Climate and Energy

The elite trips out

Part three of the Peoples' Power series

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The groundWork Report 2015

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Foreword

Bobby Peek

South Africa is experiencing one of its most severe droughts ever. People's livelihoods are being destroyed, various large rivers such as the iMfolozi are running dry, dam capacities are falling, cattle – the backbone of African culture – are dropping like flies, crops are failing and people do not have water for their daily needs. This is after two years of drought in KwaZulu-Natal. The summer rainfall areas face a second dry and scorching summer as the cyclical El Nino event extends and intensifies the drought across the eastern part of the country.

This reality will lead to social mayhem if people are excluded. The impacts of climate change will be such that government as we know it might not exist in a few decades if urgent action is not taken. Already in Jozini, KwaZulu-Natal, people are protesting because they have been left without water. The protests highlighted that trucking in water is not a sustainable solution as the trucks did not come for some months while municipal officials said that they did not have enough water trucks. The protests led to children not going to school and adults not making it to work. And ambulances that needed to transport the sick could not get through as the roads were blocked. The social system is under stress and is crumbling. Was this the first protest linked to the collapse of the social system because of climate change? It might not be the first, but this is what our future may be like.

The big question is what is government going to do? Government spin doctoring may calm some people, but not for long. From viewing the reality, we are in trouble and, as we prepare for another round of doomed United Nations Framework Convention on Climate Change (UNFCCC) negotiations, groundWork's 2015 report places on record government's inability to respond meaningfully to climate change.

Not only is government doing business as usual, but it wants us to believe that business as usual is 'green'. Coal is green, fracking is green, oil is green and mining is green. This is what Michael Mabuyakhulu, MEC for Economic Development, Tourism and Environmental Affairs in KwaZulu-Natal, wants us to believe. In his address to a meeting on government's Intended Nationally Determined Contributions (INDC) – held at an obscure venue 50 kilometres outside Durban and away from any public transport route – he claimed that Operation Phakisa will respond to the threat of climate change. What is Operation Phakisa? It is a government development model to fast track fossil fuel development.

Operation Phakisa, according to government, brings "key stakeholders together for intensive planning at a practical and detailed level, setting targets, monitoring the progress of implementation". But who are the stakeholders? They are certainly not the community people who will face the pollution from expanded extraction of oil and gas. But they do include ExxonMobil, representatives of which flew in from the US to meet with President Zuma in June of 2014 to plan and define how extraction of fossil fuel will continue. Continue to save the climate? Well, maybe. At least according to the ANC and Exxon. Meanwhile, Exxon is being investigated by the State of New York for intentionally misleading the public and shareholders on the perils of climate change.

Government's response is all about spin and appearances. The 'consultation' on South Africa's INDC is a case in point. After provincial meetings and parliamentary hearings, nothing changed in government's submission to the UNFCCC. Together with organisations from the fencelines of polluting industries, groundWork responded that our government does not have our mandate for the climate negotiations in Paris.

The reasons that we are so confident to be able to say this are presented in this report; they are part of the daily experience we have with people on the ground, they echo in the meaningless rhetoric government spouts and are made concrete in the expansion of coal mining. Now government adds insult to injury as it readies to agree to a further ten coal-fired power stations that

will add more than 4 000 MW generating capacity. And beyond this, it has given rights for exploration for shale gas that will lead to fracking across vast areas of the country. In four provinces in South Africa, more than 16 500 farms are under this threat. This excludes the Karoo which has been at the centre of the fracking resistance to date.

We are in crisis and the only way we are going to get out of this crisis is if we act as society and do not hope that government, corporations or commissions of investigations will save us. It is clear from Exxon that corporates will lie. Ask the tobacco industry, the asbestos industry and the sugar industry. In South Africa, our major corporates are complicit in working together to put pressure on government to ensure that a climate response will amount to nothing more than hot air. They are confident that they will coral government into taking their position and this won't be terribly difficult, given the very strong relationship between the state and corporate South Africa. This was evident when Eskom, Sasol and other corporations were allowed to postpone meeting the air quality emissions standards which are the backbone of the hard fought for Air Quality Act. It was evident when corporate South Africa gave very partial information to the Davis Tax Commission to argue that there is no need for action on climate change. It is evident in the sleight of hand of corporations that now do not use the words 'hydraulic fracturing' in their proposals to explore for gas. It is evident in the bellicose attitude of corporate oil and gas lawyers who say that the State of New York's investigation of Exxon's climate denial will not widen much beyond Exxon. They have a confidence in this because of their close relationship to power.

Alarmingly, government is not only not responding to the challenges communities are facing because of climate change and bad development decisions, but they are now outsourcing development to corporations through South Africa's privatised renewables programme as well as through the dodgy business of offsets by Eskom and Sasol as an alibi for failing to meet air quality emission standards. Government is on a massive drive to outsource everything. Even our democracy is being outsourced to consultants who push dirty energy projects. In the various meetings where companies propose extraction of

fossil fuels, not once do you have government officials at the table trying to get a better understanding of the challenges people face on the ground.

There is a deep and ever growing frustration emerging on the ground. I fear by the time government does wake up and try to speak to the people, it might be too late, and the outsourcing of development and democracy will have resulted in the collapse of the social system.

My fear is that it is too late, and that Paris, 23 years after the first UNFCCC meeting is going to deliver nothing more than a spin that will keep society quiet for just a bit longer. Yet, as people see their worlds crumble without a meaningful response from governments, there is a growing awareness that a real response must come from the people. Based upon the evidence presented here, neither South Africa nor the UN can have our mandate.

Introduction

This groundWork Report continues with the theme of climate and energy justice explored from different angles in the last two reports: *Talking Energy* (2013) and *Planning Poverty* (2014). *Talking Energy* is a report of conversations with people from the fenceline communities about their energy use and lived environments, what they thought of the wider energy system and their ideas for an alternative system. It opens with a discussion of the scale of inequality and poverty in South Africa and of the concentration of power and control in the carbon intensive and polluting economy defined by the minerals-energy complex. *Planning Poverty* shows that the National Development Plan will not address poverty and inequality but is rather a plan to deliver cheap labour and natural resources to capital. It documents the port and petrochemical expansion plans in south Durban to show that the massive infrastructure projects central to government planning are designed to fit with a world of ever increasing carbon emissions, a world that is made ever more toxic.

This report is published just ahead of the climate negotiations in Paris where a new treaty is to be inked. It argues not only that the negotiations will not produce a result adequate to the challenge, but that the parties are looking for a dysfunctional climate regime. Thus far, only one country has negotiated to save the climate rather than its position within the orders of imperial capital. That was Bolivia in 2009 and 2010. Bolivia is a small and poor country and showed that this is no bar to principled action. In the negotiating halls of Cancun (2010), however, it was left isolated even by its closest allies.

While Bolivia was left out in the cold, corporate capital is ever more at the centre. In Warsaw (2013), the Polish government introduced corporate sponsorship as if the negotiations were a FIFA event. The sponsors included car makers, airlines, oil and gas corporations and coal power utilities. The French are doing likewise in Paris: Air France, Renault-Nissan, power utilities EDF

and Engie, Suez, notorious for privatising water and a proponent of fracking, and BNP Parabas, a major bank with a history of funding coal and salting away money in tax havens. The only surprise must be the omission of Volkswagen. Their deceit device would surely have proven useful.

Even without direct sponsorship, however, the negotiating process is already captured by corporate capital. Corporations are part of the delegations of many countries – Eskom and Sasol have been regular participants in the South African delegation. And the big corporates circle the negotiations, gaining entry through major lobby groups like the World Business for Sustainable Development and the International Emissions Trading Association, or hosting events on the side such as the World Coal Association's infamous conference in Warsaw.

The parties to the convention are not even considering what actually needs to be done to 'avoid dangerous climate change'. This report opens with a brief account of the scale of emission reductions now required and a rapid survey of already dangerous climate impacts. The second section looks at the state of the negotiations. It gives a brief history of the process to account for how it has achieved ever more dismal outcomes. All countries have submitted pledges to the UNFCCC ahead of the Paris Conference of the Parties (COP) and the sum of them adds up to disaster.

South Africa is amongst the top 12 producers of carbon emissions. The third section looks at its submission, judged 'inadequate', and climate policy. For corporate South Africa, 'inadequate' translates into over-ambitious. This report gives an account of the business lobbies' resistance to climate measures. Amongst their regular complaints is that climate and energy policy are not aligned. We agree. South Africa's energy plans scarcely recognise its climate pledge and the Department of Energy, along with Mineral Resources and Trade and Industry, is well aligned to the corporate view. The fourth section looks at the long running power crisis and argues that it is not just Eskom that is in crisis, but the model of development that has shaped South Africa over the last century. There is no certain outcome to the political battles of the next

decades but it is certain that survival is at stake. The concluding section asks, “Whose survival?”

In November 2013, the community groups from pollution hotspots of the Vaal and the Highveld joined people from KwaZulu-Natal to create a climate camp in Durban in solidarity with the resistance to the expansion of the port and petrochemical infrastructure at the cost of people. The Climate Camp Declaration is carried in the groundWork Report 2014. It emphasises people’s resistance to the elite agenda founded on dirty energy and producing profits from destructive development. It calls for food and energy sovereignty as part of economic sovereignty on the path to a world where everyone can “live well with each other and with the earth”. It concludes, “Where no-one grabs a surfeit, everyone can have enough.”

In December this year, while the negotiators meet in Paris, France, the hotspot climate camp will be created on the banks of the Vaal River in Parys, Free State. The river supplies the town’s water but carries a heavy pollution load from the Vaal Triangle, just upstream, where Sasol, ArcelorMittal, Eskom and AngloCoal dominate the landscape. Between Parys and Sasolburg, new coal mines are planned and, if constructed, will destroy large wetland areas adjacent to the river.

The Parys camp will build on the Durban Climate Camp Declaration. And it will look beyond Paris and the dismal last hurrah for the negotiating process to explore local and global strategies for mobilising against the lords of destruction while creating people’s alternatives.

Introduction

1 Done dangerous

> Capitalism is not compatible with addressing climate change. It requires never ending economic growth for its survival. Growth has brought unprecedented wealth to the owners of capital, prosperity to the world's middle classes and untold misery to the majority of people, particularly in the global South. Capitalism plunders the resources of the earth and of the people. It is the driving force behind ecological disruption on all scales from the local to the global. Climate change is the ultimate symptom of this renting of the earth system.
>
> The nation states brought into being by capitalism and imperialism find their legitimacy in their management of growth. They have therefore proposed a series of false solutions that protect the economy but not the climate. These false solutions, rooted in the logic of capitalist markets, have been made the subject of negotiation in the United Nations Framework Convention on Climate Change. The world's people can no longer have faith in this process. Unless the people drive a process of rapid change in the economic and political system, they face escalating damages as the earth is rendered uninhabitable. It is necessary to engage with this process for two reasons only: to monitor what is done in the name of the world's people and to expose and block bad deals.
> groundWork Position Paper on Climate and Energy Justice, 2011.

At the Durban climate negotiations in 2011, the parties agreed to negotiate a new climate agreement "no later than 2015" [UNFCCC 2011]. The deadline is now here. The new climate deal is to be agreed in December this year at COP 21 in Paris. The last big deadline in the negotiations process was for 2009

in Copenhagen. Then, as now, groundWork took the view that no agreement was better than a bad agreement. Then, as now, there was no good agreement on the table.

At Copenhagen, there was no agreement. The talks collapsed in acrimonious disarray after the US and BASIC countries (Brazil, South Africa, India and China) agreed the Copenhagen Accord in a back room and, with Europe's acquiescence, tried to impose it on the rest of the world. That imposition was resisted but, in Cancun the following year, the Copenhagen Accord was effectively adopted and the anger of Copenhagen was replaced by loud cheers from the assembled delegates.

In 2015, the Paris agreement is to take the form of "a protocol, another legal instrument or an agreed outcome with legal force under the Convention applicable to all Parties" [UNFCCC 2011]. This flatulent wording was agreed in Durban and reflects the common determination of the parties to avoid a serious response to climate change. In the four years since Durban, there has been no progress even on the form of the agreement. Nevertheless, agreement is possible on condition that it mandates a dysfunctional climate regime. The parties will at all costs avoid any obligations whatever. They will re-affirm the goal of keeping global warming to less than 2° Celsius above pre-industrial levels, but will do nothing to secure that outcome. In effect, they will agree to warming of four degrees or more as the corporate economy – or rather, the accumulation of capital – is given absolute priority over the planet.

We will take a closer look at the negotiations process in Section 2 below. In the meantime, we look at the scale of emission reductions needed now and at what agreeing to a warming world means.

Target disaster

The 2°C target is a recipe for disaster, as climate scientist James Hansen has repeatedly warned [Hansen et al 2008 & 2015]. With temperatures at 0.85°C above pre-industrial levels [IPCC 2014c: 3], millions of people already

experience climate change as disastrous. Intensified heatwaves, droughts and storms have affected all parts of the world.

Already, according to a report by Dara and the Climate Vulnerable Forum,[1] the deaths of half a million people a year are directly attributable to climate change. That figure will rise steeply in the next decades. Another four and a half million people are killed each year by air pollution and other hazards associated with burning fossil fuels [Dara 2012]. It is common cause that poor people are most vulnerable to climate change. People living on the fencelines of polluting industries take a double hit, first from the impacts of pollution on their health and environments and second from the impacts of climate change. Children, elderly people and women are the most vulnerable of the vulnerable and women carry most of the extra burden of caring for the sick and disabled.

The risk of runaway climate change – the point at which natural feedback becomes more significant than anthropogenic emissions – is already evident and becomes a near certainty at two degrees. It is therefore imperative to keep warming as little above 1˚C as is now physically possible. That probably means 1.5˚C, the temperature target demanded by small island states which face the prospect of being wiped off the map in the next few decades, and African countries which face the prospect of unprecedented famines.

The rise in temperature is driven by the accumulation of greenhouse gases (GHG) in the atmosphere resulting from industrial emissions. This has given rise to the notion of a 'carbon budget' – the limit on emissions necessary to avoid exceeding a given temperature.

For a half (50%) chance of coming in under 1.5˚C, the global emissions budget is about 600 billion tonnes of carbon dioxide (Gt CO_2) from 2011 onwards. The same budget gives a two-in-three (66%) chance of coming in under 2˚C.[2] This budget is being consumed at the rate of over 35 Gt CO_2 per year. For all

1 The Climate Vulnerable Forum is composed of 20 countries highly exposed to climate change.

2 International Panel on Climate Change, Fifth Assessment Report, Working Group 3, (IPCC AR5, WG3), Summary for policy makers, Table SPM1, p.13. We take the lower end of the range for RCP2.6 for two reasons: first, to allow for climate feedback and second, because the IPCC relies on the untested assumption that large scale "negative emissions" (i.e. sinks are greater than emissions) can be achieved in the second half of the century.

greenhouse gases, the budget from 2011 is about 900 Gt CO_2e and this is being consumed at about 50 Gt per year. At present rates, the budget will be consumed before 2030.[3]

The world is already behind any reasonable schedule in reducing emissions. This means a late peak in global emissions and the necessity of a steeper reduction after peak and no room for a plateau. Northern country emissions should be in steep decline already. Taking account of the principle of common but differentiated responsibilities, if Southern countries delay peaking until 2025, reductions of around 7% per year must follow. Peaking in 2020 allows for a less daunting decline of 4 to 5% [Anderson and Bows 2011]. This is for all Southern countries, so those with high emissions must peak sooner and reduce faster.

Since existing reserves of coal, oil and gas exceed the budget several times over,[4] about 80% of it must be left in the ground, all exploration should cease, and no new fossil fuel projects should be initiated.

It is also urgent that the earth is restored. Since 1850, burning fossil fuels has released 1 340 Gt CO_2 into the atmosphere. 'Deforestation and other land use change' – that is, industrialised logging, agriculture and plantations – have put another 660 Gt CO_2 into the air [IPCC 2013: 7]. Restoring earth would result in a large portion of this 'above ground' carbon being reabsorbed.

Climate impacts now

Temperature rise is caused by, but lags behind, the increased concentration of GHGs. Carbon dioxide (CO_2) is the main GHG because it is emitted in vast quantities and lasts a long time in the atmosphere. Carbon emissions to date mean that the world is already committed to a further rise in temperature of at least 0.6˚C. By 2020, global temperature rise will have exceeded 1˚C.

3 See also: EcoEquity and Stockholm Environment Institute, 2015.

4 See Carbon Tracker and Grantham Research Institute, 2013. ***Unburnable Carbon: Wasted capital and stranded assets***.

Much of the increased warmth has been absorbed by the oceans, moderating the effects of temperature rise on land but creating a store of heat which will lock in the increased temperature for the next thousand years or so. There is no return. We are stuck with the temperature at 'stabilisation' [Solomon et al 2009]. Stabilisation is when the temperature stops rising 30 or 40 years after the concentration of carbon dioxide in the atmosphere has stopped rising.

The concentration of CO_2 is now at 400 parts per million (ppm) as compared with 280 ppm for the pre-industrial atmosphere. The last time CO_2 concentrations stabilised at this level was about 10 to 14 million years ago. Temperatures were then 3 to 6˚C warmer than now and the sea level was 25 to 40 metres higher [Tripati et al 2009]. The difference now is that CO_2 concentrations are still rising and at a faster pace than ever before. Unless this is reversed soon, runaway climate change will follow. Hansen et al [2008] argue that a 'safe' level for the concentration of CO_2 in the atmosphere is no more than 350 ppm and even that may have to be revised downwards.

There is thus no 'safe' level for rising temperatures or higher carbon concentrations. Impacts are already ahead of schedule with several natural positive feed-backs kicking in. Three of the more significant of these processes are:

- **The loss of the albedo effect from ice and snow**. The word *albedo* comes from the Latin word for *white*. White ice reflects heat back into space. When it melts because of global warming, it exposes dark sea or land which absorbs heat and so accelerates global warming. Since about 2000, arctic sea ice has melted dramatically during the summer months, which is one reason why the arctic region is warming faster than anywhere else.
- **Accelerating rates of CO_2 and methane release from peat bogs and ocean methane hydrates**. Methane is a very powerful greenhouse gas – each tonne having a warming effect equivalent to about 35 tonnes of carbon dioxide. The peat bogs are wetlands in which vegetable matter rots down to make peat which contains lots of carbon. They also produce methane in the same way that a biogas digester does. Global

warming speeds up the release of CO_2 and methane from peat bogs. In northern Russia and Canada, the peat bogs are frozen and the methane is locked in. But the big melt has started and methane is being released in ever greater quantities.

- **Land and ocean 'sinks' absorb less CO_2.** CO_2 is naturally exchanged between the air and the oceans and between the air and soils and plants. In the pre-industrial world, these 'fluxes' from one to the other would be more or less in balance. Plants and soils would absorb more CO_2 during the summer and release as much back to the atmosphere in the winter. We can call this the 'above ground' carbon cycle. Fossil fuels release carbon that was buried millions of years ago. As this 'below ground' carbon is released into the atmosphere, it puts pressure on the above ground carbon cycle. Oceans, plants and soils at first absorb more CO_2 from the atmosphere. As the oceans warm, however, they absorb less CO_2 so more CO_2 will stay longer in the atmosphere. Meanwhile, the carbon absorption of some soils has already gone into reverse so that they become a source instead of a sink for CO_2.

Not quite 1˚C warming is already catastrophic for millions of people around the world. In 2010, millions of people lost their homes to the floods in Pakistan and China, while fires induced by an unprecedented heat wave swept across large areas of Russia. January 2011 opened with unprecedented flooding in Australia and Brazil. In 2012, Hurricane Sandy hit the Caribbean – killing over 60 people – before moving up the US east coast and causing unprecedented flooding in New York.

Across the world from New York, Typhoon Bopha struck the Philippines island of Mindanao and left 1 900 dead and hundreds of thousands homeless as well as destroying people's farms and fishing boats. Mindanao is well to the south of the normal path of typhoons and had experienced nothing like it before. Bopha struck during the 2012 climate negotiations in Doha. The next year, as the negotiators met in Warsaw, the Philippines was struck by Typhoon Haiyan, the most powerful storm ever recorded. At least 6 300 people were killed and four million displaced. The city of Tacloban was flattened. Again, in 2014 as the

negotiators met in Lima, Typhoon Hagupit hit the same area around Tacloban. This time, the storm was less intense and the government better prepared. Around 1.2 million people were evacuated ahead of the storm but 18 people were killed and thousands of homes were demolished. According to Naderev Saño, the Philippines' chief negotiator in 2012, the country loses about 5% of its GDP to storms every year but it has received no climate finance to help it adapt.[5]

The year 2014 was the hottest year on record for the world and 2015 will be hotter still. California in the US is entering the fifth year of its worst drought ever, prompting an article in the New York Times to question the capacity for further economic growth there.[6] In August 2015, wildfires were raging across large parts of the state as temperatures rose over 40˚C. California "produces nearly half of all the vegetables, fruit and nuts grown in the US," according to Oxfam [2014: 2]. The crop has wilted and the loss has pushed up prices.

The water reservoirs are drying up in Sao Paulo, Brazil, where an unprecedented three years of drought was barely interrupted by heavy rains in February 2015. Home to 18 million people, Sao Paulo dominates Brazil's economy but the drought has precipitated a debate on 'depopulating' the city. The water supply is intermittent and, in poor areas where people do not have water tanks, women stay up all night to catch the water as it comes at erratic hours. The drought is exacerbated by the destruction of forests and wetlands in the watershed. And large scale deforestation in the Amazon has reduced the amount of water vapour carried on the wind and may be one of the causes of the drought.[7] As in California, agriculture and food production has withered.

In India and Pakistan, the late arrival of the monsoons resulted in a searing heatwave in May and June 2015 with temperatures up to 48˚C. In Karachi

5 See Wikipedia entries for final casualty figures. See also Kate Hodal, ***Typhoon Hagupit: at least three dead and a million evacuated in Philippines***, The Guardian, 7 December 2014; Sano quoted by John Vidal, ***Typhoon Haiyan: what really alarms Filipinos is the rich world ignoring climate change***, The Guardian, 8 November 2013.

6 Adam Nagourney, Jack Healy, Nelson Schwartz, Emma Fitzsimmons and Ronnie Cohen, ***California drought tests history of endless growth***, New York Times (online), 4 April 2015.

7 Rob Curran, ***How on earth are two of the most water-rich nations having H2O crises?*** 6 April 2015, Fortune Magazine. Marguerite Ward, ***Worries grow as serious drought hits São Paulo, Brazil***, 1 July 2015, CNBC.

alone, 65 000 people were admitted to hospital for heatstroke. The reported death toll in both countries was about 4 000 people. In July and August, temperatures as high as 56˚C were reported in Iraq as an unprecedented heatwave enveloped the whole of the Arabian Peninsula. The small minority of people with air conditioning used it and, in Karachi, crashed the power grid.[8]

In much of Africa the temperature rises at 1.5 or 2 times the global average and already exceeds 1˚C above pre-industrial levels. A "global average temperature increase of 2°C translates to up to 4°C for South Africa by the end of the century," according to the Department of Environmental Affairs (DEA) [2015: 3]. On present trends, the global temperature will pass the 2˚C mark well before 2050[9] – not the end of the century – and will rise to around 6˚C by the end of the century, which translates to between 8˚C and 12˚C for much of Africa.

In Niger, several years of drought were followed by heavy flooding in August 2010. People already vulnerable to malnutrition saw their crops destroyed and their exposed topsoil washed away. At least 200 000 people were flooded out of their homes. The 'international community' barely registered this disaster and emergency aid was not forthcoming. In 2012, drought returned to the West African Sahel putting some six million people at risk but was again followed by severe floods in 2013, 2014 and 2015.

Southern Africa has also experienced bouts of flood and drought – or both at the same time in different places. Seasons are shifting and weather patterns are more erratic. In the southern Cape, the drought of 2010 was preceded by successive years of heavy flooding while the normally dry northern Cape was inundated with flood waters in early 2011. This was followed by winter floods in summer rainfall areas. The north of the country has been hit by floods in 2012, 2013 and 2014. The March 2014 floods were particularly widespread through the North West, Limpopo, Gauteng and Mpumalanga. Over 3 500

8 Jason Samenow, ***India's hellish heat wave, in hindsight***, Washington Post, 10 June 2015; ***Pakistan heatwave death toll climbs past 1,200***, Al Jazeera, 27 June 2015; ***Unprecedented heat wave batters Mideast***, The Arab Weekly.

9 Michael E. Mann, ***Earth Will Cross the Climate Danger Threshold by 2036***, Scientific American, 18 March 2014.

people were displaced and 32 people died. Several towns were under water but people from shack settlements were hardest hit. Eskom reintroduced load shedding for the first time since January 2008, as BHP Billiton delivered fine wet coal with the consistency of slurry to Kendal power station and so shut down four of the six units. Open cast mines across the region were flooded and forced to suspend operations.[10]

In January 2015, floods in Malawi, Mozambique, Madagascar and Zimbabwe killed 225, with another 150 missing, and displaced more than 400 000. The impact did not subside with the flood. In Malawi, it was followed by an outbreak of cholera. Across the region, people lost their crops and many also lost their soil.[11] Flood damage also delayed completion of a project to upgrade and extend the railway line intended to carry coal from Vale's new mine in Moatize, Mozambique, to the port of Nacala. On the other side of the continent, drought in the upper Zambezi catchment has reduced the flow of water into the Kariba Dam, forcing both Zambia and Zimbabwe to cut power production.

