Talking Energy

Part one of the Peoples' Power series

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The groundWork Report 2013

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Introduction

This report is about household energy. It is based on conversations with people in the Vaal, the Highveld and south Durban. They took the form of interviews with a set of questions covering the composition of the household, their energy use, what they thought of the energy system and the key actors within it, and whether they had any ideas about an alternative system. We also talked about prices but it should be kept in mind that most people do not record their use or their spending and their responses are therefore approximations. Energy is not isolated from the rest of people's lives and people also spoke of water, sanitation, waste, housing and the general state of the neighbourhood and its infrastructure.

We had 36 such conversations with one or more people, mostly interviewing people in their homes and often including family or neighbours. Twenty-three of the main respondents were women and 13 were men. The higher number of women was not pre-planned. Several households were headed by women and in others women were in charge of energy or the household economy more generally. In some cases, women were home and men were not at the time of the interview. This may reflect gendered roles in the household but does not necessarily indicate that the men were employed.

The interviews were arranged by host organisations in the Vaal, the Highveld and Durban. They identified people living in different types of settlement – shack settlements, RDP developments, established townships etc. – and / or with different energy options.

Our hosts were part of our team. They provided translation where necessary, supplemented our questions, joined in discussions on local energy provision and responded to questions asked by our respondents. In the Vaal, Samson Mokoena of the Vaal Environmental Justice Alliance (VEJA) was our guide and in Evaton West we were joined by Abraham Mokete of the Evaton West

Community Crisis Committee and in Sebokeng Zone 7 by Solomon Makhanya of the Ironside, Sebokeng & Eatonside Community Committee. In the Highveld, Thomas Mnguni of the Greater Middleburg Residents Association guided us around Middleburg and Witbank while Koos Skhosana introduced us to the small rural settlement of Arbor near Delmas. In Durban, Bongani Mthembu and Noluthando Mbeje of the South Durban Community Environmental Justice Alliance (SDCEA) showed us around and led several of the interviews in Umlazi, Eziko and Clairwood. Abraham Mei, a volunteer with the SDCEA-affiliated Wentworth Development Forum, introduced us to the Wentworth community. For groundWork, Megan Lewis took photographs to create a visual record while I did the interviews.

This report is conceived within the larger project of working towards energy sovereignty. It is intended as a starting point to begin exploring the idea that renewable energy really can be people's energy. That is a long way from where we are at the moment and this report is in part about taking the measure of that distance. The opening section gives a broad description of the present context, the second section looks at people's household energy and the last section takes up what they say about change.

1 Context

Unequal South Africa

South Africa remains one of the most unequal countries in the world although it is a little less unequal than the world as a whole. Income inequality has intensified since the first democratic elections in 1994. Levels of poverty are extreme and poverty is still defined by race, class, gender and geographical location. Thus the poorest people are rural women living in the former Bantustans.

Table 1 shows that the richest 20% of South Africans took just short of 75% of household income in 2008, up from 73.5% in 2000 and 71.5% in 1993, the last year of apartheid rule. The poorest 20% increased their share of income between 1993 and 2000, mainly as a result of the equalisation of pensions and other welfare grants. Between 2000 and 2008, the top 10% increased their share at the expense of everyone else.[1] The bottom 60% got only 11.4% of all household income in 2008 while the poorest 20% got a mere 1.4%.

Table 1: Household inequality: share of income (percentage)

	1993	2000	2008
Top 20%	71.6	73.5	74.6
Second top 20%	15.8	14.8	13.9
Middle 20%	7.5	6.9	6.4
Second bottom 20%	3.9	3.7	3.6
Bottom 20%	1.3	1.5	1.4

Source: Leibbrandt et al. 2010.

1 Leibbrandt, M., I. Woolard, A. Finn and J. Argent. 2010. ***Trends in South African income distribution and poverty since the fall of apartheid***. OECD social, employment and migration working papers No. 101.

These figures refer only to household inequality, to what the Constitution calls 'natural persons'. It does not refer to 'juristic persons' – that is, to corporations. Since 1994, South Africa's biggest corporations have listed on the London and New York stock exchanges, taking very large sums of capital with them, while more foreign investors and speculators are taking home profits and royalties from money made in South Africa. So part of the difference between global and South African inequality is made up by South Africa's contribution to the global rich.

Government acknowledges increased inequality but claims reduced poverty: while the rich benefited most from higher economic growth, 'individuals across the whole spectrum experience[d] positive income growth between 1995 and 2005'.[2] Government did increase spending on welfare grants – pensions, child support, disability grants etc. – and there is little doubt that this 'alleviated' poverty. It does not follow that it reduced poverty.

In 2007, sociologist Jeremy Seekings argued that, although it 'is premature to reach any precise conclusion on poverty trends in the early 2000s', it is 'very likely that weak employment growth and a sharp increase in . . . social assistance programmes did lead to a reduction in income poverty'.[3] By that time, however, escalating food and fuel prices had ripped into any benefit from 'positive income growth' and, in 2008, economic depression evaporated jobs.

In July 2012, the official unemployment rate was 25%. People are counted as employed so long as they got some money for doing something, even if it is temporary, part-time, casual or informal. People who beg on street corners are counted as employed. The 'expanded' unemployment rate includes those who have given up looking for work. That stands at 33%. The real unemployment figure is higher still. Only 40% of South Africans between 15 and 65 years old are employed. Some are otherwise occupied, for example in studying or looking after children, but many are simply excluded from the 'labour force' figures.

2 The Presidency, 2008. ***Towards a Fifteen Year Review***. South African Government, p.20.

3 Seekings, J. 2007. ***Poverty and Inequality after Apartheid***. University of Cape Town, Centre for Social Science Research, p.10.

Poor South Africans spend 21% more than they earn according to the Bureau of Economic Research.[4] The better part of their income is spent on food, housing and energy. Working or not, increasing numbers of South Africans rely on debt to live. Much of their income is intercepted before they see it so they are driven ever deeper into debt.

In August 2012, 34 striking mineworkers were killed by police at Lonmin's Marikana platinum mine. The massacre exposed the brittleness and brutality of the post-apartheid economic order. The Lonmin strike was one of a series of wildcat strikes across the mining sector that demonstrated the alienation of workers from the labour regime and from the unions supposed to represent them. The strikes revealed that the mines still rely on migrant workers who live in appalling conditions in shack settlements or run down hostels. Many of the jobs have been 'casualised' so people work day to day at the mercy of labour brokers who take their cut of the wage while the loan sharks take another large slice. Local communities see little benefit by way of jobs and substantial costs by way of pollution, dispossession and social disintegration. The mining strikes were followed in November by wildcat strikes by non-unionised seasonal farm workers in the Western Cape. Here the development of the most 'dynamic' agricultural region in the country – that is the region that has shown the greatest economic growth – has dictated extreme deprivation and rising debt. There are jobs to be had on the mines and on the farms but, rather than alleviating poverty, they entrench it.

Carbon economy

South Africa's economy is dominated by the minerals-energy complex. This has made for a highly concentrated economy – one in which wealth and the power to direct development is held by a very few large corporations. The concentration of economic power in South Africa has led to one of the most energy and carbon-intensive economies in the world and it has the dubious distinction of hosting the single largest carbon dioxide emitter in the world,

4 M.E. Masemola, C.J. van Aardt and M.C. Coetzee, ***Income and expenditure of households in South Africa, 2011***, Research Report 429, Bureau of Market Research, University of South Africa, November 2012.

Sasol's coal-to-liquid (CTL) plant at Secunda. South Africa's carbon intensity and high emissions result from two fundamental and related reasons – its reliance on coal as its primary energy source and its policy of supplying cheap and abundant electricity to industry.

Table 2 is based on the latest statistics available from the Department of Energy – the 2009 *Digest of South African Energy Statistics* which gives statistics only to 2006[5] – and shows where the energy comes from. Primary energy is the original source of energy. Final energy is the form in which energy is actually used. The table shows both the absolute amount of energy in petajoules (PJ)[6] and the proportion of energy (percentage) supplied from each source.

In 2006, South Africa's total primary energy supply came to 5 644 PJ. Sixty six per cent of this energy came from coal, the dirtiest possible source of energy. It is used in three ways: it is converted into electricity by Eskom; it is converted into liquid fuels and chemicals by Sasol; or it is used directly as 'final energy' in industrial processes. The best quality coal is exported. Imported crude oil is the next largest source of primary energy and South Africa's largest import item. Oil is mostly converted into liquid fuels by the oil refineries.

The final energy available for use comes to 2 705 PJ. This means that nearly half the primary energy is lost in the process of converting it into electricity and liquid fuels. A large proportion of the lost energy literally goes up in smoke through the chimney stacks at the power stations and refineries.

5 The ***Digest*** is meant to give timely and accurate information on energy. Timely it is not. So the numbers in the tables are dated but they do give a sense of the scale of overall energy production and use and the share of different forms of energy.

6 A joule is a basic measure of energy. A petajoule (PJ) is 1 000 000 000 000 000 joules and 3.6 PJ is equivalent to one TeraWatt hour (TWh), or 1 000 000 000 kilowatt hours (kWh), of electric energy.

Table 2: Primary and final energy in South Africa in 2006.

	Primary energy		Final energy	
	Petajoules	%	Petajoules	%
Total	5,644	100.0	2 705	100.0
Coal	3,721	66.0	730	27.0
Crude oil	1,214	21.5	n/a	n/a
Renewables	428	7.6	189	7.0
Natural gas	160	2.8	108	4.0
Nuclear	109	1.9	n/a	n/a
Hydro	11	0.2	n/a	n/a
Electricity	n/a	n/a	768	28.4
Liquid Fuels	n/a	n/a	911	33.6

Compiled from *The Digest of South African Energy Statistics*, DoE 2009.

Box 1: Greenwashing renewables

The figure given for renewable energy in Table 2 is deceptive. It is almost entirely accounted for by biomass while the supply from wind and solar energy is minute. Over half the biomass supply is from sugar and wood-pulp wastes used to generate energy for sugar and pulp mills. Biomass is properly renewable only if its production is sustainable. High-energy mono-crop sugar and plantation forestry do not meet this criterion.

