self-discharging, meaning that they leak tiny amounts of energy when not in use. This leakage increases after batteries are discarded and especially after their metal casings crack, as inevitably happens, making it still easier for the toxic metals inside them to ooze out. By 2030, more than 10 million tons of batteries will become garbage each year.³⁴

9) *cost of land or 'room cost'*

Because renewables have a low power density, wind farms and solar arrays need to be very much larger than conventional power stations, for which room costs are generally negligible.

In the words of Stephen Davies, a senior fellow at the American Institute for Economic Research (AIER), 'you get a lot of usable energy out of a small physical quantity of oil or uranium. By contrast, if you tried to power a large metropolitan area such as Los Angeles entirely from solar power, you would have to cover an area several times the size of LA with solar panels. This is not just a matter of monetary cost, so [the fact that] the price of solar energy is falling is irrelevant – it's still too diffuse.'³⁵

³¹ <https://news.energysage.com/how-long-do-solar-panels-last/>

³² Ron Clutz, 'If That Tesla Battery Could Talk', reclutz.com/2022/04/27

³³ Kane-Berman, 'Clean energy's dirty secrets', 13 December 2020

³⁴ Ibid; Clutz, 'If That Tesla Battery Could Talk', reclutz.com/2022/04/27

³⁵ Stephen Davies, 'the Unacknowledged Logic of Radical Environmentalism', American Institute for Economic Research (AIER), 20 May 2020

As Schernikau adds, a new coal-fired power station in India would require 2.8sq km per 1 gigawatt (GW) of installed capacity, whereas a new solar park would need about 17sq km per 1GW installed capacity. However, since solar has a much lower power density than coal, the solar park would have to cover 93sq km – and its room cost would be 33x that of the coal-fired station.³⁶

In addition, notes Schernikau, ‘the room costs per installed MW of variable renewable energy (VRE) increases the higher the installed capacity reaches. This is because of the reduced capacity factor for wind in larger wind farms (the wake effect) as well as the reduced value of additional VRE beyond an optimal penetration level’.³⁷

The huge wind farms and solar arrays required desecrate the countryside through habitat loss, the destruction of bird and animal life, persistent noise pollution, and often a reflective glare from countless solar panels.³⁸

Given the intermittent nature of wind and solar, additional space is also required for the 100% backup and/or storage equipment required. Also relevant to overall room cost, thus, is the extent of the land needed to mine and process all the minerals required for wind farms, solar arrays, and their back-up or storage systems.³⁹

10) costs of other metrics

These additional metrics include ‘material input per unit of service’ (MIPS), which is particularly high for green machines, as earlier noted. The lifespan of blades and panels is also relatively short, while their ‘energy return on investment’ (eROI) is limited, as described below.

Having weighed up all relevant costs using the FCOE formula, Schernikau concludes: ‘Using FCOE, or the full cost to society, wind and solar are not cheaper than conventional power generation and in fact become more expensive the higher their penetration in the energy system.... The ‘green’ energy transition towards variable energy in the form of wind and solar will substantially increase the cost of electricity. The rise in cost will primarily burden poorer people and developing nations... If wind and solar were truly cheaper,...they would not require trillions of dollars of government funding or subsidies, or laws to force their installation.’⁴⁰

4.4 Energy return on investment (eROI)

All energy generation systems, including those that rely on wind and solar, must be manufactured before they can be operated, making it important to measure the ‘input’ energy

³⁶ Schernikau, op cit, p5

³⁷ Schernikau, ibid, p5

³⁸ John Kane-Berman, ‘Clean energy’s dirty secrets’, The Daily Friend, 13 December 2020

³⁹ Schernikau, op cit, p5

⁴⁰ Ibid, pp6,8

required to produce the ‘output’ energy. As Schernikau writes, ‘When we use less input energy to produce the same output energy, our systems become environmentally and economically more viable. When we use relatively more input energy for each unit of output energy, we risk what is referred to as ‘energy starvation’’.⁴¹

The Roman Empire some 2000 years ago achieved an estimated sustained eROI of 2:1, or roughly two kilowatt hours (kWh) of output energy for each 1kWh of input energy.⁴² By contrast, the development of the steam energy and the use of coal for energy sharply raised the eROI and made possible the industrial revolution.

Writes Schernikau: ‘The industrial revolution reduced humanity’s dependency on biomass, hydro and wind. Based on the new-found high-eROI coal energy, this energy revolution allowed for a dramatic increase in standards of living, industrialisation, a decrease in heavy human labour, and the abandonment of slavery.’⁴³

In the 20th century came the use of petroleum, with ‘its high eROI, energy density, and versatility, which enabled the transportation revolution with cars and aircraft’.⁴⁴ The nuclear energy developed in the 1960s has an even higher eROI of about 75, while the eROI of coal and gas is about 30.⁴⁵

By contrast, ‘solar in northern Europe has a buffered eROI of about 2-4:1’. This is not much different from the Roman eROI and well below the minimum eROI of 5-7 that modern life requires.⁴⁶

The low eROI of wind and solar results primarily from their variability, coupled with their need for 100% backup or storage. As Schernikau notes, ‘there are also inefficiencies in meeting peak capacity requirements, keeping the power system stable during short-term disturbances, and having enough flexibility to ramp up and down in response to changes in supply and demand’. Also relevant is the complexity of VRE systems, as more complex power systems tend to lose more useful energy than simple ones.⁴⁷

Having considered all these factors, Schernikau concludes that ‘wind and solar have a very low eROI and are therefore a step backward in history in terms of system energy efficiency. Their grid-scale employment risks energy starvation and is therefore not desirable economically or environmentally’.⁴⁸

⁴¹ Ibid, p6

⁴² Ibid, p5

⁴³ Ibid, p7

⁴⁴ Ibid

⁴⁵ Ibid, p5

⁴⁶ Ibid, pp5,7

⁴⁷ Ibid, pp7,8

⁴⁸ Ibid, p7

4.5 Current and future global energy requirements

The world's population has already risen to some 8 billion, while the UN projects that it will rise further to 10 billion in 2050 and peak between 11 billion and 12 billion at the end of the 21st century.⁴⁹

This increase in population will inevitably drive up global primary energy demand. So too will the developmental imperative in many emergent markets and the rising energy needs of the billions of people now living in 'unplugged' and 'low watt' countries. (This terminology comes from Robert Bryce, currently a visiting fellow at the Foundation for Research on Equal Opportunity in Austin, Texas. His most recent book is *A Question of Power: Electricity and the Wealth of Nations*.)⁵⁰

According to Bryce's analysis, there are some 3.3 billion people living in 'unplugged' countries, each of whom consumes less than 1 000 kilowatt hours (kWh) of power in a year. They live in countries such as India and the Philippines and make up 44.6% of the global population.

Then there are the 'low-watt' countries, where people consume between 1 000 and 4 000 kWh per head. China, Chile and Poland feature among these states, which contain 2.7 billion people or 36.7% of the world's population.⁵¹ Together, the 6 billion people living in unplugged and low watt countries make up 81.3% of the world's present population.

The third group consists of the 'high watt' countries – and here people use at least 4 000 kWh per person per year. These countries include Sweden and the United States (US) and account for 1.4 billion people or 18.7% of the world's population.⁵²

The 6 billion people now living in unplugged and low watt countries urgently need the opportunity to industrialise and grow their wealth, as the West has already done and as various other countries – particularly China and India – are busy doing.

This is especially important in Africa, as Ugandan president Yoweri Museveni pointed out in October 2021. As Museveni wrote in the *Wall Street Journal* in the run-up to COP26 in Glasgow in November 2021, Africa's population stands at an estimated 1.3 billion and is expected to double by 2050. Yet 'African manufacturing will struggle to attract investment and therefore to create jobs without consistent energy sources' that are reliable and cheap. 'Agriculture will suffer [too] if the continent [does not have] synthetic fertilizer or...efficient freight transportation'. Hence, Africans have 'a right to use reliable, cheap energy', he says.⁵³

⁴⁹ Ibid, p9

⁵⁰ Kane-Berman, 'Will anyone in Glasgow speak up for the "unplugged" millions?', *The Daily Friend*, 25 October 2021

⁵¹ Ibid

⁵² Ibid

⁵³ Yoweri K Museveni, 'Solar and Wind Force Poverty on Africa', *Wall Street Journal* 24 October 2021

So too, of course, do the billions more people living in unplugged and low watt countries in Asia and South America.

An expanding world population, coupled with the developmental imperative among the 81.3% of people living in unplugged and low watt countries, is likely to drive up global primary energy demand by 50% by 2050, says Schernikau.⁵⁴

In 2020 global electricity generation capacity totalled some 8 000GW, of which over 1 400GW was wind and solar. If the world is to transition to ‘clean energy’, as the Paris Agreement envisages, then by 2030 (eight years from now) the installed capacity of wind and solar alone would have to reach 8 600GW, according to the Boston Consulting Group (BCG). To meet increased demand in 2050, global wind and solar installed capacity would have to reach 22 000 GW by then, the BCG adds.⁵⁵

According to Schernikau, this massive expansion in wind and solar energy cannot be achieved, ‘as the world would run out of energy, raw materials and money before it could happen’. Moreover, if this expansion in VRE were nevertheless somehow to take place, ‘the economic and environmental impact to society would be distressing’.⁵⁶

Adds Schernikau: ‘It is a prudent assumption that wind and solar alone will not be able to generate enough total electricity to match the expected demand increase from 2020 to 2050. For the next 30 years and beyond, we will continue to depend on conventional energy sources for a large portion, if not the vast majority of, our global energy needs.’⁵⁷

4.6 A growing energy shortage

Much greater investment in conventional energy, including that from fossil fuels, is therefore needed to temper and reverse a prolonged energy crisis. This crisis has already begun, for it became evident in the second half of 2021, many months before the start of the war in Ukraine and the further disruption to fossil fuel supplies that this has caused.⁵⁸

Notes Schernikau: ‘The lack of investment in conventional forms of energy resulted in under-supply, while at the same time wind and solar were not able to satisfy increased demand.’ The Boston Consulting Group and the International Energy Forum had warned in December 2020 that ‘by 2030, investment levels [in oil and gas] will need to rise by at least US\$225 billion from 2020 levels to stave off an energy crisis’. The salience of this warning became apparent in the third quarter of 2021 as energy shortages in the UK and Europe grew and electricity prices started to soar, adding to other inflationary pressures. The Russian invasion

⁵⁴ Schernikau, op cit, pp9, 3

⁵⁵ Ibid, p8

⁵⁶ Ibid

⁵⁷ Ibid, p9

⁵⁸ Ibid, p10

of Ukraine in February 2022 has since further underscored the fragility of global energy systems and the importance of maintaining adequate supply.⁵⁹

Some of the practical consequences have been highlighted in the media. CNN noted in November 2021 that ‘millions of people across Europe would battle to afford to heat their homes over winter’. Bloomberg wrote the month before: ‘The world is living through the first major energy crisis of the clean-power transition. It won’t be the last.’⁶⁰

Bloomberg also spelt out the underlying causes of the crisis, saying in September 2021: ‘Europe is short of gas and coal and if the wind doesn’t blow, the worst-case scenario could play out: widespread blackouts that force businesses and factories to shut. The unprecedented energy crunch has been brewing for years, with Europe growing increasingly dependent on intermittent sources of energy, such as wind and solar, while investments in fossil fuels declined.’⁶¹

The consequences extend far beyond Europe, however, with rising energy prices undermining the sustainability of industries in China, the US, Russia, Mexico, and Turkey. Rising prices and energy shortages, especially during peak electricity demand, threaten competitiveness and economic growth in many emerging markets, including India, Indonesia, Bangladesh, and Pakistan. The same is true in sub-Saharan Africa, where shortages in energy supply hobble business, reduce economic growth, worsen unemployment, and push up energy prices – as well as the food and other prices as inflation accelerates and becomes more entrenched.⁶²

Partly because of the looming energy shortage, two countries responsible for major CO₂ emissions – China and India – declined to attend COP26. They also plan to expand their use of fossil fuels in the decades ahead because they recognise the critical importance of cheap and reliable energy in promoting development and prosperity. In China, as *The Economist* notes, the growth of the country’s coal-fired generating capacity between 2000 and 2012 was a key factor in helping to ‘drive a 200% increase in Chinese GDP per person’.⁶³

China currently accounts for 52% of global coal consumption and 29% of carbon emissions – as against 23% for the US and the European Union combined.⁶⁴ Though President Xi Jinping has promised that his country will reach ‘carbon neutrality’ by 2060, China is nevertheless still building hundreds of coal-fired power stations both at home and in 25 other countries as

⁵⁹ Ibid, p11

⁶⁰ Ibid

⁶¹ Ibid, p11

⁶² Ibid, p11

⁶³ John Kane-Berman, ‘The Paris Agreement: A costly and damaging failure?’ *The Daily Friend*, 8 February 2021

⁶⁴ Kane-Berman, ‘COP-26 and beyond: Is China playing the West for fools?’, *The Daily Friend* 1 November 2021; see also <https://worldpopulationreview.com/country-rankings/co2-emissions-by-country>

part of its Belt and Road Initiative. (The latter is despite its public cancellation of the construction of various coal-fired plants in other countries in the run-up to COP26.)⁶⁵

China's oil consumption is expected to double by 2040 following deals it signed in 2020 with Iran, Abu Dhabi, and Saudi Arabia. This additional oil will enable the number of passenger cars fired by internal combustion engines to more than double to 400 million by 2040.⁶⁶

India has denounced Western 'carbon imperialism' and plans to invest \$55 billion in 'clean' coal, including coal gasification plants, over the next decade. It has also made it clear that coal will remain its dominant energy source for decades. Japan is likewise planning additional coal-burning plants at home and abroad over the next five years.⁶⁷

Having acknowledged the risks in the growing energy shortage, the EU is considering whether it should rebrand nuclear energy and natural gas as 'climate-friendly' energy sources. The UK has proposed building up to eight nuclear reactors and doing more to exploit oil and gas in the North Sea. Many other countries are expanding their use of natural gas and considering the introduction of small modular nuclear reactors.⁶⁸

The many countries planning to increase their reliance on coal, oil, gas, and nuclear power are implicitly recognising the follies and dangers in the Paris Agreement and the net zero approach. South Africa, which contributes only 1.3% to CO2 emissions⁶⁹ and can make little difference to overall CO2 levels – irrespective of how much it strives to achieve the impossible goal of net zero – should follow suit.