In South Africa, KwaZulu-Natal (KZN) remains in the grip of a severe two-year drought. In July 2015, unseasonal winter rains in the coastal areas provided relief but did not break the drought. Rural people were already losing stock by mid-2014 but this went largely unnoticed by government or the media. Some restrictions on the use of water were introduced in the north of Durban and Ilembe District (Stanger and Ballito) in October 2014 but serious rationing was delayed till June 2015. By then, the taps were already dry in Mtubatuba and several other small towns in northern KZN.[12]

KZN's sugar industry says it has suffered a 23% drop in production, with some mills shutting down, and losses in the order of R1.7 billion. This has coincided with a global slump in prices.[13] Small-scale growers in the former homelands

10 Red Cross, ***Emergency Plan of Action***, 21 March 2014; Ed Hill, ***Hundreds Displaced in South Africa Floods***, FloodList, 11 March 2014; Terence Creamer, ***Eskom in talks with miners in bid to replenish dry, coarse coal stocks***, Engineering News, 11 March 2014.

11 Emily Corke. ***Malawi floods: food security a major concern***, Eye Witness News, 20 January 2015.

12 Mphathi Nxumalo and Kamcilla Pillay, ***Tankers to the rescue in KZN***, Daily News (Durban), 7 October 2014; Giordano Stolley, ***Water rationing kicks off in some KZN municipalities***, News 24, 21 June 2015.

13 Nompumelelo Magwaza, ***Worst drought in 23 years costs sugar industry billions***, Business Times, 16 August 2015.

are particularly vulnerable. They were drafted into the industry in the late 1980s and early 90s to compensate for the loss of crop as commercial (white) farmers converted to tropical fruits to escape the domination of the big milling corporations. Nevertheless, Tongaat Hulett is still intent on expansion and sees "small scale and land reform farmers" bringing in more land, together with government subsidies for sugar planting.[14]

The degradation of catchments, driven by industrial timber and sugar plantations, has seriously aggravated the impact of the drought. In the 1970s and 80s, both industries expanded into the midlands of KZN, the upper catchment of several important rivers. They replaced mixed farms and displaced farm workers and their families who had to move to ever more crowded and eroded homeland areas. Both industries are associated with the depletion of soils and are big water users. Timber plantations in particular suck out the water table and reduce streamflow in rivers. In drought years this becomes critical and has substantially contributed to drying out water supply dams.[15]

The weather is always variable but many of these events are unusual or unprecedented. For many years scientists described extreme weather events as 'consistent' with climate change. This is changing. First, researchers have documented the increased incidence of extreme weather and second, scientists are now showing that the severity of particular weather events can be attributed to climate change.[16]

Hot and Hungry is the evocative title of an Oxfam briefing on the impacts of climate change on the world's food system [2014]. It documents people's responses to high and volatile prices associated with extreme weather events including: "working longer hours; cutting back on more costly and preferred foods – particularly protein-rich meat and fish – and buying cheaper and less nutritious food; shopping in bulk for discounts; growing, gathering, and processing their own food; shopping in small quantities to manage daily

14 Tongaat Hulett, 2015 Annual Report, Chief Executive's Review, p.20.
15 Wally Menne, intervention at KZN Environmental Network meeting, 21 February 2015.
16 John Carey, ***Storm Warnings: Extreme Weather Is a Product of Climate Change***, Scientific American, June 28, 2011.

incomes; borrowing, begging, stealing; cutting down on portions, cutting out meals and going hungry".

As yet, hunger is not about a shortage of food but about policies that endorse the corporate food system. The 'market' simply cuts out the poor. South Africa as a country is food secure but over half the people go hungry periodically and a quarter go hungry regularly. The meaning of going hungry regularly is brought home by the impact on children: a quarter of children under five are stunted. Households headed by women are most likely to be poor and hungry.[17]

Industrial agriculture has already ruined large tracts of arable land. In South Africa, land is compacted by machinery and the surface encrusted by high chemical inputs, reducing the soil's capacity to absorb rainfall and increasing erosion. Climate change is already compounding the effects and, as the temperature climbs towards 2°C higher, more and more land will be lost to food production.

The industrialisation of agriculture has also driven more and more people from the land and into urban townships and shack settlements. As with the food system, so with housing – the property market pushes poor people to the margins. On government's own account, "many new RDP housing estates dating from the post-1994 era, [are located] on degraded land with a low market value. … Price has played a defining role in the design and construction of low cost housing and these structures are generally not 'climate-proof'" [DEA 2014: 8]. Never mind climate change, they don't keep the weather out now and many of them are already cracking up. Some informal *jondolo* are better built, but most are likewise cold in winter, baking hot in summer and dripping wet when it rains, as documented in *Talking Energy* [groundWork Report 2013]. And many are located on flood plains or steep land vulnerable to mud slides.

The health impacts of climate change are overlaid on the effects of impoverishment and, for communities on the industrial and mining fencelines, of pollution. Extreme heat, floods and drought will be accompanied by interrupted water and power supplies and more fires – particularly in shack

17 Sipho Kings, ***Too many going hungry in the land of plenty***, Mail & Guardian, 10 October 2015.

settlements and industrial timber plantations. A number of diseases, including malaria, bilharzia and dengue fever, will spread beyond their traditional range.

Ten years ago, Hurricane Katrina destroyed the levies protecting the US Gulf coast and flooded New Orleans. The Bush administration sent in the troops who shot people displaced by the storm instead of helping them. Nick Buxton and Ben Hayes observe that the receding waters exposed "America's deep-seated racism and inequality". And the militarised response to humanitarian crises has been replicated elsewhere. Brazil has not developed "credible plans to conserve water and tackle some of the root causes of water scarcity such as deforestation", but has deployed troops along the water pipelines. And in Europe, troops are mustering behind the fences being thrown up to keep out the refugees fleeing war in the Middle East. Britain is particularly bellicose, just as it was in supporting the US invasion of Iraq in 2003 which led to the present disasters.[18]

South Africa is already a major destination for people following established labour migrancy routes or fleeing political oppression or economic collapse in neighbouring countries. The flow of migrants and refugees will increase as people seek refuge from the storms of climate change. Repeated bouts of xenophobic violence, inflamed by nationalist rhetoric from the political elite, do not augur well. Violence in April this year was followed by 'Operation Fiela' – which translates as *sweep out* – a massive security force campaign of harassment against migrants, and by calls to fortify the border. As media analyst Jane Duncan argues, the xenophobic violence has been made to serve the security cluster's ambitions to "increase the coercive capacities of the state", whether for use against foreign or South African nationals.[19]

18 Nick Buxton and Ben Hayes, ***Ten years on: Katrina, militarisation and climate change***, Open Democracy, 28 August 2015.

19 Jane Duncan, ***Fortress South Africa***, Pambazuka 727, 20 May 2015.

2 Theatres of negotiation

> Money and market solutions will not resolve the current crisis. We need instead a radical change in the way we produce and we consume, and this is what was not discussed in Copenhagen.
> – Josie Riffaud of La Via Campesina in Copenhagen, 19 December 2009.[20]

The United Nations Framework Convention on Climate Change (UNFCCC) was agreed in 1992 at the Earth Summit in Rio de Janeiro. Its purpose is to "stabilise greenhouse gas concentrations in the atmosphere at a level that will prevent dangerous human interference with the climate system". All 195 countries (excluding Taiwan) have ratified the treaty and are therefore 'parties' to the Convention. The Conference of the Parties (COP) is the 'supreme body' or highest authority. The first conference – COP 1 – was in 1995 in Berlin. Since then the COP has met every year.

From the beginning, the negotiations have been subordinated to market imperatives. The UNFCCC and the Kyoto Protocol (KP) were negotiated under the sign of the Washington consensus. They make governments responsible for implementation while private sector corporations are made the agents of implementation. This agency, however, is voluntary and was supposed to be driven by the carbon market brought into being by states.

The Convention recognises that developed and developing countries have 'common but differentiated responsibilities'. This principle is meant to secure developmental equity between North and South recognising that:

20 La Via Campesina press release, ***Traders failed in Copenhagen: The future lies in people's hands***, Copenhagen, December 19, 2009.

Table 1: Key COPs

1995	COP 1	Berlin	With no voluntary action by AI countries, there are calls for a binding agreement
1997	COP 3	Kyoto	Adopts the Kyoto Protocol proposed by USA. AI countries agree to compulsory cuts in carbon emissions cheapened by carbon trading. This is 'cap and trade' – except the cap can't be found.
2000	COP 6 (1)	The Hague	Fails to reach agreement. Parties agree to a second round
2001	USA repudiates KP		
2001	COP 6 (2)	Bonn	Agrees KP market mechanisms for trading carbon. Europeans proclaim victory for 'multilateralism' (against US 'unilateralism').
2005	KP comes into force after enough countries ratify it and this gives rise to the "1st commitment period" (from 2008 to 2012).		
2005	COP 11/ CMP 1	Montreal	The first Meeting of the Parties (CMP) to the KP
2006	COP 12/ CMP 2	Nairobi	Focus on adaptation.
2007	COP 13/ CMP 3	Bali	Agrees 2 track negotiations for agreement in 2009: KP track to negotiate 2nd commitment period (meant to be from 2012 to 2017); Long term cooperative action (LCA) track to negotiate US taking 'comparable' action to other AI countries
2007	US proposes talks between "major emitters" but is rebuffed.		
2009	COP 15/ CMP 5	Copenhagen	Talks collapse. No agreement on KP 2nd commitment period. Copenhagen Accord noted but not adopted.

2010	COP 16/ CMP 6	Cancun	Effectively agrees Copenhagen Accord under LCA track: to limit warming to 2˚C but with no mechanism to achieve it; for a voluntary 'pledge and review' system in place of 'cap and trade'.
2011	COP 17/ CMP 7	Durban	Agrees 'Durban Platform' (ADP) to negotiate a new 'inclusive' agreement by 2015 for implementation by 2020.
2012	COP 18/ CMP 8	Doha	Agrees to KP 2nd commitment period but with no prospect that it will come into force. ADP replaces LCA track.
2013	COP 19/ CMP 9	Warsaw	The corporate COP. Requests countries to prepare 'intended nationally determined contributions' (INDCs).
2014	US-China joint statement on their respective intentions to reduce emissions. This deal between "major emitters" is outside the UNFCCC framework but set the frame for Lima. It implies 4˚C warming.		
2014	COP 20/ CMP 10	Lima	'Review' taken out of 'pledge and review' leaving 'pledge and talk … maybe'.
2015	COP 21/ CMP 11	Paris	A new agreement (if agreed) will be based on voluntary INDCs with no obligations for anyone. It will repeat the 2˚C target but effectively accept 4˚C warming.

- Northern countries, listed in Annex I (AI) of the convention, are responsible for the bulk of emissions to date and are better resourced to implement the agreement; and
- Southern countries, referred to as non-Annex I (NAI), have a priority for development.

It then emphasises "sustainable economic development" within an "open international economic system" and allows that all countries will define

sustainable development in line with their own development priorities. Sustainable development is thus encoded within the orders of imperial capitalism.

Kyoto

The UNFCCC initially relied on Annex I (AI) countries taking voluntary actions to reduce emissions. No-one volunteered. A binding agreement was therefore called for and the KP was adopted at COP 3 in 1997. The KP is a cap-and-trade scheme proposed by the US who said it would participate only in a system based on 'the market'. This followed an earlier Brazilian proposal, rejected out of hand by the US, that targets be based on historical responsibility. Countries exceeding their allowance should pay a fine into a common pot which could then be used to finance projects in Southern countries. The US proposal also displaced European proposals for a carbon tax. It was adopted not because anyone believed it would work but because it appeared that carbon trading was a pre-condition for US agreement.

Having imposed its preferred system, however, the US refused to ratify the KP and so exempted itself from abiding by it. Bill Clinton's administration avoided putting it to Congress for ratification. George Bush's administration actively rejected Kyoto, claiming that it was unfair for US to take commitments if Southern countries did not. Bush also promoted climate change denial although the US remained a party to the UNFCCC.

The US knew Southern countries would not accept equal responsibility with the US. From the start, they have refused commitments unless the North demonstrates real reductions. They argue that Northern countries developed on the back of high emissions and still produce the majority of emissions. They also suspected, with some justification, that the North was using the climate negotiations to lock in economic dominance by blocking economic development in the South.

This left the European Union (EU) as the champions of Kyoto. At COP 6 in Bonn (2001), the EU pushed through acceptance of Kyoto without the US. The KP

came into force three years later when enough countries had ratified it and, at Montreal (2005), COP 11 was held in parallel with the first Meeting of the Parties (CMP 1) to the KP.

Under KP, Annex I countries agreed to meet binding emission targets (supposed to provide the cap) during the 'first commitment period' (2008 to 2012). It specified targets for each Annex I country which added up to a 5% reduction in Annex I emissions as compared with what they emitted in 1990. This target was not adequate to prevent dangerous climate change but they said they would do better in each successive commitment period. In the 'second commitment period', beginning in 2013, it was expected that Annex I countries would take on tougher targets while 'non-Annex I' countries would also take on mandatory reduction targets.

The targets themselves, however, were founded on the deeply inequitable principle of 'grandfathering': those countries with the highest emissions in 1990 would have the largest rights to future emissions. The targets thus enshrined historic inequalities and projected them into the future. The logic of grandfathering extends to all levels of the economy and individual corporations by validating business-as-usual as the baseline against which carbon savings are measured. Thus, the trading mechanisms are supposed to reward increments in carbon efficiency but without challenging industries that are inherently incompatible with emissions criteria derived from the carbon budget.

Kyoto set up carbon trading through three 'flexible mechanisms':

- Emissions trading allows Annex I countries and corporations that exceed their reduction targets to trade their surplus allocation with other Annex I countries that do not meet the targets;
- Joint Implementation (JI) projects enable investors in one Annex I country to invest in projects that produce fewer emissions than a business-as-usual project in another Annex I country and to claim 'carbon credits' for the reductions;

Box 1: Carbon Trading

Carbon trading is the heart of the Kyoto Protocol and it has proved to be a false heart. The idea is that a limit (or cap) is placed on how much carbon can be emitted, emission rights are then allocated and those who emit less can sell their surplus rights to those who emit more. The 'market' would then automatically find the most efficient solutions without the need to create a big bureaucracy. Only governments can create the rights, however, so the idea that the process could run without them was nonsense. Trading not only created a new governmental bureaucracy but bloated private consultancies as well.

In the absence of the US, Europe set up its own internal emissions trading scheme (ETS). The ETS delivered profits to polluters and traders without reducing emissions. At the start, big business, particularly the energy corporations, lobbied for generous emissions rights. European governments were duly generous and gave away rights to emit more than corporate Europe was already emitting. So the cap was lifted off the corporate head. Nevertheless, the price of emissions rights was pulled up by the boom in coal, oil and gas up to 2008.

The 2008 crash in oil prices similarly crashed the carbon price. European industry slumped, energy consumption shrivelled, corporate revenues dwindled and the creditors came knocking at their doors. What they had in surplus was carbon credits which were sold off to plug the holes in their balance sheets. Got free, they produced pure profit at whatever price. The carbon price did not recover with commodities in 2010/11 and a series of scandals have shown that the market creates open season for scams of all sorts.

The Clean Development Mechanism (CDM) has an equally inglorious record. It allows polluting industries from the North to invest in projects in the South that are calculated to produce fewer emissions than a business-as-usual project and to claim 'carbon credits' for the difference. Overall, it did not reduce emissions and in some cases it spurred increased emissions. CDM

invites players to 'game the system' and they have embraced the invitation. Even if the rules are followed, the carbon accounting is based on a series of fictions and false assumptions.

For Southern countries, CDM has created a new arena of competition for foreign direct investment. Real or not, the carbon credits are subtracted from the Northern country's total carbon count and must logically be added to the Southern country's count. This is fudged. Thus, Sasol includes its CDM projects in its strategy for reducing its greenhouse gas emissions. So it takes the money from selling 'certified emission reductions' (CERs) but still reports the carbon reductions as their own, even as they are claimed by the buyers.

- The Clean Development Mechanism (CDM) works in the same way except that the investors must be from Annex I countries and CDM projects must be located in non-Annex I countries.

The stated objective of CDM was to support sustainable development in Southern countries while reducing the costs to Annex I countries of meeting their reduction targets. Thus, Northern polluters could invest in 'clean development' projects in the South and claim carbon credits known as 'certified emissions reductions' (CERs). Alternatively, they could buy CERs produced from CDM projects and sold through the market. The explicit reasoning behind this was first that the costs of meeting targets would be unaffordable to Northern economies and second that reductions would be cheaper in the South. It is thus founded on unequal development – that is, on economic, social and environmental injustice – and so negates the rationale of 'common but differentiated responsibility'.

Wolfgang Sachs concluded that negotiators "were charged with protecting economic growth and not the climate" to which end Kyoto embodies three strategies: Northern obligations are transferred to the South and East – through CDMs and JIs; obligations are discharged through sinks – that is, through forest 'offset' projects mainly located in the South and again funded through CDM; and negotiations are framed to focus on the economic tailpipe and exclude discussion of driving interests in the engine room [Sachs 2005].

The US position inside the UNFCCC but outside Kyoto led to a dual climate regime. COP 13 in Bali (2007) agreed the Bali Action Plan which outlined a 'two track' negotiating process. The Kyoto Protocol track was to negotiate the terms of the second commitment period. The Long-term Cooperative Action (LCA) track was to accommodate the US outside Kyoto and intended to ensure 'comparability of effort' with other developed countries. In other words, the US would commit to cut its emissions on the same scale as other Annex I countries bound by the KP. The Bali plan envisaged a two year process to reach agreement at COP 15 in Copenhagen in 2009, allowing time for countries to prepare for implementation in 2012.

Alongside the Bali process, the US initiated the Major Economies Forum on Energy Security and Climate Change, with 19 countries, including South Africa, at the top end of the carbon emissions rankings. This forum prioritised energy security and economic growth, an agenda that suited all participants. But it was also an attempt to move the real centre of negotiations to a more exclusive forum outside the UNFCCC, leaving out the countries that emit little but would be hardest hit by climate change. In particular, the US wanted a forum where the principle of common but differentiated responsibilities did not hold and China could be seen as sharing equal responsibility for climate action. This was rebuffed as Southern leaders used the forum to insist on the primacy of the UNFCCC and the Bali plan.[21]

Copenhagen to Paris

Copenhagen terminated whatever credibility remained to the international negotiations. The people on the streets of Copenhagen chanted, "Change the system, not the climate". But the purpose of all 'major' parties, North and South, was to defend their respective interests in the global accumulation of capital. In their vision, this is what is meant by 'development'.

The US under Barack Obama no longer gave credence to outright climate denial but otherwise continued with the wrecking tactics of his predecessors.

21 See for example, Chinese President Hu Jintao, ***Remarks at the Major Economies Meeting On Energy Security and Climate Change***, 9 July 2008. At China Climate Change Info-Net.

It refused binding targets and Europe then moved to abandon negotiations for binding reductions for the 'second commitment period' under Kyoto. Southern negotiators then rallied to 'save Kyoto' as they saw the North wriggling out of binding commitments while shifting the burden of emission reduction onto the South.

There is an evident incoherence in these stratagems. Since the 1980s, the North has presided over a global restructuring of industry, relocating energy intensive manufacturing to the South through foreign direct investments controlled by Northern corporations. In line with the Washington Consensus, these industries are mostly geared for export and the goods are consumed primarily in the North. The major Southern countries themselves compete vigorously for Northern corporate investments as industries move South looking for the cheapest energy, labour and environmental regimes while the North rigs the rules to keep profits, cheap goods and strategic resources flowing North.

The North, and the US in particular, thus calls for carbon savings in developing countries while depending on them to produce carbon intensive goods on the cheap for the home market. Since 1990, the increase in carbon embedded in traded goods heading North exceeds the reductions promised under Kyoto [Peters et al 2011]. The Southern countries meanwhile defend carbon intensive production in order to produce those goods while calling on developed countries to reduce consumption. They claim that their right to 'carbon space' is necessary for development that will alleviate poverty. India's climate justice movement called this "hiding behind the poor" because the benefits of such development are appropriated by the elite while the poor are dispossessed.[22]

Beneath the heated conflicts between North and South lies a deep seated collusion. Their respective interests in capital accumulation are best served by a dysfunctional climate regime. This allows each to use the other as an alibi for inaction or failure while rallying the home crowd in support.

22 Memorandum to the Government of India on the UNFCCC's 15th Conference of the Parties at Copenhagen, signed by the National Alliance of People's Movements and 18 other organisations, November 24, 2009.

The Copenhagen Accord was negotiated in back rooms, first between the US and the BASIC countries (Brazil, South Africa, India and China) and then with a still restricted group including Europe. Back in the COP plenary, the Danish chair then tried to impose formal adoption of the Accord but was resisted by a number of countries who had not even been given sight of the document. Finally, the COP merely noted the Copenhagen Accord as the meeting ended in disarray. Canada, meanwhile, made a show of tearing up its supposedly binding Kyoto commitment.

The Accord met with near universal derision in Copenhagen. Riding the spirit of resistance, Bolivia hosted the Cochabamba People's Conference and it appeared that there might be the beginning of a shift in power with dissident nation states realigning themselves with the people's movements. Following a year of unembarrassed diplomatic bribery and coercion by the US, however, Bolivia was left isolated at the Cancun COP and the Accord was effectively written into the official agreement to the cheers of all other delegates and civil society insiders. Bolivia's objections were simply ignored. Outside the conference hall, Bolivia emphasised its association with the people's movements. In the words of Pablo Solon, its chief negotiator, "… we did not feel alone [because] we received thousands of messages of support from the women, men, and young people of the social movements that have stood by us and have helped inform our position."[23]

Following the Copenhagen Accord, the Cancun agreement formally adopted the target of keeping global warming to less than 2°C target and even made room for discussion of a 1.5°C target. The Accord also called on all countries to 'pledge' climate action and register their pledges with the UNFCCC. Most countries did make pledges – despite the Accord not being adopted – but the pledges are voluntary and heavily qualified. Thus, South Africa's mitigation pledge was conditional on financial and technology transfers from Northern countries. The Cancun decision gave formal recognition to these pledges.

23 Pablo Solon, ***Why Bolivia stood alone in opposing the Cancun climate agreement***, The Guardian (London), December 21, 2010.

Effectively, the US had steamrollered the replacement of the Kyoto cap-and-trade regime with a non-binding pledge-and-review regime: each country, North and South, would pledge emission cuts and countries which received international climate funding (i.e. Southern countries) would be subject to international (i.e. Northern) review.[24] Since each country decides its own pledge according to 'national circumstances' – that is, economic and political interests – there is no link between the sum of country pledges and the temperature target. And since the pledges are voluntary, there is no reason to believe that countries will abide by them. If each country actually meets its pledge, it will result in a 4˚C rise in average global temperatures from emissions alone – climate feedbacks will push it higher. Whether for 2˚C or 1.5˚C, the temperature target was thus made meaningless. The real issue remains that the continued economic growth required by capitalism is incompatible with reducing carbon emissions.

COP 17 (2011) agreed the 'Durban Platform for Enhanced Action' (ADP), so opening a new negotiating track in place of the (LCA) track which was closed at COP 18 in Doha. The ADP is composed of two 'workstreams'. The first responds to the demand for a legally binding agreement while ensuring that, however legal, it will not bind: it is to negotiate "a protocol, another legal instrument or an agreed outcome with legal force under the Convention applicable to all Parties". This is the new instrument to be agreed in Paris in 2015 but which will only come into effect from 2020.

The second workstream is supposed to ensure "the highest possible mitigation efforts by all parties" for the period when there is no universal agreement between 2012 and 2020.[25] Southern countries argue that this should be achieved through the Kyoto Protocol's second commitment period, with binding emissions reductions by AI countries and comparable effort by the US as agreed in Bali. However, Australia, Canada, Japan and Russia have all refused any second period binding commitments and/or withdrawn from

24 The Northern bias of the Cancun text is stark. For an analysis, see Martin Khor, ***Strange outcome of Cancun climate conference***, TWN Cancun News Update 20, 14 December 2010.

25 See Meena Raman , ***Views of countries on workstream 2 of Durban Platform,*** TWN Briefing Paper 2, 29 April – 3 May, 2013, Bonn.

Box 2: Carbon Trading +

Even while undead, Kyoto has served as the technical laboratory for carbon trading and associated market instruments, creating the mathematical equivalences that allows trade in units of 'avoided' carbon between different industrial activities, including between factory emissions and supposed absorption of carbon in plantations.

The REDD process (Reduced Emissions from Deforestation and forest Degradation), introduced at Bali, extends the logic to natural forests to compensate for reduced logging mainly in countries that export tropical hardwoods. The carbon content of every tree that isn't logged is counted as so many units of 'avoided' emissions. But this is not reducing demand for hardwoods and the traders merely supplement their income and capacity for further deforestation. People are meanwhile dispossessed of traditional rights in forest resources to prevent them upsetting the measuring procedures. So REDD gives corporate loggers a new means of getting indigenous people out of the way.*

A similar logic operates with 'climate smart agriculture'. The capacity for measuring, reporting and verification of carbon stocks – on paper, whether real or not – resides with large corporations. Third World Network observes, "There is a significant risk that agriculture carbon offsets will incentivise 'carbon land grabs' by large-scale investors, and genetically modified organisms."†

Grain, an organisation that supports community controlled food systems, shows that 'climate smart' is really 'corporate smart' [2015]. The Global Alliance for Climate Smart Agriculture is dominated by fertiliser corporations and lobby groups. Fertilisers are the largest source of nitrous oxide (N_2O), a very potent greenhouse gas. More importantly, they deplete organic

* See, for example, No REDD in Africa Network, ***Kenya: Preparing for REDD in the Embobut Forest and forcing Sengwer People "into extinction"***, 31 January 2014.