The rest of the biomass supply is from firewood used for domestic consumption. Information on this is very unreliable and the figures may be exaggerated. The use of firewood is sustainable only if harvesting is balanced by new growth. In many areas of rural South Africa, where people are starved of energy, this is not so. The burden of collecting wood falls mainly on women who have to walk further and further as supplies are depleted. This results from the unequal distribution of energy resources and the long history of repeated dispossessions.

Context

Cheap electricity has been central to South Africa's industrial expansion strategies throughout its history and was written into the 1928 law that established Eskom as a state-owned power utility. Cheap electricity relies on the abundance of coal in South Africa, cheap labour, extensive externalities and huge additional historical and current subsidies. Industry uses the largest part of South Africa's available energy, as shown in Table 3. Consistent with the concentration of economic power, the top 36 members of the Energy Intensive Users Group consume 40% of electricity. All but six of the group are in mining and mineral processing or fuels and chemicals.

Within the industrial sector, the iron and steel and petrochemicals plants are the biggest energy users. Over 45% of the energy used in steelmaking comes directly from coal and coke with a further 23% coming from electricity. ArcelorMittal's four South African plants consumed about 169 PJ and the Vanderbijlpark plant alone consumed a massive 76 PJ in 2005. Other metal smelters are also very intensive users. Aluminium is notable for the high proportion of electricity in the energy mix. Bauxite is not mined in southern Africa and BHP Billiton's three smelters were located in the region specifically for the low-priced electricity. In 2006, they consumed a total of 98 PJ of energy including 74 PJ of electric energy or about 10% of Eskom's total production.[7]

Sasol's coal-based processes are largely responsible for the extraordinary intensity of energy use in the petrochemicals sector. In 2006, over 80% of the energy used to make liquid fuels and chemicals was directly supplied by coal and Sasol used 336 PJ of energy overall. The crude-oil refineries are also intensive energy users by any measure other than comparison with Sasol.

7 Two plants are at Richards Bay. The Mozal plant outside Maputo is not included in the South African statistics but is supplied by Eskom. It consumes more power than the rest of Mozambique.

Table 3: Final energy demand by sector in 2006.

	Total energy		Electricity	
	Petajoules	%	Petajoules	%
Total	2 705	100.0	768	100.0
Industry	871	32.2	420	54.6
Mining	202	7.5		
Transport	725	26.8	13	1.7
Residential	525	19.4	142	18.4
Agriculture	70	2.6	21	2.7
Commerce	211	7.8	104	13.5
Other	81	2.9	68	8.8
Non-energy*	20	0.7		

Compiled from DoE 2009. (Figures rounded)

**'Non-energy' includes chemicals, plastics and paper made from coal, oil, gas or wood. Electricity consumption figures exclude energy producers. Including the oil refineries, but not Eskom's own use, adds 29 PJ and increases industry's share to 56.2% in 2006.*

The cost of electricity to energy-intensive industries is amongst the lowest in the world. The cost to households is relatively high and higher still for poor people on prepaid meter systems. Access to domestic energy and electricity is highly unequal. Table 3 shows that households used 18% of all electricity but most of this was used by the richest 20% of households. A large proportion of the population are 'energy-poor': 20% do not have access to electricity and many who do use very little because they can afford electricity only for lights, TV and radio. For many people, access to electricity is intermittent. Millions of South Africans are regularly cut off because they cannot pay the bill and, with the introduction of prepaid meters, uncounted numbers are cut off every month when they run out of money to feed the meters.[8]

8 J. Dugard, 2010. ***Power to the people? A rights-based analysis of South Africa's electricity services***. In Electric Capitalism: Recolonising Africa on the Power Grid, (ed. D. McDonald). London: Earthscan and Pretoria: HSRC Press.

Emissions

South Africa emitted about 450 million tonnes (mt) of carbon dioxide in 2009. That was the year of the recession and emissions were down from 479 mt in 2008. This makes it the biggest source of emissions in Africa and it is ranked twelfth in the world. This compares with its global economic ranking in twenty-ninth place.

The big energy users and producers are all big polluters. Sasol's Secunda plant is the biggest single point source of carbon dioxide in the world and, for each unit of energy produced, Sasol pollutes more than Eskom. In terms of total emissions, however, Eskom stands out even in this company. It accounts for around 45% of South Africa's emissions. In the year to March 2012, it burnt over 125 mt of coal and emitted 232 mt of carbon dioxide. As shown in Table 4, the coal and carbon figures have increased with rising production but decreased sharply with the recession in 2009. Eskom's carbon intensity – how much it emits per kWh produced – has also risen both because it has run its plant harder to keep up with demand and because the quality of coal is declining as the central coal fields are worked out.

Table 4: Eskom production, coal and carbon dioxide.

Year to March	2012	2009	2008	2004	2000
Production (GWh sold)	224 446	214 850	224 366	206 799	178 193
Coal consumed (million tonnes)	125.5	121.2	125.3	109.6	92.5
Carbon dioxide (million tonnes)	231.9	221.7	223.6	197.7	161.2

Eskom also leads the big polluters in emissions that affect local environments and people's health. Table 5 shows that its emissions of sulphur dioxide and nitrogen oxides have also increased in line with production. Eskom has bag filters to catch particulates on some plants but has not otherwise installed

any equipment to reduce pollution. The decline in sulphur dioxide in 2012 is because there was a little less sulphur in the coal.

Table 5: Eskom's sulphur, nitrogen and particulate emissions.

Year to March	2012	2008	2004	2000
Sulphur dioxide (tonnes)	1 849 000	1 950 000	1 779 000	1 505 000
Nitrogen oxides (tonnes)	977 000	984 000	797 000	674 000
Particulates (tonnes)	69 683	50 840	59 170	66 080

Air pollution is matched by ground and water pollution. South Africa's minerals and energy corporations produce mountains of solid waste and rivers of liquid waste, much of it toxic. In addition to the pollution of water used in production, mining turns groundwater into toxic 'acid mine drainage' (AMD). The large-scale destruction and contamination of aquifers, wetlands and rivers now presents the prospect of an environmental catastrophe which will, for South Africa, be of the same order as catastrophic climate change.

2 People and energy

Home

Housing is at the core of 'delivery'. For many people, a home is their first need and their last refuge as well as the place where they must use the energy, water, sanitation and waste services needed for living. The history of apartheid removals has left many with a deep sense of insecurity and housing has been central to the conflicts that have escalated around the country in recent years.

Since 1994, government has built over two million houses but the way of doing it has put inequality on display. Commercial centres have been spruced up to attract global investors while the rich live in increasingly luxurious enclaves surrounded by walls. On the other side, many of the new houses are badly built and poor people remain crowded together, far from public amenities or job opportunities and on land with little market value. This merely reproduces slums and, in 2004, government announced a shift in thinking. The Department of Housing was renamed the Department of Human Settlements and it started to talk about creating 'sustainable human settlements' instead of just building houses.

Following from this, the 2009 National Housing Code acknowledges that environmental issues have been neglected in government's housing programmes with the result 'that many of the country's residential habitats are smoggy, barren wastelands which detract from the quality of life of the residents'. The failure to incorporate energy efficiency in the design of 'low cost housing' meant that homes were hot in summer and cold in winter and the 'beneficiaries are condemned to a future of high energy consumption'. For winter heating, many people use coal which creates 'high levels of air

pollution' and leads to 'compromised family health and worker productivity, and increased greenhouse gas concentrations'.[9]

In short, people carry the cost of the neglect of environmental justice in higher energy costs, in high levels of discomfort and in the cost to their health. Despite this recognition, the new policy is not evident on the ground in 2012. The townships are still smoggy and barren and people are still breathing air polluted by the mines and industry as well as by the use of dirty domestic fuels.

Everywhere we went, people complained about the state of their settlement. In long established settlements like Clairwood in south Durban, most roads are tarred but poorly maintained. Evaton in the Vaal Triangle is also long established but only the main roads are tarred. The tar invariably stops at informal settlements and sometimes also at new RDP settlements. Street cleaning is haphazard if it happens at all. In Avalon, a shack settlement in Middleburg, a skip is left for household waste but it is not regularly emptied and the rubbish overflows and blows across the neighbourhood. There is no waste collection in the shack settlement next to Bophelong in the Vaal. An informal dump has developed alongside the settlement and appears to be used for fly tipping waste from Vanderbijlpark businesses.

In all areas we visited, people's homes are not insulated and public housing is constructed without regard for thermal efficiency. Only eight of the 36 homes have ceilings. These are either flats in multi-story buildings in Wentworth or houses with face brick outer walls in the Vaal and Highveld. Better insulation comes with the higher building specifications associated with face brick houses built by private developers but no other basic features of design for thermal efficiency, such as the orientation of buildings, are evident even in these houses.

Flats at Landsdowne Road, Wentworth, were built by the eThekwini Council in 2010 but show no sign of the sustainable settlement policy. Bad design is compounded by shoddy construction. Debbie Peters says the flats were

9 Department of Human Settlements, National Housing Code 2009, Part 3: Technical and general guidelines - specified national housing programmes. P.35, 36.

thrown up in nine months and there are problems with the electric wiring, with the plumbing, with the sewage drains and with the basic construction. 'We are waiting for them to collapse!'

Up the road, the old Hime Street flats show the signs of decades of neglect. The KwaZulu-Natal administration has promised a R95 million upgrade that will be the embodiment of the sustainable settlements policy. Residents say the pretty promo pictures even show solar water heaters on the roof. However, people are sceptical that the project will actually be carried out. The practical effect to date is that all maintenance is put on hold.

The multi-story KwaMasiza Hostel in Sebokeng is in much worse repair. It was built by Iscor in the 1970s to house migrant workers. Each unit was designed to house ten men and they had everything, says Menziwa Zungu, from running water with bathrooms and toilets to full electric energy. Most of the workers were made redundant in the 1990s and Iscor attempted to privatise the hostel in what the people believe was a corrupt deal. The electricity was cut off in 2001 when the men successfully resisted removal and there has been no maintenance since then. Water leaks throughout the building and broken windows are covered by cardboard to keep the weather out. In this case it seems government's promise to renovate is being kept, with work starting in July 2012.

