

Fossil Fuel Energy, Electricity Access and Climate Change

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ABSTRACT

Given South Africa's fossil fuel history, so intimately connected to apartheid, there should be no surprise at the legacy of uneven access to clean energy by class, gender, race and geography. That this legacy continues and in some ways is exacerbated – notwithstanding 'Free Basic Electricity' promises – is worthy of explanation. At the core is Eskom's pressure to commercialise, liberalise and partially privatise, resulting in persistent shortages as well as economic strategies that remain energy-consumptive and capital-intensive (such as the Coega project). This means it is even more inexcusable to find South Africa's contributions to CO₂ emissions and global warming rank amongst the world's worst.

If in coming decades floods periodically inundate the eastern third of South Africa and droughts are unbearable in the western two-thirds, and if the main ports of eThekweni, Cape Town, Richard's Bay, Buffalo City and Mandela Metropole (including the new Coega complex) are gradually submerged – perhaps four meters below present sea levels in a century - once sufficiently large sections of Antarctica, the Arctic Circle and Greenland melt, where might South Africans turn to hurl the blame?

Mainly to Gauteng politicians and capitalists, that's where. State policy-makers and allied corporations active in the last two decades of the 20th century and first of the 21st drove the country's energy systems into unprecedented contradictions and crises. Perhaps none is more threatening than Eskom's contribution to climate change, amplified by the African National Congress government's 2004 policy which aims to commodify the air as a mitigating strategy. For those concerned about global warming, there are two approaches to consider in this chapter: a radical approach (i.e., going to the problem's *roots*) which would entail a genuine transformation of energy, industry and transport; or the prevailing neoliberal strategy which entails the *status quo* plus gimmicks such as the Kyoto Protocol's Clean Development Mechanism (CDM).

South Africa's contribution to climate change

The international debate over climate change is heating up, the more irrefutable evidence of global warming and climate turbulence we see emerging. The overarching problem is well known to South Africans who follow the news; less understood – if at all - is this country's responsibility for the world's overdose of greenhouse gases. Like filthy laundry, it sometimes seems like a national secret that the economy we inherited from apartheid is so addicted to fossil fuel, and moreover that the post-apartheid government has made the situation *much much worse*.

South Africa is not included in the Kyoto Protocol Annex 1 list of countries that should make emissions reductions, and hence the economy as a whole is not subject to targets at this stage. But we will be in future, and looking ahead, officials and corporations – and even a few NGOs which should know better - are promoting the Protocol's Clean Development Mechanism as a way to continue South Africa's hedonistic output of greenhouse gases, and earn profits in the process. Pretoria's own climate change strategy (Appendix 1 in this volume) argues that the 'CDM primarily presents a range of commercial opportunities' and indeed 'could be a very important source of foreign direct investment'.

But do we deserve to earn such 'investment' because of South African industry's indefensible contribution to global warming? On the contrary, from his base at the University of Zululand, professor Mark Jury has gathered the following damning facts about South Africa's *debt* to the planet:

- South Africa contributes 1,8 per cent of total Greenhouse Gases, making it one of the top contributing countries in the world;
- the energy sector is responsible for 87 per cent of carbon dioxide (CO₂), 96 per cent of sulphur dioxide (SO₂) and 94 per cent of nitrous oxide emissions;
- 90 per cent of energy is generated from the combustion of coal that contains greater than 1 per cent sulfur and greater than 30 per cent ash;
- with a domestic economy powered by coal, South Africa has experienced a five-fold increase in CO₂ emissions since 1950;
- SA is signatory to the United Nations Framework Convention on Climate Change (UNFCCC) and Montreal Protocol, yet CO₂ emissions increased 18 per cent between 1990 and 2000;
- South Africa has only recently enacted legally binding air pollution regulations via the National Environmental Management Air Quality Act, but energy efficiency is low;
- in rural areas of South Africa, approximately three million households burn fuelwood for their energy needs, causing deforestation, reduction of CO₂ sinks, and indoor health problems;
- the industrial sector consumes 2,6 quads of energy (57 per cent of total primary energy consumption) and emits 66,8 M T of carbon (65 per cent of total carbon emissions from fossil fuels), though industry's contribution to GDP is 29 per cent;
- since 1970, South Africa consistently has consumed the most energy and emitted the most carbon per dollar of GDP among major countries.