However, most countries and commentators have yet to acknowledge the greatest of the fallacies underpinning the Paris Agreement. This is the flawed assumption that CO2 emissions play a major part in pushing up global temperatures – and that reducing those emissions will therefore be effective in curtailing further temperature increases and controlling climate change.

4.7 The link between carbon dioxide and global temperatures

The Paris Agreement and the net zero goal reflect a widely-endorsed view about the role of CO2 in increasing global temperatures. There is, however, another perspective which merits a hearing, so as to encourage debate and ensure that all relevant factors are taken into consideration.

As Kenny puts it: '[The general] theory [is] that rising CO2 has caused the slight rise in global temperatures over the last 150 years, and that more CO2 will cause dangerous

⁶⁵ Ibid; Kane-Berman, 'The Paris Agreement', op cit

⁶⁶ Kane-Berman, 'COP-26 and beyond', op cit

⁶⁷ Kane-Berman, 'The Paris Agreement', op cit

⁶⁸ John Kane-Berman, 'Greens fume as Boris Johnson inches towards more oil and gas', The Daily Friend, 18 April 2022

⁶⁹ <https://worldpopulationreview.com/country-rankings/co2-emissions-by-country>

warming... Mankind has indeed increased CO₂ from very, very low levels in the 19th Century (about 280ppm or parts per million) to still very low levels now (about 430ppm)... Over the last half a billion years, CO₂ has averaged about 2 000ppm, but with wild fluctuations which never seem to affect global temperatures.⁷⁰

In the late Ordovician period some 450 million years ago, adds Kenny, CO₂ levels were more than 4 000ppm, while global temperatures were at least as low as now. In addition, temperatures were roughly 3 deg C higher than now some 3 300 years ago, in the Minoan Warm Period. They were about 2 deg C higher about 2 100 years ago, in the Roman Warm Period when Julius Caesar was born. They were about 1 deg C higher in the Medieval Warm Period, from about 900 to 1200AD. In each of these warm periods, CO₂ levels were lower than now, at roughly 280ppm.⁷¹

The Medieval Warm Period was followed by the Little Ice Age, from about 1300 to 1850AD, when the Thames River in London froze over and temperatures were at their lowest in the last 10 000 years. During this unusually cold spell, CO₂ levels remained much the same as they had been during the Minoan, Roman, and Medieval Warm Periods – which raises further questions as to the link between increased CO₂ and current rising temperatures.⁷²

CO₂ is a weak greenhouse gas. Greenhouse gases absorb infrared (IR) radiation, but do so only within certain wavebands, which are specific to each gas. CO₂ has only one relevant waveband and this waveband is already saturated. This means that all the IR leaving the earth at this wavelength is already absorbed. Above 150ppm, adding more CO₂ has only minor effects, writes Kenny. ‘It captures a bit more IR at the edges of the band and lowers the altitude at which it is captured. This effect is not only small but diminishing: each addition of CO₂ has less effect than the previous addition’. Since CO₂ is already above the 150ppm level, adding more CO₂ is unlikely to have a significant effect on global temperatures.⁷³

According to Kenny, the warming evident since 1870 has primarily been caused by high levels of activity on the sun’s surface, which resulted in the emission of many charged particles for much of the 20th century. Since about 1998, however, the sun has been relatively quiet and has been emitting far fewer charged particles. This is the main reason why there has been little global warming during the 21st century, as satellite data confirms.⁷⁴

In addition, the earth’s climate has always been in flux – though why it keeps changing remains beyond human understanding. As Kenny writes: ‘The climate is always changing. It

⁷⁰ Andrew Kenny, ‘The Paris Climate Accord: Scientific folly’, The Daily Friend, 6 February 2021

⁷¹ Andrew Kenny, ‘Climate Change Science and the Climate Change Scare’, @Liberty, Issue 23, November 2015, pp9, 11; Kenny, ‘The Paris Accord’, op. cit.

⁷² Kenny, @Liberty, p11; Andrew Kenny, ‘An assault on science by climate alarmists’, The Daily Friend, 15 August 2021; Andrew Kenny, ‘Is the earth cooling?’ The Daily Friend, 11 July 2021

⁷³ Kenny, Ibid

⁷⁴ John Kane-Berman, ‘Climate: fake news and false alarms feeds the frenzy’, The Daily Friend, 12 October 2020, o https://www.researchgate.net/publication/12376985_Global_warming_in_the_twenty-first_century_An_alternative_scenario

has been changing since the earth was born, about 4.5 billion years ago. Given changes in the sun, changes in the earth's orbit, changes in the earth's continents, changes in the earth's geology, and the earth's continual rotation, it cannot be otherwise.'⁷⁵

The climate is also 'chaotic' in the mathematical sense, in that exact mathematical predictions of how it will behave in future are impossible to make.⁷⁶ So complex are the range of factors to be taken into account that 'even the most advanced computers do not have nearly enough computing power to solve even simple climate problems', adds Kenny.⁷⁷

The computer climate models being used by the IPCC and many others cannot include factors relevant to climate change that lie beyond human understanding. This inevitably diminishes their accuracy. They also depend on the data, theories, and assumptions fed into them. As a result, their predictions of likely increases in global temperatures in future years are generally exaggerated.⁷⁸

Numerous scientists have pointed to this flaw, noting that observed temperature rises – to the extent they have actually occurred at all since 1998 – have been significantly lower than the supposedly dangerous rises predicted by climate models.

In 2019, 500 climate scientists sent a declaration to the UN emphasising that there was no climate emergency. The following year, 700 said the same thing in a 'World Climate Declaration', which another 200 soon endorsed as well.⁷⁹ According to this Declaration: 'To believe the outcome of a climate model is to believe what the model makers have put in', including their hypotheses and assumptions. 'This is precisely the problem of today's climate discussion, to which climate models are central.'⁸⁰

This raises further questions about the strength of the evidence underpinning the Paris Agreement and the net zero approach. Yet even if this perspective is indeed correct, an increasing reliance on wind and solar will greatly increase, rather than reduce, CO2 emissions – while contradicting all three of the prime objectives for energy policy.

Take the three prime objectives first. To begin with, an expanding reliance on wind and solar for baseload generation will enormously increase the cost of electricity, as a 'full cost of energy' or FCOE assessment shows. Second, it will vastly reduce the supply of electricity and push ever more countries into energy 'starvation', as an 'energy return on investment (eROI) analysis points out. Third, its adverse environmental impacts will be particularly severe because of the enormous scale of the green machines required and the environmental damage resulting from their production, operation, and decommissioning.

⁷⁵ Kenny, @Liberty, op cit, p2

⁷⁶ Ibid, p5

⁷⁷ Ibid

⁷⁸ Kenny, @Liberty, pp7-8

⁷⁹ John Kane-Berman, 'Climate: fake news and false alarms fuel the frenzy', The Daily Friend, 12 October 2020

⁸⁰ Ibid

At the same time, making all those green machines will push up CO2 emissions to an enormous extent, as vast amounts of energy from (reliable) fossil fuels will be needed to power all the mining, processing, transporting, construction, and (before long) replacement required. Perversely, more efficient energy will increasingly be used to generate less efficient energy – and the amount of CO2 emitted in the process will be far greater than if the world had focused solely on conventional power generation from fossil fuels and nuclear power.

This is a serious flaw in the Paris Agreement and net zero approach – and South Africa needs to consider this carefully before it proceeds with any legislation on climate policy, let alone this wide-ranging Bill.

4.8 Acknowledging the ‘limits of current knowledge’

Under Clause 3 of the Bill, its interpretation and application must be guided by various principles. These include ‘the need for a risk averse and cautious approach which takes into account the limits of current knowledge about causes and effects of climate change and the consequences of the decisions and actions’ to be taken.⁸¹ Also relevant here is ‘the need for climate change...responses to be informed by evolving climate change scientific knowledge’ – and for ‘decisions to be based on the best available science, evidence, and information’.⁸²

In keeping with these principles, the evidence and information set out above must be taken fully into account before any attempt is made to proceed with the Bill. So too must Schernikau’s final words of warning:⁸³

Today’s energy policy is...focused primarily on reducing anthropogenic (human-caused-energy) CO2 emissions to limit or reduce future global warming. As demonstrated by Glasgow’s COP26 meeting results,...many nations’ energy policy decisions today pay less attention to objectives (1) and (2) [energy affordability and supply] and even most aspects of (3) [environmental protection], on such issues as plant/animal life, land/space use, material and energy input, recycling efficiency, etc.

The objective of global investments in the ‘energy transition’ should be to meet all three prime goals of energy policy, not only one sub-goal, to reduce human-caused CO2 emissions. Today’s misguided energy investment focus on wind and solar increases the risk of energy starvation, with all its consequences.

FCOE and eROI assessments show that wind and solar are unfortunately not the solution to humanity’s energy problem. At grid scale, they will lead to undesired economic and environmental outcomes.

⁸¹ Clause 3(g), Bill

⁸² Clause 3(h), Bill

⁸³ Schernikau, pp9-10

The use of LCOE [levelled cost of electricity] for the purpose of discussing the ‘green’ energy transition must cease because it [deals only with three out of ten relevant factors and] continues to mislead decision makers.

Governments...must [focus on] energy economic realities before forcing the basis of today’s existence away from proven and relatively affordable energy systems. It takes energy to solve the food and water crisis, energy to withstand natural disasters, and energy to eradicate poverty...

Investment in – not divestment from – fossil fuels is the logical conclusion, not only to eradicate energy poverty but also to improve the environmental and economic efficiency of fossil-fuel-installed capacity...and avoid the prolonged energy crisis that started in the second half of 2021.

5 Content of the Bill

Not all the provisions of the Bill can be given full consideration in the limited period that has been allowed for comment. Instead, only the most important and problematic clauses are highlighted below. These are primarily considered within two broad categories: provisions aimed at carbon reduction; and provisions seeking to enhance adaptation to climate risks. Further clauses in the Bill are briefly summarised thereafter.

5.1 Chapter Five: provisions aimed at carbon reduction

5.1.1 Clause 21: National greenhouse gas emissions strategy

Under Clause 21, the environmental Minister must, in consultation with the cabinet and by notice in the *Gazette*, ‘determine a national greenhouse gas (GHG) emissions trajectory’ for South Africa. This trajectory must specify ‘a national GHG emissions reduction objective’ which must set out, in quantitative terms, ‘the total amount of GHG emissions projected to be emitted during a specified period in the Republic’. The trajectory must be ‘based on relevant and up-to-date information’ on ‘current and projected amounts of GHG emissions’ and be consistent with the Bill’s objectives and South Africa’s international obligations.⁸⁴

The trajectory to be ‘determined’ by the Minister in this way will have enormous ramifications for the affordability of electricity and the adequacy of its supply from now until the year 2050 and beyond. It will also have major costs and consequences for all those to be subjected to carbon budgets under Clause 24. Yet the Bill gives the Minister the power to decide, provided only that she acts ‘in consultation’ with the cabinet (and takes account of the views of provincial environmental MECs under the ‘consultation’ provisions in Clause 28 of the Bill).⁸⁵ Issues of such magnitude should be decided by the legislature, and not by ministerial decree.

⁸⁴ Clause 23(1), (2), Bill

⁸⁵ Clause 28, Bill

Until a new trajectory has been developed, the ‘interim national GHG emissions trajectory’, as set out in Schedule 3, will continue to serve as South Africa’s ‘national GHG emissions trajectory’.⁸⁶ Under this interim trajectory, South Africa’s GHG emissions will (a) peak in the period 2020 to 2025 in a range with a lower limit of 398 Megatonnes (Mt) (109kg) CO₂-eq and upper limits of 583 Mt CO₂-eq in 2020 and 614 Mt CO₂-eq in 2025; (b) plateau for up to ten years after the peak, within a range from 398 Mt CO₂-eq to 614 Mt CO₂-eq; and from 2026 onwards, decline in absolute terms to a range from 212 Mt CO₂-eq and 428 Mt CO₂-eq by 2050.⁸⁷

The environmental Minister must review the national trajectory within five years of the Bill’s adoption. The Memorandum on the Objects of the Bill adds that this mandatory review must take place ‘every’ five years, but the wording of the Bill does not in fact require this.