In contrast, worker housing at Chromeville in Middleburg was built by Columbus Steel in the late 1980s. With apartheid on the way out, these terrace houses were intended for permanently resident home-owning workers and their families. Many of the workers were made redundant in the 1990s but had by then bought the houses. They are well constructed and, says Kgangelo Mabitse, his family keeps reasonably warm in winter by closing the windows and using blankets.

Most of the new houses built by government are RDP houses. As little thought as possible went into their design and contractors on short budgets made money by building cheap and quick. Such charm as they have comes with the additions that people have made. There are no ceilings in any of the RDP houses we visited and cement block walls give little insulation. Many are

already cracking up even when they are not near mines. In Eziko, a peri-urban area south of Durban, some houses have cracks wide enough to see through and doors and windows are badly fitted. So these houses are draughty and do not keep the weather out. Nomusa Shozi says it is because 'the people that build the houses steal the material and therefore only use cheap material'.

Much of the new housing is over-crowded. The authorities expected gratitude from the 'beneficiaries' of the Landsdowne Road development and were much irritated when they did not get it. The people said the flats were too small for families but they finally did move in because they were left with little option. Debbie Peters, her husband and adult son and daughter live in a one and a half bedroom flat. Other families are more crowded. They have been in the flats for two years and in that time there have been 13 deaths and six strokes. Debbie believes this is a very high rate and that it's about stress.

Some RDP houses are three rooms but most are two small rooms, including kitchen and washing areas. The families we visited ranged in size from four to 11 people, with several households having eight or nine people including grandparents, parents and children. Some called them 'tin fish' (sardine) houses and they compare badly with the old apartheid 'matchbox' houses. Some have built extensions or outside shacks but others have to make do.

New housing developments are generally associated with serried ranks of RDP houses but this is not always so. In Evaton West in the Vaal Triangle different housing types are all mixed in together. More or less elaborate face brick houses are neighbour to shacks built of corrugated iron and there is the odd road of RDP houses in between. Most households are supplied with water to taps in the garden and many have had it plumbed into the house. The water, however, is dirty as if it has been contaminated by rusting pipes.

Despite the housing programmes, government says housing demand has outstripped supply as people opted to live in smaller households. This resulted in 'an increase of two million additional households over and above that generated by population growth' and led to the proliferation of shack

settlements.[10] The 'delivery' of millions of cramped RDP houses must certainly have encouraged the trend. Similarly, the free basic electricity and water supply penalises larger households because they get the same amount as small households.

Informal settlements are particularly vulnerable to fire and flood. Shacks are made of flammable materials, energy sources are unsafe and crowding increases the risks of accidents and contagion. Most settlements are also located on land that is not valued by the market, including on steep land subject to mud-slides and on flood plains. Households headed by women are more likely to be poor than those headed by men and more likely to be located in informal settlements.

There is great diversity of informal settlements. Avalon in Middleburg is at the end of the road beyond the formal township. Fifteen years ago, it was meant to be temporary but it looks more permanent with every passing year. A single standpipe serves a whole street and spilt water is pooled around the base. The quality of the water is poor – a common complaint throughout the Highveld where whole watersheds are ruined by AMD. Ventilated pit latrines front onto the street and each is shared by about four households or between 20 and 40 people. In Bongani Nkosi's household there are five adults and six children. The toilet bowls are porcelain and several were broken during a visit to the settlement by President Zuma. The story goes that Zuma's minders asked for a toilet for him to use. Each time they rejected a toilet as unfit for him, the people broke it: 'If it is not good enough for the President, it is not good enough for the people.' With tensions rising, the army escorted Zuma out of the settlement.

Between Delmas and Ogies, the isolated village of Arbor has a mix of houses including face brick, cement block, adobe and iron shacks. Irrespective of construction, all the houses are cracking because of the blasting from a coal mine opened just three years ago on the edge of the village. Four water standpipes serve the whole village. They are supplied from elevated Jojo tanks which are filled from boreholes. The water is foul and people believe it is contaminated with AMD from the mine. The municipality occasionally treats

10 The Presidency, 2003. ***Towards a Ten Year Review***, p.26.

it by over-chlorinating but, since a full tank lasts only a day, it is mostly not treated and people get diarrhoea drinking it. The municipality also installed dry composting toilets just ahead of elections in 2009 and promised to service them once a month. The toilets have not been serviced since and are clogged up. Some are collapsing on badly laid foundations. People have gone back to using traditional old pit latrines.

In Bophelong, Vanderbijlpark, a shack settlement is squeezed between the original township and a new RDP development. Many of the residents are the families of farm workers from Steel Valley where 500 small holdings were evacuated because 60 years of pollution from the Vanderbijlpark steelworks has poisoned the groundwater. The farm workers lost their jobs and their homes but were not compensated because they were not owners. The municipality put in standpipes every hundred metres or so but ignored sanitation. Several families share a single pit latrine which is not emptied. When it rains the latrines overflow and smell badly.

In Clairwood, Durban, whole settlements are squeezed onto single urban stands which are privately owned. At a site in Dayal Road, there are 35 households. The original house is crumbling, the roof covered by tarpaulins and the floors are rotten through, but it is fully occupied with people living even in the passage. Shacks are built against the perimeter fence and also into the property with passages left between rows. Rubbish is piled up on one side of the old house. At a site in Flower Road, there are 20 households. Here, the landlord occupies the main house. The shacks are still crowded in but the yard is clean. In both settlements, the people share a single standpipe and a single toilet flushed with a bucket.

One group of 43 households was evicted when the property was sold. They rebuilt on municipal land because the council says it has no responsibility for people removed from private land. The council, however, sent in an armed security group who not only evicted them but also trashed their shacks. So many people could not be ignored, however, and the local councillor came up with a makeshift solution to house them in two marquee tents – women and children in the one and men in the other. Some have found somewhere else to

live – mostly in another Clairwood shack settlement – but 50 people are still living in the tents.

With some exceptions, informal settlements are at the bottom of the housing hierarchy. Most shacks are made of iron sheeting and have no insulating ceilings or wall cladding and no flooring other than the earth. People say they bake in summer, freeze in winter and are soaked when it rains. In summer, Lindiwe Malinga pitches a tent outside her house in Evaton to make shade for herself and her children. Even in Durban people feel the cold, particularly when the damp seeps in. In the very wet spring of 2012, the ground in the Clairwood tents is sodden and people use old pallets as flooring to keep their feet out of water.

Fuels and uses

Some 80% of South Africans have access to electricity. Of those we visited, six households rely almost exclusively on electricity to power a full house of applications: lights; radio, TV and HiFi; heaters; fridge and freezer; cooker, microwave, kettle and other kitchen appliances; and irons, washing machines and hot water geysers. Almost everyone has cell phones to charge and some also have computers. Higher income households tend to use electricity only but it does not follow that all households that use electricity only are high income.

Five of the families we visited and all the people in the Clairwood tents do not have electricity. Nomasonto Mthambo from the Bophelong shack settlement is a student and says that having good light to read by and power for a computer would make a great difference to her studies and her family's life. They use batteries for TV and radio and get them charged at a local garage and they go to neighbours in RDP housing to charge cell phones. They do not have a fridge. Bheki Buthelezi lives with two teenage children in the Ezakheleni shack settlement in Umlazi, Durban. He uses a paraffin lamp for light and a paraffin stove for everything else. 'It takes about four hours to get ready in the morning because I have only one plate. I first boil the water, then I heat the iron and only after I have done the ironing do I make breakfast. And the

stove starts over-heating when it's been going a while so you have to switch it off and let it cool down.' On one occasion, the stove burst and it was lucky that no-one was hurt.

Most of the poorer 60% of South Africans who do get electricity still use a diverse range of fuels. This is not merely as a supplement or backup. Electricity is favoured for lights and required for TVs, computers, fridges and the like. In three of the households we visited, electricity powers someone's livelihood. Adam Msibi's grandson runs an internet café and does computer repairs in the front room of his house in Evaton West. Zameka Zithoza makes and sells clothes from home in Clairwood. Her sewing machine runs on electricity but she can switch it to manual and says she will do so if tariffs rise much more. Gladys King and her son bake samosas and muffins to sell to school children in Wentworth but, with electricity prices rising, they now buy in.

Other energy sources are more commonly used for the functions that consume most energy. In the Vaal and Highveld townships, many of the people we visited have old solid fuel stoves using coal or wood. Most use them only in the winter when they serve for cooking, space heating and heating water. Others have smaller home-made coal stoves designed primarily for heating but with space for a pot on top. People light the stoves in the afternoon to save on coal or wood.

Several families use open wood fires for cooking, either in preference or as a backup for when they have no electricity. Candles are the most common source of non-electric light. Paraffin is widely used, mostly for cooking but also for water heating and light. Households with electricity mostly use it as a backup. For those without electric power, it is likely to be the primary fuel although some households in Clairwood use gas. Paraffin is available everywhere and in small quantities and is easy to carry.

Gas is cleaner and more efficient but not widely available and cylinders are relatively big and heavy and expensive to refill. Wendy Nkewu sells lunch to local workers and cooks in big pots on a caterer's gas hob. She buys gas at a garage some distance from her home and uses a trolley to fetch and carry 9kg cylinders. She believes electricity would be cheaper and a lot more convenient.

She also has to buy meat daily because she cannot bulk buy and freeze without electricity.

Joyce Phahla from Eziko uses electricity, paraffin and wood to cook for a large household. For slow cooking food like samp or stew, she brings the pot to the boil and then puts it in a Wonderbox. This is a box (or bag) padded with some sort of insulating material. Bought Wonderbags use recycled polystyrene or foam rubber for insulation but people can make them themselves using a cardboard box and any material like cotton rags, paper or straw. It uses no fuel because the food cooks in its own heat. Samp can be left the whole night and will be cooked and still hot in the morning.