South African energy intensity measured 33,5 K BTU per \$unit (above), is nearly at China's level;

- South Africa's carbon intensity is far higher than in most other countries due to its dependence on coal; and
- household and industrial energy consumption across the continent is predicted to increase by over 300 per cent in the next fifty years with significant growth in sulphur and nitrogen emissions.¹

Coal is by far the biggest single South African contributor to global warming, representing between 80 and 95 per cent of CO₂ emissions since the 1950s. But liquid CO₂ emissions mainly from transport have risen to the level of more than 10 000 metric tonnes a year since the early 1990s. It is regrettable but true, just as in Eastern Europe (whose CO₂ emissions are well below 1990 levels), that the long recession of the early 1990s was the only point in South Africa's history since the early 1930s' economic crisis, that CO₂ emissions stabilised and dropped slightly. Needless to say, South Africa is by far the primary global warming villain in Africa, responsible for 42 per cent of the continent's CO₂ emissions, more than Egypt, Nigeria, Algeria and Libya put together.

Given the vast CO₂ emissions increases by South Africa especially during the 1980s-90s, added to similar increases in global greenhouse gas emissions, it is only logical to find an average 1 degree C increase in our region's temperature, over historic norms. This is merely the surface-level statistical information about the climate change crisis, as it emerges. Much more could be said about the various other indicators, ranging from droughts/floods in South Africa and Africa, to the hurricanes which belted George W. Bush's oil producing and refining belt in Texas/Louisiana in September 2005.

As noted, the Kyoto Protocol came into effect in February 2005, but South Africa is not subject to emissions reduction targets at this stage. However, since we will be in future, some state officials, international financiers and local corporations – and even a few NGOs which should know better - are promoting a gimmick, the Protocol's Clean Development Mechanism (CDM), which substitutes investments in carbon-reducing projects for genuine emissions reductions.

To critics, including dozens of environmental justice networks which signed the October 2004 'Durban Declaration on Climate Justice',² the CDM and especially the new carbon market that permits trade in pollution rights represent misleading 'greenwash'. Carbon trading justifies letting the US, EU and Japan continue their emissions, in exchange for a small profit payout to dubious South African firms and municipalities for reductions in local carbon. Those reductions we should be making in any event.

For example, methane that escapes from Africa's largest landfill, at Bisasar Road in the Durban residential suburb of Clare Estate, should be captured, cleaned and safely turned into energy. Ethekewini officials instead aim to burn the methane on site, and in the process that entails keeping the toxic dump open at least another seven years - though the ANC had promised its closure in

1. Jury, M. (2004), 'Presentation to Durban Declaration Group', Richards Bay, 9 October.

2. <http://www.carbontradewatch.org>. See the appendix, below.

1996 due to community opposition. The officials' goal is to sell carbon credits via the World Bank to big corporations and Northern governments. But a famous community activist, cancer-stricken Sajida Khan, appears to have frightened the World Bank off for now.

Unfortunately, the Department of Environmental Affairs and Tourism supports this form of carbon colonialism. DEAT issued the *National Climate Change Response Strategy* in September 2004, insisting we must understand 'up-front' how the 'CDM primarily presents a range of commercial opportunities, both big and small. This could be a very important source of foreign direct investment.' In October 2005, a gathering of environmental activists at the University of KwaZulu-Natal rejected outright the CDM policy. As noted in the Appendix, their declaration concluded, 'Real solutions are needed, and with our world-leading CO₂ emissions, South Africans must be at the cutting-edge of progressive climate activism, not partners in the privatisation of the atmosphere.'