† Third World Network briefing, ***What's wrong with the Alliance on Climate-Smart Agriculture? Is Climate-Smart Agriculture really a "triple win" or just a Trojan horse?*** 11 March 2014.

matter in soils and, since the introduction of industrialised agriculture, have resulted in the loss of 220 to 330 Gt CO_2 into the atmosphere. Grain quotes Canadian Federation of Agriculture as follows:

> There have been several organisations advocating at the international level for sustainable agriculture to be interpreted as synonymous with agro-ecology. However, agro-ecology has unfortunately come to represent principles which reject the use of farming inputs. Therefore, initiatives such as the Global Alliance for Climate Smart Agriculture are important to ensure the UN system adopts decisions that are reflective of modern agriculture. [3]

Kyoto thus facilitated the development of what Sullivan and Hannis [2014] call "standardised calculative frameworks" now used to facilitate the marketisation of nature within and beyond the climate negotiations. These techniques and the associated institutions are now migrating from Kyoto into the workstream on the new agreement. New market mechanisms (NMM) have been part of the negotiating texts since Cancun. Also at Cancun, the World Bank (WB) launched the 'Partnership for Market Readiness' (PMR) to proselytise for the market and institutionalise the necessary calculative centres in Southern countries irrespective of any agreement made at the UNFCCC.

The agenda is to expand market trading beyond projects and programmes to take in whole economic sectors and traders are calling for all credits to be "totally fungible" – that is, for all recognised forms of 'avoided carbon' to be exchangeable – and enabling of derivative markets. As yet, however, the design of new market mechanisms as part of a new treaty seems to have eluded its proponents. All parties, North and South – with the honourable exception of Bolivia – want the market. Their problem is that they are not prepared to create the scarcity of carbon necessary for any meaningful price.

KP altogether. A last ditch effort to 'save Kyoto' at COP 17 in Durban (2011) succeeded only in so far as the KP was not formally declared dead. In Doha, the European Union finally signed on for the second KP commitment period but without making any actual commitment – the terms make it meaningless and it will not in any case be ratified by enough parties to come into force. It is, as it were, an undead agreement.

Northern countries argue that mitigation in the pre-2020 period should be addressed by all countries, clarifying and improving on their existing pledges. None have volunteered improvement – just as none volunteered action in the first years of the UNFCCC.

Meanwhile, at COP 19 (Warsaw 2013) and COP 20 (Lima 2014), even 'pledge-and-review' has been diluted. At Warsaw, the Polish hosts made no bones about their bias for corporate capital and for the use of fossil fuels and coal in particular. And the COP showed the political will behind avoiding obligations. The final plenary yielded the phrase 'intended nationally determined contributions' (INDCs) in the place of 'intended nationally determined commitments'. And while the replacement of 'commitments' by 'contributions' was controversial, the word 'intended' already showed that no-one would be held to a commitment.

Shortly ahead of Lima, the US and China concluded what they called an 'historic' deal in which each "announced their respective post-2020 actions on climate change".[26] The deal between the two top carbon polluters took the US 'major economies' strategy to its logical end-point. It was cut alongside ongoing negotiations on trade and security, so putting climate in the context of economy, and the text itself emphasises energy security and trade.

The deal put forward the core of what would become each party's INDC but contained little new. Except that China specified a date – 2030 – for when its emissions would peak, both sides repeated already declared positions and, while repeating a pious line on the 2°C target, effectively agreed to lead the world to 4°C of warming. The fanfare was perhaps more important than

26 U.S. – China Joint Announcement on Climate Change, Beijing, China, 12 November 2014.

the text. The deal was hailed by various dignitaries and set the frame for negotiations at the Lima conference a few weeks later.

INDCs are now central to the process going to Paris. The Lima COP invited (rather than required) all parties to communicate their INDCs to the UNFCCC secretariat "well in advance" of COP 21 – "by the first quarter of 2015 by those Parties ready to do so".

By mid-year, countries accounting for around 50% of global emissions had submitted their INDCs. Assuming that the rest make proportionate pledges, the result will be warming of around 3˚C by 2100, according to Climate Action Tracker. However, there is a wide gap between what countries are pledging and what they are actually doing. Current policies will result in temperatures of around 4˚C higher.[27] As an example, South Africa is planning for a world that does not address climate change: its infrastructure plans assume expanding trade in everything including coal and energy intensive minerals and its energy plans scarcely recognise its climate pledge.[28]

Financial transfers

Financial and technology transfers are high on the Southern agenda. At Copenhagen, US Foreign Secretary Hilary Clinton promised climate financing of $100 billion a year by 2020. It was an empty promise made for the cameras but was written into the Copenhagen Accord. Immediately thereafter, even 'fast-track' funding of $30 billion promised for 2010 to 2012 evaporated.

At Cancun, the establishment of a 'Green Climate Fund' (GCF) under UNFCCC, rather than World Bank, control provided a glimmer of light. Climate justice groups had long advocated for such a fund as an alternative to the World Bank which has so far dominated climate funding and used that position to promote carbon trading. Under Kyoto, it established a plethora of funds, including the Prototype Carbon Fund with the "mission … to pioneer the market for project-based greenhouse gas emission reductions". It is now "building the next generation of carbon markets", including the Forest Carbon Partnership

27 See Climate Action Tracker at http://climateactiontracker.org/global.html visited 3 August 2015.
28 See The groundWork Report 2014.

Box 3: US emissions reduction

The US INDC repeats the targets given in its deal with China: it will cut greenhouse gas emissions by 26 to 28% below its 2005 level in 2025. That is a mere 13% below the 1990 level which is the UNFCCC benchmark and good for four degrees.

The INDC says the US has already taken "substantial policy action" and shows emissions peaking in 2007 and declining since. The policy measures are largely taken under the Clean Air Act and will come with additional benefits according to Brian Deese, Senior Advisor to President Obama. The Clean Power Plan, for example, will prevent "up to 150 000 asthma attacks in kids per year and up to 6 600 premature deaths per year".* That seems like a good start. However, according to a Harvard Medical School study, pollution from industrial coal combustion kills 24 000 people in the US every year. Another 11 000 are killed by pollution from coal mines.† So perhaps the Clean Power Plan is one fifth clean.

The US-China deal is more explicit on energy: "The two sides [will cooperate] on advanced coal technologies [including carbon capture and storage], nuclear energy, shale gas and renewable energy, which will help optimize the energy mix and reduce emissions, including from coal, in both countries."‡ In short, they will use everything they've got.

There are major problems with US claims to reduced emissions. First, emissions of methane leaked from fracked oil and gas wells are large but unmeasured. So the decline in US emissions is likely to be rather less than stated. Second, if leaking methane is not counted, the shift from coal to gas fired power has contributed to reduced emissions but has not been the prime driver as is widely claimed. In 2008-09, emissions fell by 10% largely because of economic recession. Emissions increased in 2010-11

* Brian Deese, ***We're taking action on climate change—and the world is joining us***, at https://medium.com/ 31 March 2015.

† Center for Health and the Global Environment, Harvard Medical School, ***Mining coal, mounting costs: The life cycle consequences of coal***. At http://www.chgeharvard.org/resource/explore-true-costs-coal

‡ US-China agreement, p.4.

on a weak economic recovery before dipping again in 2012 with reduced energy intensity leading the reduction in emissions ahead of the shift to gas. In part, reduced energy intensity reflected the continued offshoring of dirty production to China. Further, coal exports increased as domestic consumption declined [Feng et al 2015]. Continued emissions reductions thus look uncertain.

On several levels then, the US INDC is more about evading than addressing climate change.

Facility, which supports trading through REDD [see Box 2], and the Partnership for Market Readiness, a sort of faux multilateral treaty body which aims to commit countries to the use of market mechanisms.[29]

The light at Cancun was immediately snuffed out as the UNFCCC then delegated managing GCF accounts to the World Bank. The African Union has since decided to channel all GCF money through the African Development Bank (AfDB) which is, in effect, the WB's branch in Africa. Cancun copied the Copenhagen Accord verbatim: Funds may "come from a wide variety of sources, public and private, bilateral and multilateral, including alternative sources of finance." No obligations for the North there.

As originally proposed, the GCF was to provide grant funding for adaptation and mitigation in developing countries from public money provided by developed countries. Various sources of money were identified, such as a 'Tobin' tax on international money flows or the redirection of defence spending. However, as the nuts and bolts of the GCF were put together following the Durban COP, it was evident that the Board, composed of representatives from 12 southern and 12 northern governments, was predisposed to serve it up for corporate capture: Corporates were given privileged access while more critical elements of civil society were kept at arm's length; a private sector facility was set up on the model of the International Finance Corporation (IFC), the World Bank's

29 See http://www.worldbank.org/en/topic/climatechange/brief/world-bank-carbon-funds-facilities visited on 24 September 2015.

private borrowing window; and mitigation, where private profits are possible, was privileged over unprofitable adaptation in poor countries.

As Karen Orenstein of Friends of the Earth comments, this sets it up for "the prolific use of financial intermediaries", including "commercial and investment banks, private equity and venture capital funds, microcredit institutions, insurance and other financial institutions which … would ostensibly invest money in developing countries in climate-friendly sub-projects".[30] What they will actually invest in is anybody's guess since terms such as 'climate finance' are not defined and civil society proposals for an 'exclusion list' to prevent funding of dirty energy were swatted aside. The implications were brought home when Japan said that funding for three coal-fired power plants in Indonesia was climate funding because the plants burn coal more efficiently than older plants.[31]

The GCF will make scant difference to global carbon emissions or to the lives of those made vulnerable by climate change and is scarcely designed to do so. What is built into the design, according to Sarah Bracking, a specialist in development funding, is a "firewall to stop the cognitive connection between what is needed to prevent catastrophic climate change, and what capital is prepared to do in the GCF" [2014: 13]. In other words, it works to save capital and not the climate but provides a 'spectacle' of environmental care, along with Byzantine but ultimately vacuous technical complexity, to conceal the contradiction [16]. It thus repeats the dysfunction at the heart of the UNFCCC itself.

Despite this ideological victory for business, the money taps have barely opened. As of August 2015, the GCF remains next to empty with just US$5.8 billion committed and a further $4.4 billion pledged.[32]

Promises of technology transfer are also empty. The critical issue concerns intellectual property rights under the World Trade Organisation (WTO) which

30 Karen Orenstein, ***A Struggle for the Soul of the GCF***, blog posted 20 November 2012 at http://www.foe.org/news/archives/2012-11-a-struggle-for-the-soul-of-the-gcf

31 Karl Ritter and Margie Mason, ***Climate Funds for Coal Highlight Lack of UN Rules***, Associated Press, 1 December 2014.

32 Green Climate Fund, ***Status of Pledges and Contributions at 12 August 2015***.

enable profit from control of innovation and pre-empt the free sharing of technology. At the insistence of the US, and over Bolivian protests, the climate negotiators avoid the issue. At the same time, false solutions such as carbon capture and storage (CCS) are adopted as a recognised mitigation technology and so eligible for carbon credits within the trading regime.

Climate equity

In the mid-2000s, China overtook the USA to top the global rankings for greenhouse gas emissions. China is the most populous country in the world with over four times as many people as the US – so it should not be surprising if it has the highest emissions. Equity generally starts with the idea that all people are equal and everyone should be able to emit an equal share of the carbon budget.

Over the last 150 years, however, the US has emitted four times more than China. Carbon dioxide lasts a long time in the atmosphere. It therefore accumulates year after year and emissions from a 150 ago still contribute to present concentrations in the atmosphere. This is why historical emissions matter. If they are not counted, then someone else carries the can for them and that someone is invariably poorer.

The time period over which emissions are counted makes a very big difference to who can emit how much in the future. The most commonly used starting points are: 1850 – from which date emissions can be attributed with reasonable accuracy; 1970 – when the issue of climate change was made known in policy circles; and 1990 – when the issue became widely known and countries agreed that a convention was needed.

In 2009, the German Advisory Council on Global Change (WBGU) calculated a budget based on a starting point in 1990. For a 75% chance of avoiding 2˚C, it calculated the budget for 1990 to 2050 as 1,100 Gt CO_2. Since 500 Gt were emitted in the first 20 years, that left just 600 Gt for 2010 to 2050. It then calculated selected countries' share of the 1,100 Gt based on population. Table 2 shows the results: the US had already bust its budget, Germany had

Box 4: False solutions

False solutions follow from the necessity of concealing the contradiction between the capitalist market and addressing climate change.*

Hence, the first false solution is the **carbon market** discussed above. When the UNFCCC was signed in Rio de Janeiro in 1992, the Business Council on Sustainable Development proclaimed that business "is part of the solution". By the time of the Kyoto COP in 1997, 'the market' was the solution. By the time of Rio+20 in 2012, the logic was extended to nature as a whole: unless it was given a (market) value, nature could not be saved. But the opposite seemed more likely. Following the 2008 meltdown, capital needed a new frontier in which to expand and found the 'green economy'. Nature was offered up to save capital.

The next false solutions are technology fixes designed to save vested interests. **Nuclear power** is carbon free at the power plant but mining uranium, fabricating fuel and disposing of waste are all energy and carbon intensive. Over the full production cycle, it is far less carbon intensive than coal but far more carbon intensive than renewables. Nuclear power stations are extremely costly in money and energy to build and equally costly to decommission. And whereas future income may cover the building, there is no income after decommissioning. It is well known that no satisfactory solution has been found for the disposal of high level nuclear waste which will remain radioactive for hundreds of thousands of years. The probability that the energy and money for decommissioning will not be available when needed in 50 or 60 years' time is not well understood. It will add a devastating twist to the toxic legacy of the nuclear age.

Carbon capture and storage (CCS) is central to the 'clean coal' agenda. Carbon emissions are captured, condensed to a liquid and piped off to be stored deep underground. The main problems are that it won't work at the scale required, is enormously expensive and consumes nearly a third of the

* This is updated from a more detailed discussion of false solutions in Hallowes 2013.

energy produced by the plant. It thus contradicts the coal industry's latest propaganda that cheap coal will deliver energy to the poor. They haven't been doing it for the past 200 years and the pretended concern that corporations like Anglo Coal, BHP Billiton and Peabody display is cynically dishonest. CCS also takes from the efficiency claimed for the latest (also very expensive) coal combustion technologies. But the real use of CCS is not that it will be deployed tomorrow, but that the promise will be used today to justify new 'CCS ready' coal plants.

Under pressure from politicians and corporates, the International Panel on Climate Change's fifth assessment report (IPCC AR5), assumes massive 'net negative' emissions in the second half of the century. This gives the first half of the century a larger carbon budget and allows politicians to delay action while pretending that they are still on track to meet their 2˚C target. And big oil is allowed to carry on business as usual. **Biomass energy with carbon capture and storage** (BECCS) is the fairy story the scientists have come up with to persuade themselves of this. The idea is to burn trees, grass or other biomass instead of coal in power stations equipped with CCS. The trees absorb carbon from the atmosphere as they grow and this carbon is then captured and buried. So the whole system takes CO_2 out of the air. To be 'net negative', BECCS must remove more CO_2 than other activities pump out. Unfortunately, AR5 did not do basic maths around how much land would be required to grow enough trees to absorb enough carbon. Another planet would probably come in handy. Nor did it consider whose land that might be. Corporate investments in biofuel crops and CDM plantations – where carbon supposedly absorbed by trees is traded for carbon actually emitted from factories – are already driving land grabs. BECCS will similarly end with the dispossession of peasants and indigenous peoples in Southern countries.

BECCS is a form of **geoengineering** known as **Carbon Dioxide Removal (CDR)**. The other form of geoengineering is **solar radiation management (SRM)**. The proposal that gets most attention is to pump sulphur dioxide (SO_2) into the upper atmosphere. This has a cooling effect because SO_2

aerosols are silvery and reflect light and heat away from the earth. It is thus proposed that we agree to pollute on purpose. But SRM does nothing about CO_2 emissions so, even if the earth is cooled, the oceans will carry on getting more acidic. SO_2 pumping will accelerate acidification – of land as well as sea – because much of it falls to earth. It would thus add to the impact of ground level industrial pollution and the acidification of soils cannot be reversed. It is also likely to change weather patterns and, with a little practice, those who 'manage' radiation will probably try to manage the climate in their own geo-political interests. Alan Robock, a US climate scientist, relates that his suspicions were aroused following a phone call from the CIA. He does not trust their motives for funding a National Academy of Sciences report on geoengineering.* Finally, SO_2 is short-lived in the atmosphere. To maintain the cooling effect, the managers would have to keep pumping it out. Should they stop for whatever reason, the temperature would rise very rapidly to where it would have been without the additional SO_2 aerosols, leaving no time for people or other species to adapt.

* Ian Sample, ***Spy agencies fund climate research in hunt for weather weapon, scientist fears***, The Guardian, 15 February 2015.

nothing left (in 2010) and the EU would break its budget around 2014. China looked comfortable but, at the 2008 emissions rate of 6.2 Gt CO_2 per year, would consume its budget by 2026. In fact, of course, its emissions were still rising and, in 2013, China emitted 9.1 Gt. India had 100 years at 2008 emission rates.

If the chances of avoiding 2˚C were reduced to 67%, then the 1990-2050 budget increases to 1,250 Gt and what was left for 2010-2050 is 750 Gt. The figure on the next page is based on this: the total area below each line adds up to 750 Gt CO_2. It shows that peaking later means sharper cuts in the following years and the budget is down to zero before 2050.

A second budget is shown in Table 3. It is from a group of experts from the BASIC countries – Brazil, South Africa, India and China – who took a longer view of history [Basic 2011]. From the start of the UNFCCC process, Southern countries said that Northern commitments must reflect their responsibility

for causing climate change. Historic emissions must therefore be central to the carbon calculation and the BASIC experts made their budget for 1850 to 2050.[33]

Table 2: Carbon budgets 1990-2050 with 75% chance of avoiding 2˚C or more

Country	Population: % of world	1990-2009 emissions Gt CO_2	1990-2050 budget Gt CO_2	2008 emissions Gt CO_2	2010-2050 What's left Gt CO_2
USA	4.7	108	52	6.1	-56
EU	8.9	81	98	4.5	18
Germany	1.5	17	17	0.91	0
China	22.0	75	239	6.2	164
Russia	2.8	31	31	1.6	0
India	16	19	175	1.5	156
Burkina Faso	0.16	0.009	1.7	0.00062	1.7
World	**100**	**500**	**1,100**	**30**	**600**

Source: WBGU (German Advisory Council) 2009.

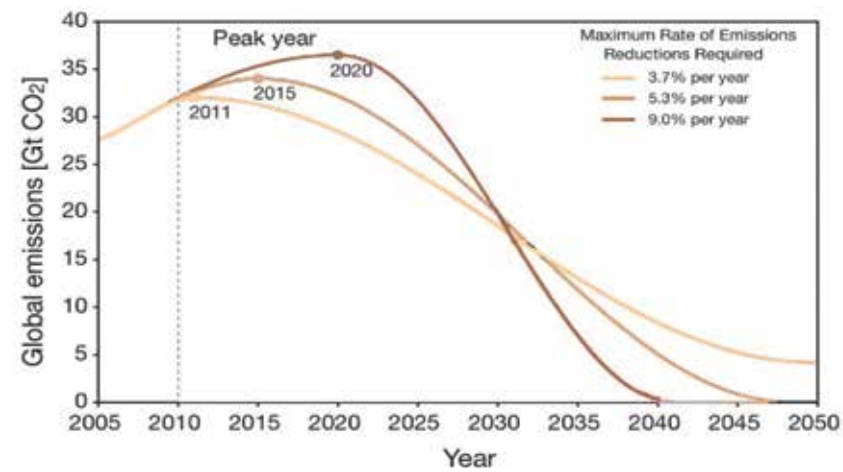

Figure 1: Reduction pathways for a 750 Gt CO_2 budget from 2010 to 2050. Source: WBGU 2009.

33 They make an alternative budget starting from 1970.

This budget is based on only a 50% chance of avoiding 2˚C and it allows 2 413 Gt CO_2 for the full period. That leaves 1 438 Gt for 2000 to 2050 – considerably more than WBGU's 1990 to 2050 budget with a 75% chance. This budget for 50 years is also nearly one and half times what was actually emitted in the previous 150 years. And since it does not include feed-backs, the chances are probably a lot less than 50%. This is therefore the largest possible budget with some shred of intellectual credibility and choosing it no doubt reflects the reluctance of the BASIC countries to face up to what they really need to do. Moreover, the budget for the whole of the 21st Century with a 50% chance of avoiding 2˚C is 1 578 Gt CO_2 [Anderson and Bows 2011] so the BASIC experts leave just 140 Gt for the second half of the century.

The table, from the Indian and Chinese experts, shows the US and Europe deep in carbon debt while the big Southern countries have ample entitlements. South Africa, however, will have broken its 7 Gt about now (2015) – although the South African experts give it a lot more room with a scarcely credible 29 Gt CO_2 for 2000 to 2050. Since it is physically impossible for Northern countries to repay their debt in carbon (i.e. to absorb rather than emit billions of tonnes of carbon), the Southern countries cannot use their full entitlement without breaking the global budget. The BASIC experts argue that the difference must be made up in funding and technology support.

The over-use of the carbon budget is one aspect of the climate debt owed by the North to the South. Arguably, the BASIC countries themselves owe a debt to the countries at the bottom of the global rankings. Poor countries and poor people have least responsibility for causing climate change but are most vulnerable to its impacts. A second aspect of climate debt therefore relates to adaptation – the costs of avoiding harm as well as the costs of actual harm. Since this debt is not acknowledged, and since funding the poor will not return a profit, funding for adaptation will not go where it is needed unless power relations shift to enable poor people to claim their right.

That said, the division of the climate response into mitigation and adaptation is artificial. Restoring the resilience of ecosystems, and of agriculture within

Table 3: Carbon budgets 1850-2050 with a 50% chance of avoiding 2˚C or more

Country	Population in 2000: millions	1850-2000 emissions Gt CO_2	1850-2050 budget Gt CO_2	2000-2050 Remainder
USA	288	300	114	-186
EU	481	281	190	-92
China	1,267	71	500	429
Russia	147	84	58	-26
India	1,043	20	411	391
Brazil	174	7	69	61
South Africa	45	11	18	7
Annex I		756	491	-269
Non-Annex I		204	1,910	1,706
World	6,116	973	2,415	1,438

Adapted from BASIC experts: Indian approach [65]; AI & NAI from Chinese approach [43].

ecosystems, is an adaptation measure which would simultaneously restore the capacity to absorb carbon – an essential mitigation measure.

Finally, however, these considerations of equity are all centred on the state. Given the imperial ordering of the world, this remains salient. Nevertheless, as argued above, the North-South dispute is something of a distraction. Both sides ask for what they don't want. They are concerned about the global pecking order between elites. They are not concerned to change the global system within which they are constituted as elite. Given the degree of inequality in all countries, an insistent question concerns the climate debt owed by rich to poor in all countries.

In a recent post, the Philippines worker organisation Bukluran ng Manggagawang Pilipino (BMP), questions the nationalist assumptions embedded in the North-South discourse of environmental justice. They ask if this might "pave the way for a different kind of climate injustice: the African-American working-class mother being made to pay for the 'excesses' of the male Filipino CEO who flies around the world using his private jet?" And they question why workers should "demand that reparations from the rich countries go to 'their' government" when they know it is "systematically dominated by capitalists and is likely to mobilize all their power to keep those 'reparations' in their hands?" They conclude: "Why, in short, do we not just articulate the principle and the demand in the following terms: 'We demand that those most responsible—i.e. the dominant classes and groups in all countries—pay back their climate debts to those least responsible—i.e. the dominated classes and groups in all countries'?"

Clearly, the dominant classes would not entertain this demand. But this carries another implication: the climate debt would be eliminated with the elimination of imperial capitalism. It might then be hoped that the world's people could address themselves to the task of climate and energy justice in the spirit of mutual solidarity.

3 South Africa's climate response

South Africa released an INDC discussion document in August 2015 and submitted the final version to the UNFCCC in late September. It says South Africa is "firmly committed" to keeping global warming to less than 2˚C above pre-industrial levels. It adds that this target may be revised to "below 1.5˚C in light of emerging science, noting that global average temperature increase of 2˚C translates to up to 4˚C for South Africa by the end of the century" [p.1]. As part of the Africa group at the climate negotiations, South Africa advocates for the 1.5˚C limit.

On present trends, the global temperature will pass the 2˚C mark well before 2050[34] – not the end of the century – and will rise to around 6˚C by the end of the century, which translates to between 8˚C and 12˚C for inland South Africa. Assuming all countries honour their pledges, global temperatures will rise to around 3˚C – 5 or 6˚C for South Africa. South Africa's own pledge implies a 4˚C rise in global temperatures and Climate Action Tracker has judged it 'inadequate'.[35] The South African pledge thus repeats the disconnect between the temperature target and 'intended nationally determined contributions' at international level.

The draft INDC paper contains another indication that South Africa is simply not serious about the temperature target. The International Panel on Climate Change's (IPCC) fifth assessment report (AR5) defines a set of four scenarios called "representative concentration pathways": RCPs 2.8, 4.5, 6.0 and 8.5.

- Only RCP 2.8 gives a reasonable chance of coming in under the 2˚C target in 2100 and even that likelihood fades if climate feedbacks are taken into account. It is less than likely to come in under 1.5˚C.

34 Michael E. Mann, ***Earth Will Cross the Climate Danger Threshold by 2036***, Scientific American, 18 March 2014.

35 Climate Action Tracker at http://climateactiontracker.org/countries/southafrica.html visited 2 October 2015.

- RCP 4.5 results in a temperature rise of between 2˚C and 3˚C but may go to 4.5˚C with climate feedbacks.
- RCP 6.0 between 3˚C and 4˚C and up to 6˚C with feedbacks.
- RCP 8.5 results in a rise of between 4˚C and 5˚C and nearly 8˚C with feedbacks.[36]

The INDC discussion document refers to only two of these pathways. It calls RCP 8.5 a "low mitigation scenario" and RCP 4.5 a "high mitigation scenario". Hence, it appears that the South African government does not take RCP 2.6 as a serious option and therefore has no firm commitment to keeping warming to less than 2˚C.