In Bophelong 'some people from ArcelorMittal' came to the shack settlement and handed out gel fuel stoves with five litres of gel. Nomasonto does not know why they did it but it presumably related to some corporate social responsibility project for safer fuels. She says the gel is less smoky than ordinary paraffin but it has a more toxic smell and it feels like the fumes penetrate deeper into the lungs. It is also substantially more expensive and less efficient than ordinary paraffin. Once the five litres were used up, it was more liability than asset. The people from ArcelorMittal have not been back to check.

Those without solid fuel stoves use mbaulas (braziers) for heating and they also heat water and cook on them. People burn wood, coal and anything else that will burn, including used soup bones and rubbish such as chipboard and plastic. Families with fruit trees in the garden use the prunings and are careful to burn only wood or bones so that they can use the ash as a garden fertiliser. One family gathers wood for free from beneath a stand of trees outside Vanderbijlpark. Rubbish, including chipboard, is also free but very toxic.

People light mbaulas outside and take them inside when the worst of the smoke has burned off. They prefer to burn only wood inside because, although the smoke affects them, it is less noxious than coal or rubbish. People burning rubbish said they take the mbaulas inside only when it is very cold and even then they place them at an open door to ensure some level of ventilation.

Very few homes have electric hot water geysers. The homes we visited in KwaGuqu, eMalahleni, are exceptional in this respect, being part of a private

development of face brick houses. The geysers are not put above the ceiling but under the eaves of the roof. Thabang Motebejane says this is to avoid damage to the ceilings because the water is so contaminated by AMD that the geysers last only about 18 months before they start leaking. Like most people in eMalahleni, they buy in water for drinking.

Most people heat water on stoves and use it for cooking, washing themselves and washing dishes. Most wash clothes in cold water only. Two families we spoke to have solar water heaters (SWH) installed through local government projects. They said it makes life a lot more comfortable. The solar heaters are without electric backup but the water is warm even when it is cloudy. On sunny days it is near boiling. Hot water on tap is particularly appreciated in the early morning as it saves fuel and time taken in heating water for washing and getting off to school or work. It also saves on bringing water to the boil for cooking. Rather oddly, only the hot tap is inside some houses but the cold tap is outside even though the cold water feed to the SWH is piped through the house.

A large number of solar water heaters have been 'rolled out' in the last few years. There are several issues of concern. First, as with RDP houses, many SWH projects have been done on the cheap. Contractors in a hurry have barely stopped to speak to householders and a fair number of units are badly installed with some facing in the wrong direction. Second, solar water heaters need water and are liable to burst if they run dry on a hot day. They can also be damaged by dirty water. In many areas the water supply is not reliable and not clean. In some areas people are also cut off or run out of money for pre-paid water meters. Municipalities can thus damage their own investments in solar water heaters by not ensuring the water supply.

Stranded assets

In 1990, Eskom had a surplus of generating capacity because it over-estimated economic growth and built too many power stations during the 1980s. It was therefore left with 'stranded assets' – power stations that had to be mothballed. At the same time, it started to face real pressure to electrify black

townships which were previously excluded from electricity and other services. As the political transition got under way, it anticipated both a political and an economic dividend from electrification. It got the political dividend but the anticipated expansion in demand fell short of its expectations. People did not simply switch to electricity as Eskom expected.

It was commonly observed that the cost of new appliances inhibited the wholesale transition to all-electric households. That may be so. Nevertheless, many households that we visited have electric appliances which are no longer used. One family have an unused tumble drier and several have electric stoves that they now use as store cupboards. They are either too expensive to use or too expensive to repair. In the first case, people have been left with 'stranded assets' because of the rising cost of electricity. In the second, they have encountered unexpected expenses.

Cutting off

Everyone we spoke to wants electricity but not everyone is happy to be dependent on it. In some areas the supply is not reliable and most people periodically run out of money to pay for it. Those living in the most formal types of accommodation have the least opportunity for alternatives. When they run out, one family simply buys food that doesn't need cooking and makes a 'tea' of cold water, milk and sugar. Food rotting in the fridge is not an issue because 'if we have no money for electricity, the fridge is already empty'. Another family braais their dinner on the balcony of their third story flat.

Most people on pre-paid meters are periodically cut off when they do not have money for the meter. Some families can only afford electricity for part of the month: two weeks with and two weeks without. For other families the cut offs occurred between two and six times a year and lasted for between two and five days. They can connect again when they do have money. However, the information system keeps tabs on them and those who have any other debt to the municipality are prevented from topping up the meter.

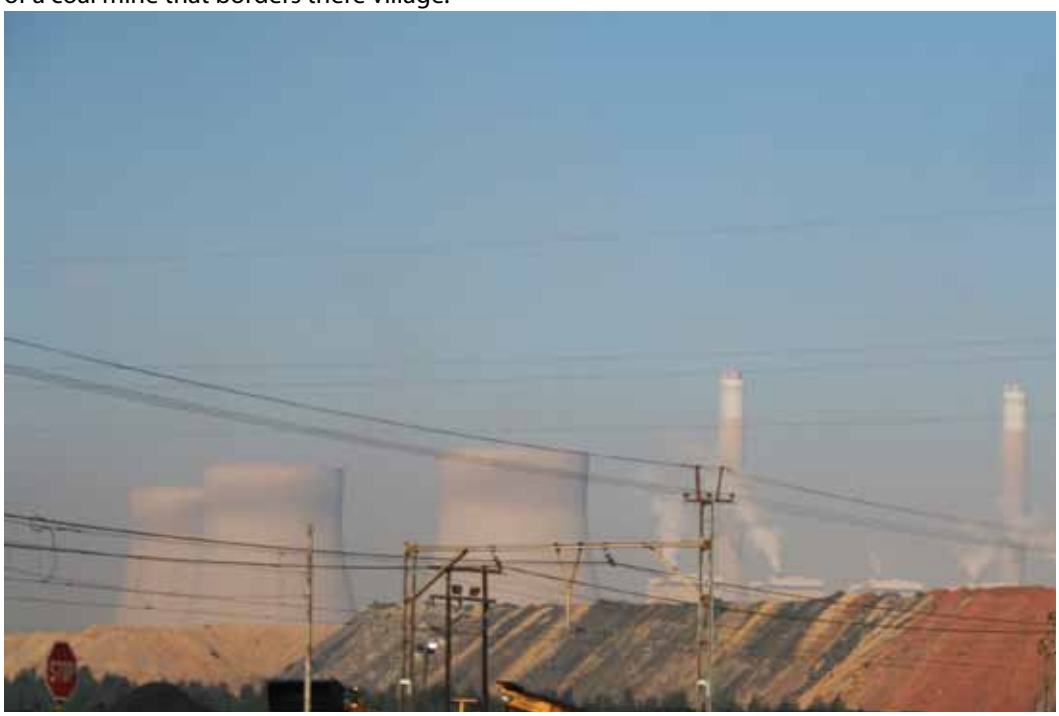
For those with traditional meters, the implications of not paying bills are more serious. Their electricity is disconnected by municipal workers and they have to pay a fee on top of the outstanding account to have it reconnected. The encounter with Eskom or municipal bureaucracy is often stressful. West Majoro lives on a small holding in the Vaal supplied by Eskom. He has been cut off several times and recently paid R4 800, covering his arrears of R4 300 plus a R500 reconnection fee. He said his neighbour owes R15 000 and is unlikely to reconnect. Both households use the full range of other energy sources including waste chipboard. West says he would prefer a pre-paid meter to avoid going into arrears but, at R15 000 the cost of changing meters is prohibitive.

Going into arrears is most stressful for those who are most reliant on electricity. Gladys King is diabetic and landed in hospital after blacking out from stress. Her eThekwini bill – covering electricity, water and rates – tripled in 2011. She simply could not believe it and nor could she pay it. She turned to her family to bail her out before she was cut off and also queried the bill. The municipality did send someone to check the meter and he said it was working properly. This did not answer her question of how such a big jump was possible. It is increasingly hard to pay the metro bill but, she says, 'you can't live without electricity … Paying that becomes the first priority. After that you think of food'.

Some people feel shamed at being cut off. It indicates that the family is not coping and that is accompanied by a sense of guilt: 'people think you don't know what you are doing with money'. So they try to conceal it from their neighbours. It is a reasonable bet that some of the neighbours are similarly concealing it from them. In other areas, running out is simply part of the way things are and people ask their neighbours to store frozen foods or other perishables. Lindiwe Malinga has a child with diabetes and the insulin needs to be refrigerated so she takes it to her mother's house.

Many of those on conventional meters find the billing system incomprehensible. Most distributers – municipalities and Eskom – read the meter once every three months and give estimated readings for the two months in between. People find this practice confusing and do not trust it. They suspect the estimates are

Top: This house in Arbor (Highveld) is crumbling as a result of blasting coming from the coal mine bordering it.
Bottom: The people of Arbor (Highveld) have this view of Kendal Power Station from the banks of a coal mine that borders there village.



Top: Many people feel that while prepaid electricity can sometimes be more costly it gives them a sense of control over their consumption.
Bottom: Many families in the Highveld and Vaal use old-fashioned coal stoves like this Magic stove used by a family in Arbor (Highveld).

Top: People were forcibly removed off municipal land and moved to this tent settlement situated on an open field in Clairwood (Durban).
Bottom: A construction pallet serves as a dry bed off the muddy floor in the "men's tent" in the settlement in Clairwood (Durban).

Top: Electricity transistor boxes like this decorate the skyline in the Vaal but many, like residents here in Evaton West, are unable to afford the electricity the supply.
Bottom: A small boy sits next to his house in Witbank (Highveld) ignoring the commonplace sight of a plume of black smoke arising from a distant coal mine.

Top: A donkey and chickens eat from a skip on an informal communal dumpsite in Avalon (Highveld) that had been recently cleaned by municipality after a long time.
Bottom left: Once the entrance to a coal mine, people in Arbor (Highveld) believe this pool of water has high levels of acid mine drainage and is polluting the groundwater where they live.
Bottom right: The Vaal Triangle is one area among many in South Africa where illegal connections or "breaching" are made.