Indeed, the economy's five-fold increase in CO₂ emissions since 1950 and 20 per cent increase during the 1990s, can largely be blamed upon the attempt by Eskom, the mining houses and metals smelters to brag of the world's cheapest electricity. Emitting twenty times the carbon tonnage per unit of economic output per person than even the United States, South African capital's reliance upon fossil fuels is scandalous. Not only are vast carbon-based profits fleeing to the mining houses' offshore financial headquarters. There are very few jobs in these smelters, including the proposed \$2.5 billion Coega aluminium project for which the notorious Canadian firm Alcan has been promised lucrative sweetheart deals from Eskom, the Department of Trade and Industry and the Industrial Development Corporation. Less than 1000 jobs will be created in the smelter, though it will consume more electricity than nearby Port Elizabeth.

Aside from carbon trading, the main answer to the climate question provided by public enterprises minister Alec Erwin is fast-tracking the dangerous, outmoded Pebble Bed technology rejected by German nuclear producers some years ago. That reckless strategy will continue to be fought by Earthlife, who won two important preliminary court battles against Erwin's special advisor, former DEAT director-general Chippy Olver.

Instead, renewable sources like wind, solar, wave, tidal and biomass are the only logical way forward for this century's energy system, but still get only a tiny pittance of government support, a fraction of the hundreds of millions rands wasted in nuclear R&D. Meantime, because of alleged 'resource constraints', communities like Kennedy Road bordering Bisasar landfill – where impoverished people rely upon dump scavenging for income – are still denied basic services like electricity. While Kennedy Road activists are promised a few jobs and bursaries, the plan to burn the landfill's methane gas on-site could release a cocktail of new toxins into the already-poisoned air. Gas flaring would increase 15-fold under the scheme Durban has tried selling to the World Bank. The generator's filters would never entirely contain the aromatic hydrocarbons, nitrous oxides, volatile organic compounds, dioxins and furans.

An even more dubious carbon trade is now being marketed: Sasol's attempt to claim credits for its new Mozambique gas pipeline, on grounds the huge investment would not have happened without them. That this is a blatant fib was conceded offhandedly to researchers by a leading Sasol official in June 2005, and is the sort of incident which discredits the whole idea of commodifying the air through unverifiable carbon reductions.

Aside from the World Bank, the cash-rich companies which most need to cut these deals to protect their future rights to pollute are the oil majors, beneficiaries of windfall profits as the price per barrel soared from \$11 in 1998 to more than \$70 in 2006. The Bank itself even admits in a recent study that these and other extractive firms' depletion of Africa's natural resources drain the national wealth by hundreds of dollars per person each year in the Gabon (whose citizens lost \$2,241 each in 2000), the Republic of the Congo (-\$727), Nigeria (-\$210), Cameroon (-\$152), Mauritania (-\$147) and Cote d'Ivoire (-\$100).³

In the process, the oil fields are attracting a new generation of US troops to bases being developed in the Gulf of Guinea. Once again, Pretoria is amplifying the worst trends, as HSRC researchers John Daniel and Jessica Lutchman recently concluded of sleazy oil deals - not only by Imvume in Saddam's Iraq replete with transfers to ruling party coffers - that encompass the Sudanese and Equatorial Guinean dictatorships: 'In its scramble to acquire a share of this market, the ANC government has abandoned any regard to those ethical and human rights principles which it once proclaimed would form the basis of its foreign policy.'⁴ President Thabo Mbeki himself downplayed Sudan's Darfur crisis, even when sending peace-keeping troops, because, as he said after a meeting with Bush in mid-2005, 'If you denounce Sudan as genocidal, what next? Don't you have to arrest the president? The solution doesn't lie in making radical solutions - not for us in Africa.'⁵ Pretoria's national oil company, PetroSA, had five months earlier signed a deal to share its technicians with Sudan's Sudapet, so as to conduct explorations in Block 14, where it enjoyed exclusive oil concession rights.⁶

Those ethical principles should be urgently revisited now, since our future generations' very survival is at stake. Since DEAT's October 2005 National Climate Change Conference did not engage seriously with these critiques, its attendees will be regarded as a large part of the problem. The irony is that while generating enormous carbon emissions, energy is utilised in an extremely irrational way. The unjust system leaves too many without access, while a few large corporations benefit disproportionately, as we see below.