Instead, Clause 21 provides that she ‘may’ review the trajectory ‘periodically, when national circumstances require such a review’. Whether such a review is needed is to be assessed in the light of ‘monitoring and evaluation results, new technologies, and the best available science, evidence or information’. Also relevant are ‘constraints and opportunities to implementation’, as well as South Africa’s ‘international commitments and obligations’.⁸⁸ This wording is inadequate, for the listed factors should surely be considered in amending any GHG emission reductions previously set, not merely in deciding whether a review of existing reduction goals is required.

Neither the Bill nor the Explanatory Memorandum provide any explanation or supporting data for the GHG emission reductions set out in the interim trajectory in Schedule 3. This makes it difficult to assess whether these interim projected emission reductions are in line with current or projected GHG emissions for the period in question. This in turn means that the rationality and reasonableness of the mooted reductions cannot easily be assessed.

In addition, though the focus in subsequent sections of the Bill is on ‘carbon budgets’ as a mechanism to reduce CO₂ emissions, the Bill defines a ‘greenhouse gas’ far more broadly as ‘gaseous constituents of the atmosphere, both natural and anthropogenic, that absorb and re-emit infrared radiation’.⁸⁹

By far the most important greenhouse gas is water vapour, which accounts for about 90% of the greenhouse effect on earth. The earth has one key means of losing heat, which is by radiation. The peak energy of the earth’s emitted radiation is in the infrared (IR) range, which is invisible to humans. Some gases in the earth’s atmosphere capture some of this outgoing IR radiation and are known as ‘greenhouse gases’. These gases keep the earth’s average surface temperature higher than it would otherwise be and have made possible the

⁸⁶ Clause 23(3), Bill

⁸⁷ Schedule 3, Bill

⁸⁸ Clause 21, Bill

⁸⁹ Clause 1, definitions, Bill

development of higher life forms.⁹⁰ Greenhouses gases absorb IR radiation only at certain wavebands. Water vapour has many such wavebands whereas CO₂, as described above, has only one.⁹¹

The interim trajectory in Schedule 3 sets targets for emission reductions in terms of CO₂-eq or carbon dioxide equivalent. ‘Carbon dioxide equivalent’ is defined in the Bill as ‘the number of metric tons of carbon dioxide emissions with the same global warming potential as one metric ton of another greenhouse gas’.⁹² (However, this wording overlooks the usual formulation of the CO₂-eq concept, in which one metric ton of carbon dioxide is used as the reference to assess the global warming potential of other greenhouse gases, such as methane and nitrous oxide.)⁹³

5.1.2 *Clause 22: Sectoral emissions targets*

The environmental Minister must, within a year of the statute’s coming into operation and by notice in the Gazette, ‘list the greenhouse gas emitting sectors (and sub-sectors) that are ‘subject to sectoral emissions targets’. She must also, in consultation with the ministers responsible for these sectors and by notice in the Gazette, ‘determine the prescribed framework and the sectoral emissions targets’ for these sectors.⁹⁴

These sectoral emissions targets must be implemented by the responsible ministers through ‘relevant planning instruments, policies, and programmes’.⁹⁵ They must also be ‘aligned with the national greenhouse gas emissions trajectory’, while ‘noting that the cumulative amount of greenhouse gas emissions which the sectoral emissions targets represent are not equivalent thereto’.⁹⁶ This provision is ambiguous, but suggests that sectoral emissions targets could cumulatively exceed the national emissions trajectory.

Sectoral emissions targets must include ‘quantitative and qualitative greenhouse gas emission reduction goals’ for the first five years, the next five to ten years, and the 10- to 15-year period thereafter.⁹⁷ What ‘qualitative’ elements may be introduced is not explained.

The determination of relevant sectors and their sectoral emissions targets is again a matter of great moment for the economy and the wellbeing of all South Africans. It should be decided by Parliament, after due deliberation among all political parties, not by the executive by notice in the Gazette.

⁹⁰ Kenny, @Liberty, op cit, p4

⁹¹ Ibid, p4

⁹² Clause 1, definitions, Bill

⁹³ Understanding Global Warning Potentials, epa/gov, 12 January 2016

⁹⁴ Clause 22 (1), (3), Bill]

⁹⁵ Clause 22(4)(a), Bill

⁹⁶ Clause 22(4)(b), Bill

⁹⁷ Clause 22(4)(c), Bill

In ‘determining’ sectoral emissions targets, the environmental Minister must take all relevant considerations into account, including ‘the socio-economic impacts’ of introducing these targets and the ‘best available science, evidence and information’.⁹⁸ Without parliamentary scrutiny, however, it will be difficult to assess how adequately these requirements have been met.

The ministers responsible for the listed sectors must ‘adopt policies and measures towards the achievement of the sectoral emissions targets’.⁹⁹ As this wording suggests – and Clause 22(10) confirms – the relevant ministers are to adopt these measures by way of regulation and without reference to Parliament. This further undermines the separation of powers between the different branches of government, which is supposed to be a hallmark of South Africa’s democracy.

The environmental Minister must review the sectoral emissions targets every five years. She must also amend these targets when either the outcomes of these reviews or ‘national circumstances’ require it. The need for such amendment may be ‘demonstrated by (a) monitoring and evaluation results, (b) new technologies, (c) the best available science, evidence or information’, (d) South Africa’s international commitments and obligations, (e) the strategic importance of the sector as a catalyst for growth and job creation in the economy, or (f) the agreed approach to the just transition’.¹⁰⁰

Again, without parliamentary scrutiny of proposed amendments and the reasons for them, it will be difficult to assess whether the Minister is giving due weight to these criteria. In addition, the list is disjunctive, so allowing the Minister to take only one of six criteria into account.

Any amended sectoral emissions targets must be for the same five-year periods as earlier described. The responsible ministers must then amend their policies and measures in keeping with the revised targets. They must publish any amendments by notice in the Gazette and ensure that their new regulations are ‘implemented and monitored for effectiveness’. The responsible ministers must report on progress to the presidency, while the environmental Minister must submit progress reports on all sectoral emissions targets to the cabinet on an annual basis.¹⁰¹

Again, the responsible ministers are to change policies by regulation, without reference to Parliament, which undermines the separation of powers.

5.1.3 Clause 23: Listed greenhouse gases and activities

The environmental Minister must, by notice in the Gazette, publish a list of greenhouse gases which she ‘reasonably believes cause, or are likely to cause, or exacerbate climate change’.

⁹⁸ Clause 22(5), Bill

⁹⁹ Clause 22(6), Bill

¹⁰⁰ Clause 22(7), Bill

¹⁰¹ Clause 22 (11), (12), Bill

She must also, again by notice in the Gazette, publish a list of ‘activities’ which emit one or more of the listed greenhouse gases and which she ‘reasonably believes cause, or are likely to cause, or exacerbate climate change’.¹⁰²

‘Climate change’ is defined in the Bill as ‘a change of climate that is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and that is in addition to natural climate variability observed over comparable time periods’.¹⁰³

This definition assumes that the environmental Minister is capable of distinguishing sufficiently precisely between ‘natural climate variability’ and that which is ‘attributed directly or indirectly to human activity’. Yet there is a vast body of research and literature on this issue which underscores the enormous complexity of the climate, the broad range of variables that affect it, and the difficulty of making such distinctions in a credible and scientifically rigorous way.

Under the Bill’s definition, much also depends on how changes in climate are to be ‘attributed directly or indirectly to human activity’. How such ‘direct’ or ‘indirect’ attribution is to be made is left wide open, exacerbating the vagueness of the provision and putting it in conflict with the rule of law.

Moreover, the environmental Minister is empowered to list both greenhouse gases and activities that, in her ‘reasonable belief’, either ‘cause’ or ‘are likely to cause’ or ‘exacerbate’ climate change. Again, this wording is inordinately wide and uncertain. That her ‘belief’ is what counts most adds to the uncertainties and risks in the provision – especially as she is empowered to act simply by publishing a notice in the Gazette, without reference to Parliament, and without having to show on what basis she considers her ‘belief’ to be ‘reasonable’.

Under Clause 23(3) of the Bill, a notice listing the activities the environmental Minister believes are ‘likely’ to ‘cause’ or ‘exacerbate’ climate change, as broadly defined, must apply to activities which have ‘already commenced’ and that are ‘new’ (a criterion which is not defined but perhaps means ‘proposed’).¹⁰⁴

Such a notice must also ‘determine quantitative greenhouse gas emission thresholds expressed in carbon dioxide equivalent to identify persons to be assigned a carbon budget, in terms of section 24(1) and who are required...to submit greenhouse gas mitigation plans to the Minister’.¹⁰⁵

This provision indicates that carbon dioxide is undoubtedly to be listed as a greenhouse gas that ‘causes’ or ‘is likely to cause’ or ‘exacerbates’ climate change, as broadly defined. Yet

¹⁰² Clause 23(1), (2), Bill

¹⁰³ Clause 1, definitions, Bill

¹⁰⁴ Clause 23(3)(a), Bill

¹⁰⁵ Clause 23(3)(b), Bill

there are contrary views on this issue that need to be taken into account – and the ‘best available science, evidence and information’ does not uniformly support the Bill’s approach.¹⁰⁶

The Minister’s notice must specify that its terms do not apply to listed activities which emit greenhouse gases at quantities below the emission thresholds determined by the environmental Minister. The notice may also contain ‘transitional provisions and other special arrangements’: wording which is again uncertain and vague.¹⁰⁷

Under Clause 23(4), the thresholds determined by the environmental Minister must be ‘expressed in carbon dioxide equivalents for carbon budgets and greenhouse gas mitigation plans and shall be applicable at company level based on operational control’. They must also be based on the ‘availability of feasible mitigation technology’ and take account of ‘opportunities and constraints to implementation’.¹⁰⁸ Much of this wording is uncertain and could be interpreted in different ways by different officials, thereby contradicting the doctrine against vagueness of laws.

The environmental Minister ‘may’ review these lists to determine whether they need amendment or revision. Such a review may be conducted when the need for it is demonstrated by ‘(a) monitoring and evaluation results, (b) new technologies, (c) the best available science, evidence or information, (d) South Africa’s international commitments and obligations, or (e) ‘opportunities and constraints to implementation’.

Again, this list is disjunctive, so only one of these five criteria needs to be considered. In addition, on the current wording, these criteria apply only to the need for a review and not to the need for amendments to the lists. This limitation is irrational.

Under Clause 23(6), where a review indicates the need for amendments, the environmental Minister may add or remove greenhouse gases from the greenhouse gas list, add or remove activities from the activities list, or ‘make other changes to the particulars on the list, such as the applicability of greenhouse gases to certain activities’.¹⁰⁹

This last sub-clause makes little sense and seems tautologous, given the wording of the rest of the sub-section. Again, the environmental Minister is given sweeping powers, to be exercised without reference to Parliament.

5.1.4 Clause 24: Carbon budgets

The environmental Minister ‘must allocate a carbon budget’ to any person that conducts an activity listed in terms of section 23(2). In allocating carbon budgets, the environmental Minister ‘must take all relevant considerations into account’, including, amongst others, (a)

¹⁰⁶ Kenny, @Liberty, op cit, pp 9, 11

¹⁰⁷ Clause 23(3)(c), (d), Bill

¹⁰⁸ Clause 23(4), Bill

¹⁰⁹ Clause 23(6), Bill

‘the socio-economic impacts of imposing the carbon budget, (b) the best available science, evidence and information, (c) the ‘best practicable environmental options available and alternatives that could be taken to mitigate the emission of greenhouse gases, (d) national strategic priorities, (e) the alignment of carbon budgets with the national greenhouse gas emissions trajectory, noting that the cumulative amount of greenhouse gas emissions which the carbon budgets represent are not equivalent thereto, and (f) progress in the implementation of greenhouse gas mitigation plans’.¹¹⁰

The environmental Minister is once again empowered to act unilaterally, and without reference to Parliament, in imposing carbon budgets on any person, natural or juristic, conducting a listed activity. This wording is inconsistent with Clause 23(4), under which carbon budgets ‘shall be applicable at company level based on operational control’.

Though the list of criteria to be considered is this time conjunctive, rather than disjunctive, the Minister’s discretionary powers – on matters so vital to the cost and availability of electricity to the economy and the people of South Africa – undermine the rule of law, the separation of powers, and the country’s commitment, under Section 1(d) of the Constitution, to ‘a multiparty system of democratic government to ensure accountability, responsiveness and openness’.¹¹¹

Under Clause 24(3), a carbon budget must last for at least ‘three successive five-year periods’ and ‘specify the maximum amount of greenhouse gas emissions that may be emitted in the first five years’. This wording creates uncertainty as to whether this ‘maximum amount’ may be increased or decreased after the initial five years. Yet many companies need longer time horizons for planning and investment purposes.

In terms of Clause 24(4), ‘a person to whom a carbon budget has been allocated...must submit...a greenhouse gas mitigation plan’ to the environmental Minister for her approval. This plan must ‘describe the mitigation measures’ to be implemented to remain within ‘the allocated carbon budget’. The plan must also comply with such ‘content requirements’ as the Minister may prescribe using her regulatory powers.¹¹² This wording is again too broad, especially as these ‘content requirements’ need not be limited to such issues as ‘processes, procedures, and reporting’.