Top left: An mbaula used to roast mielies to sell to customers on the streets of Evaton West (Vaal). Top right: Coal is burnt inside in this stove in a house in Evaton West (Vaal) and the chimney carries the smoke outside.
Bottom: Old tins and pots are heated on this stove in a room in the KwaMasiza Hostel in Sebokeng (Vaal).

Top: A coal stove in Arbor (Highveld) used to cook food on top and for heating the home. Bottom left: A young woman lights the toxic-smelling gel stove provided by ArcelorMittal in a shack settlement near Bophelong (Vaal). Bottom right: Fruit tree branches and bones are used as a readily available source of fuel to burn in Evaton West (Vaal).

Top left: A woman earns income for her family by cooking takeaway meals for workers passing by her home in Clairwood (Durban). Top right: This mbaula is burnt in an enclosed shed separate to the main house in Evaton West (Vaal).
Bottom: Rubbish is used to heat pots outside on this property on the outskirts of Vanderbijlpark (Vaal).

over-estimates so that the distributer gets cash in advance and so uses their money to earn interest. However, it is the low estimates that contribute to shocking bills when the meter is read. People also believe meter readers are prone to making mistakes or to making up the reading if they are behind on their round. Some people have taken to reading their meters themselves to keep a check but many people cannot access their meters because they are behind locks.

Fear of debt and distrust of the billing system makes people feel that things are out of their control, that they might find themselves with unexpected and inexplicable liabilities. Moreover, failure to settle these liabilities results in a punitive response from the authorities. Even if they can appeal, people feel they cannot win because they do not understand the logic to which they must answer.

This is the main reason why many of the people we visited said that they prefer the pre-paid system. They cannot go into debt without knowing it so they feel that at least they are in control of their money. Some also said that they find it easier to budget. Debbie Peters buys R20 daily and when that is used the lights go out. But she is one of a minority of people on pre-paid who are able to keep the power on throughout the year. With more price hikes on the way she too may find herself having to do without. Others at the Landsdowne Road flats already go without: 'If there's no money they go without. Over the last three years, people have been suffering. It's not just energy. It's also food and everything else. You need energy in your home. And here there are no alternative fuels to electricity.'

The experience or fear of being cut off for want of money is the main reason why several people said they do not like pre-paids.

Free Basic

'Free basic electricity' (FBE) is supposedly available to all people who are defined as 'indigent' and is administered by municipalities. This objectionable language is justified as creating a subsidy that is 'well-targeted' at the poor but

seems better calculated to put the poor under surveillance. It implies that all who apply for FBE will be subject to some sort of means test and in theory all municipalities should keep an indigent register of those who meet the criteria of poverty. In practice, identifying all poor people is a major administrative task and most municipalities are not up to it. Each municipality has its own policy and most rely on people to apply for FBE.

eThekwini's response is entirely about administrative convenience. It allows 65kWh FBE (compared with 50kWh mandated by national policy) to any household that consumes less than 150kWh per month. Only one of the households we visited managed to keep within this limit. Other people do have a general idea of how this system is supposed to work but since there is little chance of staying within the limit they do not pay it much attention. Some argued that there would be more incentive to save on power if people who use less than 150 units could be credited with the saving in the next month.

It may well be the case that most people who consume 150kWh or less are poor but there are many poor people who use more than that. So this is not a 'well-targeted' subsidy but a means of reducing the number of eligible people at least cost to the municipality.

In Middleburg, people said the Steve Tshwete Municipality has a simple income criterion for 50kWh FBE, they know how to apply and many do. Pensioners qualify and the municipality also makes provision for child-headed households. The Council restricts the supply to households registered as indigent to 20 amps. The 20 amp limitation is also a condition for getting free basic water, waste removal and sanitation. The Council's policy says it does not have the capacity to run checks on people so the limitation stands in for doing means tests: it is apparently assumed that people will not accept a trickle feed if they have the means to pay for a full service.

Several of the people we spoke to in Emfuleni are clearly eligible for FBE. But no-one gets FBE and no-one knows how the system is supposed to work or who they should apply to. The Council does in fact have an indigent policy. As in Middleburg, it is based on an income criterion. It does not impose a trickle feed but requires an evaluation and verification process which must

include the ward councillor and 'local community leaders or ward committee members' as well as the 'relevant' officials. Who the relevant officials are is not stated.

Ward councillors and committees are widely regarded as instruments of the ruling party or factions within it. In Sebokeng, people said the promise of FBE was used to lure people into signing forms acknowledging debt to the Council. Even so, few people qualified because 'to be indigent, you have to sit on the floor. If you have a kettle or a TV or a stove or even a chair, you are not indigent.'

Municipalities are supposed to provide free basic alternative energy (FBAE) for poor people without access to electricity. The alternatives listed are paraffin, gas, coal and bio-ethanol gel and municipalities are supposed to provide an amount that is about equivalent to 50kWh. People living in shack settlements without electricity should in principle be eligible for this support. The FBAE policy has been in place since 2007 but none of those we spoke to were aware of it.

Price hikes

The costs of all forms of energy have escalated in the last five years. Even candles are expensive. Paraffin rises with the price of petrol and diesel and now costs R10 or R12 a litre depending on where it is bought. In 2008, says Bheki Buthelezi, it was more like R2.50. In shack settlements without electricity, people go through a litre or more a day and so spend R300 to R400 a month. In the Vaal, Nomasonto Mthambo's family also spends R10 to charge a car battery and R5 for cell phone and PM9 batteries.

Like paraffin, liquid petroleum gas is produced by the petroleum refineries and the price rises with the price of oil. In addition to using two litres of paraffin a day in her home, Wendy Nkewu goes through a 9kg bottle of gas every three weeks for her take-away food business. It costs her R186 a bottle.

People in the Vaal and on the Highveld put the cost of a 50kg bag of coal at between R100 and R120 and some think it is 'as expensive as electricity'. Nonhlanhla Mngomozulu from KwaZanele, Breyton, said a half bag lasts about

four days and she and her grandmother spend R200 to R250 a month on coal. They do get FBE but spend another R50 on electricity so their energy bill amounts to R300. Her grandmother's pension is the only income so energy takes about 25% of it.[11]

For everyone, electricity costs 'too much'. Since 2008, Eskom tariffs have increased by over 120% in real terms (after inflation) and municipal tariffs have followed. Nonhlanhla's consumption is exceptionally frugal. Most people spend at least R150 on electricity if they also use other energy sources. In Evaton West, Sophie Msibi and her four adult children spend up to R200 on electricity which lasts about two weeks. In winter they also light the Jewel stove in the evenings. When the electricity is done, they rely on coal, wood and paraffin.

Most people on pre-paid buy in small amounts of R10, R20, R50 and sometimes R100. As with paraffin, this is convenient for poor people who budget day to day. Unlike paraffin, where the price goes up but the quantity remains the same, with electricity you can pay the same but get less. Everyone said that what they buy is used more quickly. Solomon Makhanya in Sebokeng says R50 used to last a month but now it barely lasts a week.

In Eziko, the people we visited are well aware of the price rises but believe that the units are now used faster. They attribute this to illegal connections made into the supply boxes[12] and believe that their units are used up faster because they are paying for the stolen electricity. I have asked some technical people about that and am told it is not possible – the electricity has to come through the meter in their house to be charged to them. This suggests that the perception of units being used up faster really is about the price increases. People also observe that they have more blackouts because the illegal connections overload the system.

This situation clearly creates neighbourhood tensions. While strongly disapproving, the people we spoke to said that more people are stealing electricity because of the price rises. These prices are unfair because 'most of

11 Old age pensions in 2012 are R1,200.

12 There is one box per (legal) connection and the box is located at the top of a pole outside the house.

us are unemployed and only have grants as our source of income. It could be better if they created jobs for us because it does not make sense for them to keep increasing the price because we need electricity, yet we can't afford it.'

In the Vaal Triangle, by contrast, there is little disapproval of illegal connections – or 'breaching' as it is called. Everyone is aware that this overloads the system and leads to frequent blackouts but they also think that the system is under-engineered. Either way, they share the view that people need electricity and think the real thieves are Eskom and the municipality. Therefore, if someone is disconnected 'we have the snakes organise for us'. This use of 'snakes' is a subversion of an Eskom advertisement which tries to brand people who do illegal connections as anti-social.

Across much of Evaton, breaching is informally organised but in some areas of the Vaal it is supported by local community organisations. Thus the Ironside, Sebokeng & Eatonside Community Committee (ISECC) took a formal decision to breach Bertha Mhlangu's[13] pre-paid meter after she broke both her hands in an accident and could not work. ISECC also rejects Council's demand of R960 for formal reconnection. Bertha says she is not worried by the threat of disconnection: 'They can take [the wires] away if they insist. There is nothing I can do about that. People are unemployed so there is no money to pay.'

In fully electrified households people are paying R500 and upward. In Middleburg, Elizabeth Bassed's household accommodates three generations and, including two tenants, there are nine people in all. They pay about R1,000 a month for electricity and another R1,500 for rates and water. Wendy Dubazane lives in Umlazi, Durban, with her husband, mother and three children. Their electricity bill has more than doubled in the last four years from R400 to between R800 and R900. The household has become more energy conscious – for example, switching off the geyser during the day – but this is difficult to maintain when the children come home from school. With just two people in the household, Gladys King's municipal bill is close to R1,000 with R600 for electricity. She and her son do everything they can to save electricity – pulling out plugs at night and switching off the geyser.

13 Not her real name.

In early 2012, eThekwini ran an energy efficiency promotion with stands in the malls around Durban. Both Gladys and Wendy swapped out some bulbs for CFLs and left their addresses for a follow up energy audit at home and the promise of items such as geyser blankets that would produce bigger savings. They have heard nothing since.

Electricity prices are not uniform across the country. Prices are set by the National Energy Regulator of South Africa (Nersa) following applications from Eskom and each of the municipal distributers. In 2010, when Eskom was applying for steep increases for the next three years, community groups testified that many households would be driven into penury by the increases demanded by Eskom. Nersa responded by introducing an 'inclining block tariff'. The idea is that the first block of electricity is cheapest and the rate (cents per kWh) rises with each successive block. Nersa set the size of the blocks and the rates per block for Eskom as shown in Table 6. The percentage rise shows the increase in the price over the previous year.