The discussion document was released in August on the first day of a series of 'public consultations' in the provinces on government's COP 21 positions. Prior notice of these consultations was tucked away in an obscure corner of the DEA's website and there was no advance publicity. The first provincial meeting, in KZN, was held in a luxury hotel well away from the main population centres or transport routes. groundWork director Bobby Peek managed to get there. He observed that the meeting was well attended by provincial government officials but, unsurprisingly, 'the public' was reduced to a handful of people from two or three civil society groups. Nor was there much 'consultation': "… we gathered to hear speeches and presentations from government officials and there were no meaningful discussions to challenge and make input to in order to shift our government's thinking."[37]

The day following the KZN meeting, the INDC consultations process was elevated to the home page on DEA's website where it was given almost equal prominence with Operation Phakisa – Oceans Economy. Phakisa is government's 'big fast results' process and DEA got in on the ground floor to lead the 'first implementation'.[38] The Oceans Economy includes "four critical areas to explore and further unlock the potential of our country's vast coastline": Marine Transport and Manufacturing; The Aquaculture work

36 IPCC 2015, AR5, WG3, Table SPM 1.
37 Bobby Peek, ***From the Smokestack***, groundWork Newsletter, Spring 2015.
38 At https://www.environment.gov.za/ visited on 7 August 2015.

stream; Marine Protection Services and Ocean Governance; and Offshore Oil and Gas Exploration.

On the last point, the DEA boasts that South Africa has "possible [offshore] resources of approximately nine billion barrels of oil … equivalent to 40 years of South African oil consumption … [and] eleven billion barrels oil equivalent of natural gas." There may, of course, be nothing there at all but the Oceans Economy team has set "an ambitious target" for drilling exploration wells and hopes this will lead to production of 370 000 barrels a day. The DEA does not mention that this makes around 117 500 tonnes a day of CO_2 or 43 Mt a year. Nor does it mention its own climate policy in this context.

At the KZN meeting, however, the provincial minister for Economic Development and Tourism somehow represented offshore drilling for oil and gas as part of a climate change programme.

The draft INDC follows from the National Climate Change Response Policy (NCCRP) published just ahead of COP 17 in Durban. The policy has two objectives: to make a fair contribution to global mitigation and to adapt to inevitable climate change impacts.

Adaptation

Commenting on the policy, groundWork noted that "Adaptation is already an unwelcome necessity but, without serious mitigation, adaptation will fail". This is confirmed by Ross Garnaut, an establishment economist who reviewed the economic impacts of climate change for the Australian government. In a formal presentation to the UNFCCC ADP negotiators in 2013, he warned that "mitigation must be the frontline of adaptation" as it is "fanciful to think of effective polices for adaptation to above 2 degrees". Beyond 2°C there would be a breakdown in the national and international order and hence no capacity for effective policy on adaptation.[39]

39 Ross Garnaut (University of Melbourne), ***Overview of challenges in the design of the 2015 agreement - participation, ambition, durability and implementation***, Presentation to the UNFCCC Ad Hoc Working Group on the Durban Platform for Enhanced Action workshop on Scope, Structure and Design of the 2015 Agreement, 29 April 2013.

In South Africa, adaptation is already failing – even before it starts. This is because environmental integrity, including the relation of people to their environments, is the foundation of adaptation. People's well-being and the well-being of their environments, now and in the future, are intrinsically linked. In South Africa, to the contrary, the priority for capital has resulted in the wholesale destruction of environments, as documented in the official Environment Outlook (DEAT 2006], as well as the impoverishment of people. The effect is to amplify climate impacts while undermining the resilience of both people and eco-systems.

Thus, the KZN drought is intensified by poor land management as industrial timber plantations dry out wetlands and rivers. Industrial farming also exacerbates floods. The capacity of the soil to absorb and hold water is reduced as land is compacted by heavy machinery and the surface encrusted through the application of agricultural chemicals.

Groundwater, wetlands and rivers are also being poisoned. On the Rand and Highveld, in the Vaal and Northern KZN, acid mine drainage from working and abandoned mines is slowly turning whole catchments into wastelands. Most of the province of Mpumalanga is either being mined or is planned to be mined for coal. This includes the 'lakes district' which gives rise to four critically important rivers: the Vaal, the country's hardest working river, the Usuthu, the Komati, and the uMpuluzi. Open cast coal mines are steadily eating out some of the best farm lands in the country while both open cast and underground mining interrupts the flow of groundwater.

Much of South Africa is already water stressed and the engineering that has turned South Africa's rivers into a giant national plumbing system is to compensate for the pollution of water as much as for the lack of it. Industry consumes vast quantities of clean water and returns dirty water to streams and rivers. Across the country, municipalities leak sewage from poorly maintained plants. The cost of treating water escalates and Lesotho's clean water is used to dilute the pollution in the Vaal at the cost of the ecological health of the Senqu River which becomes the Orange.

Remediation of damaged environments is an urgent priority. Corporations have a way of avoiding their environmental liabilities. Mining corporations are prone to 'pass the parcel', selling off mines where profits are exhausted and liabilities are accumulating – in some cases to inexperienced black economic empowerment (BEE) companies. They also commonly just walk away. The country is littered with 'abandoned and ownerless' mines. Miners are required to set aside funds for mine closure but the amount required by the Department of Mineral Resources (DMR) is a mere token and amounts to a subsidy. It needs to be raised by about 10 times to reflect actual costs.[40] It should be raised a good deal more to reflect the damage that cannot be remediated.

A more equal society is likewise essential to adaptation. The economy created by capital, energy and carbon intensive development is grossly unequal and has resulted in over 35% unemployment while 57% of the people live in poverty.[41] A sustainable society that caters for everyone can only be founded on democratic economic relations. That requires confronting the power of corporate capital and initiating a major shift in economic priorities.

Without this, adaptation strategies are likely to entrench inequality and will ultimately prove counter-productive. This is already the experience of people responding to environmental disaster.[42] Steel Valley was a productive farming area opposite the Iscor (now ArcelorMittal) steel works in Vanderbijlpark. Iscor's effluent poisoned the groundwater and, after a long struggle, the corporation was forced to admit it. About that time, farming became impossible. The only 'adaptive' strategy left was to abandon the land and find another life somewhere else. Iscor then provided some compensation to the farm owners and bought them out. Farmworkers, however, were left with nothing and had to sell their stock cheap. Most of them now live in the shack settlements around Vanderbijlpark.

40 A report for Continental Coal by SRK comments that "DMR methodology is generally acknowledged to underestimate closure liabilities" [SRK Project 427952, 15 August 2011]. It provides for six times more than the DMR requires for closure.

41 Stats SA visited 30 July 2015: http://www.statssa.gov.za/?page_id=739&id=1

42 This experience was related by participants in a climate and energy learning group of people on the fossil fuel fencelines.

Unequal adaptation is also inscribed in the compromised health of people living on the fenceline of polluting industry – that is, the industries responsible for the bulk of carbon emissions. Pollution associated with coal already kills over 2 000 people each year. The developing foetus and young children are particularly vulnerable and the damage stays with them for life. Sick children become sick adults. People from the fenceline communities commonly observe that they do not even get the jobs in the industries that pollute them because they do not pass the medicals. And people's bodies do not adapt to pollution. The South Durban Health Study showed that exposure makes them even more vulnerable [Naidoo et al 2006]. They will also be more vulnerable to the health impacts of climate change.

In 2004, when the Air Quality Act was passed, industry was put on notice that it would be subject to emission standards. Following a process in which industry participated, standards were promulgated in 2010 for implementation in 2015. The major polluters, led by Eskom and Sasol, did nothing to prepare for compliance and, in 2014, applied to the DEA for exemption. When it was made clear that the law did not allow exemption, they applied for postponements. In February 2015, the DEA granted the postponements. Nomcebo Makhubelo of the Highveld Environmental Justice Network commented, "We have been opposed to these applications because they meant that industries, in particular Eskom, are ultimately seeking permission to continue destroying the health and lives of ordinary people in the Highveld."[43]

Unequal adaptation is identified in South Africa's flagship research on adaptation, the Long Term Adaptation Scenarios (LTAS). An overview report outlines 12 'high level messages' [LTAS 2015: 6 ff]. They include:

- *Adaptation must focus on vulnerable communities, as they are most at risk from climate change.* This notes that poor people – both rural and urban – are most vulnerable.
- *Climate change will likely accentuate inequality, undermining social justice and cohesion if South Africa does not adopt effective adaptation responses.* This warns that the rich have the resources to adapt and

43 Sapa, ***Molewa's emission reprieve criticised***, Engineering News, 25 February 2015.

> the poor do not. There will be "growing social tensions" if the state is unable to "insulate the poor majority" from climate impacts.

The report is titled: *Together developing adaptation responses for future climates*. But it is already evident that participation in the LTAS itself is unequal and this is reflected in a generally patrician regard for 'the poor'. As in the phrasing above, they are rendered as beneficiaries of the state and without agency. Those who are given agency are those with adaptive capacity – that is, those with capital – and the broad intention of the LTAS is to preserve current economic interests, for example in agriculture and forestry, and expand them where possible. The question of whether those interests are compatible with a serious response to climate change is not asked.

Curiously, the LTAS hardly registers the destruction of adaptive capacity at the base of the country's carbon intensive economy. Coal is mentioned only in the context of flooding interrupting supplies to the power stations. Consequently, it also misses the direct link between adaptation and mitigation.

In contrast, the 2015 Lancet Commission on Health and Climate Change argues that "tackling climate change could be the greatest global health opportunity of the 21st Century. Many mitigation and adaptation responses … lead to direct reductions in the burden of ill-health, enhance community resilience, alleviate poverty, and address global inequity" [Watts et al 2015: 1]. In particular, it calls for: the "rapid phase out of coal"; renewable energy to supply electricity to communities and health facilities; and settlements with energy efficient buildings, ease of "active transport" (walking and cycling) and access to green spaces. "Such measures improve adaptive capacity, whilst also reducing urban pollution, greenhouse gas emissions, and rates of cardiovascular disease, cancer, obesity, diabetes, mental illness, and respiratory disease" [2].

Mitigation

South Africa's pledge is known as the 'peak, plateau and decline' (PPD) trajectory. It has its origin in the offer South Africa took to the 2009 Copenhagen negotiations and was subsequently formalised at Cancun in 2010. The offer

was that greenhouse gas emissions should 'deviate' by 34% below business-as-usual by 2020 and would peak in 2025 at 42% below business-as-usual. Emissions would then 'plateau' before finally declining after 2035. It was made conditional on financial and technology support from developed countries but does not distinguish domestic from international responsibility. This qualification is repeated in the draft INDC. Essentially, South Africa reserves the right to do as little as it likes.

The Copenhagen offer was said to be based on the Long Term Mitigation Scenarios (LTMS), a research document commissioned by the DEA in 2007. The LTMS constructed two scenarios: Growth without Constraints (GWC) which is used as the business-as-usual baseline for the Copenhagen offer; and Required by Science (RBS) which shows the emissions path necessary for South Africa's contribution to avoid warming of more than 2˚C. These two scenarios produce top and bottom lines for emissions through to 2050.

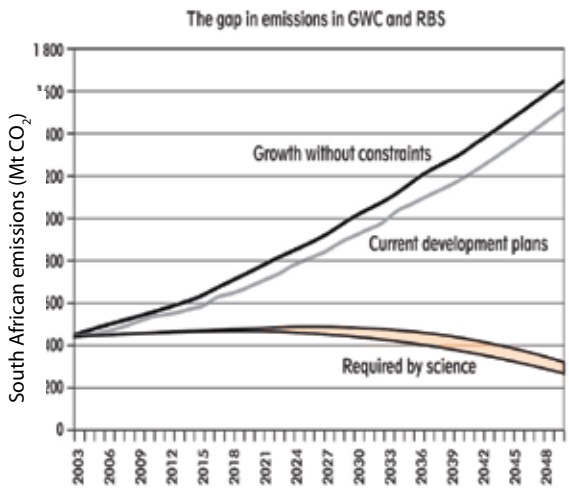

Figure 2: GWC and RBS

Source: LTMS.

While preparing the national climate policy in 2011, the DEA presented what the PPD range meant in actual emissions. It showed the business-as-usual baseline reaching 750 million tonnes (Mt) of greenhouse gases in 2020 and 870 Mt in 2025. Hence, the Copenhagen offer translated to 495 Mt in 2020

and 506 Mt in 2025. In 2011, emissions were already above these targets and, under intense pressure from business, the DEA cheated the numbers.

In March that year, it introduced an 'error range' into the business-as-usual baseline and it widened the error range in August. This was an entirely arbitrary procedure with no technical justification. It produced a very wide PPD range with upper and lower limits: between 398 and 583 Mt in 2020 and between 398 and 614 Mt in 2025. Table 4 lays out the numbers.

Table 4: South African emissions and promises in Mt CO_2e

	Actual		LTMS (GWC)			LTMS (RBS)		Copenhagen offer		Copenhagen "revised" (Aug 2011)	
Dates	2004	2010	2011	2020	2025	2020	2025	2020	2025	2020	2025
CO_{2e} Mt	440	518	545	750	870	460	453	495	505	398-583	398-614

As can be seen, the original Copenhagen offer was already substantially higher than what the LTMS said was required by science. The August 2011 revision is what went into national policy and the upper limit for 2025 is 160 Mt higher than RBS.

Moreover, the LTMS RBS scenario itself misses what is really required:

1. It assumes the disastrous 2°C target. A 1.5°C target would require a much earlier peak and steeper decline.

2. It takes stabilisation at 450 ppm CO_2e to be adequate to that target. The IPCC's Fourth Assessment Report [AR4] says this gives only a 50% chance of temperature stabilisation in the range of 2°C-2.4°C.[44]
3. It gives 2015 as the target date for peak global emissions, whereas the AR4 says emissions must peak between 2000 and 2015.
4. It assumes a 50% global reduction in emissions by 2050 with 80% reduction by Northern countries taking account of common but differentiated responsibilities. AR4 says that reductions in the range of 50-80% are required by 2050 to meet 450 ppm stabilisation.

In short, the LTMS takes the least demanding end of the range in all cases. Meanwhile, numerous studies produced since publication of the AR4 in 2007 show that climate impacts are happening harder and faster than previously anticipated. Finally, the LTMS rightly takes account of the principle of common but differentiated responsibility (CBDR) which allows for the fact that Northern countries are responsible for most of the emissions driving climate change. However, by bundling South Africa with the South in general, the LTMS gives it a free ride on the really low emissions from least developed countries.

In 2014, the DEA initiated a process to define Desired Emissions Reduction Outcomes (DEROs). It said that annual emissions might fluctuate between the upper and lower PPD limits but the middle of the PPD range would be used to define the national budget. If this budget was exceeded in one five year period, it would have to be compensated for in the next. As can be seen in Table 5, the middle numbers are about the same as for the original Copenhagen offer. So this is reinstated as government's target.

Table 5: PPD to 2050, Mt CO_2e

	2010	2015	2020	2025	2030	2035	2040	2045	2050
Upper	547	562	583	614	614	614	552	490	428
Mid	473	480	491	506	506	506	444	382	320
Lower	398	398	398	398	398	398	336	274	212

Source: DEA DEROS explanatory note 1.

44 The IPCC's 2007 Fourth Assessment Report is cited by the LTMS.

Figure 3 shows the PPD range in graphic form.

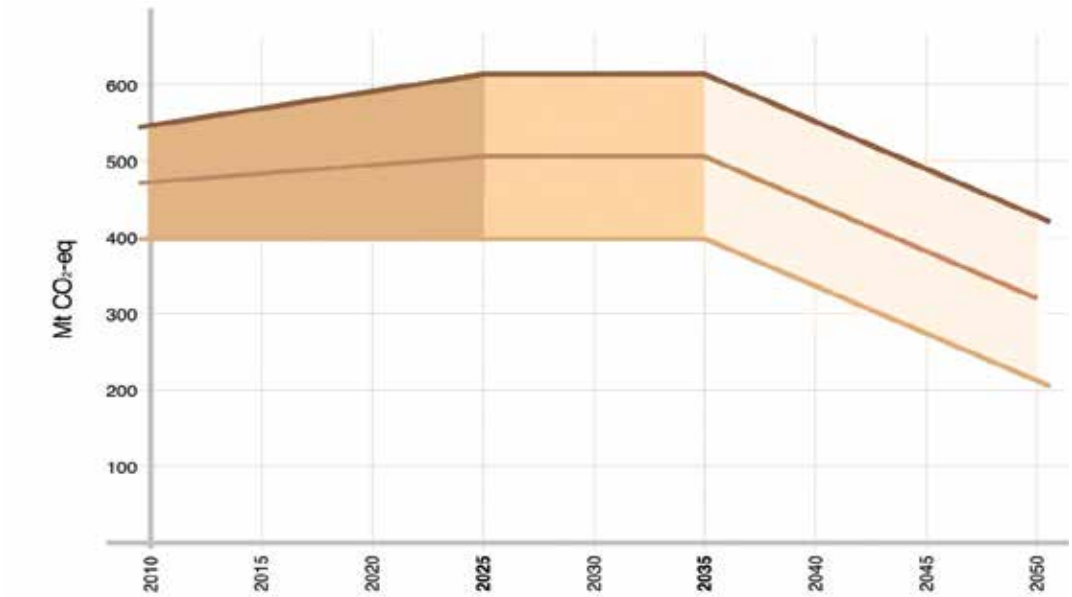

Figure 3: The PPD range 2010-50 with upper (darkest line) and lower (lightest line) limits and the mid-range line.

Source: DEA DEROS explanatory note 1.

The PPD upper limit adds up to a 2010-50 greenhouse gas budget of 23 billion tonnes (Gt), the mid-range to 19 Gt and the lower limit to 15 Gt. The upper limit, assuming a proportionate mitigation effort from other countries, will make for a 4˚C rise in global temperatures by the end of this century – and it won't stop there. The mid-range – government's target – is not much better. In our view, even the lower limit of the PPD range is too high – between 5 and 3 Gt more than a generously conceived budget for a fifty-fifty chance of exceeding 1.5˚C.

There are, as the draft INDC paper notes, many different takes on what is fair and how to calculate it. In a paper commissioned by the BASIC countries, South African experts calculated an extraordinarily generous 29 Gt CO_2e budget for the period 2000-2050 [Basic 2011: 89]. The DEA translates this to 20-22 Gt CO_2e for 2016-2050. In contrast, both Chinese and Indian experts gave South

Africa only 7 Gt CO_2 for 2000-2050 [43 & 69]. The three expert groups each used their own methods to take account of CBDR. They all agreed a global carbon budget (1440 Gt CO_2e for 2000-2050) that gives only a 50% chance of coming in under 2˚C, on the grounds that this "seems reachable" [6], but without taking account of climate feedbacks. So the real chances are a lot less than 50%.

As argued earlier, groundWork assumes a global budget of 900 Gt CO_2e for 2011 onwards. If this were divided on a per capita basis, it would give South Africa 6.3 Gt CO_2e. Allowing an overly generous margin for CBDR, we think this leaves South Africa with a carbon budget of between 10 and 12 Gt from 2011 to 2050 and almost nothing thereafter.

South Africa's Copenhagen pledge is made conditional on financial and technology support from developed countries [6.1]. This too is argued on the basis of CBDR. Northern (developed) countries are responsible for the largest part of the emissions that are driving global warming. By any reasonable accounting, including that of the BASIC experts, they have already broken their GHG budgets and are in deep deficit. It is clear, however, that it is not physically possible for them to turn their countries into GHG sinks on the scale needed to recuperate the debt. This has two implications: First, the North owes the South a climate debt which can only be paid by other means including financial transfers. Second, the South must still reduce emissions by more than its fair share to avoid dangerous climate change.

Thus, for a good chance of coming in below 2˚C and a slim chance of coming in below 1.5˚C, EcoEquity calculates that South Africa's emissions should peak in 2014 at about 540 Mt CO_2e. It should then decline at between 3 and 6% a year to 320 Mt in 2025 and 260 Mt in 2030. But this is more than its fair share of 440 Mt CO_2e in 2025 and 400 Mt in 2030. So, on this calculation, "about two-thirds of South Africa's domestic mitigation obligation in 2025 would be self-funded and about one-third would be supported by international finance" [Athanasiou et al 2014: 42].

groundWork supports the demand that rich countries pay their climate debt. However, making the pledge conditional implies that South Africa's will to act

in the interests of its people depends on what rich countries do. The INDC document notes that poor people are most vulnerable to climate change. At the same time, it says that "zero poverty" and reduced inequality are government's "over-riding" priorities and cites the National Development Plan (NDP) to that effect. As the 2014 groundWork Report showed, the NDP makes these goals dependent on GDP growth averaging 5.4% between 2010 and 2030. This is not happening, is not going to happen and, if it were to happen, would not eliminate poverty and would likely increase inequality. Hence, it is difficult to believe that government really has a priority for zero poverty.

Rather, it is using poor people as an excuse to avoid determined mitigation and, in so doing, knowingly consigning them to death. The rich will follow the poor on the sorrowing road to death sooner than they think. The INDC document represents the short term interests of a class that can't believe that it won't get away with the destruction of earth.

Invoicing for false solutions

South Africa's INDC includes a section on what international support it expects and for what. It is, so to speak, an initial invoice for the climate bill. For mitigation it lists:

- Estimated incremental cost to expand REI4P [the renewable energy programme] in next ten years: US$3 billion per year.
- Decarbonised electricity by 2050: estimated total of US$349 billion from 2010.
- CCS: 23 Mt CO_2 from the coal-to-liquid plant: US$0.45 billion.
- Electric vehicles: US$513 billion from 2010 till 2050.
- Hybrid electric vehicles: 20% by 2030 – US$488 billion

The second item amounts to ZAR4.9 trillion.[45] The draft INDC specified "renewable energy and nuclear power" and the bulk is likely to be for the latter, starting with about R1 trillion for the nuclear procurement that the

45 At R14/$1.

Department of Energy (DoE) says it will initiate this year. Thus it appears that government will look to climate finance to fund nukes.

The third item is entirely to the benefit of Sasol – a massive subsidy for a false solution. Even with CCS, Sasol's Secunda plant will remain the dirtiest way to make liquid fuels and the people of the Highveld will still feel it in their lungs. The South African Centre for Carbon Capture and Storage (SACCCS) is funded by the South African and Norwegian governments along with Sasol and Eskom. Presumably the latter also hopes for a payoff. Other 'participants' are Anglo American, Xstrata Coal, Total, PetroSA, Agence Francaise de Developpement (AFD), Alstom, and Exxaro. SACCCS is about to hold a conference on the theme "Capacitating South Africa for CCS".[46]

A 'geological storage atlas' has already identified potential sites and the CCS 'roadmap' says the next step is to develop a 10 000 tonne pilot project in 2017, followed by a 100 000 tonne demonstration project in 2020 and a 1 Mt commercial project in 2025. In 2014, Sasol's direct CO_2 emissions (excluding indirect CO_2 emissions from power use and other greenhouse gases) came to 58 Mt. That is 2.5 times the amount of 23 Mt given in the INDC, so it must be assumed that the INDC means 23 Mt per year – otherwise the project is as useless in conception as it will prove to be in execution.

The nearest geological formation with the (untested) potential to accommodate that is off the KZN coast, over 400 kilometres from Secunda. So a considerable infrastructure of pipelines and pumps must be built to carry it away and inject it under the earth where it may or may not stay. According to Vaclav Smil, an academic specialist in the field of technology and environment, "… to sequester just 25% of CO_2 emitted in 2005 by large stationary sources … we would have to create a system whose annual throughput (by volume) would be slightly more than twice that of the world's crude-oil industry …"[47]

Urban planning and public transport are notably absent from the list. So the electric and hybrid vehicles probably include more cars than buses. This

46 See http://www.sacccs.org.za/.

47 Vaclav Smil, ***Long-range energy forecasts are no more than fairy tales***, Letter to Nature, Vol. 453, May 8, 2008.

assumes a major shift in the global car making industry. Regrettably, it is likely to be accompanied by intensified emissions from car production. And, unless electricity production really is 'decarbonised' by 2050, emissions will be transferred to the power stations. Decarbonised electricity implies that Medupi and Kusile are shut down early and the DoE's current programme to procure privatised coal-fired power should be terminated. May it be so.

Business against climate action

Government has initiated processes to introduce a 'mix of measures' for mitigation. The key measures are the DEA's DEROs process which is intended to define a national carbon budget and to allocate it between economic sectors and an initiative by National Treasury to introduce a carbon tax.

Big industry, however, has decided that South Africa should not do anything about climate change. This is how the Chemical and Allied Industries Alliance (CAIA) puts it in a presentation to the Davis Tax Committee in May 2015: "CAIA does not support South Africa's continued development of climate change policy, including that of the carbon tax."[48] Corporate South Africa knows the consequences. It is choosing a rising death toll as the planet is made ever more inhospitable rather than any limit on its short term interests.

This marks a new tone to what South African industry likes to call its 'contribution' to climate policy. Previously, it has noted that climate change is serious and, following the World Business Council for Sustainable Development (WBCSD), argued that business is part of the solution. The solution, however, never includes any actual policy measure but relies entirely on business taking voluntary action.

48 CAIA presentation to the Davis Tax Committee, 12 May 2015. at http://www.taxcom.org.za/library.html. Presentations by the Chamber of Mines and Sasol, cited below, are also available at the site. An earlier version of this section was published as an opinion piece in the Mail & Guardian, 17 July 2015. Responding, CAIA said it was misrepresented and continued: "Though it can be agreed that the carbon intensity of the South African economy should be reduced in a phased manner, there is no urgency for this to take place" (Letters 24 July 2015). Either they have not read the climate literature and don't know what they are talking about, or they have decided to ignore it.

At the Davis Tax Committee, Treasury's carbon tax proposal was at issue. Earlier in the year, business stonewalled the DEA's DEROs process to define a national carbon budget and allocate it between sectors. Business and industry walked out on a key workshop in February and, they hoped, left the process for dead. They have considerable power to stall it because defining the DEROs relies on industry providing the DEA with information on which to calculate emissions.