A person to whom a carbon budget has been allocated must ‘implement the approved plan’, monitor annual progress in accordance with the ‘prescribed methodology’ (whatever that might be), ‘evaluate progress on the allocated carbon budget’, and report annually on progress made in the prescribed manner. If these reports show that ‘the person has failed, is failing or will fail to comply with the allocated carbon budget’, the plan must also describe the measures to be taken to remain within it.¹¹³

¹¹⁰ Clause 24(1), (2), Bill

¹¹¹ Section 1, Constitution

¹¹² Clause 24(4), Bill

¹¹³ Clause 24(6), Bill

Under Clause 24(7), the environmental Minister ‘must review’ an allocated carbon budget ‘at the end of the five-year carbon budget commitment period’ or on request by the person subject to it. Waiting till the end of the five-year period will undermine forward planning for most companies, so earlier reviews will generally be needed. Considerable resources will thus be required – both for the state and for those subject to carbon budgets – in continually conducting and participating in these reviews and in evaluating proposed revisions.

Revision or cancellation of a carbon budget may also be sought, but only ‘in the prescribed circumstances’, which may be unduly narrow. The factors ‘listed in section 24(2) must be taken into consideration when a carbon budget is reviewed’.

Under Clause 24(8), the environmental Minister ‘must revise... a carbon budget’ to ensure ‘(a) it always has a duration of at least three successive five-year periods and (b) if the National Greenhouse Gas Inventory demonstrates an increase in national greenhouse gas emissions above the national and international climate change mitigation commitments and obligations’.¹¹⁴ These are the only circumstances in which revision is mandatory.

Under Clause 24(9), an allocated carbon budget ‘may’ be amended if the activity in question is ‘transferred or acquired in part or fully’, in which case ‘the affected person’ must request a reallocation from the Minister.¹¹⁵ This wording is sloppy as it is not clear whether the ‘affected’ person is the transferor or the transferee.¹¹⁶

These carbon budget provisions give the environmental Minister an extraordinary degree of discretionary power to limit or curtail the use of dependable fuels for electricity generation (coal, gas, and oil), while overlooking a necessary debate on the extent to which CO₂ causes damaging climate change. Yet cheap and reliable energy from these sources is vital to investment, growth and employment in South Africa. By contrast, an increasing reliance on wind and solar energy risks making electricity increasingly scarce and unaffordable to business and all South Africans. This in turn could result in energy ‘starvation’, even as it worsens environmental damage from the construction and recycling of the enormous number of green machines that will be needed.

5.1.5 Clause 25: Phase-down and phase-out of synthetic greenhouse gas emissions and declaration

The Bill’s definition of ‘synthetic greenhouse gases’ is meaningless, for all it says is that such a gas is ‘an artificial greenhouse gas as declared by the Minister under section 25’. As generally understood, however, synthetic greenhouse gases are man-made chemicals commonly used in refrigeration and air conditioning, fire extinguishing, foam production and medical aerosols. They were introduced as replacements for ozone depleting substances as

¹¹⁴ Clause 24(8), Bill

¹¹⁵ Clause 24(9), Bill

¹¹⁶ Section 24

they do not damage the ozone layer. However, they generally have a much greater ‘global warming potential’ (GWP) than CO₂.¹¹⁷

Under Clause 25(1), the environmental Minister, in consultation with the ministers responsible for the greenhouse gas emitting sectors listed under clause 22 (the ‘responsible ministers’), must by notice in the Gazette declare certain greenhouse gases to be ‘synthetic greenhouse gases’. She must also specify whether each of these synthetic gases is ‘required to be phased out or phased down’, ‘prescribe thresholds for the use of synthetic greenhouse gases in terms of section 23(3)(b)’ and set out ‘timeframes for [their] phase-down or phase-out’.¹¹⁸

The Minister’s obligation to ‘prescribe thresholds for the *use* of synthetic greenhouse gases in terms of section 23(3)(b)’ is confusing. It suggests that any use of synthetic greenhouse gases could in practice be prohibited, simply by the Minister’s setting a high threshold considerably above the current use of the synthetic greenhouse gas in question. Under section 23(b), moreover, the purpose of the threshold is to ‘identify persons to be assigned a carbon budget’, not authorise the ‘use’ of a relevant gas. This inconsistent and uncertain wording conflicts with the doctrine against vagueness of laws.

Under Clause 25(2), the environmental Minister, in consultation with the responsible ministers ‘and any affected party’, must develop a plan to phase out or phase down the listed synthetic greenhouse gases. She must also review or update the plan every five years. The plan must ‘address how importers and exporters of synthetic greenhouse gases must account for their emissions’, contain ‘measures to facilitate’ their phase-down or phase-out, and be consistent with South Africa’s international obligations.¹¹⁹

The use of the word ‘account’ is vague and confusing too. It could mean that importers and exporters must explain and justify their use of these gases, but it could also mean that they must report on the quantities they use. Again, this uncertainty is against the rule of law.

Under Clause 25(4), the environmental Minister ‘may allocate a carbon budget to persons undertaking activities’ that give rise to listed synthetic greenhouse gas emissions. In this case, she must ‘follow the process for the allocation of carbon budgets provided for in section 24’.¹²⁰

Again, the powers given to the Minister are extremely wide. She is given complete discretion to list whatever synthetic greenhouse gases she sees fit, provided only that she consults with others in the executive – and irrespective of how great a danger they in fact pose, bearing in mind not only their global warming potential (GWP) but also the quantities in which they are

¹¹⁷ <https://www.awe.gov.au/environment/protection/ozone/ozone-science/synthetic-greenhouse-gases#>:

¹¹⁸ Clause 25(1), Bill

¹¹⁹ Clause 25(2), Bill

¹²⁰ Section 25

being emitted. She can also require major reductions in, or complete termination of, the use of various synthetic greenhouse gases, despite the impact this might have on important refrigeration, air conditioning, foam production, and fire-extinguishing services in South Africa. Though her decisions on ‘phase-out’ or ‘phase down’ must be made ‘in consultation’ with ‘affected parties’ (an undefined and uncertain term), this is unlikely in practice to make much difference to what she and her fellow ministers decide. Again, this level of executive law-making is contrary to core constitutional principles.

5.1.6 Clause 26: National Greenhouse Gas Inventory

Under Clause 26, the environmental Minister must ‘establish an institutional arrangement to facilitate a national system of data collection’. This will be used to create a National Greenhouse Gas Inventory and to compile an annual National Greenhouse Gas Inventory Report. This report must analyse emissions trends, note ‘changes in the greenhouse gas emissions intensity in the economy’, and ‘compare actual greenhouse gas emissions’ both to the national greenhouse gas emissions trajectory and the country’s national and international commitments and obligations.¹²¹

Under Clause 26(3), the environmental Minister may, by notice in the Gazette – or simply ‘in writing’ – ‘identify a list of activities and thresholds for which measurements or estimations of greenhouse gas emissions and carbon sinks from stationary, mobile, fugitive, process, agriculture, land use and waste sources must be carried out’. Any such notice must ‘indicate the manner in which the information must be furnished and, if required, how this information must be verified’.¹²²

Under Clause 26(4), the ‘thresholds’ stipulated by the Minister under sub-clause (3) ‘must be expressed as a function of activity for greenhouse gas emissions reporting and may be different for different activities, taking into account the significance of the contribution of these activities to total national greenhouse gas emissions as well as its completeness’. This sub-clause is unintelligible.

A ‘carbon sink’ is defined in the Bill as ‘any process, activity or mechanism which removes a greenhouse gas, an aerosol, or a precursor of a greenhouse gas from the atmosphere’. [Clause 1, definitions, Bill] (This definition seems to equate greenhouse gases with aerosols, even though the particulate matter in aerosols can have cooling effects by scattering solar radiation or promoting cloud formation.¹²³ The definition also seems to assume that all precursors are harmful when some, such as ‘ozone precursors’, are arguably not.)¹²⁴

The Bill thus requires a complex and costly process of collecting and analysing data on the removal of aerosols and precursors which may largely be benign, rather than harmful. It also

¹²¹ Clause 26(1),(2), Bill

¹²² Clause 26(3),(5), Bill

¹²³ <https://www.nature.com/scitable/knowledge/library/aerosols-and-their-relation-to-global-climate-102215345/>

¹²⁴ https://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/1_Volume1/V1_7_Ch7_Precursors_Indirect.pdf; coolerfuture.com/blog/co2e

gives the Minister untrammelled discretion to decide (simply, ‘in writing’, if she so chooses) the ‘activities’ and ‘thresholds’ for which ‘measurements’ and ‘estimations’ must be provided and ‘verified’ to her satisfaction. These broad powers are likely to add significantly to compliance costs, while doing little to prevent ‘climate change’, as broadly defined in the Bill.

5.2 Chapter Four: Provisions seeking to enhance adaptation

Though the Bill seeks to improve ‘adaptation’ to climate-related risks, there is nothing new about such interventions. Governments around the world have long been taking steps to protect communities against droughts, floods, wildfires, and other risks. They began doing so well before any alarm was raised against greenhouse gases. Great successes have also been achieved. As countries have grown richer, the cost of providing protection has fallen as a proportion of GDP. In addition, as Bjorn Lomborg of the Copenhagen Business School and the Hoover Institute at Stanford has pointed out, the overall risk of climate-related disaster death has dropped over the last century by at least 92% (while the most recent figures point to a 99% decline).¹²⁵

These successes raise doubts as to the need for legislation to compel more emphasis on adaptation. Both for this reason, and because of time constraints, the ‘adaptation’ provisions in the Bill are summarised more generally, rather than in detail.

5.2.1 Clause 1: definition of adaptation

‘Adaptation’ is defined as ‘any adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects which moderates harm or exploits beneficial opportunities’. This definition is so broad as to be largely meaningless, while much of the wording used is capable of many different interpretations.

5.2.2 Clause 16: Adaptation objectives

Under Clause 16, the environmental Minister must, within a year of the statute’s coming into operation and by notice in the Gazette, ‘determine national adaptation objectives’ and ‘indicators for measuring progress towards them’. She must also periodically review and amend them.¹²⁶

5.2.3 Clause 17: Adaptation scenarios

Under Clause 17, the environmental Minister must, also within year of the statute’s coming into operation, ‘develop adaptation scenarios which anticipate the likely impacts of climate change’ in the country ‘over the short, medium, and longer term’. These scenarios must be based on the ‘best available science, evidence, and information’. They must include ‘a systematic observation of the climate system and early warning systems’. They must also set out ‘available adaptation response options’ to reduce ‘identified vulnerabilities by building

¹²⁵ John Kane-Berman, ‘The Climate Change Bill is a monstrous absurdity’, *The Daily Friend*, 23 May 2022

¹²⁶ Clause 16(1), (2), Bill

adaptive capacity and resilience’. The Minister may periodically ‘review and amend’ these scenarios.¹²⁷

These ambitious plans largely depend on ‘early warning systems’, yet these systems have not been maintained and often no longer operate. In the water context, for example, the number of functional rainfall gauging stations has dropped so steeply that South Africa now has fewer of these stations than it did in 1920, when record keeping began. The quantity of streamflow monitoring stations – which measure the flow of water in rivers over time – has also fallen sharply, leaving the country with much the same number as it had in the 1960s. According to independent water expert Anthony Turton, this diminished monitoring capacity explains why a major drought in KwaZulu-Natal in 2014 ‘remained invisible’ to officials for a significant period. Only two out of 13 rainfall monitoring stations in the Mvoti River basin were yielding regular data – which is why the magnitude of the drought became apparent to the government only when the Mvoti Water Treatment Plant suddenly ran out of water.¹²⁸

Other failures of a similar kind may also have occurred. Hence, the government’s primary focus should be on restoring and improving warning systems and on ensuring, for example, that existing precautionary rules against building on floodplains or too close to riverbanks are properly enforced. This focus should take priority over introducing a plethora of new statutory obligations under the Bill, which will add to the compliance burden on government and make it more difficult for it to fulfil either its existing or its additional obligations.

5.2.4 *Clause 18: National Adaptation Strategy and Plan*

Under Clause 18, the environmental Minister must, within two years of the statute’s coming into operation, ‘develop and publish a National Adaptation Strategy and Plan’ (the Plan) by notice in the Gazette. She must do so ‘in consultation’ with the ministers responsible for various listed functions, including agriculture, energy, health, human settlements, manufacturing, land reform, transport, water affairs and sanitation.¹²⁹

The Minister ‘may review and amend’ the Plan at five-yearly intervals to take account of ‘(a) monitoring and evaluation results, (b) new technologies, (c) the best available science, evidence or information’, or (d) South Africa’s international commitments and obligations’.¹³⁰ This wording is disjunctive, so only one of these four factors need be taken into account.