Table 6: Inclining block tariffs for Eskom residential customers

Monthly consumption	2010/11		2011/12		2012/13	
	c/kWh	% rise	c/kWh	% rise	c/kWh	% rise
Block 1: 0-50 kWh	55	-10.59	58	5.40	61	5.50
Block 2: 51-350 kWh	58	-5.20	66	13.23	75	13.50
Block 3: 351-600 kWh	76	21.95	96	25.80	121	25.90
Block 4: more than 600 kWh	84	35.82	105	25.80	133	25.90

So, taking the 2012 figures, for the first 50 kWh used each month everyone pays:

61c x 50 kWh = R30.50 (+ VAT).

If someone consumes a total of 200 kWh in the month, then they pay for the next 150 kWh at the Block 2 rate: 75c x 150 kWh = R112.50. So their total bill would be:

30.50 + 112.50 = R143.00 (+ VAT).

If someone consumes 850 kWh, then the bill would be as follows:

61c x 50 kWh = R30.50

75c x 299 kWh = R224.25

121c x 249 kWh = R301.29

133c x 249 kWh = R331.17

Added together = R887.21 (+ VAT)

There is considerable variation in municipal tariffs as a comparison of eThekwini, Steve Tshwete and Emfuleni shows. Most municipalities introduced the inclining block tariff but eThekwini did not. It has one price for all customers, whether on pre-paid or on conventional meters, whether they live in shacks or palaces, and irrespective of how little or how much they consume. In 2012/13, the tariff is 103 c/kWh plus VAT. This includes administrative costs so there is no additional 'basic charge'. eThekwini does, however, impose a 'deposit' equivalent to the bill for three months consumption and, as the price goes up, it requires that everyone pay an increase on their deposit.

The 'basic charge' is a fixed monthly charge which is paid whether or not any electricity is used. Steve Tshwete municipality classifies its customers as 'domestic high' and 'indigent'. 'Indigents' do not pay the service charge. Presumably they do not in fact pay the Block 1 tariff since this would be covered by free basic electricity.

Table 7: Steve Tshwete (Middleburg) tariffs 2012/13

	Basic charge	Block 1	Block 2	Block 3	Block 4
Domestic high	R40.00	68	90	105	118
Indigent	-	68	86	-	-

In Emfuleni, 'domestic high' and 'domestic low' are defined by the type of electricity connection: three phase electricity for domestic high and one or two phase for domestic low. The 'basic charge' is higher for the former but the 'energy charge' is the same for all consumers. However, Emfuleni charges more in the winter months when demand rises because people are heating their homes.

Table 8: Emfuleni tariffs 2012/13

Domestic high basic charge: R293.57				
Domestic low basic charge: R128.36				
	Block 1	**Block 2**	**Block 3**	**Block 4**
Winter (June-August)	89	100	134	161
Summer (September-May)	63	71	96	115

Civil society organisations have long advocated for a rising block tariff so that poor people who consume little can afford what they need while rich people who consume wastefully will be penalised by higher prices. They do not agree with the way Nersa defined the blocks or with the price in each block because it still leaves poor households with a steep increase which they cannot afford.

Evaton West is on the Eskom tariff. Kedibone Konyana lives with her two sons, a daughter and a grandchild in two rooms made of corrugated iron. They light a Jewel coal stove on winter evenings and use electricity only for a chest freezer, radio and TV, three lights, a two plate hob and cell phone charging but they can afford it for only two weeks of the month.

Civil society organisations have proposed that the Block 1 should be greatly expanded to provide for people's essential needs and this block should be free. The first step to paid-for electricity (Block 2) should be a small step but it should be followed by increasingly steep steps for Blocks 3 and 4 and there should be more blocks added at the higher end. The aim is that everyone gets enough to live while extravagant consumers pay a premium.

In its latest application for a price increase, Eskom has asked Nersa to scrap the inclining block tariff claiming that people do not understand it. In Evaton West, however, Eskom has not told people about it, just as it has not told them how to get free basic electricity. It now proposes that tariffs designed to protect the poor should be set according to the type of electrical connection: only those who are connected by 20 amp trickle-feed should be counted as poor. Anyone with a full 60 amp connection is counted as not poor. In Eskom's proposal, everyone will face annual price rises over the next five years but the

rise will not be as steep for people on trickle-feed. This clearly has more to do with Eskom's administrative convenience than with helping the poor.

Nor does it appear that Eskom is keen on penalising excessive consumption. It proposes that tariffs for its 'homepower' customers – high consumption households with full power – be adjusted to raise the costs of low consumption and lower the costs of very high consumption.

Bad air

South Durban, the Vaal Triangle and the Highveld are notorious hotpots of industrial pollution. In the late 1990s, government more or less abandoned its responsibilities. The system of air pollution control was badly flawed and totally inadequate but the Department of Environmental Affairs allowed it to collapse entirely.

In 2000, following years of sustained pressure from the community organisations that make up the South Durban Community Environmental Alliance (SDCEA), government initiated a 'multi-point plan' to address air pollution. This was supposed to be the pilot for action in other hotspots. There are 180 smoke stack industries in south Durban including the two refineries – Sapref owned by Shell and BP and Engen owned by Petronas – and the large Mondi pulp and paper mill. Sulphur dioxide emissions from the big polluters have been reduced but the stench of volatile organic compounds, particularly benzene, still hangs in the air. There are also regular incidents – explosions, fires and spills – which blast the full range of pollutants into the air.

One point in the plan was to draft new air quality legislation to replace the apartheid law that protected industrial polluters from the community. It took five years but the National Environmental Management: Air Quality Act was finally passed in 2005 and it included provision to declare 'air quality priority areas'. The Vaal Triangle was the first priority area and the Highveld was the second. In 2012, the Waterberg was declared the third priority area. This is not because pollution levels exceed ambient air standards now, but because

they will do so when the new Medupi Power Station is completed. In other words, this area is planned as the next pollution hotspot.

In the Vaal, the top polluting plants are ArcelorMittal's iron and steel plants in Vanderbijlpark and Vereeniging, Eskom's Lethabo power station, Sasol's Chemical Industries complex in Sasolburg, the Natref refinery also in Sasolburg and Anglo American's New Vaal Colliery where spontaneous combustion results in repeated fires. Boipatong and Sharpeville are downwind of the Vanderbijlpark steel plant and Zamdela is downwind of Sasol's plants. Wind directions were studied before these industries were built. The towns were then laid out so that white people would not live in the path of pollution. Black people were placed there for the convenience of having the workforce close to work but separate from the white town. This pattern of environmental racism had its origins in the way the Durban City Council planned the expansion of industry into south Durban in the 1930s and it is reproduced across South Africa's industrial landscape. When Sasol 2 was built on the Highveld, the black town of Driefontein was taken over for white settlement and renamed Secunda. Black people were moved out to eMbalenhle downwind of Sasol's new plant.

Eleven of Eskom's 13 big coal-fired power plants are on the Mpumalanga Highveld. The other big polluting industries are Sasol's synfuel (coal-to-liquid) plant at Secunda and an array of minerals smelters and metal makers. As in the Vaal, the coal mines and dumps are prone to spontaneous combustion.

In eMalahleni, meaning 'place of coal', KwaGuqu looks across a valley towards Witbank's industrial area. A plume of dark smoke rises from the valley bottom where an 'abandoned and ownerless' mine has burnt for fifty years or more. On the other side of KwaGuqu, a rust red haze of particulates hangs over Highveld Steel and Vanadium owned by Evraz, a Russian corporation now headquartered in Luxembourg. Thabang Motebejane says everyone in her house has sinus and chest problems. She notes with irony that the local tuberculosis hospital is located in the middle of Witbank's industrial area. She and her neighbours agree that 'the corporations know what they are doing – they know they are harming people and especially the children'.

Middleburg's industrial estate is dominated by Columbus Stainless Steel, owned by Acerinox of Spain, and Samancor Ferrochrome jointly owned by Anglo American and BHP Billiton. As in eMalahleni, neighbours say the pollution rains down on them: 'The stoep [veranda] is white in the morning and everyone is coughing.' Meanwhile, the coal mines encircling Middleburg come ever closer to the town and the blasting is beginning to open cracks in the houses.

The village of Arbor next to the Vlakvarkfontein Mine, a joint venture of Continental Coal and Mbuyelo Resources, is covered in coal dust kicked up from the open cast workings or from the train of coal trucks lining up for the next load. But the smoke from mine fires is the worst: 'That really stays in your lungs.'

The mine signed a three year, 720,000 tonnes/year supply contract with Eskom in March 2012 making it one of 25 direct suppliers to Eskom.[14] Locals think the coal is destined for Majuba Power Station about 140kms away. The village is also in sight of the Kendal Power Station, a major source of sulphur dioxide, nitrogen oxides and ozone. Kendal is surrounded by coal fields operated by BHP Billiton, Shanduka and the state-owned African Exploration Mining and Finance Corporation. It is not supplied from Vlakvarkfontein.

Across the Highveld, there is a very high concentration of particulates (PM_{10}) in the air, particularly in the winter months when an inversion layer in the air acts as a lid to keep pollution in. Figure 1 shows concentrations in winter 2009. The horizontal lines show three different standards: the top line is the interim standard set at 120 ug/m^3 by the Department of Environmental Affairs (DEA). Secunda, Ermelo and Witbank constantly exceed this standard. From 2015, the DEA will apply the more stringent standard of 75 ug/m^3 which is shown by the middle line. All monitoring stations regularly exceed this level. The bottom line is the World Health Organisation (WHO) guideline of 50 ug/m^3 which is exceeded at all the monitoring stations throughout the winter. Much the same pattern is repeated in 2010.