A third process thus concerns the DEA's greenhouse gas reporting regulations. Here, business has worked to keep the DEA in the position of a supplicant for information. It was given an inside track to influence, and provide text for, the first draft of the regulations before they were published for public comment. This draft requires as little information from business as possible and not enough to establish carbon budgets. In particular, it requires businesses to report at company level only and not at plant level where the emissions occur. It also allows business to avoid public scrutiny by creating a presumption that the information will be treated as 'confidential'. Elsewhere in the world, the same corporations are complying with rigorous and public reporting requirements.

All business and industry presentations to the Davis Tax Committee opposed the carbon tax but left it to CAIA to argue for scrapping climate policy altogether. They argue first that South Africa's emissions are globally insignificant and second, based on numbers provided by Sasol, that the carbon reduction objective of the National Climate Change Response Policy has already been met. These claims either reflect bad maths or bad faith.

On the first point, the Chamber of Mines (CoM) says South Africa's emissions are "tiny compared with China, India and the USA" even if per capita emissions are high. Indeed, those three countries plus the European Union (28 countries) account for about 50% of global emissions. The CoM's biggest members – Anglo, Billiton and Glencore – dominate world trade in coal and have not called on Europe, India or China to reduce coal consumption and imports. To the contrary, they are part of the World Coal Association's drive to expand coal markets.

The other half of global emissions, about 25 Gt CO_2e a year, is more than enough to keep global warming on the boil. In that half, South Africa's emissions are very significant in absolute terms as well as per capita terms. Only two European countries – Germany and the UK – have higher absolute emissions and none have higher per capita emissions. Malawi, by contrast, emits 140 times less per person.

CAIA adds that South Africa is a developing country and needs carbon "space to be able to grow its economy as developed countries have had in the past". This invokes CBDR and implies that the priority for development is to lift people out of poverty. Regrettably, poor people in South Africa didn't get much from economic growth even during the boom years before the 2008 crash. The benefits were taken mainly by the rich and a good portion of that was 'repatriated' to the developed world. Since the larger and more influential members of both CAIA and the CoM are transnational corporations, their use of supposed Southern carbon space is to the benefit of Northern investors.

Sasol similarly argues that South Africa's pledge to reduce emissions – the PPD trajectory – is 'aspirational' and, as a developing country, it should not make any firm offers at the Paris COP. This position obviously shelters its coal-to-liquid plants which include the world's biggest point source of CO_2 at Secunda. In the USA, meanwhile, Sasol plans a massive gas-to-liquids plant to be supplied from fracked shale gas. Gas-to-liquids is the next most carbon intensive option after coal-to-liquids and, because fracked wells have a propensity to leak methane, the combination may be worse. At home with the oil and gas lobby in America's deep south, Sasol has garnered lush subsidies from the Louisiana state government[49] and is not calling on the US to take the lead with rapid emissions reductions.

Sasol is CAIA's weightiest member, so much so that CAIA is generally seen as its proxy. In its own presentation to the Davis Committee, however, Sasol is careful not to argue against all climate policy but concludes that power from

49 Office of the Governor, State of Louisiana, ***Governor Jindal and Sasol Announce Largest Manufacturing Investment in Louisiana History, Creating Over 7,000 Direct and Indirect Jobs***, 5 December 2012.

gas, in which it has a commanding interest, would be the right alternative to a tax which would "reduce Sasol's ability to invest further".

This replays its response to Treasury's 2006 proposal that Sasol should be subject to a windfall tax on its extraordinary profits off the back of the rising oil price. The tax was proposed to reclaim some part of the subsidy that Sasol enjoyed throughout the 1980s and 90s. Sasol's response was that more subsidies would be appropriate as incentives for further investment in 'alternative' fuels. Treasury then dropped its windfall tax proposal in return for Sasol's promise to invest in Project Mafutha – a new Secunda in the Waterberg. That promise faded away with the memory of the windfall tax. Mercifully, Mafutha was not a viable proposition.

Sasol has led the argument on the second point, that the carbon reduction objective of national climate policy has already been met. Slide 14 of its presentation to the Davis Committee, shown opposite, purports to show this. This slide was also used by Business Unity South Africa (BUSA), which led the call for a hearing on the carbon tax at the David Tax Committee but declined to put its presentation on the Committee's website. CAIA and the CoM both declare support for BUSA's positions. The repeated message in all cases is that South Africa is 'below target' and cannot afford to do more.

The source of the slide is given as: *Sasol. 2015. Development of new emissions outlook Sasol calculations based on data from the DEA: Mitigation Potential Analysis. Sasol.* It turns out that this was nothing more substantial than 'internal calculations' that are not documented except in this slide.[50] In response to groundWork's request for substantiation, Sasol first said, "Our calculations, which rely on the MPA (Mitigation Potential Analysis) and GHG inventory, also incorporate third party information which we are obliged to keep confidential." It later agreed that "we can provide some information and clarity to you without breaking confidentiality".[51] Two weeks later, it sent a note headed: *Sasol's development of a new greenhouse gas emissions outlook for South Africa:*

50 Email correspondence from Sasol, 25 June 2015.
51 Email correspondence, 1 July 2015.

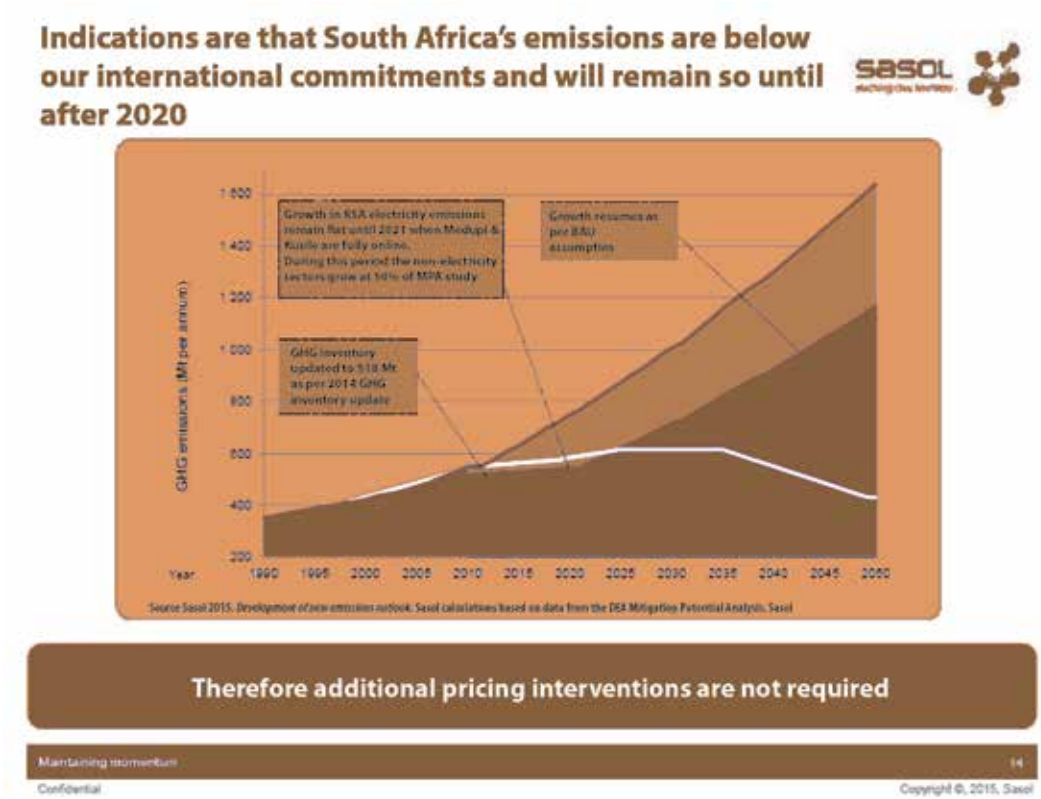

Figure 4: Slide 14 of Sasol's presentation to the Davis Tax Committee.

assumptions and data.[52] It is striking that the note does not mention third party information under 'data sources'. Further, Sasol's assumptions read rather like findings, suggesting that it found what it set out to find.

Sasol's stated objectives were about comparing the emissions 'outlook' (i.e. Sasol's projection of the path of future emissions) with government's PPD trajectory to establish if South Africa is "below the current PPD". Slide 14 represents its conclusions and says: 2010 emissions were 518 Mt; electricity emissions remain flat until 2021 when Medupi and Kusile are fully online; other sectors grow at 50% of the rate assumed in the MPA study; business-as-usual growth rates in emissions resume in 2021. The top line in the chart shows the business-as-usual baseline projected by the LTMS in 2007. The

52 Sasol's note is available on groundWork's website along with its presentation to the Davis Tax Committee and our response.

lower line is Sasol's projection. The white line is the PPD upper limit and is represented as defining the target. The PPD lower limit is not shown and not mentioned.

Emissions in 2010 were 544 Mt CO_2e according to the GHG Inventory. This excludes substantial emissions from spontaneous combustion – the fires that break out on working and abandoned coal mines and discard dumps. The land sector is assumed to be a sink although there is considerable uncertainty about the data. The inventory estimates that land absorbed 26 Mt in 2010 [DEA 2014]. This gives the net emissions total of 518 Mt which, as Sasol observes, is lower than the business-as-usual baseline. (The LTMS did not anticipate recession in 2008-09. If it had, the baseline would have been lower.) It also falls within the PPD range (398 – 547 Mt). This is not surprising since that very wide range was created precisely to accommodate South Africa's raging emissions. But it is well above the mid point (473 Mt) that the DEA says is the target.

Sasol also notes declining electricity production "since 2010"[53] and observes that "electricity accounts for nearly half of RSA's GHG emissions …" According to the Department of Energy's (DoE) Integrated Resource Plan (IRP) Update (Nov 2013), power emissions are about 45%. This is something short of "nearly half" and that 5% makes a large difference. Besides, other things being equal, the share of emissions from other sources would automatically increase as Eskom's production declined.

In its assumptions, Sasol focuses almost exclusively on Eskom. Only one point addresses the wider economy which Sasol assumes cannot grow in emissions "without the availability of electricity". This is the only assumption behind the projection that "non-electricity sectors grow at 50% of the MPA study". Sasol goes on to conclude that slower economic growth and increased energy efficiency – both of which are attributed to reduced electricity production and increased pricing – slow the growth in GHG emissions "to far lower levels than previously anticipated" .

53 Sasol quotes a Stats SA publication dated May 2015 and embargoed to 2nd July. It would not have been available when Sasol prepared this slide ahead of the DTC presentation on 12th May.

Slow economic growth is not, of course, solely down to Eskom. The global economy has not recovered from the (misnamed) 'great recession' and this is indeed likely to have slowed the rate of increase in GHG emissions. It should be noted, however, that reduced production is frequently accompanied by increased emissions intensity at plant level – as is the case for Sasol itself.

The increase in electricity prices is also likely to have driven greater efficiency. Big industry has a long history of wasting what was the cheapest electricity in the world so there is considerable potential for saving. We might add, of course, that raising the price of emitting carbon is precisely the aim of the carbon tax. And while Treasury's arguments for 'getting prices right' and then leaving it to the market are limited, the impact of electricity prices on efficiency might be taken as proving their point – at least in the short term.

As to Eskom, reduced production has not resulted in reduced emissions. In the year to March 2012, it produced 237 terawatt hours (TWh) and pumped out 232 million tonnes of CO_2. In 2014, total production was down to 231 TWh but emissions were over 233 Mt. This may be because of the declining efficiency of its coal plants and because it was over using the diesel plants that are supposed to kick in only at peak demand times. Load shedding, meanwhile, has driven many firms, from mines to supermarkets, to bring in their own diesel generators. The meltdown at Eskom is thus as likely to increase as to reduce energy emissions. Sasol does not account for this new source of emissions.

Sasol projects that electricity emissions "will remain flat until 2021 when Medupi and Kusile are fully online". This is risible. The first unit of Medupi was fired up and fully operational by August this year and the rest are meant to follow at six-month intervals. The first unit of Kusile is meant to start up in 2017. They will be late, no doubt, but unless equivalent units are shut down as they come online, another 60 Mt of emissions will be added during this period, not at the end of it.

The relevant Sasol assumption reads: "Even with the start-up of units from Medupi earlier than 2021, the average electricity growth rate is expected to remain relatively muted unless the current Eskom fleet availability improves."

First, as noted, the electricity growth rate is not necessarily linked one-to-one with the carbon growth rate. Production from the central coal basin is in decline and Eskom says that the quality of coal is likewise declining. Eskom also has to truck more and more coal by road or rail as some of the mines tied to particular power stations are closed. This suggests rising carbon intensity.

Second, Medupi's new units will add to current emissions at "current fleet availability". For the assumption to hold, it should read that there will be a further loss of plant availability. Or, as noted above, that equivalent units are shut down as the new units come online.

groundWork advocates that they are shut down, starting with the most polluting plants with remote coal supplies or which are driving the development of new mines in sensitive areas – such as the critical watershed of the Mpumalanga lake district. We are likewise opposed to Sasol's own coal mine expansion. We would welcome reduced electricity production from coal starting now and an instruction to Eskom that it focus on renewables.

But this is not what Eskom or government is planning. First, Eskom plans to improve plant availability. Second, the draft IRP Update shows units at the oldest plants closing from 2020 and the draft Integrated Energy Plan shows the first units closing only in 2022. IRP Update shows emissions increasing well above the PPD range before being sharply (and improbably) reduced to the PPD upper limit in 2025.

Sasol's assumptions say nothing about the renewable energy programme, announced in 2012 and already making a substantial contribution to the grid at a lower cost than new coal power. In government planning, however, renewables do not replace coal but are additional to the expansion of coal-fired power. It will reduce the carbon intensity of power but overall emissions will continue to rise.

Moreover, the renewables programme is now being made the model for the procurement of privatised coal-fired power – the so-called base-load independent power producer (BLIPP) programme. Government initiated this process this year (2015) but Sasol does not mention it. It is very unlikely that

any coal project will be brought on line as quickly as wind or solar so it may be that these plants will not contribute to additional emissions until after 2021.

Sasol concludes that "GHG emissions are expected to remain below the PPD for the next few years". This treats the upper limit as the PPD and erases the PPD range. Whereas industry chooses to notice only the top limit, we reiterate that the lower limit is still too high for a fair contribution to preventing devastating climate change.

After 2022, however, Sasol's slide 14 shows emissions rising sharply – as if in triumph – to break through the upper limit. The relevant assumption says: "Thereafter GHG emissions growth after 2022 is as per the BAU [business-as-usual] rates …"

This reads more like a finding than an assumption but seems to conceal a real assumption: that South Africa's high carbon economy is constrained by the electricity crisis and will recover once full power is restored. Hence, 'below target' emissions do not indicate economic transformation. The minerals-energy complex (MEC) remains large and in charge and a low carbon economy is not in prospect and not wanted.

4 Energy in crisis

The MEC has shaped South Africa's development for over a century. It has created an energy model based on cheap coal, cheap labour and heavy duty pollution. It is unsustainable economically and is socially and environmentally catastrophic. Government and the corporations at the heart of the MEC are trying to remake and expand this model. But the model is broken. In particular, the electric power system made by building big base-load to supply 'cheap and abundant' power to energy intensive industries is collapsing. The effort to remake it, interacting with the global economic depression,[54] is liable to bring the whole country down.

South Africa is getting used to load shedding. Rolling mass blackouts first hit Cape Town in 2006 when the bolt hit the rotor at the Koeberg nuclear power plant. This proved to be the prelude to national load shedding in 2007-08. Eskom then 'kept the lights on' through the 2010 football world cup, the 2011 CoP 17 and the 2014 elections. But this came at the cost of maintaining its plant. From 2012, Eskom was already calling on the big corporate users to reduce their consumption during peak demand periods. In 2014, however, both its plant and its top management were falling apart. National load shedding resumed in November and December and became more or less routine in 2015.

The crisis has long roots.[55] Very briefly, following World War II and with the support of the big mining houses, Eskom established itself as a monopoly power utility. It also determined policy, effectively becoming the apartheid government's energy arm and more or less running the power section in the Department of Minerals and Energy (DME). Its own inclination for secrecy was reinforced and protected by security legislation and its monopoly on strategic information prevented any serious challenge to its decisions.

54 Described in ***Planning Poverty***, the second part of this series.
55 See Hallowes 2011 for a more detailed account.

During the 1970s, commodities boomed in response to the 'oil shocks', the demand for electricity soared and debt was cheap as the international banks needed to invest a surplus of 'petrodollars'. State and private corporations collaborated to create a coal export market with the construction of the Richards Bay terminal and port. Eskom borrowed heavily and completed seven new giant power stations between 1979 and 1992. The oil shocks were a symptom of the world turned upside down for the imperial powers but, in the 1980s, the US reasserted its dented authority. It imposed neo-liberal policies and pushed interest rates sky high even as commodity prices collapsed along with the value of Third World currencies, including the Rand.

By the end of the 1980s, South Africa's economy was in recession and anti-apartheid sanctions were biting. The demand for electricity fell well short of Eskom's projections, leaving it with a massive surplus of capacity just as the political transition got under way. Eskom then mothballed some plant while pushing demand primarily through offering the world's cheapest electricity to energy intensive users. The cheapest power of all went to BHP Billiton's new Hillside and Mozal aluminium smelters in Richards Bay and Maputo. Eskom switched on Majuba, its newest power station, four years after it was completed, just as Hillside went into production in 1996.

Neo-liberal policies were introduced by the apartheid government and entrenched by the first democratic government with the misnamed Growth, Employment and Redistribution (GEAR) economic policy. In 1998, the White Paper on Energy said that Eskom should be privatised as it was assumed that 'the market' would lead the action to create economic growth and jobs. It predicted that Eskom's surplus would be consumed and new power plants would be needed by 2007. It said that building them should be left to private investors.

Privatisation, however, did not happen. It was resisted by Eskom as well as the unions and major elements within the ANC. And it was incompatible with the real heart of the energy policy – the long-term commitment to cheap energy for industry as the foundation of international competitiveness. The conflict resulted in paralysis. While government barred Eskom from planning new

plants, private investors were not interested so long as there was no price escalation in prospect.

In 2004 government adopted the rhetoric of the developmental state and privatisation was put on hold. Amid alarms that economic growth was now overtaking the capacity to deliver power, government declared that Eskom would lead on building new generating plants but an additional third of new capacity would be reserved for private independent power producers (IPPs). The new plants were to be up and running in 2008.[56] The instruction to Eskom was too late already. As Trollip et al [2014] point out, it takes at least nine years to build the big 'six pack' power plants favoured by Eskom and, to meet the deadline, the decision to build should have been made by 2000. Moreover, Eskom's capacity to undertake a 'new build' had been dismantled and now had to be restored.

Table 6 shows Eskom's new build. It is centred on Medupi and Kusile, the giant new coal-fired power stations still under construction. The first unit at Medupi is now in production, three years behind schedule, but nothing is being said about the second unit. Ingula, the pumped storage plant, is also under construction. The rest of the new build has been completed, adding 4 000 MW of baseload coal plant and 2 000 MW Open Cycle Gas Turbines (OCGT) to Eskom's generating capacity. The OCGT plants in fact run on diesel. They are designed to be run only for two or three hours a day at peak demand times and run at a very high cost.

As to the IPPs, the electricity price was still too low to yield a profit and investors were further deterred by conflicts around connection to the grid which remained under Eskom's control. Moreover, the DME (later DoE) was responsible for procuring power from IPPs but did not have the capacity to do so. It developed the necessary legislation only in 2006 and did not actually sign a power purchase agreement until 2013 when a team seconded from Treasury managed the first tranche of renewable energy projects [Trollip et al 2014: 13]. The renewables procurement has been accounted a great success

56 Public Enterprises Minister Alec Erwin, ***Economic Cluster: Higher Growth, Sustained Growth, and Shared Growth***, Parliamentary media briefing, 17 February 2005.

Table 6: Eskom's New Build

	Technology	Name and location	MWatts
Peaking Plant	OCGT	Ankerlig, Atlantis, Cape Town.	2 080
		Gourikwa, Mossel Bay, Western Cape.	
	Pumped storage	Ingula, Van Reenen, KZN / Free State.	1 352
Renewable	Wind	Sere, Vredendal, Western Cape.	100
Total			**3 532**
Coal-fired base plant	Expansion	Arnot	300
	Return to service of mothballed plant	Camden, Ermelo, Mpumalanga	1 520
		Grootvlei, Balfour, Mpumalanga	1 170
		Komati, Middelburg / Bethal, Mpumalanga	955
	New coal	Medupi, Lephalale, Limpopo	4 764
		Kusile, Witbank, Mpumalanga	4 800
Total			**13 509**

and the 'learning' is now being applied to the procurement of privatised coal-fired power. Some things, evidently, are not learnt.

In 2005, even as the surplus capacity (or 'spinning margin') was consumed, government and Eskom continued to pump up demand, offering cheap power to investors in energy intensive industries. Eskom was instructed to plan for government's GDP growth target of 6%, set by Mbeki's Accelerated and

Shared Growth Initiative for South Africa (ASGISA), instead of actual growth projections of around 4%.

Major expansions were either planned or in progress in the Mpumalanga platinum mines, at the Hillside and Mozal aluminium smelters, at Columbus Steel and ArcelorMittal, and at Sasol, while Indian conglomerate Tata constructed a new ferrochrome plant at Richards Bay. Most spectacularly, government signed a deal with Rio Tinto Alcan to invest in an aluminium smelter at the empty Coega Industrial Development Zone (IDZ) near Port Elizabeth. The smelter would require a 1 355 MW power supply and government baited the deal with subsidised electricity as well as a big tax break. Rio Tinto pulled the plug on the deal in 2009, citing Eskom's inability to guarantee the power supply but without mentioning that the price of aluminium had crashed alongside Wall Street.

Things fall apart

In the middle of this gung-ho expansion, the national power crash in January 2008 appeared to come as a shock. In September 2007, Eskom briefed government and business to expect load shedding. It nevertheless "reacted as if it were caught unaware" when the lights went down, according to the National Energy Regulator of South Africa's (Nersa) report on the crisis [2008: 9]. It approached the crisis with eyes wide shut, forgetting the Western Cape experience as one would a bad dream and making no active preparations for a major loss of power. Further, it allowed its coal stockpiles to decline throughout 2007 even as it used more coal to run plants harder to keep pace with rising demand.

Whereas national government portrayed the Western Cape blackouts as a local matter, it was quick to claim control in 2008. On the 25th of January, cabinet declared a national emergency and promised "vigorous and coordinated action" from 'team South Africa'. The heart of the response was to be the Power Conservation Programme, intended to ration demand in the short term while Eskom recovered itself, with longer-term demand-side interventions to be fast-tracked. Meanwhile, Eskom's new build would be accelerated. Commissioning

of the first Medupi unit, at this time scheduled for 2012, would be brought forward to 2011.

It was soon evident that 'team South Africa' was government, Eskom and corporate business with the unions in the corridors and the rest of civil society not invited. Government established two structures to manage the crisis: the Forum of Energy Executives (FEE) composed of the state's energy mandarins and meant to coordinate government's response; and the broader National Electricity Response Team (NERT) which was chaired by the DME and included business and labour along with the government departments and state entities.

In the event, team South Africa barely held together. Despite the rhetoric, top-level leadership from government was not evident. Eskom muddled through the immediate crisis by imposing a 10% supply reduction on the big energy users, who cooperated more or less grudgingly, with load shedding for the rest. As the threat of rolling blackouts receded after May 2008, government lost interest. Officials were perhaps distracted by the political drama of President Thabo Mbeki's ousting in September. Following that event, they abandoned the NERT to the corporates. The DME chair did not appear at meetings and money for the management of the structure was unpaid.[57] Team Eskom was also falling apart. Bobby Godsell, a former Anglo executive brought out of retirement in 2008 to chair Eskom's Board through the crisis, resigned in November 2009 following a boardroom tussle with CEO Jacob Maroga. Maroga's victory was short lived as the Board ousted him two days later.

At issue was his failure to present a coherent funding model to the board and to renegotiate Special Pricing Agreements (SPAs) with BHP Billiton. Maroga claimed neither issue was within his powers: Eskom's funding crisis resulted from the extraordinary costs of the new build and the funding plan had to be negotiated with government. It was then subject to Nersa's decision on tariffs. 'Buying back' the power from Billiton would cost US$ 800 to 900 billion and was unaffordable. The sum presumably indicates the long-term value of

57 Terence Creamer, ***Electricity Crisis Response Team Hits Turbulence***, Engineering News, 3 November 2009, and ***Government at Fault for Inertia around Power-Crisis Structures, Manuel Admits***, 8 December 2009.

the contract to Billiton. The SPAs could not be renegotiated without political backing from government, which was not forthcoming.[58] Neither issue has been resolved since.

Later that year, Billiton and Eskom agreed to renegotiate the special pricing agreement, purportedly in the interests of both parties and of the public. Evidently the interests of the public could not be reconciled with Billiton's interest in profiting at the public's expense and the company subsequently stalled the negotiations.

In the next year, it appeared that governance at Eskom was stabilising under its new Chair, Mpho Makwana, and CEO Brian Dames. In November 2010, President Jacob Zuma reshuffled his cabinet to reinforce his grip on government and replaced the independently minded Barbara Hogan with Malusi Gigaba as Minister of Public Enterprises. Gigaba announced that he would be an 'activist' shareholder and, in June 2011, sacked nine of the 11 non-executive board members, including Makwana, and installed Zola Tsotsi as Chair of a loyal Board.

Within the next three years, half of Eskom's senior management team was gone, including Dames and financial director Paul O'Flaherty. Eskom's longest serving executive, technical supremo Steve Lennon followed when he was reportedly overlooked for the post of acting CEO.[59] Instead, Board member Colin Matjila was appointed and, with Tsotsi's support, immediately pushed through deals with Idwala Coal, owned by the Gupta family who are closely associated with President Zuma. The Idwala mines were operating illegally without water licenses. Matjila also signed over the whole of Eskom's R40 million sponsorship budget to the Gupta's The New Age media house.[60]

Gigaba's Board finally appointed Tshediso Matona, who was Gigaba's Director General of the Department of Public Enterprises (DPE), as permanent CEO. He took up his post in October 2014. Following the 2014 election, however,

58 Louise Flanagan, ***'Eskom Couldn't Afford to Buy Back Power – Maroga'***, Business Report, 31 March 2010.
59 Sapa, ***Two top Eskom executives resign***, Engineering News, 25 September 2014.
60 Sapa, ***Eskom in R43 million deal to sponsor one New Age breakfast a month***, Times Live, 24 October 2014; Loni Prinsloo, Stephan Hofstatter, Mzilikazi wa Afrika and Piet Rampedi, ***Eskom's Tsotsi 'bent the rules' to favour Gupta mines***, Times Live, 22 April 2015..