The purpose of the Plan is to reduce vulnerabilities, strengthen resilience, ‘enhance adaptive capacity’, achieve the listed adaptation objectives, provide ‘a strategic and policy directive for adaptation’, and provide ‘an integrated and coordinated approach to the management of

¹²⁷ Clause 17(1), (2), (3), Bill

¹²⁸ Anthony Turton, ‘Water Pollution and South Africa’s Poor’, IRR, Johannesburg, November 2016, p3; Anthony Turton, ‘Sitting on the Horns of a Dilemma: Water as a Strategic Resource in South Africa’, @Liberty, IRR, Johannesburg, Issue 22, November 2015, p16

¹²⁹ Clause 18(2), Schedule 2, Bill

¹³⁰ Clause 18(3), Bill

adaptation measures’ in response to climate change by organs of state in all spheres of government and also ‘where relevant’ by non-governmental organisations, the private sector, and local communities. The Plan must also include the objectives, scenarios, assessment of vulnerabilities, and adaptation response options that are required under clauses 16 and 17.¹³¹

This provision is replete with vague words and concepts likely to be interpreted in different ways at different times. Whether the government is capable of drawing up a Plan of this complexity is also uncertain, while its capacity to implement is even more doubtful.

5.2.5 Clause 19: Sector Adaptation Strategy and Plan

Under Clause 19, every minister responsible for a relevant function (as earlier described) must within a year of the adoption of the National Adaptation Strategy and Plan conduct an assessment which identifies relevant risks and vulnerabilities and ‘determines measures and mechanisms’ to implement the required ‘adaptation response’. Within a further year, every such minister must also ‘develop and implement a Sector Adaptation Strategy and Plan’ (a Sectoral Plan) which is aligned with the national Plan and ‘informed’ by the assessment earlier undertaken.¹³²

Every relevant minister must also, every five years, review and if necessary amend his or her Sectoral Plan to take account of ‘(a) monitoring and evaluation results, (b) new technologies, (c) the best available science, evidence or information’, and (d) South Africa’s international commitments and obligations’. This time the wording is conjunctive, so all four factors must be considered. Each relevant minister must also report to the environmental Minister, at five-yearly intervals, on progress made in implementing his or her Sectoral Plan.¹³³

5.2.6 Clause 20: Adaptation Information and Synthesis Adaptation Report

The environmental Minister may, by notice in the Gazette – or simply ‘in writing’ – require ‘any person’ to provide her, ‘within a reasonable time or on a regular basis’, with any ‘data, information, documents, samples, and materials’ that are ‘reasonably required’ for the National Climate Change Response White Paper. (This is defined in the Bill as the white paper, of the same name, that was published in the Gazette in October 2011.) The Minister may also specify how this information must be verified.¹³⁴

The Minister must also ‘collate, compile and synthesise information’ relevant to the national adaptation objectives and the objectives of the statute. She must then publish a Synthesis Adaptation Report for consideration by the cabinet and for use in South Africa’s ‘national and international reporting processes’.¹³⁵

¹³¹ Clause 18(4), (5), Bill

¹³² Clause 19 (1)(a)(b), Bill

¹³³ Clause 19(1)(c), (2), Bill

¹³⁴ Clause 20(1), (2), Bill

¹³⁵ Clause 20(3), Bill

These provisions will add significantly to the compliance burden on the government and others. Just how much information will have to be supplied, verified, and analysed – simply because the Minister has demanded this ‘in writing – remains uncertain and is likely to grow exponentially over time.

5.3 Chapter 3: Provisions on ‘climate change responses’ by provinces and municipalities

The Bill also has various provisions on the ‘climate change responses’ to be undertaken by provinces and municipalities. Again, these are summarised briefly, rather than in full.

5.3.1 Clause 15: Climate change response

Under Clause 15, provincial environmental MECs and the mayors of metropolitan and district councils must undertake a climate change needs and response assessment within a year of the National Adaptation Strategy and Plan being drawn up. This assessment must identify vulnerabilities, identify appropriate counter ‘measures’ and be ‘based on the best available science, evidence and information’.

Each MEC or mayor must also, within two years of making this assessment, ‘develop and implement a climate change response implementation plan’, as part of its ‘planning instruments, policies, and programmes’. These plans must be in line with the assessments earlier conducted. They must include ‘both adaptation and mitigation’ measures and comply with any requirements prescribed by the environmental Minister. The relevant MECs and mayors must also review and, if necessary, amend their implementation plans every five years.¹³⁶

These sweeping and vague provisions place large compliance burdens on often ineffective or dysfunctional provincial and district administrations – and are likely to erode their already limited capacity still further.

5.4 Chapter 2: Provisions on policy alignment and institutions

The Bill has various provisions on the obligations of relevant organs of state, the need for provincial and municipal ‘forums on climate change’, and the establishment of a presidential climate commission. Again, give time constraints, these clauses are broadly outlined, rather than described in detail.

5.4.1 Clause 7: Alignment of policies

Under Clause 7 of the Bill, ‘every organ of state that...performs a function that is affected by climate change’ or is entrusted with powers aimed at achieving ‘a sustainable environment’, must review and if necessary revise their ‘policies and measures’ to ensure that the risks of climate change are taken into consideration and to give effect to the objects of the statute.¹³⁷

¹³⁶ Clause 15, Bill

¹³⁷ Clause 7(1), Bill

To give effect to those objects, organised labour, civil society, and business may also ‘advise’ on the country’s ‘climate change response’, including both mitigation and adaptation measures, and so help attain a ‘just transition to a climate resilient and low carbon economy and society’.¹³⁸

This clause is inordinately vague in all its elements, while its ramifications are so extensive that they cannot be foreseen.

5.4.2 Clause 8: Provincial forums on climate change

Every provincial premier’s ‘intergovernmental forum’ (established under the Intergovernmental Relations Framework Act) must also serve as ‘a provincial forum on climate change’. This forum must ‘coordinate climate change response actions’ in the relevant province and report to the President’s Coordinating Council (also established under the Intergovernmental Relations Framework Act).¹³⁹

5.4.3 Clause 9: Municipal forums on climate change

Every district intergovernmental forum (likewise established under the Intergovernmental Relations Framework Act) must serve as a ‘municipal forum on climate change’. This forum must ‘coordinate climate change response actions’ in its district and report to the relevant provincial forum.¹⁴⁰

5.4.4 Clauses 10: Presidential Climate Commission

The president may establish a Presidential Climate Commission and appoint not more than 30 people from government, organised labour, civil society and business to serve on it. Its role is to advise on South Africa’s climate change response, including both mitigation and adaptation strategies that are aimed at ‘a just transition to a climate resilient and low carbon economy and society’.¹⁴¹

Climate resilience is, of course, important but is more likely to be attained by carefully targeted and practical measures, rather than the unduly complex and onerous obligations set out in the Bill.

5.4.5 Clauses 11 to 14: Functions, appointment, reports, and administrative support

The functions of the Presidential Climate Commission are to advise on the country’s climate change response and its mitigation and adaptation strategies, as well as to monitor and evaluate progress towards its ‘emissions reduction and adaptation goals’.¹⁴²

¹³⁸ Clause 7(2), Bill

¹³⁹ Clause 8, Bill

¹⁴⁰ Clause 9, Bill

¹⁴¹ Clause 10, Bill

¹⁴² Clause 11, Bill

The members of the commission are to be appointed by the president. They must ‘broadly reflect the demographics and gender composition’ of the country and be ‘appropriately qualified in ‘socio-economic, environmental and broader sustainability field’.¹⁴³

The president may require the commission to report on any advice it has provided to the government, while the environmental department will provide it with necessary administrative and secretariat support services.¹⁴⁴

5.5 Chapters 1 and 6: Application, conflicts of law, regulations, and appeals

5.5.1 Clause 4: Application

Under Clause 4, the statute applies to the entire country, including its territorial waters, exclusive economic zone and continental shelf. It also ‘binds all organs of state’.¹⁴⁵

The Bill is thus binding on each and every organ of state, from national and provincial departments to municipalities of all kinds and hundreds of state-owned entities (SOEs). This gives the Bill’s uncertain requirements an extraordinarily broad sweep, the full ramifications of which cannot be identified, let alone assessed. This wording is also inconsistent with Clause 7 of the Bill, which applies only to organs of state with functions that relate to climate change or which are empowered to help achieve ‘a sustainable environment’.

This wide clause could also be used to put an end to all on-shore and off-shore exploration and production of oil and gas, regardless of how much the country needs these energy sources and would benefit from the additional investment, growth, employment, and prosperity they would bring.

5.5.2 Clause 6: Conflict with other legislation

Under Clause 6, in the event of ‘any conflict between a provision of this statute and other legislation specifically relating to climate change’, this statute prevails.¹⁴⁶

This broad provision will allow the Bill to trump all other legislation ‘specifically relating’ to climate change. This could have many unintended and adverse consequences, as the ramification of this clause are impossible to foretell or assess.

5.5.3 Clause 27: Regulations

Under Clause 27, the environmental Minister ‘may’ make regulations: [Clause 27(1), Bill]

- on any matter ‘necessary’ to give effect to South Africa’s ‘international climate change commitments and obligations’;
- on the ‘management of climate change responses’, including ‘incentives and disincentives’ to encourage behaviour change; and

¹⁴³ Clause 12, Bill

¹⁴⁴ Clauses 13, 14, 10(4), Bill

¹⁴⁵ Clause 4, Bill

¹⁴⁶ Clause 6, Bill

- that will ‘promote effective monitoring, evaluation, and assessment of national progress’ on climate change mitigation and adaptation matters, including Sector Plans and other ‘climate change response implementation plans’.

The Minister ‘must’ make regulations on ‘the determination...and enforcement of allocated carbon budgets’, the content and implementation of greenhouse gas mitigation plans, and the phasing out or phasing down of synthetic greenhouse gases. She ‘must’ also make regulations that will ‘promote the effective monitoring...and assessment of national progress’ on ‘climate change matters and climate change data and information’, including ‘information relating to... greenhouse gas emissions’ and ‘the compilation of the National Greenhouse Gas Inventory’. In addition, she ‘must’ make regulations ‘in relation to any other matter she must prescribe’ under the statute.¹⁴⁷

These regulatory powers are extremely broad and are likely to add to the compliance burden on both government and business, while harming rather than helping the country and its people.

Any regulations made under the statute may provide that any persons who fail to comply with it commits an offence and is liable on conviction to the penalties set out in Section 49B(2) of National Environmental Management Act (NEMA).¹⁴⁸

5.5.4 *Clause 33: Appeals*

Under Clause 33, any person may appeal to the environmental Minister against a decision taken under a power delegated by the Minister. Alternatively, any person can appeal to a provincial environmental MEC against a decision taken under a power delegated by him or her.

This provision seeks to oust the jurisdiction of the courts and is in breach of the separation of powers doctrine. It is also inconsistent with Section 34 of the Constitution, which gives everyone a right of access to the courts or other independent tribunals.

Any appeal to the Minister or a provincial MEC must be noted and dealt with in terms of Section 43(4) of NEMA.¹⁴⁹

6 Ramifications of the Bill

6.1 *A heavy burden on a failing state*

As earlier noted, all organs of state will be bound by the Bill. In addition, organs of state that perform functions affected by climate change, or which are expected to help achieve sustainable development, will be obliged to review and revise all their ‘policies, programmes,

¹⁴⁷ Clause 27(2), Bill

¹⁴⁸ Clause 27(3), Bill

¹⁴⁹ Clause 33, Bill

measures, and decisions’ so as to ‘ensure’ that ‘the risks of climate change impacts’ are ‘taken into consideration’ and the Bill’s broad-ranging objectives are fulfilled.

The burden on all affected organs of state will be heavy. Yet already the public service and most other state entities are unable to fulfil their core responsibilities. Examples of the resulting malaise are legion: some 80% of public schools are dysfunctional; at least 85% of public clinics and hospitals cannot comply with basic norms and standards, even on such essentials as hygiene and the availability of medicines; roughly 87% of RDP houses are badly built ‘high-risk’ structures needing extensive repairs if not complete reconstruction; essential infrastructure cannot be expanded because the state (in the words of former finance minister Trevor Manuel) lacks ‘the capacity to get projects off the ground’; and vital financial controls are persistently disregarded because inadequately skilled people have been appointed to crucial positions.¹⁵⁰

Dysfunctionality is particularly acute at the local government level where most municipalities are unable to maintain public safety by filling in potholes, keeping traffic and street lights working, providing clean drinking water, and preventing raw or partially treated sewage from flowing into dams and rivers. In some parts of the Vaal River, this last problem has become so acute that, for many years now, sewage has been spilling ‘at record levels’ into ‘townships, suburbs, central business districts, schools, clinics, council buildings, apartment blocks and roads’, as a local business chamber commented in 2019.¹⁵¹

Take Eskom too. Already its energy availability factor (EAF) has fallen from 85% in 2011 to 59% in 2022.¹⁵² This is largely because of poor skills, inadequate maintenance, pervasive corruption in procurement, and a flawed ‘new-build’ programme at the Medupi and Kusile power stations which is running ten years behind schedule and R300bn over budget.¹⁵³ Eskom’s current low energy availability factor is already causing repeated blackouts estimated to be costing the economy some R1bn a day at ‘Stage 2’ of loadshedding (when the shortfall in electricity supply is 2 000 MW) and close to R4bn a day at ‘Stage 4’ of loadshedding (when the shortfall is double that).¹⁵⁴

Once the Bill is enacted into law, Eskom will no longer be able to focus on finding the most efficient and cost-effective ways to improve its electricity supply. Instead, it will have to put enormous time and effort into reviewing and revising every policy, programme, measure and decision that impacts on the Bill’s low-carbon goal or otherwise raises (unspecified) ‘risks’ of ‘climate change impacts’. The Bill’s provisions on carbon budgets and other measures to reduce CO₂ emissions could also compel the early closure of many of Eskom’s coal-fired

¹⁵⁰ *Business Report* 7 June 2012

<https://www.iol.co.za/business-report/economy/manuel-shoots-down-wage-argument-1313331>

¹⁵¹ *Weekend Argus* 7 April 2019

¹⁵² *Business Day* 20 May 2022; Eskom system status reports

¹⁵³ <https://www.biznews.com/energy/2022/05/14/eskom-medupi-kusile-power>

¹⁵⁴ <https://www.politicsweb.co.za/politics/load-shedding-costs-country-r500-million-per-stage>

power stations – and leave the country largely dependent on intermittent wind and solar power unable to meet baseload needs.