In sum, our purpose is to dig deeper, in order to uncover an emerging form of environmental injustice, the carbon market, and to highlight cutting-edge attempts to mitigate that injustice through civil society activism and

3. World Bank (2005), *Where is the Wealth of Nations? Measuring Capital for the 21st Century*, Washington, Conference Edition, 15 July.

4. Daniel, J. and J. Lutchman (2005), 'South Africa in Africa', Presentation to the SA Association of Political Studies Colloquium, Pietermaritzburg, 22 September.

5. Becker, E. and D. Sanger (2005), 'Opposition to Doubling Aid for Africa', *GreenLeft Weekly*, 2 June.

6. Fabricius, P. (2005), 'PetroSA to send Technicians to Explore Oil Possibilities in the Sudan', *The Star*, 5 January.

advocacy that stretches from retail household reconnections to international environmental negotiations. This is not an entirely celebratory account, for notwithstanding successful civic resistance to South Africa's largest proposed CDM project, at Bisasar Road, one of the concerns our research has uncovered is the failure of the environmental justice critique to penetrate the realm of policy. In that sphere, Big Oil and the South African minerals-energy complex appear to have the upper hand.

Corporate CO2 beneficiaries

All South Africans must face up to their responsibility for permitting the country's ruthless powerbrokers – mining/smelting magnates such as the late Brett Kebble, the Oppenheimer family, Lakshmi Mittal, and newly enriched Patrice Matsepe, Tokyo Sexwale and Mzi Khumalo – to befriend the ANC government. The result is that state provides them electricity prices at the world's lowest levels, largely for the benefit of *externally-located* mining/smelting empires, whose profits and dividends now mainly flow from South Africa to Britain, the US and Australia. The recent upsurge in earnings by mining/smelting firms is a good indicator of the extent to which South African public policy and greed are threatening our descendants' very lives.

Even though industrial users do provide a small cross-subsidy to household consumers, Eskom supplies the large firms with the cheapest industrial electricity in the world. While in other countries, domestic consumers are charged twice as much as large industry, Eskom charges industry prices that are as little as one seventh the domestic price.⁷ As a result, the University of Cape Town's Energy for Development Research Centre (EDRC) confirms that generation of cheap electricity in South Africa still relies on the extremely wasteful burning of low-grade coal, which has a worsening impact on the environment not just through emissions but also in requiring vast amounts of coolant water. Indeed, Eskom is the single largest consumer of raw water in South Africa. While industry benefits from cheap electricity as a competitive advantage, the negative social and environmental effects of electricity production have never been internalised into the cost.

One EDRC study concedes that South Africa:

- is 'the most vulnerable fossil fuel exporting country in the world' if the Kyoto Protocol is adopted, according to an International Energy Agency report;
- scores extremely poorly 'on the indicators for carbon emissions per capita and energy intensity';
- has a 'heavy reliance' on energy-intensive industries;
- suffers a 'high dependence on coal for primary energy',
- offers 'low energy prices' which in part is responsible for 'poor energy efficiency of individual sectors'; and

7. Leslie, G. (2000), 'Social Pricing of Electricity in Johannesburg', Masters research report submitted to the Faculty of Management, University of the Witwatersrand, Johannesburg.