Lynne Brown replaced Gigaba at Public Enterprises and, come December, she in her turn replaced the Board, retaining only Tsotsi as Chair. At the same time, as load shedding intensified, government set up a 'war room' under Deputy President Cyril Ramaphosa, to be located at Eskom and involving seven government departments, to coordinate a five-point response to the crisis.[61] Ramaphosa also set up an expert panel to advise him.

The most visible effect of these high powered interventions was, once more, to overturn Eskom's executive. In March 2015, the Board suspended the top four executives, including Matona. The reasons remain opaque. Tsotsi said it was to enable an investigation into four things: the poor performance of the generating plants; the delays at Medupi and Kusile; the high costs of coal and diesel; and cash flow challenges. Brown echoed these issues but added that Eskom was not giving the war room the information it needed. Shortly thereafter, Ramaphosa, his advisory panel and officials from the war room gave a confidential briefing to business leaders.[62] No-one else has heard anything from the war room.

Tsotsi himself was ousted by the Board two weeks later, apparently because of improper interference in executive decisions including those concerning the Gupta coal deals.

Following the suspensions, Transnet CEO Brian Molefe was brought in as acting CEO. Two months later, Matona was prevailed on to resign and the investigation then cleared the executives of wrongdoing – an odd result since they were not accused of wrongdoing and the four questions were not resolved. Molefe seems likely to stay. He is reputed to be a tough, can-do leader but his opening statements looked more like bluster. First, he suggested that he could deal with load shedding by the end of the year. He is planning to hire off-shore power barges – floating power stations running on gas, diesel or

61 SA Government. ***Energy on plan to address electricity challenges*** [sic], Media statement, 12 December 2014. The departments were Energy, Cooperative Governance and Traditional Affairs, Public Enterprises, Trade and Industry, Economic Development, Water Affairs, the National Treasury.

62 See, amongst others, Lionel Faull, Qaanitah Hunter, Lisa Steyn, ***Eskom chiefs put on ice by gatvol board***, Mail & Guardian, 13 March 2015; Carol Paton, ***Official Eskom explanations just do not add up***, Business Day, 13 March 2015; Terence Creamer, ***Ramaphosa moves to share war room developments with business***, Engineering News, 20 March 2015.

heavy fuel oil – but would need a small fleet of them to keep the lights on. This may be technically feasible but excruciatingly expensive and highly polluting, particularly if heavy fuel oil is used to save on costs. Next he suggested that Eskom could restore its finances by by-passing municipalities to take monopoly control of all distribution. This is a non-starter as the municipalities have a constitutional right to distribute electricity. Most recently, he has stalled the connection of renewable IPPs to the grid claiming that Eskom can't afford it.

Planning disaster

Following the energy policy developed in 1998, energy planning was to shift from conventional supply side planning – that is, a focus on building new energy generators – to 'integrated' planning. This approach puts demand first and it starts with the question 'energy for what?' It then considers how to meet the demand, including through 'demand side management' designed to reduce demand. The approach also requires that public participation should be integrated into the planning process.

South Africa's top level energy planning is supposed to be the Integrated Energy Plan (IEP). The Integrated Resource Plan for electricity (IRP) and liquid fuel and gas 'master plans' fall underneath it. The DoE is responsible for developing these plans to provide the basis for decision making. In respect of electricity, the minister must make 'determinations' about how much generating capacity is required from what technologies according to the IRP. The IRP is thus required to guide Eskom's planning and the tariff decisions made by the National Energy Regulator (Nersa) through multi-year price determinations (MYPD). The end of supply side planning was thus to be accompanied by planning being taken out of Eskom's hands and into the hands of government.

In 2009, however, while Nersa was considering Eskom's latest application for an outrageous tariff hike, government was strangely absent. In particular, it neglected to produce an IRP. The DoE finally produced a paltry two-pager of dubious legal standing on the eve of Nersa's 2010 hearings into Eskom's MYPD application so that the process could go forward to meet a March deadline for

decision.[63] It was immediately evident that, far from giving direction to Eskom, it had taken direction from Eskom's application. Policy on power remained with Eskom and at the service of energy-intensive corporate industry.

As if to confirm this, the DoE implicitly admitted that it was incapable of producing a full IRP. In February 2010, it called in the MEC A list – Eskom, Anglo American, Billiton, Sasol, Xstrata and the Chamber of Mines – to do it for them. The existence of this "technical committee" was revealed through leaks to the press, meetings were behind closed doors and civil society requests for minutes were refused.[64] Of course, committee members had to share 'proprietary' technical information and the draft IRP 2010 finally released for public comment was shorn of these details. It thus confirms that confidentiality is not an issue between these competitors but is an issue between corporate South Africa and the public.

The draft IRP displayed the MEC's vision for future power. This was only slightly modified, following public comment, in a final 'policy adjusted' IRP 2010 adopted by cabinet in March 2011 and subsequently promulgated – making this the legal basis for decisions. Its most striking feature was its projection of rapidly increasing demand largely driven by an expansion of ferrochrome smelting and topped by a 30% 'spinning margin' – the surplus of capacity over peak demand. Exaggerated demand then allowed a traditional power expansion plan with capacity required to more than double from about 40 000 MW in 2010 to 89 000 MW in 2030.

Including completion of Eskom's 'new build', already under construction, the IRP 2010 requires the addition of 19 800 MW of coal fired power and 9 600 MW of nuclear power. Renewables are reserved for private IPPs and given a niche role with 17 800 MW. This results in the following energy mix in 2030: coal produces 65% of the supply, nuclear 20% and renewables 9%. The rest is supplied by peaking plant, a little gas and imports. Demand-side management

63 The MYPD stipulates annual price increases over a three-year period, supposedly to bring certainty to both Eskom and its customers.

64 See McDaid 2010; Lynley Donnelly, '***Cloud Over Power Plan***', Mail and Guardian, 19 March 2010; Chris Yelland, '***National Integrated Resource Plan for Electricity, or Conflict Brewing?***' EE Publishers, 22 April 2010.

displaces 3 420 MW capacity, less than half Eskom's earlier target and equivalent to just 4% of the supply.

The IRP is supposed to be subject to regular updates to allow for changing circumstances. The DoE duly published a draft 'IRP Update' for public comment in 2013. By this time, the DoE could not but acknowledge that the IRP 2010 demand growth was exaggerated. The draft Update creates demand trajectories for several scenarios with capacity requirements in 2030 ranging from 66 000 MW to 82 000 MW. On this basis, it concluded that nuclear is not needed before 2025 at the earliest and, in the low growth scenario, is not needed at all. Further, nuclear should be abandoned if the price goes over US$6 500/kW.

Update's demand trajectories are based on projections for economic growth in each of the scenarios. Even the worst scenario shows significantly higher growth than has actually been experienced since 2012. As shown in the groundWork Report 2014, this is unlikely to change. Consequently, the lowest of Update's projections for capacity requirements in 2030 is also too high. Indeed, although it avoids saying it, Update makes evident that there will be a surplus of capacity when Medupi and Kusile are completed. What it calls the 'reliable reserve' – the spinning margin for baseload power excluding renewables – rises to over 30% even in a high growth scenario before declining as old power stations are closed. The category 'reliable reserve' is a mark of the DoE's continuing prejudice against renewables.

After one round of consultation, nothing more was heard of the IRP Update. The process went into unannounced suspension. The reason is obvious but not acknowledged. The Presidency wants a nuclear deal, probably with Russia, and cannot legally do it if an updated IRP 2010, reflecting realistic demand projections, is promulgated. This is staggeringly irresponsible but in keeping with Zuma's presidency.

The DoE says it has completed studies on funding and financing and that the nuclear procurement is affordable. But it refuses to make the studies public on the unlikely pretext that this would reveal its negotiating hand to vendors. It also refuses to release a study by the International Atomic Energy Agency

on South Africa's readiness to embark on nuclear procurement. The figures that it gives suggest a price between R325 billion and R550 billion. Previous cost estimates from within government are for over R1 trillion.[65] Given the price escalations at Medupi and Kusile, and the likelihood that the DoE is cherry picking numbers, the higher estimates are more credible. Quite simply, it will bankrupt the country. It is rumoured that Rosatom, Russia's atomic agency, may fund the nuclear build in return for a guaranteed price and sale of electricity. In this case, the country will be bankrupted by having to buy what it cannot afford.[66] And however funded, it will result in crowding out renewable energy which is cheaper, creates more jobs that local people can do and is without environmental risk.

Government touts nuclear power as the means to reduce the extraordinary carbon intensity of South Africa's economy. Given its ambition to establish a full supply chain, from mining uranium to fuel fabrication, the nuclear industry as a whole will scarcely mitigate emissions. And it will certainly add to the radioactive dust that blows off the Rand mine dumps or settles in the banks of streams and dams. This is a wide-scale environmental disaster that the nuclear regulator appears incapable of managing. Be that as it may, it seems that government hopes to get financial transfers on the back of climate change to pay for what it patently cannot afford.

In respect of CO_2 emissions, the DoE, like business, assumes that the PPD upper limit is the target. The IRP Update ignores the lower limit and assumes that the power sector gets 45% of upper limit emissions. It therefore puts the sector's emissions limit at 275 Mt CO_2 in 2025. In the years before 2025, however, Update ignores even the upper PPD limit and emissions rise well above the supposed 'peak' of 275 Mt. The actual peak year in all economic scenarios is 2024 with emissions at between 288 Mt (low growth) and 316 Mt (high growth). Apart from the economic scenarios, Update creates two

65 DoE, ***Media Statement: Nuclear Procurement Process Update***, Pretoria, 14 July 2015. In 2010, the Department of Trade and Industry's IPAP2 put the cost "in excess of R1 trillion" [p.88].

66 See, amongst others, Lionel Faull, ***Exposed: Scary details of SA's secret Russian nuke deal***, Mail & Guardian, 13 February 2015; Carol Paton, ***Key details of SA's nuclear procurement plan kept under wraps***, Business Day, 2 June 2015; Sam Sole and Lionel Faull, ***Nuke plan: 50 shades of arms deal***, Mail & Guardian, 17 July 2015. Kevin Davie, ***From Russia with atomic love***, 24 September 2015.

emissions scenarios: 'moderate decline' and 'advanced decline'. Both follow the same path to 2030. They peak at 311 Mt in 2024 and drop to 275 in 2025.

Eskom emitted 233 Mt CO_2 in 2013-14. So Update indicates that Medupi and Kusile plus new IPP coal plants minus some units which are shut down, will add between 55 and 83 Mt in the next few years. The sudden drop in emissions from 2024 to 2025 looks improbable as it occurs independently of the schedule for shutting old plants. If the upper PPD limit is to be met, there are two obvious conclusions: first, old coal plants must be shut down as Medupi and Kusile are brought on line; and second, there is no space for IPP coal plants. The misbegotten BLIPP programme should be cancelled.

Meeting the PPD upper limit does not meet "desired emissions reduction outcomes" (DEROs) for the power sector. In *DEROs explanatory note 4*, the DEA looks at how to allocate the PPD budget between sectors. It gives upper and lower boundaries for each sector to add up to the upper and lower limits of the PPD. Table 7 compares Update's 'moderate decline' and 'advanced decline' scenarios with the DEROs for the power sector.

Whereas Update assumes that the power sector will get 45% of total emissions into the future, the DERO note allocates it a declining share of emissions. This reflects that low carbon technologies are more readily available for the power sector than for other sectors. Most of the share taken from the power sector goes to industry with some going to transport. As is evident, the DoE is scarcely on the same page as the DEA's DEROs. To meet the DERO lower boundary, not only must existing plants be retired early, but Medupi and Kusile must both be closed in the 2040s, being left as stranded assets about half way through their assumed life span. As argued above, however, even the PPD lower limit is too high. To avoid extremely dangerous climate change, these plants must start shutting down in the 2030s.

Running out of road

When Brian Dames resigned as Eskom CEO in 2014, energy analyst Chris Yelland commented that it perhaps "dawned upon Dames that with a number

Table 7: Update emissions scenarios compared with power sector DEROs (Mt CO_2)

	2010	2015	2020	2025	2030	2035	2040	2045	2050
Update 'moderate decline'	246	266	289	275	275	275	258	226	201
Update 'advanced decline'	246	266	289	275	275	259	231	191	140
DERO Upper	241	250	258	217	209	205	192	166	159
Share of total	49%	48%	47%	42%	43%	40%	37%	36%	38%
DERO Lower	241	250	258	191	126	94	63	31	0
Share of total	49%	48%	47%	41%	34%	37%	24%	13%	0%

Sources: DoE 2013 & DEA 2015b

of electricity sector problems converging, Eskom as it is currently structured and financed is simply unsustainable and unmanageable, that Eskom's shareholder fails to appreciate this, and that it is time to get out while the going is (relatively) good".[67]

As noted, Eskom's 'shareholder' demanded that it keep the lights on and it did so by:

- Deferring maintenance and keeping defective generators going;
- Demand Side Management (DSM) – including increasing use of 'demand market participation' whereby big industrial users made deals that allowed Eskom to switch off their supply in return for cheaper power,

67 Chris Yelland, ***Electricity problems converge as Eskom CEO departs***, Daily Maverick, 1 April 2014.

and buy-backs whereby big industrial users reduced their normal load requirement, or shut down plants, and 'sold' the unused power back to Eskom at a fat profit [see Box 5].

- Increasing use of peaking power OCGT plants, well beyond normal operating for these plants and with spectacular consequences for Eskom's diesel fuel bill.
- Purchase of premium priced power from IPPs.

By 2014, Eskom was running out of options: It was barred by Nersa from using the buy-backs to reduce demand; it had failed to get Medupi up and running before its existing and neglected plant started collapsing; its coal supply was deteriorating and the floods that turned coal dust to slurry took out its Kendal power station; it was running short of money for diesel and was also reluctant to run the peaking power plants into the ground – although it has in fact continued to overwork them.

The outages showed just how bad things were. In 2007, before the new build began, Eskom had about 38 000 MW capacity and, with close to 90% availability of plant, was managing peak demand of up to 36 000 MW. By 2014, Eskom's new build had raised nominal capacity to 42 000 MW but, with plant capacity falling below 70%, it was barely able to supply peak demand of 30 000 MW. The deterioration of plant is one aspect of the crisis. Another is the drop in demand and it signals a deeper crisis. The model of development is broken in three fundamental ways: first, growth is failing and will not be restored; second, the MEC – and not just Eskom – is breaking down; and third, the accumulated environmental impacts of this model are destroying the physical basis for its future – as well as for any other future.

Faltering growth

South Africa has relied on the commodity boom that depended on Chinese demand which in turn depended on exports to consumers in the US and Europe. As argued last year in *Planning Poverty* [groundWork Report 2014], China's strategy of substituting domestic demand for exports is contradicted by the

requirement for cheap labour to attract investment from the big transnational corporations that still control global production. This year, the Chinese stock market crash confirms our view that the Chinese stimulus policy has resulted in massive over-investment. But this is not a new crisis. Beyond China, global economic growth is dependent on what amounts to Ponzi capitalism. From 2003, the groundWork Reports warned that the economic system was in trouble. In 2005, even as the global economy boomed, we argued that the economic system led by the USA was entering a terminal crisis:

> The history of capitalism is marked by the succession of distinct regimes of accumulation according to Giovanni Arrighi [1994]. To date, there have been four such regimes of accumulation and each has been led and dominated by a specific political power. In the 19th Century, this power was Britain – the third in line. In the 'long' 20th Century, it is the USA. The transition from one regime to the next is marked by two crises. The first is the 'signal crisis' and it is followed by the 'terminal crisis' of the old regime and the accession to world leadership of the new regime. [groundWork Report 2005: 16]

The signal crisis for the US system was marked by military defeat in Vietnam followed by the 'oil shocks' of the 1970s as Third World producers won a higher share of oil revenues. Growth in First World economies ground to a halt while inflation soared. Underlying this was a crisis of over-accumulation: there was more money capital in the system than could be safely and profitably invested and too much capital was invested in producing too much for too few.

Finally, the US induced the recession of the 1980s to reassert its global political and economic dominance while also crushing worker power in the North. As Paul Volcker put it shortly before being appointed Chair of the US Federal Bank in 1978, the US preferred "freedom of action for national policy" over "a stable international [economic] system". He continued: "A controlled disintegration in the world economy is a legitimate objective for the 1980s" [quoted in Varoufakis 2011: 100]. At the Fed, Volcker raised interest rates steeply even as

Box 5: Eskom saves the smelters

The IRP 2010 projected a rapid increase in demand for electricity for the period 2010 to 2030 and concluded that generating capacity would have to more than double from less than 40 000 MegaWatts of capacity to 89 000 MW. The primary driver of this extraordinary increase in demand came from ferrochrome smelters that the big MEC corporations on the DoE's technical task team said would be built. The plants would need big base-load power, meaning more coal and a fleet of nuclear power stations.

In 2012, Eskom was again struggling to keep the lights on despite the fact that demand had barely recovered to its 2007 pre-crash high and it had since added about 4 000 MW capacity. It therefore approached the big energy users and offered to 'buy back' the electricity they expected to consume. That is, Eskom would buy back what it had not yet sold and at a premium price.

The ferrochrome producers immediately volunteered as the market was oversupplied and the price of ferrochrome had crashed. Xstrata-Merafe (now Glencore-Merafe) shut seven smelter units, International Ferro Metals shut two, Tata shut two and Hernic shut one. Samancor and Ruukki shut more furnaces. In total nearly half South Africa's ferrochrome capacity was shut between February and June 2012. What Eskom paid for the electricity it did not sell was not disclosed but Xstrata-Merafe said it would have "a net positive economic impact" for the firm: it would shut down for a profit.

At the same time, Xstrata-Merafe called for a trade tariff on chrome ore exports. China, they said, was importing South African ore and smelting it cheaper than the local producers, so causing a massive shut down of South African plant. That was, of course, the same plant shut down for Eskom's buy-back. And most of the firms exporting ore to China were those that shut their South African smelters. Amongst other things, the producers complained that the Chinese smelters enjoyed cheaper electricity. Since industry was and is still supplied at below the cost of production, this

implied that South Africa's energy subsidy was no longer competitive with China's energy subsidy.

More broadly, the local smelters were making more ferrochrome than they could sell, driving down the price and so compounding their losses. Just as something had to break, Eskom's buy-back paid out handsomely for electricity they would not use in smelters they wanted closed. The price of ferrochrome then started to recover. In short, these transnational corporations made a profit without going to the trouble of producing goods that were not wanted using power that was not there.*

Eskom's buy-back programme was terminated after the first quarter of 2013. The ferrochrome smelters then went back to business and most reported strong results in 2014. With prices falling in 2015, however, some are going bankrupt as reported below.

* The buy-backs were widely reported. See amongst others from Mining Weekly: Martin Creamer, ***South African ferrochrome in meltdown, urgent intervention needed***, 16 March 2012; Martin Creamer, ***New Merafe CEO backs chrome exchange proposal***, 20 June 2012; Martin Creamer, ***South African ferrochrome profitability down to zero – Danko Konchar***, 6 September 2012; Reuters, ***SA ferrochrome output cuts expected to boost prices***, 31 January 2013. See also Merafe Resources: ***Reviewed Interim Results For the six months ended 30 June 2012***.

the price of oil and other resources collapsed. The cheap loans of the 70s then turned into the Third World debt trap of the 80s.

Riding on cheap commodities and depressed wages, the Northern elites enjoyed a new boom but without resolving the basic crisis. Power passed from production capital to finance capital and money was increasingly invested in money rather than production, since production no longer provided the returns necessary to sustain growth. Even corporations whose primary business was production put money into trading money in order to show profits. The US energy giant Enron is just one corporation that did this – only to tangle itself in an increasingly complex web of deals. It ended by cooking the books to show the profits needed to attract more capital to cover its losses. This process of money chasing money is known as 'financialisation'. Through the 1990s and 2000s, the US Fed kept it going by blowing up one bubble after

another. When the bubble burst in 2008, the satirical Onion magazine wrote: "Recession-plagued nation demands new bubble to invest in".[68] The world's leaders are still doing everything possible to provide it.

Financialisation is accompanied by a second strategy for maintaining growth. Geographer David Harvey [2005] calls it accumulation by dispossession. This combines what the groundWork Reports have identified as the three mechanisms of environmental injustice: enclosure, externalisation and exclusion. Harvey observes that it now provides the largest part of corporate profits as returns from actual production have diminished. In the colonies, the Third World, the global South, of course, it has always been critical to corporate profits. But it is turbo-charged through what Naomi Klein calls 'disaster capitalism' – using natural or man-made disasters to force enclosure.[69] It is not merely that capitalism has the capacity to adapt to crisis but that it both creates and feeds off crisis. Disaster capitalism appears as one of the ways that capital is able to respond to climate change, feeding from a crisis it cannot address.

These strategies, however, do not resolve the crisis but deepen it. They are themselves manifestations of the terminal crisis of the global regime of accumulation led by the US. The meltdown on Wall Street in 2008 and the Chinese stock market crash of 2015 are both moments in an extended economic depression marked by bubble-induced booms and bigger busts to follow.

There are thus two reasons why addressing poverty, inequality and other 'development challenges' must do without economic growth. First, economic growth is not happening and second, the booms depend on deepening poverty and inequality.

Cracks in the minerals-energy complex

Eskom is integral to the MEC and is buckling under the strain of trying to reproduce the MEC model of big base-load generators to produce cheap and abundant power for energy intensive mining and minerals industries. Cheap is

68 Cited by Paul Krugman in his op-ed column in New York Times, July 18, 2008.
69 Naomi Klein, ***The Rise of Disaster Capitalism***, The Nation, 2 May 2005.

no more – except for BHP Billiton's (now South32) aluminium smelters. And it is not just the MEC that is at risk. These investments are dragging the country into a 1980s type debt trap as groundWork [2009] warned.

The escalating cost of building Medupi and Kusile – which, as Eskom keeps boasting, will be the fourth and fifth biggest coal-fired plants in the world – and the rising cost of coal are the main drivers of rising electricity prices. When Eskom's 'new build' was first announced in 2005, the estimated cost was R87 billion and each of the big 'six pack' plants was estimated at R30 billion. That used to sound like a lot of money but it has been dwarfed by the subsequent escalation shown in Table 8.

Table 8: Medupi and Kusile cost escalations

	Overnight costs			Costs with interest	
	2005	2007	2009	2010	2015
Medupi	R30 bn	R79 bn	R100 bn	R125 bn	R154 bn
Kusile	R30 bn	R84 bn	R110 bn	R140 bn	R172 bn

'Overnight' costs exclude the cost of borrowing. Construction delays increase borrowing costs as interest is being paid before the plant starts making money to pay off loans. Eskom has become cagey about costs, so the 2015 figures are estimates from analyst Chris Yelland who warned that they were already out of date. Costs may go much higher. Consultant Ted Blom puts the cost of completing Medupi at R300 billion, with a significant contribution from corruption.[70] In June 2015, a civil society conference on the electricity crisis called for an independent commission of enquiry into the construction delays and cost overruns.[71]

The price of electricity has been dragged up behind the cost of the new build. In 2008, Treasury gave Eskom R60 billion. At the same time, Eskom began borrowing money on the open market and the Wall Street credit ratings agencies – capital's watch dogs – were looking for a steep hike in tariffs. Eskom

70 Lisa Steyn, ***Sinking into Eskom's black hole***, Mail & Guardian, 6 February 2015; Natasha Odendaal, ***Load-shedding a reality until 2023, says former Eskom adviser***, Engineering News, 2 June 2015..

71 Electricity Crisis Conference Declaration, posted on 5 June 2015 at http://www.numsa.org.za/article/electricity-crisis-conference-declaration/

applied to Nersa, which sets the price, for a 60% hike but was granted 27%. The agencies then downgraded Eskom's credit rating. Controversially, the World Bank came to Eskom's rescue with a US$3.75 billion loan which, it said, would bring financial stability to the utility, support future economic growth, contribute to poverty alleviation and, amazingly, help South Africa onto a 'low-carbon path'.

This loan was complemented by several others more or less under World Bank management: two loans from the African Development Bank (AfDB) totalling $3.1 billion and a Clean Technology Fund (CTF) loan of $250 million. Another $1.7 billion or so was secured through the German and French export credit agencies (ECAs) from private European banks to fund the boilers and turbines for the coal plants.[72] By 2010, it added up to some R66 billion calculated at R7.50 to the dollar. That makes R123 billion at present exchange rates (R14 per $) for the capital sum without interest. Interest rates also escalated as the credit ratings agencies issued successive downgrades.

National Treasury was required to guarantee repayment of these debts. And it issued further guarantees to enable Eskom to borrow from private sources. The February 2009 budget provided for R176 billion of loan guarantees, covering both development bank and private lending. It soon became evident that this would not cover funding for Kusile as well as Medupi. In October 2010, the Treasury made its choice in a game of double or quits. It doubled the guarantee on Eskom's debt to R350 billion rather than call it quits on Kusile. The risk was thus shifted to the public purse and South Africa's credit rating has consequently been dragged down behind Eskom's rating.

In 2009, groundWork noted the notorious volatility of the Rand resulting from the country's reliance on 'hot money' from the rest of the world to cover its balance of payments.[73] We concluded that, in taking on the debt, Treasury was making a double bet: "that future economic growth, and the continuous expansion of the energy system, will more than cover repayments; and that

72 Northern country ECAs guarantee debt to secure contracts for their home industries – in this case for the boilers and turbines for Medupi and Kusile. They eliminate the risk to banks, effectively taking over unpaid debts, but not to the recipient country. They now hold a substantial proportion of southern debt.