14 Business Report, ***Eskom in new coal supply pact***, March 7 2012 at 12:43pm

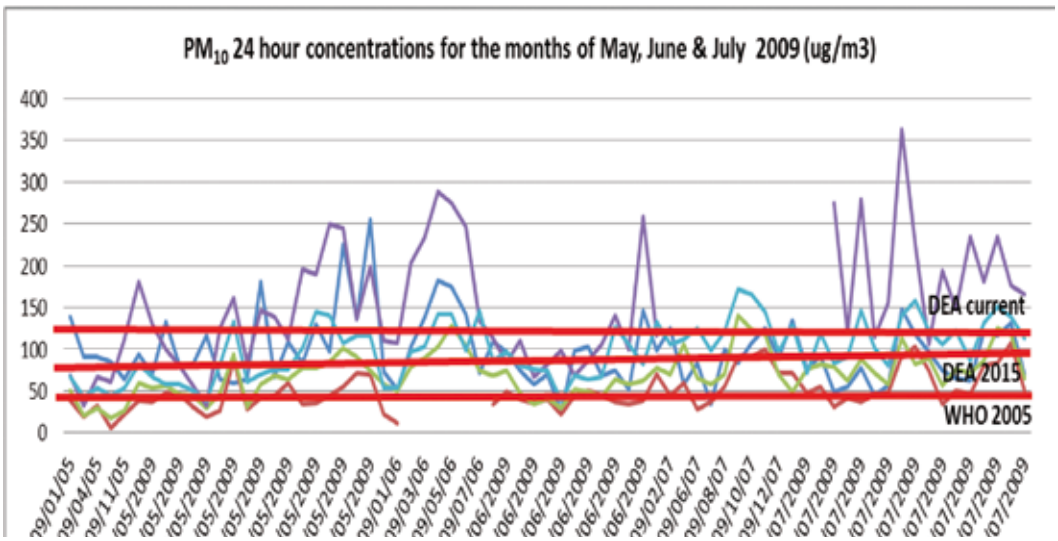


Figure 1: Particulate concentrations in the Highveld air. Source: DEA.

Figure 2 below shows ambient concentrations of sulphur dioxide in the winter of 2010. The red line shows the ambient air standard set by the DEA at 191 parts per billion. Witbank stands out for its foul air but there are regular pollution spikes above the line at the other stations too.

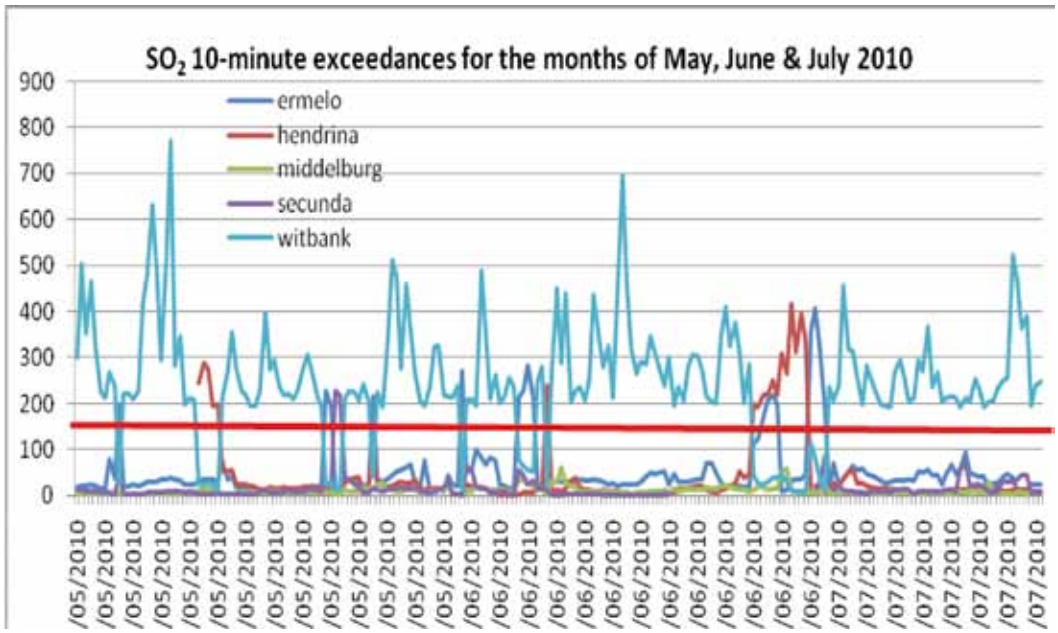


Figure 2: Sulphur dioxide concentrations in the Highveld air. Source: DEA

The early 2010s look like the late 1990s all over again. Government is once more allowing the air quality regime to collapse. In Durban, the City Health Department developed an air monitoring system and enforcement capacity as part of the 'multi-point plan'. What took ten years and considerable cost to create was destroyed in a month when City Health decided it had other priorities. The air quality division lost most of its senior staff and the air monitoring system is no longer functional. It produced 'insufficient data' to report throughout the first half of 2012. There is thus no longer a basis for enforcement.

The national Department of Environmental Affairs is running the system in the Vaal and Highveld because local government in these priority areas do not have capacity to do it themselves. On the Highveld, huge gaps are opening in the monitoring data. In May and June 2012, the Witbank monitoring station produced data for only nine of 61 days while the Secunda station was functional for 27 days. When the monitors are working they register a high number of exceedances. The Vaal is no better. Figure 3 below shows gaping holes in the

data and extraordinary levels of fine particulates ($PM_{2.5}$) in the air when there is data. The $PM_{2.5}$ standard, reluctantly introduced by the DEA in 2012, allows a very high 65 ug/m^3 as against the WHO guideline of 25 ug/m^3.

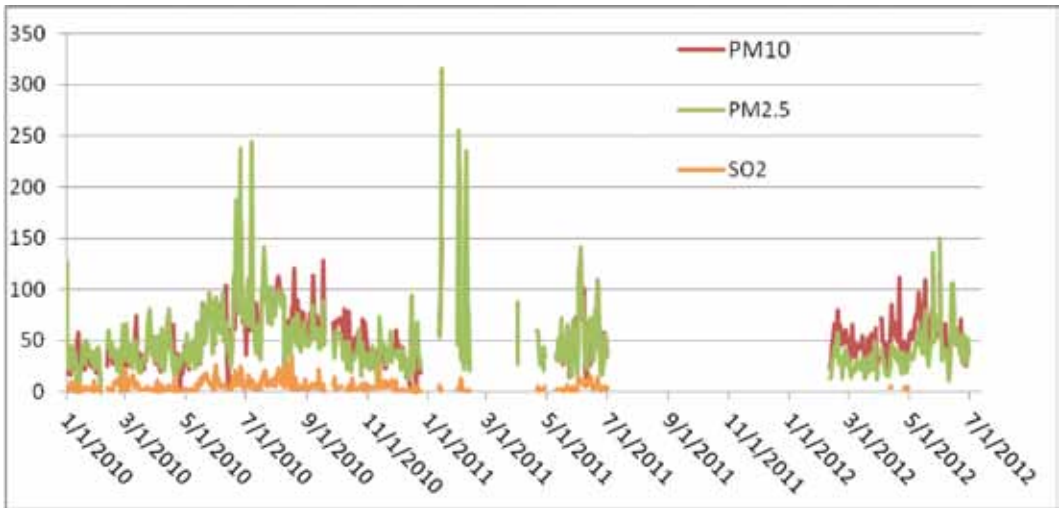


Figure 3: Pollution data for Sebokeng from January 2010 to July 2012.

Pollution from domestic fires is minor compared with industrial pollution, but it is emitted where people live and so has a major impact on health. On a winter's evening around five, the people of Mhluzi in Middleburg are lighting up their stoves and mbaulas and the air is thick with smoke. This scene is repeated in townships across the country. The mbaulas are lit outside so that the worst of the smoke burns off before they are taken inside. The stoves all have chimneys but they also leak smoke indoors before the fire is hot and people leave their windows and doors open to vent the smoke. Typically, people use paper, wood and candles to start the coal burning. Some people use the 'Basa Njengo Magogo' method which involves placing the kindling on top of the coal so that the fire burns down. This reduces particulate (PM_{10}) emissions visible as smoke from the start up but does not reduce sulphur dioxide or volatile organic compounds from burning coal.

A campaign promoting the Basa method originates with Sasol in the late 1990s and was taken up by government and other coal corporations in the

mid-2000s. The then Department of Minerals and Energy (DME) made it one of three strategies for reducing domestic energy emissions and indoor pollution. The other two strategies were supporting the use of low-smoke fuels and improving the thermal quality of housing. The last of these strategies was ignored. The promotion of low smoke fuel made from waste coal was associated with the Basa method as part of the DME's 'low smoke fuels programme'. This fitted well with the coal industry's agenda and it was hoped this would also reduce dumping of waste coal by miners. However, smokeless coal is more expensive so few people buy it. The Basa method was thus left as government's only strategy for reducing domestic pollution and it appears to rely heavily on industry for implementation. The campaign represents a cheap option for government but has made little difference to domestic emissions or indoor pollution.

In May and June 2012, people from KwaZanele (Breyton), Ermelo, Mhluzi (Middleburg), eMalehleni and Arbor conducted indoor air monitoring in their homes. They took samples in 13 homes using a minivol which measures the concentration of particulates over a twenty-four hour period and also shows the presence of metals. It does not measure sulphur dioxide, nitrogen oxides or volatile organic compounds.

Two of the 13 samples came in below the WHO guideline of 50 ug/m^3 and one more came in below the DEA's interim 120 ug/m^3 standard. Ten samples showed particulates above this standard and five showed particulates at more than twice the standard. One household specified that they use the Basa method to light their coal stove but the sample still showed 194 ug/m^3. The highest level of 458 ug/m^3 was recorded in Arbor. All the samples also showed significant levels of metal toxins in the air. Of particular concern are mercury, lead, cadmium, chromium and manganese which are toxic when breathed in even in very small quantities.

Most of these homes have coal stoves for cooking and heating. People's homes are not sealed off and heavy pollution from neighbouring mines and industries contributes to the concentration of particulates indoors. It is very likely, for example, that the Vlakvarkfontein mine contributed to the high reading in Arbor.