- risks developing a 'competitive disadvantage' by virtue of 'continued high energy intensity' which in the event of energy price rises 'can increase the cost of production'.⁸

In short, the existing levels of environmental degradation caused by coal mining, electricity generation, lack of access by the majority of low-income people, hydropower and nuclear energy are formidable. Not including net exports of greenhouse gas pollutants - since South Africa is the world's second largest exporter of coal after Australia - the energy sector contributed 78 per cent to South Africa's share of global warming and more than 90 per cent of all carbon dioxide emissions in 1994. These ratios have probably increased since.

By 1998, South Africa emitted 354 million metric tonnes of carbon dioxide, equivalent to 2 291 kilograms of carbon per person (a 4 per cent increase from 1990 levels). South Africa is amongst the worst emitters of CO₂ in the world when corrected for both income and population size, worse than even the United States, *by a factor of 20*. South Africa took no action to reduce emissions over the period 1990-98, and indeed allowed them to increase from 2 205 to 2 291 kilograms of carbon per person.⁹

Energy sector carbon emissions, 1999¹⁰

Area	Population (mns)	CO ₂ /person	GDP (\$bns)	CO ₂ /GDP (kg/\$bn)	CO ₂ (kg)/GDP*pop
S.Africa	42	8.22	\$164	2.11	0.0501
Africa	775	1.49	\$569	1.28	0.0016
USA	273	20.46	\$8,588	0.65	0.0023
OECD	1116	10.96	\$26,446	0.46	0.0004
World	5921	3.88	\$32,445	0.71	0.0001

NOTE: The tonnes of carbon dioxide (CO₂) emissions are those measureable through fuel combustion.

Finally in 2005, the deals which gave Billiton, Anglo American and other huge corporations the world's lowest electricity prices came under attack by Alec Erwin, minister of public enterprises. It seemed like progress finally, because the package Eskom had given Billiton for the Alusaf smelters at Richards Bay Hillside and Mozal in Maputo during the period of Eskom's

8. Spalding-Fecher, A. (2000), 'The Sustainable Energy Watch Indicators 2001', Energy for Development Research Centre, University of Cape Town, Cape Town, November. www.edrc.uct.ac.za.

9. International Energy Agency (2000), 'CO₂ Emissions from Fuel Combustion, 1971-1998', Paris; International Energy Agency (2000), 'Key World Energy Statistics from the IEA', Paris.

10. Source: International Energy Agency data, with final column calculated by Bond. Because Purchasing Power Parity estimates by the IEA are dubious (e. g. , Zimbabwe's GDP is \$32,7 billion), the actual GDP figures are used. However, South Africa's is far less than \$164 billion, so the ratios indicating South Africa's high carbon/GDP emissions are actually quite conservative.

worse overcapacity, had resulted in ridiculously cheap electricity – often below R0,06/kiloWatt hour (kWh) – when world aluminium prices fell. *Creamer's Engineering News* reported in June 2005 that, 'following the introduction of new global accounting standards, which insist on "fair value" adjustments for all so-called embedded derivatives... Eskom admits that the sensitivities are substantial and that the volatility it could create is cause for concern.' Public enterprises minister Alec Erwin reportedly insisted on lower 'financial-reporting volatility' – every time the Rand changes value by 10 per cent, Eskom's wins or loses R2 billion - and he gave 'guidance that the utility should no longer enter into commodity-linked contracts and that management should attempt to extricate the business from the existing contracts'. Mkhwanazi replied that any change to the current contracts could be 'a bit tricky for us... We would adopt a pragmatic approach and, who knows, perhaps there will even be some sweeteners in it for us.'¹¹

How did that new approach play out in terms of the vast subsidies promised at Coega, where Erwin as trade and industry minister from 1996-2004 had led negotiations for a new aluminium or zinc smelter? The answer was clear within two weeks, as a long-awaited \$2,5 billion (R16,3 billion) deal with Canada's Alcan came closer to completion. According to the chief executive of the parastatal Industrial Development Corporation (IDC), Geoffrey Qhena, 'The main issue was the electricity price and that has been resolved. Alcan has put a lot of resources into this, which is why we are confident it will go ahead.' Meanwhile, however, to operate a new smelter at Coega, lubricated by at least 15 per cent IDC financing, Alcan and other large aluminium firms were in the process of shutting European plants that produce 600 000 metric tonnes between 2006-09, simply 'in search of cheaper power', according to industry analysts.