73 Hot money is discussed in detail in last year's gWR [2014: 20ff].

the Rand will hold its value. Otherwise the debt becomes a trap as it did for many southern economies in the 1980s" [2009: 28]. We thought then that both bets looked bad and that view has been confirmed. Nevertheless, once the 'new build' is completed, Eskom will once more have surplus generating capacity and will again chase sales. Its interest in DSM is not likely to survive.

Within the next year it became evident that these deals were already corrupted and that all parties colluded as documented in Box 6. The precedents for poor governance were thus well established under the Mbeki administration and effectively endorsed in Washington.

Price is capitalism's way of doing demand side management, usually to exclude the poor. It is also a condition for private capital investment in power stations. The World Bank, like the credit rating agencies, wanted to see the costs of the new build recovered through rising tariffs. It argued that, "effective pricing and cost recovery are key for achieving financial sustainability for [South Africa's] electricity sector" [quoted in groundWork 2009: 27]. This contradicted the need for rapid expansion of the system to pay back the loan. Nor did it take account of the diminishing prospects for growth.

Eskom's extravagant tariff applications have met with storms of protest from all sides. And while it has not got what it asked for, it wrung a series of increases from Nersa that tripled the price in the five years to April 2013. For the next 'multi-year price determination' (MYPD3) covering the period 2013 to 2018, Eskom looked for a further doubling of the price with 16% hikes each year. Nersa gave it 8% but the utility has used a 'claw-back' mechanism, supposed to compensate for earlier losses, to push that up to 12.5%. It is also angling for a revision to the MYPD3 decision.

Business sees the need for Eskom to recover costs but, together with labour, protests that steep increases are jeopardising a fragile recovery. In a context where more than half the population is poor, community groups and environmental justice organisations note that many thousands of households cannot afford the increased tariffs and must resort to dirty fuels like paraffin and coal.[74] The social costs include indoor air pollution, burn accidents and

74 For a detailed discussion of household energy, see gWR 2013: ***Talking Energy***.

Box 6: Coal stain

The World Bank's loan specifically excludes the boilers and turbines for Medupi. The African Development Bank (AfDB) loan is specifically for these components only. The AfDB is to all intents and purposes the World Bank's less scrutinised branch in Africa and the two loans were clearly coordinated. The reason for this split in funding is that Eskom awarded a R40 billion contract to Hitachi Power Africa to supply the boilers for both Medupi and Kusile. They will be made by Hitachi Europe which is located in Germany – hence the German Export Credit Agency (ECA) loan.

Chancellor House, an investment company set up to fund the ANC, is Hitachi Africa's accredited Black Economic Empowerment (BEE) partner with a 25% shareholding. The ANC consequently gets a very large rent off the deal. At the time that the boiler contract was awarded, Valli Moosa was both chair of the Eskom board and on the ANC's National Executive Committee. The Public Protector, not hitherto known for making findings which discomfort the ruling party, found that Moosa's conduct was improper in that he did not manage the conflict of interests appropriately. Prior to this finding, ANC Treasurer Matthews Phosa admitted the conflict of interest and said that Chancellor House would withdraw its stake in Hitachi. It did not do so.

The World Bank's procurement rules prohibit lending to projects that benefit a political party. The comfortable arrangement with the AfDB, which operates under less stringent criteria, was patently a subterfuge to circumvent the rule. The major European countries and the US are members of the AfDB as they are of the World Bank. It must be assumed that they knew very well what the game was. Once the matter was splashed across the international media, it seems that some heavy diplomacy followed. Within days of the vote, Phosa again promised that Chancellor House would sell the shares but was immediately contradicted by ANC General Secretary Gwede Mantashe. Chancellor House subsequently said that it had no intention of selling its shares.

Four years later, in February 2014, Hitachi bought out the Chancellor House shares. Another year on, in September 2015, the US Securities and Exchange Commission (SEC) charged Hitachi with making improper payments to the ANC in return for support in winning the contracts. Amongst other things, the SEC alleged that Chancellor House, and hence the ANC, benefitted from a $1 million 'success fee' and another $1 million improperly recorded as a dividend "in exchange for its political influence in assisting Hitachi land two government contracts". In addition, Chancellor House made over $10 million from dividends and the eventual sale of the shares, a 5 000% return on investment in nine years. Hitachi settled for $19 million (R266 million) without admitting or denying the allegations.*

Chancellor House, meanwhile, has got its hands into coal again. It has shares in an R18 billion private coal-fired power project which will be competing against other bids for a slice of the DoE's BLIPP procurement programme.†

* United States District Court for the District of Columbia, Securities and Exchange Commission v Hitachi, 28 September 2015.

† Sam Sole, ***ANC front bids for power station***, Mail & Guardian, 11 September 2015; Box updated from Hallowes 2011.

repeated fires in shack settlements. They object to paying for super-sized generators designed for big industry and also denounce the new build for its climate and other environmental impacts. Two critical questions are at the core of their concerns: Cost recovery from whom and to pay for what?

The Energy Intensive Users Group (EIUG) says the higher prices are making South Africa uncompetitive. This is effectively a demand for the revival of the policy of 'cheap and abundant' power for big industry. The sub-text is that the rest of the country should pay.[75] On Eskom's account, the rest of the country is already paying. It is selling electricity below cost and the biggest users take the biggest subsidy: "wealth is effectively being transferred to large consumers of

75 Henry Lazenby, ***Current power price path will squeeze SA competitiveness***, Engineering News, 22 February 2012; Linda Ensor, ***Power costs 'tipping point' – Nersa***, Business Day 5 November 2012; Martin Creamer, ***ARM's Motsepe urges serious Govt intervention on Eskom let down***, Engineering News, 16 March 2015

electricity" [2012: 16]. In particular, several billions are transferred every year to BHP Billiton (now South32) in terms of the special pricing agreement.

South African industry in fact still gets power cheaper than industry in competitor countries, including China and India, according to international consultancy group McKinsey. However, "this advantage is eroding, as energy supply is unreliable and planned price increases will keep business margins under pressure" [2015: 27]. According to the EIUG, electricity has risen from 9% of total costs in 2007 to 14% in 2010 and 20% in 2013.

There are just 31 members of the EIUG and 23 are MEC corporations. They use a large part of South Africa's electricity output but this is only a portion of their energy consumption. Sasol's coal-to-liquids process is as energy intensive as any in the world. About 20% of its energy is from electricity with most of the rest from burning coal and gas. Hence, its Secunda plant emits more CO_2 than any other single plant in the world. Steel making is very energy intensive and about a quarter of its energy is from electricity and two thirds from coking coal. Thus, about 24% of ArcelorMittal's carbon emissions are from electricity consumption and 70% are from burning coal. Intensive energy use for aluminium smelting, on the other hand, is largely from electricity.

In 2012, EIUG members consumed 112 704 GWh or 55% of Eskom sales in South Africa (202 770 GWh). In 2014, however, their power consumption dropped to 78 637 GWh or 38% of Eskom sales in South Africa (205 525 GWh).[76]

This is a very large reduction in electricity use. Some of it may be accounted for by rising prices driving greater efficiency. The interruption of power supplies during load shedding incidents is also significant. But a large part of the reduction is from the collapse in demand for the commodities produced by the MEC corporations. Several plants have now been closed or are working at a fraction of capacity. Amongst others:

- Assmang, a partnership between Assore and African Rainbow Minerals (ARM), closed an inefficient and dirty ferrochrome smelter at

76 EIUG website at http://www.eiug.org.za/about/membership/ visited 18 April 2014 and 20 August 2015.

Box 7: EIUG members

AECI	Kumba Iron Ore Ltd
Air Liquide (Pty) Ltd	Lonmin Platinum
Anglo Platinum	Mondi Ltd
Anglo Operations	PPC Cement
AngloGold Ashanti	Rand Water
ArcelorMittal SA	Richards Bay Minerals
ARM	SA Calcium Carbide
BHP Billito (now South32)	Samancor Chrome
Columbus Stainless (Pty) Ltd	SAPPI South Africa
Consol Glass (Pty) Ltd	Sasol Ltd
Evraz Highveld Steel	Scaw South Africa (Pty) Ltd
Exxaro Resources	Sibanye Gold Ltd
Glencore	Sublime Technologies
Harmony Gold Mine Company Ltd	The South African Breweries Limited (SABMiller)
Hulamin	Transnet Ltd
Implats	

Machadodorp. The plant was the major local employer with 360 people. It is opening a new plant in Malaysia because, it says, the Malaysians have guaranteed annual electricity price rises of just 2.5%. At present, South Africa's prices are competitive but will become less so as Eskom's tariffs continue to rise.

- Assmang has also closed one smelter at its Cato Ridge manganese plant and says labour will be 'right-sized' – the new phrase for job cutting.

- International Ferro Metals' (IFM) South African operation is broke and has gone into business rescue. It blamed labour militancy and power outages along with the collapse of the ferrochrome price. It employed 1 215 people.
- South32 (formerly BHP Billiton) has temporarily closed three of four manganese smelters at its Samancor Metalloys plant in Meyerton.
- Evraz Highveld Steel, the second largest steel maker in South Africa, is bankrupt and has closed its giant plant at eMalahleni (Witbank). It was put into business rescue in April and, in September, it was looking for someone to buy its assets, including the steel plant and the Mapochs iron ore mine. There are 2 240 jobs at stake.

ArcelorMittal is South Africa's largest and dominant steel maker. In July it said it was looking at closing its Vereeniging plant which employs 1 200 people including contract labour. CEO Paul O'Flaherty admitted that the corporation had been a 'poor citizen' but nevertheless asked government for an import tariff and anti-dumping measures to protect it from cheap Chinese imports. Shortly thereafter, the National Union of Metalworkers South Africa (Numsa) convened a meeting of unions and employers, including ArcelorMittal, to save the steel industry. According to Numsa, there was a risk that the industry would collapse. A joint delegation to government repeated ArcelorMittal's request, warning that 190 000 jobs were at stake in the industry with 100 000 more in the supply industries. Agreeing to the demand, Trade and Industry minister Rob Davies nevertheless recalled the corporation's poor citizenship.[77]

ArcelorMittal was previously Iscor, an integrated steel maker owned by the apartheid state. It was privatized in 1989 but the state held a majority share through the Industrial Development Corporation (IDC). It benefited from cheap labour, cheap energy and cheap iron ore from its own mines as well as a 30% tariff but was inefficient and produced too many product types requiring high cost short production runs. From 1994, the corporation cut capacity and

77 Rob Davies, ***Steel is a key strategic industry for South Africa's growth***, The Mercury, 31 August 2015. See also Terence Creamer, ***'Poor citizen' AMSA promises to mend ways as it seeks support to save Vereeniging and company***, Engineering News, 23 July 2015 and ***'Fair' steel pricing model will cap good-times upside, offer bad-times collar***, Engineering News, 31 July 2015; Tshepo Tsheole, ***Numsa fights to save steel sector's looming massive job cuts***, SABC, 24 August 2015.

product lines while the workforce was reduced from 44 000 in the 1980s to 12 000 in 2004.

In an effort to benefit downstream manufacturing, government cut the tariff on imports to 5%. At the same time, Iscor responded to neo-liberal mantras. It 'unbundled' its iron ore and coal mines to form Kumba which was acquired by Anglo American. This deal did secure cheap ore at 'cost + 3%'. Iscor also took on massive debt to build a new 'export oriented' plant at Saldanha Bay. The plant started producing in 1998, just as the price of steel collapsed. In panic, the IDC then looked for an international investor to bail it out. It found Lakshmi Mittal who was building his global empire by buying out cheap, dirty and inefficient steel makers hit by the price collapse and, in effect, paid him to take it away.

His atrocious environmental record did not register as an issue with the IDC or government. Government did, however, come to a 'gentlemen's agreement' that the benefit of low cost production would be passed through to domestic steel users and so create a competitive advantage to local manufacturing. Mittal immediately reneged on the deal and used the South African operation to drain money from the country. He ignored maintenance and invested little in upgrading plants. According to Davies, this "contributed to seven catastrophic plant breakdowns at various of its plants across the country". Mittal also instituted import-parity pricing, meaning that it loaded the price with the imaginary costs of transport to South Africa, handling costs at the ports, the 5% import duty, and transport inland. This added around 30% to the price of domestic steel and, between 2002 and 2005, Mittal charged domestic customers over 60% more than it charged for export steel [Roberts and Rustomjee 2009]. Government subsequently scrapped the import duty as it had no other means to reduce steel prices.

The tables are now turned as imported steel is 12% cheaper than ArcelorMittal's cost of production. The joint business and labour delegation to government added several points to O'Flaherty's offer. They called for: 10% tariff protection and anti-dumping measures; a 'fair pricing model'; government procurement of local steel for public infrastructure projects; a ban on scrap metal exports;

government support for 'training lay off schemes' – that is, training instead of retrenchment; and 'delaying' implementation of the carbon tax.[78] Immediately following the joint delegation's meeting with government, ArcelorMittal announced that it would cut 400 jobs at the Vereeniging plant. Numsa vowed to fight all retrenchments.

The coal corporations are also seeing the tables turn. Traditionally, the coal miners relied on long term 'cost plus' contracts with Eskom which took the low grade coal that forms the bulk of production. This established the economic base for coal mining. With costs covered, they could make fat profits from the export of more lucrative high grade coal, mainly to Europe.

In the 2000s, this started to change. China and India started importing coal and used lower grades than the Europeans to fire power stations. So they started competing for the coal previously reserved for Eskom. One of the reasons why the lights went out in 2008, according to Eskom, was that the tied mines supplied to the lower limit of their contracts as the big corporations focused on more lucrative exports.[79] In addition, the quality of coal from the central basin is deteriorating as production declines.

In 2008, Team MEC initiated the South African 'coal roadmap', a process that was fittingly hosted by the Fossil Fuel Foundation. The big private corporations took the lead with AngloCoal in the chair and Exxaro, BHP Billiton, Sasol, Shanduka, Optimum, Coaltech and the Chamber of Mines participating. They were joined by the key state-owned corporations, Eskom and Transnet, and by government's MEC insiders, the DMR and DoE. Most of the mining corporations are also members of the EIUG and hence key suppliers and key customers of Eskom.

The coal roadmap, published in 2013,[80] is a confident demand for expansion spurred by high prices and, they thought, limitless demand from China and India. It says 40 new mines are needed for export and to supply 4 billion

78 Joint statement by Labour and Business on government outcomes, posted at http://www.numsa.org.za/article/category/press-releases/ on 24 August 2015.

79 Eskom's response, carried in an annex to Nersa's report on the crisis, p. 44 ff.

80 The South African Coal Roadmap available at www.fossilfuel.co.za.

tonnes of coal to Eskom through to 2050 as well as to supply privatised IPPs – most of them in partnership with the colliers.

It constructs four scenarios which are defined by South Africa's response to climate change: **More of the same**, i.e. business-as-usual; **Lags behind** the pace of mitigation in the rest of the world; **At the forefront** with the global leaders on mitigation while the rest of the world lags behind; and **Low carbon world** with strong global and national action. It represents South Africa as being at the forefront, a curious judgement given the 'inadequate' rating on South Africa's INDC by Carbon Action Tracker but one which foreshadows industry's subsequent representations at the Davis Tax Committee hearings.

Being at the forefront does not appear to be different from the IRP 2010 combined with the expansion of coal exports. Nor does it diminish the urgent need for those 40 coal mines and for Eskom to prioritise contracting the 4 billion tonne coal supply. The coal roadmap warns that "shortfalls at some power stations are anticipated as early as 2015" [5]. This was accompanied by a good deal of press anticipating a "coal supply cliff" with Eskom being left short of 40 million tonnes a year from 2018.[81]

Production from the central coal fields of the Highveld is now in decline and the road map advocates for opening up the new mining frontier in the Waterberg. This is not viable without big power station demand creating the economic base from which exports can flourish. Supporting infrastructure is also required, notably massive water transfers from the Vaal, and ultimately from Lesotho, and heavy haul rail lines to get the coal to Mpumalanga and, beyond that, to the Richards Bay Coal Terminal. These plans are repeated in the first of government's Strategic Infrastructure Projects (SIP1) intended to 'unlock' the mineral wealth of the Waterberg. Hence, Transnet has plans to upgrade the line from the Waterberg to the Highveld to supply Eskom stations stranded by the decline of supplying mines and to meet with the export line which Transnet also plans to expand.

81 Terence Creamer, ***Eskom sees transformation potential as it works on coal-cliff solutions***, Engineering News, 8 August 2013.

The roadmap also shows the industry's ambitions for the region (see map). Vale, the leading Brazilian TNC, has developed a new mine at Moatize in the Tete province of Mozambique and dispossessed thousands of people to make way for it. With the damage done, production is limited by the capacity of export infrastructure. Rio Tinto sold a neighbouring mine at a loss for want of an export route. In 2014, the coal price started to fall and corporate ambitions contracted. Nevertheless, the Moatize-Nacala coal line and export terminal, conceived at the height of the coal boom, are nearing completion and Vale is due to start exporting coal through Nacala shortly. A power station is also proposed at Moatize to take low grade coal or discards to supplement exports. The line from southern Botswana to connect with the Waterberg line is also being upgraded. However, the very long lines from Botswana and Zimbabwe, and an alternative Botswana to Walvis Bay line, will not be built without a much higher price.

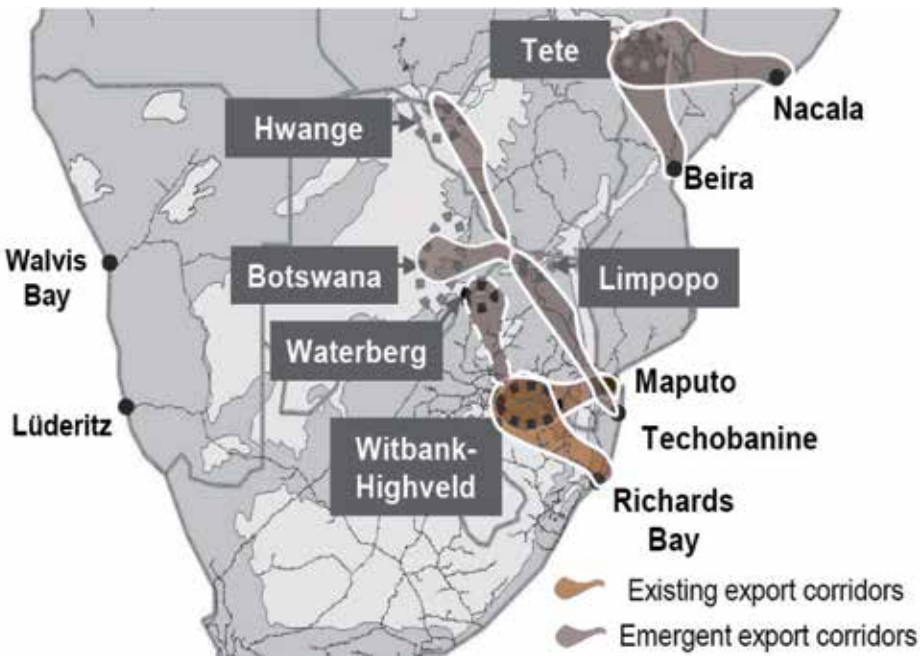

Figure 5: Coal ambitions

Source: South African Coal Roadmap

In 2015, as China's economy slowed and it imposed pollution limits on its industries, its apparently endless appetite for coal was suddenly satiated. Its consumption of coal shrank and it cut imports. India's imports were also in decline. Coal prices slid on down towards $50 a tonne from the record highs of $200/t in 2008, prompting Goldman Sachs to declare that the global coal industry is in terminal decline.

In South Africa, coal analyst Xavier Prevost says that the further expansion of rail and port export infrastructure makes "no sense whatever". South Africa's higher grade coal cannot find a market and its low grade exports are scarcely worth it. This marks a sudden reversal of the coal industry's high pitched lobbying for the state to expand export capacity. Prevost now looks to the domestic market to save the coal industry. He proposes that coal miners "help" the country avoid the coal cliff by selling high grade coal for power production by Eskom and IPPs and the coal transport infrastructure be remade to that end.[82]

The case of Glencore's Optimum mine illustrates the reversal of fortunes. It has a long term contract to supply Eskom's Hendrina station but served up the dregs of production in order to maximise exports. Eskom sought to impose penalties for the poor quality of supply at the same time as Optimum's exports collapsed. Glencore then placed the mine in business rescue, possibly to dispose of its liabilities, and the mine has now renegotiated with Eskom to supply Hendrina at R150/t in contrast to the export price of about R800/t.[83]

Glencore itself, once the darling of global investors, has lost more than 75% of its share value since the beginning of 2014. Most recently, its shares plunged 30% in a day before recovering half of that. The corporation is the world's biggest commodity trader with a seamy history that includes sanctions busting to trade with the South African apartheid regime. Over the last decade

82 Ilan Solomons, ***SA no longer exports coal to China, shipments to India likely to stop in two to three years,*** Mining Weekly, 4 September 2015; Reuters, ***Coal futures drop to $50/t first time since 2003 as Goldman calls peak***, Mining Weekly, 23 September 2015; Martin Creamer, ***Prevost drops coal bombshell***, Engineering News, 30 September 2015.

83 Martin Creamer, ***Top coal analyst backs Optimum coal for Eskom***, Engineering News, 9 March 2015; Terence Creamer, ***Optimum offers Eskom coal at cost as it suspends 'onerous' supply agreement***, Mining Weekly, 20 August 2015.

it has also become one of the biggest mining houses in the world by buying cheap and nasty mines around the globe – in the same way that Lakshmi Mittal bought cheap and nasty steel mills. It borrowed heavily to expand on the rising market, notably to buy out copper and coal mining corporation Xstrata. As the trading revenue dried up and commodity prices crashed, investors looked at the debt load and fled.[84]

Glencore has a reputation as a corporate bully for trampling over worker and community rights, despoiling the environment and siphoning money from Southern countries through transfer pricing and similar dodges. In June 2014, the Permanent Peoples' Tribunal heard evidence of abuse from the Philippines, Peru, Colombia, the Democratic Republic of Congo and Zambia. For example:

> In the Democratic Republic of the Congo, in the mining area of Kolwezi, Katanga, and through its subsidiary Kamato Copper Company, the corporation is responsible for allowing child labour, for employing expatriates who are not aware of their rights and thus live in conditions of extreme poverty and marginalisation, perpetrating fraud and corruption to smuggle minerals out of the country, avoiding fiscal and tax obligations by keeping management secreted from local authorities, causing air and water pollution, and finally harassing those who protest against their activities through subsidiary security companies.[85]

It cannot be said that this deterred global investors.

Reluctant demand side management

Eskom was rattled by the fiercely critical public response to the 2005-06 outages in the Western Cape but regained control of the politics of energy with its 'recovery plan for the winter of 2006'. Under the slogan "sharing

84 Scott Patterson and John W Miller, ***Mining industry's alpha male Ivan Glasenberg tries to save his realm***, Wall Street Journal, 2 October 2015; Agency Staff, ***Was Glencore panic a blip or warning sign of more pain to come?*** Bloomberg, 2 October, 2015.

85 Campaign to dismantle corporate power press release: ***International jury rules in favour of binding laws for Transnational Corporations***, 26 June, 2014, Geneva. At http://www.stopcorporateimpunity.org/

the load", the plan aimed to manage a rotational schedule of load shedding and to minimise load shedding through 'demand management'. The biggest savings were made in poor neighbourhoods where people consume least. Five million compact fluorescent lights (CFLs) were swapped for free with traditional incandescent lights to save 229 MW peak hour capacity. Lesser savings were made in middle class areas through publicised appeals to switch off pool pumps and geysers during peak hours and to buy geyser blankets and the like at subsidised rates. Cape Town's central business district, meanwhile, was exempted from load shedding and exempted itself from 'sharing the load'. Businesses were approached directly to implement energy savings but only a handful did so and saved just 4 MW. Overall, however, peak hour savings of 418 to 498 MW surpassed targets.

Energy conservation did not come naturally to Eskom. Its demand side management (DSM)[86] programme dated back to 2003 but it was barely noticed and consistently missed energy saving targets until the blackouts compelled urgency. As Eskom ran out of spinning margin in 2007, *Engineering News* observed the irony of its "having to champion efforts to curb consumption … In the context of a tight spinning reserve margin of between 7% and 10%, little conflict arises, but there will be a definite conflict of interest when the utility overcomes its supply side constraint and re-establishes a reserve margin of about 15%".[87]

In 2008 it expanded its efficient lighting programme beyond the Western Cape and added solar water heating (SWH), previously excluded with some determination, with the minister proclaiming a target of installing one million by 2015. For industry, Eskom focused on energy-efficient electric motors. For 2008-09, it claimed savings of 916 MW against a target of 645 MW and cumulative savings of 2 000 MW since 2003. By comparison, cancellation of the Rio Tinto Alcan smelter planned for the Coega Industrial Development Zone (IDZ) instantly knocked off 1 355 MW from forecast demand.

86 This is later called Integrated Demand Management (IDM). To save confusion, I have left it as DSM throughout.

87 Terence Creamer, ***Powering Down***, Creamer's Engineering News, September 7-13, 2007.

The reserve margin has not been restored and it is notable that, in Eskom's reporting, the DSM programme is now located under "keeping the lights on". Nevertheless, the programme has been a stop-go affair. According to Eskom, Nersa's MYPD3 decision did not allow it the necessary revenues for the residential programme – the 'mass roll-out' of CFLs and SWH systems – and the money would therefore need to come from government. And funding for its industrial 'demand response' programme was cut by 90%. Its 2014 Integrated Report gives only 410 MW of additional savings for the year (down from 595 MW in 2013) and puts cumulative peak demand savings since 2003 at 4 000 MW [Eskom IR 2014: 113].