The bureaucratic complexity of the Bill will compound the pressure on an already incompetent state. As Kane-Berman writes, there will be ‘forums galore’ in provinces, metros and all district municipalities, plus a new presidential climate commission. In the mitigation context, there will be a national greenhouse gas emissions trajectory, sectoral emissions targets, carbon budgets for listed sectors and activities, the phasing out or down of synthetic greenhouse gases, a national greenhouse inventory, and annual greenhouse gas inventory reports, along with regular reviews and revisions of all these interventions.¹⁵⁵

In the adaptation sphere, there will be national adaptation objectives and scenarios, a national adaptation strategy and plan, numerous sector adaptation strategies and plans, a synthesis adaptation report (to buttress the national climate change response white paper), and a constant emphasis on assessing needs, vulnerabilities, and progress towards ‘an effective national climate change response’.¹⁵⁶

A plethora of new regulations are sure to be gazetted too, by both the environmental Minister and a dozen or more of her cabinet colleagues. These rules will be adopted without parliamentary scrutiny – and are likely to truss up the private sector in many more reams of red tape. This will subvert President Cyril Ramaphosa’s plans, announced earlier this year, to ‘cut red tape across the government’ with the help of former Exxaro CEO Sipho Nkosi.¹⁵⁷

Comments Kane-Berman: ‘Listing sectors and allocating carbon budgets will no doubt be easy for a government so addicted to regulation and decree. How much capacity exists at any level of government to determine “adaptation” needs is doubtful. And even if realistic “adaptation” plans for the necessary infrastructure can be drawn up, successful “implementation” thereof is beyond the [state’s] capacity.’¹⁵⁸

Since 1994, most South Africans have been badly affected by governmental failures in one form or another. Some have suffered lethal consequences. Yet a government which cannot get the basics right at any level now proposes to put in place a vast new planning, monitoring, and implementation machine aimed at achieving ambitious and often profoundly mistaken goals.

The Bill will not only over-burden a failing state but have many other adverse consequences too. Among other things, it is likely to exacerbate indoor pollution, cripple the economy, worsen already astronomical unemployment rates, lead to energy ‘starvation’, and make it

¹⁵⁵ Kane-Berman, *The Climate Change Bill is a monstrous absurdity*, TDF, 23 May 2022; Memorandum on the Objects of the Climate Change Bill of 2022

¹⁵⁶ Memorandum on the Objects, para 1

¹⁵⁷ Kane-Berman, *The Climate Bill*, *ibid*

¹⁵⁸ *Ibid*

harder to afford adaptation strategies with substantial value. These factors make it unlikely too that the Bill will help achieve a ‘just’ transition.

6.2 Indoor pollution

The number of people with access to electricity in South Africa has risen sharply since the 1980s¹⁵⁹ and especially since 1994. Yet some 5.8 million black people still lack access to electricity for cooking and must instead rely on wood, coal, or paraffin.¹⁶⁰ This exposes them to the many risks of indoor pollution, which arises from the burning of these fuels and other forms of biomass inside people’s homes.

This problem is even more acute in many other countries. According to a recent article on *spiked-online*, some 2.5 billion people across the world ‘still cook with wood, charcoal or dung because they are not connected to a gas grid or cannot cook using electric appliances’. The outcome, as *The Economist* reports, is that between 2.5 million and 4 million people die prematurely every year because of their exposure to this indoor pollution. In India alone in 2010, notes an article from the Bloomberg news agency, deaths from indoor pollution totalled more than 1 million.¹⁶¹

Infant deaths from indoor pollution are widespread. According to the *2020 State of Global Air* report published by the Health Effects Institute, 64% of all infant deaths from air pollution across the world are from household or internal pollution.¹⁶²

Indoor pollution is most severe in Africa. As Magatte Wade, director of the African Centre for Prosperity at the Atlas Network points out, 700 million households in Africa still ‘rely on biomass for indoor cooking’. What the 700 million women in these households most need, she adds, is reliable and cheap electricity ‘so they can avoid the effects of burning charcoal, coal, and diesel in their small homes’.¹⁶³

Since 1994, South Africa has made enormous strides in expanding access to electricity and reducing indoor pollution. The Bill threatens these gains. The more the country shifts to intermittent wind and solar energy, the more electricity shortages will increase and the higher electricity prices will rise. Millions more people will then be compelled to rely on wood, coal, and paraffin for cooking inside their homes. This will increase exposure to indoor pollution and add to the risks of infant and other deaths.

6.3 Loadshedding, joblessness, and economic malaise

As earlier noted, South Africa has been bedevilled by energy shortages for well over a decade. Eskom’s ‘loadshedding’ began in 2008 and has steadily intensified as the parastatal’s

¹⁵⁹ <https://www.jstor.org/stable/41145715>

¹⁶⁰ Centre for Risk Analysis, ‘Living Conditions’ in 2021 Socio-Economic Survey of South Africa, p39; Statistics South Africa, General Household Survey 2020, Statistical release P0318, 2 December 2021, Figure 12.5, p45

¹⁶¹ John Kane-Berman, ‘The injustice of “climate justice”’, *The Daily Friend*, 13 December 2021

¹⁶² Kane-Berman, *The injustice*, *ibid*

¹⁶³ Kane-Berman, *The injustice*, *ibid*

energy availability factor has declined from 85% in 2011 to 59% in 2022. The economic costs of Eskom's escalating blackouts have been severe. In 2020 a report by the Council for Scientific and Industrial Research (CSIR) energy centre said that loadshedding in 2019 alone had cost the economy between R60bn and R120bn. The report put the total economic impact at some R340bn over ten years.¹⁶⁴

In 2021, however, the late Michael Schussler, then chief economist at economists.co.za, concluded that the overall costs of Eskom loadshedding had been far higher, running into 'trillions of rands over the past 14 years'. Said Schussler: 'Think of all the businesses that didn't start up and the businesses that have closed down, the mines that haven't expanded because there's no power, and the extra refinery that we were going to have in Coega that didn't come.' Blackouts had also cost 'a million job opportunities' over this period, he added.¹⁶⁵

Poor skills and rigid labour laws, among other factors, have also increased unemployment rates. These have now reached unprecedented levels: 35.3 % on the official definition, and 46.2% on the expanded definition, which counts those too discouraged to keep looking for work. Among young people, joblessness rates are 66.5% on the official definition and an astounding 77% on the expanded one. These unemployment rates are higher than those in any of the 82 countries monitored by Bloomberg.¹⁶⁶

So bad is joblessness now, as the IRR has commented, that 'if you put the entire unemployment line in a row, each person standing a metre apart, it would stretch from Cape Town to Cairo. If people could stand on the ocean that line would continue all the way to St Petersburg'.¹⁶⁷

Electricity constraints are not the only reason for the unemployment crisis, to which bad policies, excessive red tape, inefficient administration, and corruption have contribute as well. But without a reliable and affordable electricity supply, South Africa cannot begin to attract investment, increase growth, or generate the millions more jobs it needs.

Under the Bill, however, an already bad situation is set to become much worse. It will give further impetus to the closure of coal-fired power stations and their replacement by intermittent wind and solar energy. This will reduce electricity supply, making blackouts more frequent and severe and putting the stability of the entire grid at risk. Investment will diminish and existing businesses will battle to survive, while millions more jobs will be lost. This could easily take official unemployment rates across the population to 50% or more and among young people to some 80% or so (see *Little prospect of a 'just' transition*, below).

¹⁶⁴ Solidarity, Loadshedding: 14 years and another 350 000 jobs lost, 12 November 2021

¹⁶⁵ Ibid

¹⁶⁶ <https://www.bloomberg.com/news/articles/2021-08-24/south-african-unemployment-rate-rises-to-highest-in-the-world>

¹⁶⁷ <https://dailyfriend.co.za/2022/05/20/without-reforms-sa-youth-is-doomed-to-joblessness-irr/>

6.4 *The risks in energy ‘starvation’*

Some climate activists have acknowledged that ‘a lot less energy’ will be produced as fossil fuel usage declines to zero – but they nevertheless assume that all important needs will still be met.

This will be achieved, one such commentator argues, by terminating capitalism’s focus on ‘perpetual growth’ and by ‘taxing the rich out of existence’, which will end the ‘excess energy demand...for SUVs, private jets, commercial air travel, industrial beef, fast fashion, advertising, and planned obsolescence’.¹⁶⁸

With these excesses removed, this commentator claims, the energy available will sustain ‘universal public healthcare, housing, education, transport, water, and the Internet so that everyone has access to the resources they need to live well’. The working week will be shortened to guarantee that ‘everyone has access to a decent livelihood’ – and ‘a basic income’ will be provided to ‘those who cannot work or choose not to’, as ‘this is the bread and butter of a just transition’.¹⁶⁹

However, this is wishful thinking by people who prefer not to confront facts or think about their ramifications. According to Stephen Davies of the American Institute for Economic Research (AIER), most climate activists simply assume that climate change policies will generally ‘leave our present way of life intact’ and have no adverse impact on ‘the Internet and the modern welfare state’. They seem to believe that ‘modern civilisation can stop using fossil fuels, and not use nuclear power, and yet still keep a high energy civilisation and economy going’.¹⁷⁰

The reality, by contrast, is that a shift to renewable energy alone will bring about ‘a massive reduction in living standards’ for most people. The Internet would not survive as it ‘produces as much carbon emissions as the airline industry and its energy use is massive and constant’. In addition, ‘the physical infrastructure of computers and transmissions requires massive expenditure of energy to mine and refine rare minerals and turn them into products. None of this would be possible. People could also kiss smartphones and laptops goodbye, for the same reason’.¹⁷¹

There would be no further economic growth and Malthusian constraints would re-emerge. In this situation, welfare benefits – already a key source of rising public debt in many countries - - would often become too costly to sustain. There would also be ‘a big movement of labour into agriculture and the reappearance of the peasantry as an important social class’. As

¹⁶⁸ ‘What Would It Look Like If We Treated Climate Change as an Actual Emergency?’, currentaffairs.org/2021/11

¹⁶⁹ What Would It Look Like, *ibid*

¹⁷⁰ Stephen Davies, *The Unacknowledged Logic of Radical Environmentalism*, AIER.org, 20 May 2020

¹⁷¹ *Ibid*

environmentalist Richard Heinberg puts it, ‘about 30% of the labour force would have to become farmers’.¹⁷²

It would be difficult for women to work outside the home or aspire to professional careers, as many labour-saving devices would no longer be available. Writes Davies: ‘One of the things that high energy capture has made possible is [the invention of] high energy devices such as the washing machine. [These] have transformed the lives of women...and made possible a relocation of much female life away from the domestic. It is hard to see how this could possibly continue in a low energy society.’¹⁷³

Most climate activists prefer to ignore these issues, as Davies points out. This explains their anger at a recent Michael Moore documentary, *Planet of the Humans*. This echoes the activist belief that carbon-fueled climate change is an existential crisis but declines to endorse the naïve assumption that ‘fossil fuels can simply be replaced by renewable energy’. Instead, Moore invites activists to grapple with the major changes that shifting from ‘a high energy economy and society to a low-energy one’ would in fact entail. (Most activists have declined this invitation, preferring to call for the film to be banned than to confront its uncomfortable content.)¹⁷⁴

6.5 The costs of making the shift

The direct, indirect, and opportunity costs of making the shift to renewable energy will also be very high. In the run-up to COP26 in Glasgow last year, Barbara Creecy, minister of the environment, forestry and fisheries, called on developed countries to contribute \$750 billion a year to emerging markets to help them cope with the heavy costs of climate change. Even if this were to be agreed, however, this commitment would probably remain unfulfilled. At the climate conference in Copenhagen in 2009, rich countries pledged \$100 billion a year for this purpose. Yet even this much smaller amount has not in practice been provided. In 2018, for example, developed countries managed only \$79 billion.¹⁷⁵

Now that Covid-19 lockdowns, loose monetary policy, and the war in Ukraine have pushed up public debt and consumer inflation rates in the US, the UK and the EU to levels not seen in decades, many governments in the developed world are raising interest rates and trying to trim state spending. Taxpayers under pressure from rising prices for electricity, petrol, food and other essentials will become more resistant to climate change transfers to emerging markets. Before long, annual transfers as high as \$79 billion are likely to become unattainable.