A Coega plant would generate an estimated 660 000 tonnes of CO₂ a year. For the purpose of complying with Kyoto Protocol obligations, Europe will be able to show reductions in CO₂ associated with the vast energy intake needed – representing a third of a typical smelter's production costs – while South Africa's CO₂ will increase proportionally. Indeed, as a result of the sweeteners offered to Alcan, Eskom will more rapidly run out of its excess electricity capacity, resulting in raised prices to poor people, more coal generation, and a more rapid turn to objectionable power sources such as nuclear reactors and two proposed Zambezi River megadams.¹²

According to University of Cape Town professor Richard Fuggle (2006),

It is rather pathetic that our current environment minister Marthinus van Schalkwyk has expounded the virtues of South Africa's 13 small projects to garner carbon credits under the Kyoto Protocol's Clean Development Mechanism, but has not expressed dismay at Eskom

11. *Creamer's Engineering News* (2005), 'Eskom will seek to Cancel Commodity-Linked Tariff Deals', 29 June.

12. Bailey, S. (2005), 'Alcan Will Probably Build \$2,5 Bln Smelter, IDC Says', *Bloomberg News*, 13 July. For a full critique of Coega, especially Erwin's role, see Bond, *Unsustainable South Africa*, Chapter Two; for an update see Bond, P. (2006), 'South Africa Embraces Corporate Welfare: Mega Deal Subsidies Over Services for the Poor', <http://www.multinationalmonitor.org/mm2006/092006/bond.html>.

selling 1360 megawatts a year of coal-derived electricity to a foreign aluminium company. We already have one of the world's highest rates of carbon emissions per dollar of GDP. Adding the carbon that will be emitted to supply power to this single factory will make us number one on this dubious league table.

Conclusion

In sum, several important factors converge when we consider the nature of South African energy and its contribution to climate change:

- South Africa, already amongst the most unequal countries in the world in 1994, became more unequal during the late 1990s, as a million jobs were lost due largely to the stagnant economy, the flood of imports and capital/energy-intensive investment—and these trends had enormously negative implications for the ability of low-income citizens to afford electricity;
- billions of rands in state subsidies are spent on capital-intensive energy-related investments such as new smelters, where profit and dividend outflows continue to adversely affect the currency;
- the price of electricity charged to mining and smelter operations is the lowest in the world;
- a pittance is being spent on renewable energy research and development, especially compared to a dubious nuclear programme;
- the dangers of nuclear energy are now widely understood, in the wake of damaging reports on the Koeberg powerplant showing systemic maintenance problems that should result in the plant's decommissioning;
- greenhouse gas emissions per person, corrected for income, are amongst the most damaging anywhere, and have grown worse since liberation;
- electricity coverage is uneven, and notwithstanding a significant expansion of coverage, millions of people have had their electricity supplies cut as the state provider moves towards commercialisation and privatisation;
- the possibilities of improving gender equity through access to free lifeline electricity are vast;
- for people suffering from the recent upsurge in TB, and indeed for 6,4 million HIV-positive South Africans, the public and personal health benefits of replacing coal, wood or paraffin with electricity are vast; and
- there are other important environmental, segregation-related and economic benefits that flow from clean electricity as a replacement for traditional fuels, which are at present not incorporated into social and financial decision-making, especially when it comes to pricing electricity.

All of these problems can be countered by critiques from civil society. However, most challenging is the lack of synthesis between the three major citizens' networks that have challenged government policy and corporate practices: environmentalists, community groups and trade unions.