The lighting programme swapped out 60 million CFLs for incandescent bulbs during the three years to March 2013 – the MYPD2 period. The extension of this programme was trumpeted in the next months. Promotional energy stalls were set up in shopping malls and people were invited to register for energy audits and light swapping. Then … nothing. In December, Eskom told the business press that the programme was put on hold but no trumpets sounded.[88] For most people, it simply faded away. The CFL swap out was supposed to start again in June 2015. Meanwhile, cumulative savings on lighting seems less certain than Eskom claims. It includes the savings made during the Western Cape crisis but independent research shows that households were replacing blown CFLs with cheaper incandescent bulbs [Mohlakoana and Annecke 2008]. It may be anticipated that this is now happening nationally.

The SWH programme, implemented with the same level of disregard that is characteristic of RDP housing, has been kicked back and forth between Eskom and the DoE. Eskom's website now says that, from February 2015, it is being implemented by the DoE. This is no doubt the case but the DoE's website still says it is managed by Eskom – a small indicator of paralysis.[89] DoE's 2014 Annual Report, meanwhile, acknowledges problems with "poor quality products, poor workmanship and the crowding out of locally produced systems by imports" [51]. Only half the 2013-14 target number of 80 000

88 Mariaan Webb, ***Eskom places temporary hold on energy efficiency rebate programmes***, Engineering News, 9 December 2015.

89 Both web-sites visited on 9 May, 2015.

SWHs was installed. And the total since 2009 is about 400 000, well short of the million promised.

But that promise is itself part of the problem. In the townships, the programme has been implemented in a rush by contractors with no consideration for the people who live there – the so called beneficiaries of development. In the suburbs, by contrast, the middle classes get a rebate following installation by an approved firm and people choose the firm and the SWH system and can monitor installation. Thus, while many poor people have experienced real benefits – such as hot water on tap – many have been left with dysfunctional, dry or leaking systems. And these problems are not addressed as the development 'roll-out' rolls on.

The lack of thoughtfulness and respect is symptomatic of a subtle discrimination that plays out when people are made the objects of development. It repeats a pattern established in the 2006 Western Cape power crisis. Accounting for the higher savings made in poor areas, the 2007 groundWork Report observed, "It seems that the discourse of 'pro-poor' development made it easier to target programmes at the poor. And it may be that this discourse will, in times of crisis, be used to shed the poor from the grid altogether" [59]. Alternatively, it now appears as likely that the rich will shed the grid, leaving an impoverished and increasingly cranky service.

Renewables on the (private) side

Like DSM, the renewable energy programme is largely the result of Eskom's crisis. The wall of hostility to energy efficiency and renewables from all constituents of the MEC – Eskom, intensive energy users and government – began to crack only in 2006 when the Western Cape experienced the first round of load shedding. Prior to that, a mandate for renewable energy was given in the 1998 Energy White Paper but, like that policy's commitment to "managing energy related environmental impacts", was clearly subordinate to the long term policy of providing cheap energy to bolster the competitiveness of South Africa's energy intensive exports [Hallowes 2005: 26].

Box 8: Mercury in the light

Each CFL contains a minute quantity of mercury. Eskom's 2006 Western Cape recovery plan included the 'roll out' of five million CFLs but said nothing about mercury. Environmentalists pointed out that this added up to a substantial quantity of mercury destined for municipal waste dumps – about 25 kilograms on the calculation of the 2007 groundWork Report [57]. A recommendation for a disposal plan was made but not followed up.

By 2011, Eskom was alert to the issue. A 'COP 17 Fact Sheet' on the CFL programme notes that "mercury is a bio accumulative neurotoxin" and could accumulate on landfills. Indeed, the 60 million CFLs distributed in the period to March 2013 would add up to around 300 kilograms of mercury. Eskom's fact sheet urges people to dispose of them properly, "in the same manner as other household hazardous waste products like paint, batteries and non-digital thermostats". It added that "a dedicated disposal mechanism was being developed in partnership with national, provincial and local government".

In fact, most household hazardous wastes in South Africa are thrown into the general municipal waste. Some middle class supermarkets do now have bins for batteries and CFLs but they are more discrete than visible and not consistently available. The CFLs are then collected by specialist disposal firms. Rather than recycling the mercury into new CFLs, they stabilise it and encase it in concrete and send it to hazardous landfills. South Africa is now preparing to ratify the newly agreed Minamata Convention on mercury and will need to develop a plan that works within the next two years.

It would be preferable, as the 2007 groundWork Report suggested, to focus on even more efficient light emitting diodes (LEDs) and so avoid mercury altogether. LEDs are still comparatively costly but, like other electronic goods, the price is falling.

A White Paper on Renewable Energy followed five years later in 2003. It set a target of producing 10 000 GWh of renewable energy by 2013. Understood as an annual target, this was modest enough but Department of Minerals and Energy[90] officials subsequently insisted that the target was cumulative: 10 000 GWh would be produced between 2003 and 2013. As Earthlife Africa pointed out, that reduced the target for renewables from a low 1.5% to a risible 0.15% which could be met without government doing anything.[91] In short, government wasn't interested but wanted a policy that said it was.

Instead, it was pumping billions of Rand into the Pebble Bed Modular Reactor (PBMR) – the so called fourth generation nuclear power plant – and claiming that it would provide clean energy almost as if this was renewable energy. With escalating costs and time over-runs, the PBMR Corporation never even got started on building a demonstration plant and, in 2010, government finally cut the funding and PBMR folded with nothing to show for the investment. Even the skills necessary for localisation of a conventional nuclear programme melted away.

For its part, Eskom ensured that it had a presence in renewable industry fora through minor investments in pilot projects. It even put the three wind turbines at its Klipheuwel test site on the cover of its 2005 Annual Report. The project was designed to test the viability of wind but, as Banks and Schaffler observed, it was not located at "an optimum wind site" and returned very low figures for energy availability. This, they said, "could prejudice future wind investments" [2005: 22]. Eskom's critics thought that was exactly the point. It was a 'Trojan Horse' investment designed to gain entry to the renewable industry so as to obstruct its development.

Government now sees renewables as the business of private IPPs and as adding a new economic niche industry to help revive growth. Following South Africa's power crash and the global financial market crash in 2008, Nersa introduced renewable energy feed in tariffs (REFiT) – which pay a higher rate

90 Minerals and energy have since been split into separate departments.

91 Earthlife Africa, ***Initial submission on the proposed 'White Paper on the Promotion of Renewable Energy and Clean Energy Development (Part 1)' dated August 2002***. 19 September 2002; and Earthlife Africa, ***Remarks on the White Paper on Renewable Energy of November 2003***, March 2004.

for each kWh produced. This initiative was widely consulted and IPPs lined up impatiently with project proposals. However, as Baker and Wlokas observe, "the process was subjected to numerous delays over disagreements including: tariff levels; the appropriate regulatory framework; who the buyer of power would be; the nature of the off take agreement; mistrust of renewable energy from certain factions of government, industry and the utility; and perceived political and financial risks" [2014: 5].

In August 2011, some months after the final IRP 2010 was adopted, Treasury suddenly announced that a feed in tariff was anti-competitive and hence illegal and, without any consultation, substituted a competitive bidding system (which became known as REBid). A Treasury team was seconded to DoE to design and manage what government now called the Renewable Energy Independent Power Producer Procurement Programme (REIPPPP). The people in the team were experienced in overseeing public-private partnerships and well known in business circles. They made "extensive use of private domestic and international advisers to design and help manage the program …" [Eberhard et al 2014: 9].

In this process, government announces a bidding round – there have been four so far – and stipulates how much capacity it wants from each technology. Thus in the first round DoE called for 3 625 MW capacity: 1 850 from wind, 1 450 solar PV, 200 concentrated solar power, 75 small hydro, 25 landfill gas, 12.5 biomass, and 12.5 biogas.[92]

IPPs must put down R15 000 just to get the Department of Energy's (DoE) 'request for proposals' which details what is required of a bid and the criteria on which it will be judged. This document and the IPP's response to it are to be treated as secret and there are severe penalties for disclosure. Energy analyst Chris Yelland commented that "the intention is clearly to prevent wider access to documents by stakeholders, the media and the public, and to restrict access to a tight circle within government, and to bidders with significant vested

92 Terence Creamer, ***Evaluation of first renewable-energy project bids begins as first deadline closes***, Engineering News, 5 November 2011.

commercial interests".[93] Evidently then, Treasury views competition as being strictly ring-fenced from democracy.

Actually submitting a bid, which might not be accepted, costs tens of millions. IPPs must have fully developed projects including land tenure agreements and EIAs and they have to be able to calculate a price for the electricity produced over the lifetime of the project. Bids have to meet a range of 'developmental' criteria. Those that do so (in the judgement of the DoE) are then ranked by price with the lowest winning. The first round attracted 53 bids of which 28 were accepted, making up 1 415 MW. This was less than half what DoE asked for and the shortfall is generally explained by the very short notice given to IPPs.

Government thus imposed very high costs of entry and, having blocked renewables for two decades, it now wanted big projects fast. So the process is custom made for transnational corporations with access to capital, command of the technology and capacity to deliver projects. These corporations were at the same time on the hunt for projects as the economic crash exposed a global surplus of manufacturing capacity which was exacerbated by Northern governments cutting support for renewables. The REIPPPP instantly created one of the world's largest arenas for renewable energy investment and it benefitted from the rapidly falling prices that resulted from global overproduction.

The REIPPPP has been hailed as a great success and it has certainly produced some impressive results. After four bidding rounds, R168 billion has been or is being invested in 79 projects with a total capacity of 5 243 MW, according to the DoE,[94] and it seems that this is largely free of corruption. Most of the projects from the first round came on line during 2014, within budget, on time and within two years of the projects being approved. The price per kWh has decreased dramatically from the first to the fourth round as shown in table 9.

93 Chris Yelland, ***Renewable energy: a disquieting move from transparent to opaque***, Daily Maverick, 31 August 2011.

94 Terence Creamer, *SA to mop up near-term renewables prospects, ahead of revamped process for 6 300 MW more*, Engineering News, 16 April 2015.

Table 9: Renewable energy price in R/kWh at 2014 rand values

Bid round	1: Nov 2011	2: Mar 2012	3: Aug 2013	4: Aug 2014
Solar PV	3.29	1.96	1.05	0.79*
Wind	1.36	1.07	0.78	0.61*

Source: Tobias Bischof-Niemz, *Financial benefits of renewables in South Africa in 2014,* CSIR Energy Centre, 21 January 2015.

* Kim Cloete, *Energy Minister announces successful fourth round renewable-energy projects*, Engineering News, 16 April 15.

Based on actual production from all sources for every hour of every day of 2014, a study conducted by the Council for Scientific and Industrial Research (CSIR) shows that renewable energy from wind and solar PV saved the economy R800 million in the first year of production [Bischof-Niemz 2015]. This is highly unusual. When renewable technologies are first introduced, the purely financial cost to the economy is usually greater than the benefit. The economic benefit from the first round of the REIPPPP is largely due to Eskom's crisis. By the second round, however, wind energy was on par with the estimated cost of energy from Medupi – R1.05/kWh according to Trollip et al [2014: 15] – and solar PV was down to this level by the third round. At the latest prices, wind and solar PV are competitive with Eskom's present cost of production (about R0.67/kWh and rising) and much cheaper than new coal.

Figure 6 shows how the savings were made. The first two columns on the left show that wind and PV saved R400 million in coal costs and R3.3 billion in diesel costs. They also supplied additional energy when Eskom's available capacity fell short of demand. This prevented the loss of economic output due to 'unserved energy' to the value of R1.6 billion (fourth column). These savings add up to R5.3 billion (fifth column) from which the R4.5 billion cost of paying for the renewable energy produced is subtracted (sixth column).

Four points need emphasising. First, the benefits are high because of Eskom's crisis: diesel savings would have been far less if the OCGTs were not working overtime and there would have been no saving on unserved energy. With load shedding becoming more or less routine in 2015, the savings will be correspondingly higher. Second, the renewable energy produced in 2014 is

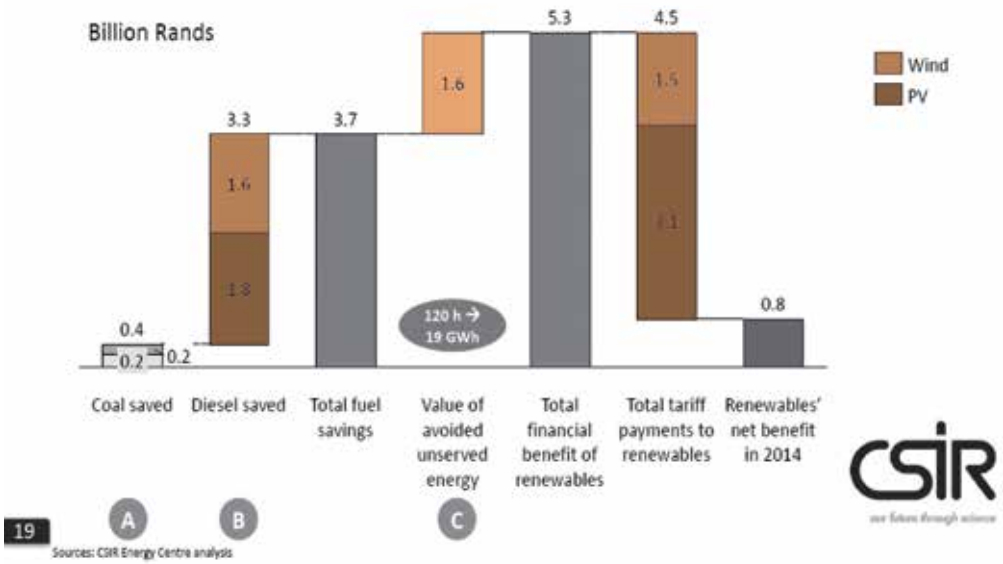

Fig. 6: Financial benefits and costs of the REIPPPP in 2014 [Bischof-Niemz 2015].

mostly from the first bidding round when the bid prices were highest. As the contribution of projects from the subsequent rounds increases, the overall cost of energy from these sources will fall. Third, these projects came on line during 2014 as shown in figure 7, so the production in January was negligible but grew to make a very substantial contribution by December. Total 2014 production was 2 190 GWh. In 2015, all these projects will produce to capacity and the contribution will rise to over 4 000 GWh. Additional projects from the second and third bid rounds will also start coming on line. An update of the CSIR study in August 2015, which included solar PV projects from the second bid round, showed that the overall savings had risen to R4 billion for the first half of the year – compared with the R800 million for the whole of 2014. Fourth, these calculations take no account of the very high external costs of coal imposed on people and their environments.

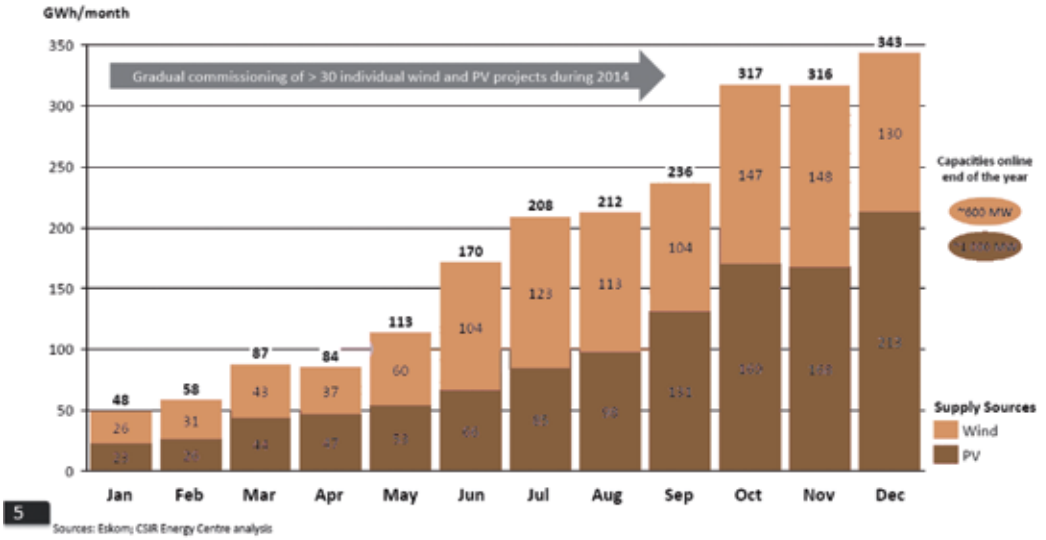

Fig. 7: Monthly production from renewables in 2014 grows as new projects are connected to the grid. [Bischof-Niemz 2015]

Developmental lottery

While the REIPPPP favours TNCs, it imposes seventeen 'developmental' criteria under the broad headings of job creation, local content, BEE participation and local community ownership, preferential procurement, 'enterprise' development and socio-economic development. This reads like a list of governmental anxieties in the age of neo-liberalism. Having crafted policies to satisfy international capital and attract foreign direct investment, they find that jobs are shed, skills are lost, capital goods are imported, capital accumulation goes offshore and communities are abandoned to poverty, particularly in rural areas where most renewable projects are located.

These criteria appear more strenuous than those required of other sectors, apparently because government viewed the renewables programme as "inherently excellent for achieving positive socio-economic outcomes"

[quoted in Eberhard et al 2014: 24]. The transnational energy corporations do not necessarily see it like that. Many saw it as an additional transaction cost and risk and outside of their competence. Eberhard et al imply that this may contribute to the price of renewable energy being higher than in some other countries. Wind prices in Brazil, for example were around R0.18 cheaper than third round REIPPPP prices [37]. Local participants familiar with the South African discourse of corporate social responsibility are apparently more accepting of these conditions.

Government provides no guidelines but, as part of their bid, project developers have to "assess socio-economic needs within a 50 kilometre radius of the project site and state their commitments to providing financial resources for health, education and other objectives during the lifespan of the project," according to Baker and Wlokas. For enterprise development, they "must identify and design programmes, such as support for small and medium sized enterprises or business skills training" [2014: 30]. Within the 50 kilometre radius, they can decide which communities or groups will be made into beneficiaries. They will similarly choose the local community partners who will get shares in the project. In short, they will do what takes their fancy.

One might ask where government is in all this. The first answer is that a government team assesses the plans to make sure they are not "half baked" [ibid]. It must be wondered if the business oriented team from Treasury and associated advisers would know the difference. Second, government is supposed to monitor the performance of the socio-economic and enterprise interventions and can penalise operators accordingly. Eberhard et al question if it has the resources to do so [2014: 24]. 'Half baked' indeed.

But the last answer is that government appears absent and the requirement for socio-economic and enterprise development is inserted into the place of that absence. What it has created is a sort of developmental lottery in which those who happen to live in the neighbourhood of a project can hope to be winners. This is likely to cause division in communities if those who do not turn out to be winners resent their exclusion. Industry participants now see

a risk of 'raised expectations" being disappointed and resulting in "a threat to the viability of the project" [Baker and Wlokas 2014: 29].

The REIPPPP thus brings into being a patchwork development entangled with corporate patronage. Amenities and opportunities of variable quality will be created but, as with corporate social responsibility,[95] they are in the gift of the corporation (however reluctant) and are not the rights of citizens.

This pattern of development by lottery is repeated in government's offsets proposals. The DEA's decision allowing Eskom and Sasol to postpone compliance with minimum emissions standards stipulates that they must produce offset plans. Sasol, for example, "must implement an offset programme to reduce particulate matter (PM) and SO_2 pollution in the ambient air / receiving environment" and present a plan to the national and local air quality authorities. So the plan is up to them. It is anticipated that they will include interventions to reduce domestic emissions but only in selected neighbourhoods.

Community participants at a DEA workshop on offsetting thought this was a way of shifting blame for pollution onto communities and noted that there is no comparison in the scale of emissions from industrial and domestic sources. They also argued that interventions to reduce domestic emissions are a responsibility of government and should not depend on offsets. It was particularly galling that government has failed to address domestic emissions in any meaningful way but, over the last decade, had tried to do it on the cheap with the 'Basa Magogo' project.[96]

95 See The groundWork Report 2003 p. 61ff for a critique of corporate social responsibility.

96 DEA workshop on 31 march 2015. Basa Magogo is about teaching people to light their fires with kindling on top of the coal.

5 Whose survival?

In a study for TEEB (The Economics of Ecosystems and Biodiversity), consultants Trucost looked at the "unpriced natural capital inputs to production, across business sectors at a regional level" [Trucost 2013: 7]. In other words, they looked at the costs of environmental externalities from selected business sectors – such as coal power production, iron and steel mills, rice farming and sugarcane – in specific regional locations – such as North America, Southeast Asia and North Africa. It looks at the costs of standard operating of each 'region-sector' and does not consider the catastrophic events that, as the people from the fenceline communities know, occur with some regularity. The forms of externality are: water use, greenhouse gas emissions, air pollution, land and water pollution, waste, and land use. They do not include costs resulting from the enclosure of people's common resources, the dislocation of communities or the outright massacres that are an integral part of the expansion of capital. Trucost does not ask who pays.

The study shows that, of 20 high impact 'region-sectors', externalities exceed revenues in all but four. Trucost assumes that 'internalisation' would result in costs being passed on to consumers unless there are alternatives. This then creates huge risks for investors. We may conclude that externalisation is not so much a 'market failure' but a condition of profitability for the corporates operating across the economy and for capital in general – that is, for investors.

Since the Durban COP, a massive divestment campaign has gathered force around the world. It is aimed at investors in part because climate activists have lost faith that their governments have the will to act. Or rather, they suspect that governments will act only at the behest of capital. Coal is the main focus of the campaign and this is a strategic choice. According to Bloomberg, global capital can live without coal but there is $5 trillion invested in oil and gas and alternative investments are not available on that scale. And money taken out

of fossil fuels will not automatically go to renewables. In so far as it does, we might add, corporate finance will lead investments in renewables and define the terrain – much as is happening in South Africa.

The ironies of divestment are noted by Bobby Peek. Following a lengthy campaign led by groundWork's partner Urgewald, the Norwegian government decided to divest from companies with major coal operations. That included Anglo American, BHP Billiton and Sasol. This was a sweet victory but the "bitter pill to swallow is having to consider where this liberated money will now go. Oil development in Uganda and gas developments in Tanzania? We are still a long way off".[97] The prior irony is that Norway's sovereign wealth fund was created out of North Sea oil.

Hence, if climate change is to be averted, a great deal of capital must be written off. Indeed, capital itself must be written off since its requirement for economic growth as the organising principle of economy cannot be reconciled with addressing climate change. Alternatively, capital will be swept away by the storms of climate change. That implies a stark choice for people. They must shake off capital or go down with it.

Until then, the 'carbon bubble' will only be made into an economic bubble if government policy makes it so. That is, if governments do not declare the unburnable carbon to be unburnable, it will be burnt. Responding to investors made anxious by the prospect of 'stranded assets', ExxonMobil reassured them that it is "highly unlikely" that governments will "restrict hydrocarbon production". The world "will require all the carbon-based energy that ExxonMobil plans to produce" and "we are confident that none of our hydrocarbon reserves are now or will become 'stranded'".[98]

Rebecca Solnit, an independent writer, comments: "Exxon has decided to bet that we can't make the corporation keep its reserves in the ground, and the company is reassuring its investors that it will continue to profit off the rapid, violent and intentional destruction of the Earth."[99] They have, of course,

97 Bobby Peek, ***From the Smokestack***, groundWork Newsletter, June 2015.
98 ExxonMobil, ***Energy and Carbon – Managing the Risks***, Undated note (put out in March 2014).
99 Rebecca Solnit, ***Call climate change what it is: violence***, The Guardian, 7 April 2014.

put big money into cooking the bet that governments will not act, through funding climate denial, buying politicians or entering the UNFCCC to subvert the objective of avoiding dangerous climate change.

The divestment struggle engages at a high level. On the ground, people are struggling for survival now as much as for the long term survival of all. The present economic order offers a bleak future with growing impoverishment, failing services and failing health in an ever more degraded environment. In many communities, the systemic violence that keeps people poor is turned inwards and manifests in high levels of violence and terrible abuse of women and children. The form of development shaped by the MEC is killing people now. It is not providing energy for all. It is shedding jobs and making work precarious. And people are already feeling the effects of climate change.

As argued above, the MEC is itself failing but still fighting for an expansion of the coal economy. The local choice mirrors the global choice. People must either shake off the MEC or go down with it. For the near term, if South Africa wants to 1) supply the energy needs of its people, 2) avoid catastrophic climate change, 3) clean up air pollution to let people breathe, 4) conserve water and prevent the further destruction of whole watersheds, and 5) avoid bankrupting itself, it is imperative to focus national resources on developing renewables under democratic control while shutting down coal plants. For the longer term, the economy must be democratised and profoundly remade so that people can find a way to live well with each other and the earth.

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This report is published just ahead of the climate negotiations in Paris where a new treaty is supposed to be inked. It argues not only that the negotiations will not produce a result adequate to the challenge, but that the parties are looking for a dysfunctional climate regime. It opens with an account of the scale of emission reductions now required and a rapid survey of already dangerous climate impacts. It then gives a brief history of the negotiation process to account for how it has achieved ever more dismal outcomes. All countries have submitted pledges to the UNFCCC ahead of the Paris COP and the sum of them adds up to disaster.

South Africa is amongst the top 12 producers of carbon emissions. The report examines its submission, judged 'inadequate', and climate policy. For corporate South Africa, 'inadequate' translates into over-ambitious. Amongst their regular complaints is that climate and energy policy are not aligned. We agree. South Africa's energy plans scarcely recognise its climate pledge and the Department of Energy is well aligned to the corporate view. The report looks at the long running power crisis and argues that it is not just Eskom that is failing. The model of development that has shaped South Africa over the last century is based on cheap coal, cheap labour and heavy duty pollution. It is now broken.

There is no certain outcome to the political battles of the next decades but it is certain that survival is at stake. The concluding section asks "whose survival?"

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