¹⁷² Ibid, pp3-4

¹⁷³ Ibid, p4

¹⁷⁴ Davies, *The Unacknowledged Logic*, ibid, p2

¹⁷⁵ John Kane-Berman, ‘Barbara Creecy’s \$750 billion a year sounds about right’, *The Daily Friend*, 16 August 2021

At the COP26 conference in November 2021, South Africa was promised \$8.5 billion over the next three to five years in grants and loans to encourage the ‘accelerated decarbonisation’ of its electricity system and accelerate ‘the retirement of coal power’. Helped by this input from the rich world, South Africa’s coal plants would be ‘closed ahead of schedule’, said US president Joe Biden. ‘The phasing out of coal’ in South Africa would be ‘speeded up’, added Ursula van Leyen, president of the European Commission.¹⁷⁶

The agreement was hailed both here and abroad as a major triumph for COP26 and South Africa too. But this overlooks the fact, as Kane-Berman writes, that Eskom’s coal-fired power stations – though ageing and inefficient – are ‘just about all we have’. Hence, closing them down to satisfy...foreign governments, would be an act of economic self-destruction. It would make a desperate situation even worse’.¹⁷⁷

Less media attention was given to the fact that some of the signatories to the agreement were busy increasing their own coal consumption, even as they put pressure on South Africa to cut its use of coal. Both the US and the UK were ramping up their coal consumption in response to the energy shortages pushing up the price of power (see *Current and future global energy requirements*, above). Even Germany, with its strong determination to wean itself off both coal and nuclear power, was increasing its use of coal, which now accounts for more than 27% of its electricity as opposed to 22% for wind.¹⁷⁸

The \$8.5bn that has been pledged is a miniscule proportion of the overall costs that South Africa will incur in shifting from its coal-fired plants to renewables. Some additional financial help may in time be provided by the rich world, but this assistance will never be enough to compensate for the direct, indirect, and opportunity costs of reducing the country’s electricity supply still further. Even the subsidies that currently underpin the building of renewables are likely to become unaffordable as growth stalls, tax revenues decline, and South Africa moves closer to a ‘fiscal cliff’.

South Africa’s ‘fiscal cliff study group’ defines the fiscal cliff as the moment when all tax revenues collected are spent on payments to civil servants, social grants, and debt servicing costs.¹⁷⁹ In 2007 spending on these three items absorbed roughly 55% of government revenue. By February 2020, such spending was expected to absorb 76% of tax revenue. But later that same year, the mid-term budget policy statement showed that the fiscal cliff had already been reached, with spending on these items expected to absorb 100% of the country’s diminished tax revenues.¹⁸⁰

¹⁷⁶ John Kane-Berman, ‘Has Ramaphosa sold out to the eco-colonialists and their eco-hypocrisy?’, *The Daily Friend*, 8 November 2021

¹⁷⁷ *Ibid*

¹⁷⁸ *Ibid*

¹⁷⁹ <https://businesstech.co.za/news/finance/564552/south-africas-updated-fiscal-cliff-forecast/>

¹⁸⁰ *Ibid*

Then came the mining tax bonanza triggered by recovering economies and rising commodity prices. This averted the fiscal cliff for the time being, but spending on public servants, social grants, and debt servicing nevertheless stood at 75% of estimated tax revenue in the February 2022 budget.¹⁸¹ That the fiscal cliff was reached in 2020 – and averted solely through windfall mining taxes – underscores the extent of South Africa’s vulnerability. It also reinforces the vital importance of avoiding measures such as the Bill, which are sure to increase public debt, raise debt-servicing costs, and cripple the country’s economy still further.

6.6 Little prospect of a ‘just’ transition

Many commentators here and abroad shrug off the jobs that are sure to be lost in the shift to renewables on the basis that new ‘green’ jobs will more than compensate for the jobs that disappear, so generating a net gain in employment as part of a ‘just’ transition.

In South Africa, however, the jobs that are lost are unlikely to be replaced by new ‘green’ jobs in anything like sufficient number. Rather, most of the new jobs will be generated in China and other countries, to which much of the world’s manufacturing activity has already been transferred.¹⁸² By way of example, seven out of ten of the world’s top turbine manufacturers are Chinese, while China is also the world’s largest manufacturer of solar panel components.¹⁸³

Adds Kane-Berman: ‘China uses cheap coal, government subsidies and probably also forced labour, to produce the wherewithal for renewables, which are then dumped upon Western markets. Although renewables are also subsidised in the West, manufacturers there cannot compete with Chinese products. In the UK, parts of Europe, and the US, state-supported Chinese manufacturers of renewables have driven Western firms out of business.’¹⁸⁴

China also dominates ‘rare-earth’ metal supply chains. These metals are crucial for renewables, especially wind turbines. China accounts for two-thirds of the world’s rare earth mining, 85% of refining, and 90% of production. The US imports 80% of its rare-earth compounds and metals from China.¹⁸⁵

In addition, China is a major supplier of lithium, which is used in the manufacture of the batteries needed for electric vehicles, among other things.¹⁸⁶ Three quarters of lithium-ion batteries across the world are produced in China.¹⁸⁷

¹⁸¹ Ibid

¹⁸² Robert Lyman, ‘Magical Thinking: Why “Net Zero” is Neither Possible Nor Desirable’, Executive Summary, 6 September 2021, <https://blog.friendsofscience.org/2021/06/09/magical-thinking-why-net-zero-is-neither-possible-nor-desirable/>

¹⁸³ John Kane-Berman, ‘Cop-26 and beyond: Is China playing the West for fools?’, TDF, 1 November 2021

¹⁸⁴ Ibid

¹⁸⁵ Ibid

¹⁸⁶ <https://www.forbes.com/sites/rpapier/2019/08/04/why-china-is-dominating-lithium-ion-battery-production/?sh=4960ea763786>

¹⁸⁷ Ibid

If renewables are to replace coal-fired power stations in South Africa, there may be some additional new jobs in the dismantling of existing stations and their replacement by vast wind and solar farms. But these jobs, mainly in construction, will be temporary at best. Maintaining the new installations may also provide some green jobs – but much of the monitoring needed is likely to be done remotely (perhaps via drones and computer scanning), so relatively few full-time maintenance jobs will be required. Often, these jobs will necessitate a considerable level of technical skill, which most South Africans lack.

Overall, then, South Africa will find that the great majority of new green jobs go to China and other countries – and that there is little fresh employment to replace the millions of jobs lost here.

Job losses in South Africa will affect not only the coal mining and electricity sectors but also the towns which currently serve those sectors. Here, most retail centres and support services – ranging from accountancy to hair dressing, vehicle repairs, and domestic work – will largely disappear. Jobs will be lost from many other spheres as well.

According to Robert Lyman, an energy expert and consultant for many years to the Canadian federal government, the industries likely to be most affected are ‘in petroleum, petrochemicals, metal refining and fabrication, cement, steel, pulp and paper, and vehicles and parts manufacturing’. Canada’s experience shows the extent of the potential damage, for climate change policies have (directly or indirectly) caused the cancellation of energy and mining projects worth \$196bn in a five-year period from 2014 to 2019.¹⁸⁸

6.7 Better value in adaptation strategies

As Bjorn Lomborg of the Copenhagen Business School and the Hoover Institute at Stanford and many others have pointed out, people have used adaptation strategies for millennia to counter the risks of floods, droughts, fires, hurricanes and other extreme weather events. Wealthier nations can afford to do more, which is why extreme weather events kill fewer people in rich countries than they do in poor ones.

In October 2019 the Global Commission on Adaptation published a report entitled *Adapt Now: A Global Call for Leadership on Climate Resilience*. Though it echoed the widely expressed view that climate change is increasing the number and ferocity of ‘potentially extreme weather events’, it also pointed out that ‘humanity has always lived under the looming threat of nature’s fury’ but that humans have ‘adapted to climate variability for thousands of years’.¹⁸⁹

As Kane-Berman points out, ‘thanks to engineering skills and political accountability, people in rich countries are much safer than they were a hundred years ago. Thanks to such measures

¹⁸⁸ Robert Lyman, *Magical Thinking: Why “Net Zero” is Neither Possible nor Desirable*, Executive Summary, <https://blog.friendsofscience.org/2021/06/09/magical-thinking-why-net-zero-is-neither-possible-nor-desirable/>

¹⁸⁹ Kane-Berman, Barbara Creecy’s \$750bn a year sounds about right’, TDF, 16 August 2021

as better warning systems and storm and cyclone shelters, even Bangladesh, a very poor country, has seen a decline in deaths from disasters'.¹⁹⁰

Across the world, there has been at least a 92% decline in the world's per-decade death toll from natural disasters since the 1920s. This, as Lomborg has noted, has reduced the number of natural disaster deaths over the past century from almost half a million a year to fewer than 20 000. This decline has been achieved despite a quadrupling of the world's population.¹⁹¹

Adaptation has many advantages. It can be closely targeted to specific problems, making it more precise and more effective. The benefits of sound adaptation strategies – Amsterdam's superbly efficient water management system, for example – are clear to households and taxpayers alike. Unlike the net zero approach, adaptation does not push up energy prices, reduce economic growth rates, worsen unemployment, or make it harder to lift people out of poverty. Nor does it demand that poor countries forgo the cheap and reliable energy that would help them to grow richer – and would enable them improve living standards while spending more on adaptation strategies to protect their people.

By contrast, the likely costs of 'net zero' are so high that adaptation strategies will become increasingly unaffordable as the net zero goal is pursued. No official cost estimates accompanied the Paris Agreement or have since been put forward by the IPCC, but Lomborg has calculated some likely costs in a paper published in the peer-reviewed journal *Technological Forecasting and Social Change*. For this purpose, he made use of peer-reviewed estimates used for the US, the EU, China, and Mexico, which together make up around 80% of the promised reductions in CO2 emissions.

Writes Kane-Berman: 'Extrapolating these for the whole planet, [Lomborg] arrived at an annual cost of between \$1 trillion and \$2 trillion in lost GDP, the latter being the more likely figure. This would be the cost of reducing emissions by just 1% of the quantity needed to limit the rise in global temperatures to 2 degrees Celsius. The cumulative cost of achieving this target would amount to \$250 trillion, or 5.4% of future GDP.' Lomborg's cost-benefit analysis also showed that for every dollar spent on cutting carbon, the claimed benefits to human welfare arising from the Paris Agreement would be only 11 cents. The *costs* of carbon-cutting climate policies thus far outweigh their climate *benefits*.¹⁹²

By contrast, as Lomborg points out in a 2020 book entitled *False Alarm*, it would cost very much less to lift all the 650 million extremely poor people in the world out of poverty, while the positive impact on the environment would be far greater. Writes Lomborg: 'It turns out that the theoretical cost to lift *everyone* on the planet out of extreme poverty would be less than \$100 billion per year. Compare this to our current trajectory: we've committed to spending \$1 trillion to \$2 trillion a year just on the almost entirely ineffective Paris

¹⁹⁰ Ibid

¹⁹¹ Ibid

¹⁹² Kane-Berman, The Paris Agreement, op cit

Agreement. Every *month* the cost will be the same as the amount that could lift everyone from extreme poverty. This strikes me as obscene. As rich countries commit to going carbon-neutral, the cost will escalate to tens of trillions of dollars per year, to make a small temperature change in a century's time. Just a couple of days of these new higher costs could transform the world by ending extreme poverty entirely.'¹⁹³

As Lomborg adds, helping the poor to rise out of poverty would also offer a much cheaper and more effective way to protect the environment. Once people are wealthier and less worried about their daily survival, they are more capable of investing in adaptation, which offers the most effective protection against rising sea levels, destructive hurricanes, and other extreme weather events.¹⁹⁴

Lomborg puts it thus: 'Fixating on scary stories about climate change leads to poor decisions... Overspending on bad climate policies doesn't just waste money, it means underspending on *effective* climate policies and underspending on the opportunities we have to improve life for billions of people, now and into the future. That's not just inefficient. It's morally wrong.'¹⁹⁵

7 No SEIA reports on the Bill

Since September 2015 all legislation and regulation in South Africa must be subjected to a 'socio-economic impact assessment' before it is adopted. This must be done in terms of the Guidelines for the Socio-Economic Impact Assessment System (SEIAS), developed by the Department of Planning, Monitoring, and Evaluation in May 2015. The aim of this system is to ensure that 'the full costs of regulations and especially the impact on the economy' are fully understood before new rules are introduced.¹⁹⁶

According to the Guidelines, the SEIA system must be applied at various stages in the policy process. Once new regulations (or other rules) have been proposed, 'an initial assessment' must be conducted to identify different 'options for addressing the problem' and making 'a rough evaluation' of their respective costs and benefits. Thereafter, 'appropriate consultation' is needed, along with 'a continual review of the impact assessment as the proposals evolve'.¹⁹⁷

A 'final impact assessment' must then be developed that 'provides a detailed evaluation of the likely effects of the [regulation] in terms of implementation and compliance costs as well as the anticipated outcome'. When the regulation is published 'for public comment and consultation with stakeholders', the final assessment must be attached to it.¹⁹⁸

¹⁹³ Charles Rotter, False Alarm: Book Review, wattsupwiththat.com, 25 August 2020

¹⁹⁴ Ibid

¹⁹⁵ Rotter, False Alarm, *ibid*

¹⁹⁶ SEIAS Guidelines, p3, May 2015

¹⁹⁷ Guidelines, p7

¹⁹⁸ Ibid, p7

The Guidelines stress that the SEIA system must be applied to all legislation, including ‘legislation [that] provides an enabling framework for more detailed regulations’, as the Bill does.¹⁹⁹ Framework legislation like the Bill is particularly difficult to evaluate because it is impossible to foretell what ‘policies and measures’ might in time be adopted by ‘every organ of state affected by climate change’. [Clause 7, Bill] Nor can the full extent of the Bill’s proposed mitigation and adaptation strategies be foreseen. [Memorandum]

This also makes it impossible to quantify what the full economic costs of the Bill might be. Yet, according to the SEIAS Guidelines, it is particularly important that a final SEIA report should ‘identify’ and caution against proposed legislation where ‘the burdens of change loom so large that they could lead to excessive costs to society, for instance through disinvestment by business or a loss of skills to emigration’.²⁰⁰ This has not been done for the Bill, even though it is likely to trigger precisely the kind of ‘excessive costs’ against which the Guidelines warn – and many more negative consequences too.