Looking for change

3 Looking for change

People have three big issues with the energy system as a whole: the price, the pollution and the sense that they have no control. People from all three areas say that they would prefer renewables. They note that sun and wind are free whereas coal keeps going up in price. Even if capital costs are high, people believe that wind and solar will be cheaper in the long run. Several people specified that a combination of solar water heaters and solar PV at household level would be ideal.

People are very concerned about pollution both from domestic fuel and from Eskom. Lindiwe Malinga in Evaton observes that 'there are no bad smelling emissions with solar and we won't get sick and our children won't get sick'. Maria Mosima in Mhluzi, Middleburg, makes the same point: 'You can feel the pollution in your lungs. Going solar would make a difference.' In the Vaal and on the Highveld the damage caused by mining and the power stations is very evident to people. In contrast, Eziko south of Durban is not heavily polluted and a long way from the nearest power station. Nevertheless, Joyce Phahla says that solar is 'the natural way' and does not affect other people with pollution. 'It is better to use what we are given by God.' Xolani Nkosi from Umlazi argues that government also gains by 'saving nature'.

Several people thought the underlying issue in their communities is that people just don't have money and they associate this with not having jobs. Some concluded that the way to create jobs was precisely through a drive for renewable energy. Thus, Solomon Makhanya of Sebokeng summarises the benefits of renewable energies, including solar and biogas digesters, as follows:

- Using the sun will be cheaper and it will create more jobs for people;
- Coal is affecting our lives and adding to existing [industrial] emissions;
- Fewer people will be injured on the mines.

Kedibone Konyana from Evaton West thinks it's best if you have a solar PV panel on your roof because then there is no middle-man to rip you off or cut you off: 'You have control.' Who controls is a critical issue for most of the people we spoke to. At present they see national and local government and Eskom as being in control but no-one trusts them. They see them acting in the interests of profit while the people are abandoned.

Some are shocked that big industries pay a fraction of what people pay for electricity. Others comment that those making illegal connections are not the thieves. The real thieves are those who borrowed from the World Bank 'without consulting us', says Bheki Buthelezi. Everyone will pay for Eskom to build its new power stations and, since this is a national debt guaranteed by national government, they will pay even if they don't get electricity. And everyone will also pay the environmental costs of climate change.

Participation is loudly proclaimed across the country but no-one sees it working. In Arbor, people say that the managers of the coal mine next door make promises which they do not keep. When they ask their local council to protect them, 'they say we are not under government. So we are nowhere. They come when they want our votes but they run when we have trouble.' Similarly, the people living in the Clairwood tents asked to be connected to electricity but the municipality said they do not accommodate people living in shacks. 'Therefore we do not exist. You have to have a house to get services.'

Yet those with houses and electricity are scarcely more impressed. The mildest criticism is that government is remote and does not listen to people and does not engage them in planning processes. Government also makes promises that it does not keep. People generally think the promises are made in bad faith, usually around election time. There is a strong perception, particularly but not only in the Vaal, that government is corrupt.

Government is also widely thought to be either incompetent or unresponsive or both. In Middleburg, some people indicated that they did use the ward committees to report things that are not working 'but nothing happens'. In the Vaal, the people we spoke to thought 'the councillors are useless' and are there for themselves and not for the people. Most saw little point in engaging with their councillors but those who had said they just made 'empty promises'. Even those whose loyalty to the ANC is such that they cannot conceive of voting for anyone else do not trust it in power.

Some of the people we visited participate in community organisations or movements but most do not. Nevertheless, people said that they had faith in these organisations where there is 'a love of the people'. Generally, they saw these organisations giving voice to people's concerns through 'petitions, marches and complaints' so as to put pressure on government. Not everyone is convinced that this is working since 'there are no tangible results'. Others thought it does work because 'if we are quiet they don't know what our problems are'.

In some areas, however, local organisations have been subverted. In Arbor, people said there was no longer a local community forum as community leaders had been bought off with jobs at the mine. Further attempts at local organising would be divisive and bring conflict. In Avalon, it was said that leaders were bought off with positions in the ANC but the community holds regular open meetings and replaced them. However local elites manipulate particular situations, there is a sense that people will not be quiet: 'Even in ANC areas they are toyi-toying.' There is less confidence that they will get the response they want or need from the authorities.

Most people do not have fixed ideas about how or who should organise the energy system. Some thought solar electric panels could be installed on people's roofs in the same way the SWH had been installed – that is, through projects of national and local government. However, maintenance should be done by people within the community, both to create local jobs and because they would be more reliable than the incompetent municipalities. Others took

this further and said the users of the system should control the system: 'it should be a democratic system'.

The sentiments expressed by the people we visited indicate a strong desire for greater autonomy. People want more control of their lives and energy, along with water and sanitation, is an intimate and necessary part of living. Yet the energy system does not begin and end in isolated households but is social. The Tyndall Centre, a British climate change think tank, observes that:

> The existing regulatory system for electricity distribution operates within the paradigm of centralised generation and one-way flow of electricity from large power plants to users. The 'passive' user has co-evolved with such a supply system.[15]

In other words, big power plants managed by centralised and secretive corporations like Eskom are associated with consumers who do not ask about the system behind the switch that turns on the light. Wendy Dubazane from Umlazi argues that, since we use electricity daily and cannot do without it, we need to be more conscious about how we use it and where it comes from. 'We need to develop a critical understanding of the electricity system and of new technologies that we buy without thinking of the bigger picture.' She hopes the younger generation will be more questioning of things than their elders.

The 'passive consumer' is part of an extravagantly wasteful energy system. Only about 35% of the energy in coal is converted into electricity. The other 65% goes up the chimney in heat. And about 6% of the electricity that is produced is lost from the lines over the long distances from the power stations to the users. The biggest users are the large industrial users who care little about energy efficiency because the point of 'cheap and abundant' power is that it can be wasted without penalty. Shops and offices also waste power with some office blocks lit up through the night even when no-one is there. Householders too have been extravagant according to their means. The rich installed every new technology from tumble dryers to air conditioners and

15 Tyndall Centre, 2005. ***Decarbonising the UK: Energy for a climate conscious future***, at www.tyndall.ac.uk p.73.

under-floor heating. Nersa's Block 4 starts at 600 kWh per month but the really rich consume more than eight times that amount. At the other end of this energy system, comments West Majoro, rural people and people living in shacks get nothing.

The energy system composed of big base load plants, big industrial users and passive consumers on the side, thus embodies the concentration of political and economic power. In opposition to this, environmental justice organisations have long campaigned on the slogan that 'Renewable energy is people's power'. In principle, renewable energy can and should be dispersed rather than centralised and its management can similarly be decentralised. That in turn suggests the possibility of 'people's power' – of energy produced and consumed under democratic control of the producers and users and without harm to people and their environments somewhere else. This is the meaning of 'people's energy sovereignty'.

But energy sovereignty does not automatically accompany renewable energies or the conscious consumer. Modern capital is quite capable of managing decentralised technology systems, including those that are decentralised all the way into people's homes. In South Africa, Eskom – which is state-owned but not democratically controlled – is building the big coal-fired plants and is lining up to build a fleet of nuclear plants. Renewables have been handed over to the private sector. So far, there have been two bidding rounds and the Department of Energy has ensured that the costs of bidding are such that only very large corporations can do it. Since there is no renewable industry in South Africa, all the bids are from transnational corporations, some of which have a very poor record on human rights.

The elite energy agenda is meeting with opposition from community groups who do not want to pay for the expansion of big base load – coal and nuclear – designed to supply energy-intensive industries and who do not want to live with the pollution produced all along the production line from mine to power station. Resistance is the first necessary step in the fight for a just energy system. This resistance goes beyond the energy system to the minerals-energy complex and the unequal development that it has dictated.

But in calling for democratic control, people are also looking for transformation – for a way to go beyond resistance and to start shaping the agenda. Several initiatives are already contributing to this.

The Million Climate Jobs Campaign aims for 'a just transition to a low carbon economy to combat climate change and unemployment'. It brings together trade unions, community organisations and environmental justice organisations and is based on the recognition that there is a great deal of work to be done if we are to address climate change. As noted above, people we visited similarly thought that a big shift to renewable energy would help address the crisis of unemployment. The Climate Jobs campaign also takes the view that the process of making this shift must be driven by people and not by profit.

The National Union of Metalworkers (NUMSA) is campaigning for socially owned renewable energy. In calling for 'social ownership' rather than 'public ownership', it signals that nationalisation does not necessarily result in democratic control. Indeed, Eskom is the first example of a state-owned corporation that is anything but democratic. Hence NUMSA sees a variety of forms of social ownership working at different scales from local cooperatives to municipal ownership and to the democratisation of control of Eskom at the national level.

Food is the most basic form of energy for people and energy sovereignty borrows from the idea of food sovereignty. This is at the core of the agenda of La Via Campesina, the global movement of peasant farmers. They hold that the food system must be thoroughly transformed to enable people to define and take control of production and consumption and hence of their own futures. In the words of the Nyeleni Declaration on food sovereignty, this transformation should be based on people's right 'to healthy and culturally appropriate food produced through ecologically sound and sustainable methods …' This implies a determined shift to organic production and sustained programmes for agrarian reform and urban agriculture.

For groundWork, energy sovereignty means an open-ended process of transition to a society in which people are actively and consciously making the decisions that shape their collective future. It will not be a smooth process nor

is the outcome certain. How things take shape will depend on what emerges from struggles, how people learn from struggle and from doing, and where they decide to take things from there. groundWork hopes to contribute to people's debates in their organisations, through their networks and in the places where they live and work, but believes that it is the conclusions and decisions for action that people come to that are important.

Talking Energy recounts conversations with people in the Vaal, the Highveld and south Durban. We talked about household energy use, the rising price of energy, what they thought of the energy system and the key actors within it, and whether they had any ideas about an alternative system. Energy is not isolated from the rest of people's lives and people also spoke of water, sanitation, waste, housing and the general state of the neighbourhood and its infrastructure.

The report is conceived within the larger project of working towards energy sovereignty. It is intended as a starting point to begin exploring the idea that renewable energy really can be people's energy. That is a long way from where we are at the moment and this report is in part about taking the measure of that distance.

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