In the absence of a comprehensive SEIA report – and given the width and vagueness of the Bill’s provisions – the public cannot adequately ‘know about’ the issues raised by the measure. Yet this is also contrary to the public participation provisions in the Constitution.

8 The need for proper public consultation

The Constitutional Court has repeatedly stressed that proper public participation in the law-making process is a vital aspect of South Africa’s democracy. Relevant rulings here include *Matatiele Municipality and others v President of the Republic of South Africa and others*; [(2006) ZACC 12] *Doctors for Life International v Speaker of the National Assembly and others*; [2006 (6) SA 416 (CC)] and *Land Access Movement of South Africa and others v Chairperson of the National Council of Provinces and others*. [(2016) ZACC 22]

In these judgments, the Constitutional Court has elaborated on what is needed for proper public consultation. According to the court, citizens must be given ‘a meaningful opportunity to be heard in the making of laws that will govern them’. They must also be given ‘a reasonable opportunity to know about the issues and to have an adequate say’.²⁰¹

A proper SEIA assessment would have helped the public to understand the many risks raised by the Bill and to make informed comments on it to the portfolio committee. In the absence of interim and final SEIA reports, the public has been barred from the opportunity for adequate consultation. In addition, the time allowed for people to get to grips with the Bill’s vague and complex provisions has also been too short to pass constitutional muster.

¹⁹⁹ Ibid, p8

²⁰⁰ Ibid, p11

²⁰¹ *Matatiele Municipality and others v President of the Republic of South Africa and others*; [(2006) ZACC 12] *Doctors for Life International v Speaker of the National Assembly and others*; [2006 (6) SA 416 (CC)] and *Land Access Movement of South Africa and others v Chairperson of the National Council of Provinces and others*. [(2016) ZACC 22]; *Minister for Health and another v New Clicks South Africa (Pty) Ltd and others*, [2005] ZACC 14, at para 630

9 Unconstitutionality of the Bill

Parliament has failed to ‘facilitate public involvement’ in the legislative process, as required by Section 59 of the Constitution. This renders the Bill unconstitutional on procedural grounds. In addition, the measure is unconstitutional on substantive grounds too.

The Bill is a broad ‘framework’ measure that contradicts the separation of powers doctrine by giving ministers, environmental MECs, mayors, and hundreds of organs of state the power to devise and implement a host of new rules, policies, and measures. They will be able to do so by notice in the Gazette and without reference to Parliament.

This is clearly contrary to the separation of powers, under which legislative powers are reserved for Parliament and the executive is confined to implementing the laws the legislature has adopted. In addition, the powers given to the executive undermine one of the founding values in the Constitution: the country’s commitment to a ‘multiparty system of democratic government to ensure accountability, responsiveness and openness’.²⁰²

This empowerment of the executive at the expense of Parliament and the country’s commitment to an open and accountable democracy permeates the entire Bill. It is particularly evident in provisions that empower:

- ‘every organ of state affected by climate change’, or entrusted with helping to achieve ‘a sustainable environment’, to adopt unspecified ‘policies and measures’ under Clause 7;
- the provincial environmental MECs and the mayors of district and metropolitan councils to introduce and implement provincial and local ‘climate change response implementation plans’, under Clause 15;
- the minister of environment, forestry and fisheries (the environmental Minister) to develop and implement a ‘National Adaptation Strategy and Plan’, under Clause 18;
- a host of other ministers, including those responsible for housing, agriculture, mining, and transport, to develop and implement ‘Sector Adaptation Strategies and Plans’, based on their assessment of relevant ‘vulnerabilities to climate change’ and the ‘measures needed to respond thereto’, as envisaged in Clause 19;
- the environmental Minister to lay down a ‘national greenhouse emissions trajectory’ for South Africa, under Clause 21;
- the environmental Minister to decide what sectors are to be ‘subject to sectoral emissions targets’, under Clause 22;
- the environmental Minister to list the ‘greenhouse gases’ and ‘activities’ that ‘cause’, are ‘likely to cause’, or ‘exacerbate’ climate change, under Clause 23;

²⁰² Section 1(d), Constitution

- the environmental Minister to allocate ‘carbon budgets’ to natural and juristic ‘persons’ conducting ‘listed activities’, in the light of ‘national strategic priorities’ and all other ‘relevant considerations’, as envisaged in Clause 24; and
- the environmental Minister to determine what ‘synthetic greenhouse gases’ must be ‘phased down or phased out’ and to prescribe ‘thresholds’ for their ‘use’, under Clause 25.

The matters listed here are enormously important to the country’s economy and the wellbeing of all South Africans. This makes it imperative that decisions on them should be made by Parliament – after due deliberation among all political parties – and not simply by the executive by notice in the Gazette. Moreover, without proper parliamentary scrutiny, it will be difficult to assess how adequately the criteria for the exercise of these powers, as set out in the Bill, have been met.

In addition, as earlier outlined above, the Bill is replete with vague words and concepts likely to be interpreted in different ways at different times. Many of the criteria for the exercise of the powers listed above – which depend, for example, on what is ‘feasible’, or what ‘opportunities’ or ‘constraints’ might apply – are intrinsically uncertain. This contradicts the doctrine against vagueness of laws and is in breach of Section 1 of the Constitution, which guarantees the ‘supremacy’ of the rule of law.²⁰³

The Bill also seeks to oust the jurisdiction of the courts. Under Clause 33, appeals against decisions taken under powers delegated by the environmental Minister are to be heard and decided by the Minister herself. The same is to apply at the provincial level, where appeals against decisions taken under powers delegated by environmental MECs are to be decided by those MECs.

These provisions breach the doctrine of the separation of powers, which reserves the interpretation of the law and the adjudication of disputes to the judiciary. They are also inconsistent with Section 34 of the Constitution, which gives everyone a right of access to the courts or other independent tribunals.²⁰⁴

10 The Way Forward

The Bill is unconstitutional, both procedurally and in terms of its substantive content, and should simply be abandoned.

If it is instead enacted into law, the Bill will over-burden an already failing state and have many other adverse consequences. Among other things, it is likely to exacerbate indoor pollution, cripple the economy, push up already astronomical unemployment rates, increase the risk of energy ‘starvation’, and make it harder to afford adaptation strategies with substantial value.

²⁰³ Section 1(c), Constitution

²⁰⁴ Section 34, Constitution

The direct, indirect, and opportunity costs for South Africa of prematurely closing down many of its coal-fired power stations and shifting increasingly to intermittent renewable energy will be enormous. Yet very little of the \$750 billion the environmental Minister believes the rich world should transfer to emerging markets, such as South Africa, to help them shoulder these costs will be provided.

At the same time, South Africa's economic position is now particularly weak. In the past decade, investment has fallen sharply, the growth rate has remained well below the rate of population growth, unemployment has soared, and public debt has grown to the point where the country could soon reach the fiscal cliff.

By contrast, the seven countries that have adopted legislation aimed at turning their Paris Agreement commitments into binding domestic law are all developed nations with greater wealth, lower unemployment, and more administrative capacity than South Africa.

In addition, some of these countries – along with other nations too – are currently planning to increase their use of fossil fuels and nuclear power to help counter energy shortages and rising prices.

According to the International Energy Agency, the amount of electricity generated from coal rose by 9% last year. Around the world, adds the Global Energy Monitor, some 1 000 coal-fired plants are being planned or are already under construction, 865 of them in Asia and the Pacific. India plans to increase coal production by 28% over the next ten years. China has more than 100 coal-mining projects under construction.²⁰⁵

Many countries, including China and Russia, are ramping up nuclear power too. The European Commission, as earlier noted, has adopted a proposal to label nuclear and gas as 'sustainable', subject to certain conditions. France, which generates more than 70% of its power from nuclear reactors, intends to expand its use of nuclear energy and has already announced plans to build six new reactors, the first of them to come online by 2035.

The Netherlands plans to build two new plants. Adds Kane-Berman:²⁰⁶

France is also keen to invest in small modular nuclear reactors (SMRs), which can be produced in factories much more quickly and cheaply than nuclear power stations can be built. Rolls-Royce has similar plans, backed by British government interest and a small group of private investors. Poland, Turkey and the Czech Republic have expressed interest, and Rolls-Royce says the first could come online by the early 2030s.

²⁰⁵ John Kane-Berman, 'Mantashe is right and the DA is wrong', The Daily Friend, 14 February 2022

²⁰⁶ Ibid

China, Russia, and Canada are also pursuing the idea of SMRs. NuScale, an American company, last year signed a deal to supply six such reactors to Romania. More than 70 projects are under way in the US.

Public opinion appears to be changing. According to Michael Shellenberger, author of *Apocalypse Never*, public support in the US for nuclear power grew from 49% to 59% between 2018 and 2021. Among Democrats it grew from 37% to 60%. Shellenberger also noted a YouGov poll last year which showed that more than half of Germans think nuclear power should be part of their country's climate policy.

The energy shortages that emerged in Europe in the second half of 2021 have done much to prompt this rethink – the *Wall Street Journal* suggesting that they have ‘shocked’ Europe into ‘climate realism’. So too have declining wind speeds in the region over the past few years, which have highlighted the precarious nature of wind power. Russia's invasion of Ukraine has also rekindled interest in energy independence and reinforced the need for reliable and affordable electricity supply.

Instead of enacting the Bill, South Africa should follow the example of all the countries now intent on expanding their use of fossil fuels and nuclear power. It should take full advantage of its enormous coal reserves, exploit the natural gas it seems to have in quantity both off-shore and in the Karoo, and extend the life of its Koeberg nuclear plant for as long as possible. It should also pursue the SMR option, as these small nuclear plants could be installed adjacent to its coal-fired power stations and integrated into the existing transmission grid. (By contrast, an increasing reliance on renewables will require Eskom to spend an unaffordable R180bn on expanding the grid to the Northern Cape – which is best for generating solar energy but far from the country's economic heartland – and the Eastern Cape, where many wind farms need to be located.)²⁰⁷

South Africa should also join with these other countries in discounting widespread but unsubstantiated assumptions that variable renewable energy from wind and solar will succeed in supplying baseload electricity with lower costs and more efficiency than fossil fuels.

Transport minister Fikile Mbalula has recently endorsed this view, telling a conference convened by the Presidential Climate Commission in mid-May 2022 that ‘renewable energy production will make electricity cheaper and more dependable, which will have positive knock-on effects on our energy-dependent sectors’. Renewables, he said, will ‘ensure an affordable and reliable supply of electricity for all citizens’, which will ‘stimulate greater investment and employment in our country’.²⁰⁸

But this perspective is mistaken, for all the reasons outlined in this submission. The mineral resources and energy minister, Gwede Mantashe, is correct to caution that the transition from

²⁰⁷ https://www.investec.com/en_za/focus/economy/sa-clean-energy-lost-in-transmission.html

²⁰⁸ *Financial Mail* 12 May 2022

coal to renewables should not be done in a ‘rush’ – and that South Africa must be careful to avoid the power shortages being experienced in the UK, China, India and elsewhere.²⁰⁹

Other factors are important too, as earlier outlined. Perversely, an increasing reliance on wind and solar will greatly increase, rather than reduce CO2 emissions. It will also contradict all three of the prime objectives of energy policy.

Take the three prime objectives first. To begin with, an expanding reliance on wind and solar for baseload generation will vastly increase the cost of electricity, as a ‘full cost of electricity’ (FCOE) assessment shows. Second, it will greatly reduce the supply of electricity and risk precipitating energy ‘starvation’ in South Africa, as an ‘energy return on investment’ (eROI) analysis points out. Third, its adverse environmental impacts will be particularly severe because of the enormous scale of the wind farms, solar arrays, and storage batteries (the ‘green machines’) required and the environmental damage that will result from their production, operation, and decommissioning.

At the same time, making all those green machines will push up CO2 emissions to an enormous extent, as vast amounts of energy from (reliable) fossil fuels will have to be used to power all the mining, processing, transporting, construction, and (before long) replacement required. Perversely, more efficient energy will increasingly be used to generate less efficient energy – and the amount of CO2 emitted in the process will be far greater than if South Africa had focused solely on expanding conventional power generation from coal, nuclear, and natural gas.

South African Institute of Race Relations NPC

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²⁰⁹ John Kane-Berman, ‘This climate deal would make our energy crisis worse’, The Daily Friend, 18 October 2021