REPORT

SHELL: DON'T FRACK THE KAROO

SOUTH AFRICA

REPORT / AUGUST 2014

groundWork

Southern Cape Land Committee

milieudefensie
Friends of the Earth Netherlands

groundWork (Friends of the Earth South Africa) is a non-profit environmental justice service and developmental organization. groundWork seeks to improve the quality of life of vulnerable people in Southern Africa, through assisting civil society to have a greater impact on environmental governance.

The Southern Cape Land Committee is an NGO working towards agrarian transformation. Southern Cape Land Committee supports organizations and movements of rural women and men in mobilizing for access to and control over natural resources.

Milieudefensie (Friends of the Earth Netherlands) is the largest Dutch grassroots environmental organisation, comprising 80 local groups and an 85,000+ base of members en supporters. Milieudefensie campaigns focus on (fossil and bio) energy, raw materials, agriculture and traffic.

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CONTENTS

1 WHAT IS FRACKING?

Drilling equipment on the Loma Campana concession in Argentina owned by YPF and Chevron.
© Observatorio Petrolero Sur

How do we understand the concept of "fracking"?

The term "fracking" is shorthand for "hydraulic fracturing" and usually refers to the technique used for extracting shale gas from deep under the earth's surface.

The term **hydraulic** means that there is water involved in the process, and comes from the word *hydro*, Greek for water.

The technique involves high-pressure drilling, firstly vertically, for up to four kilometers underground. The drill then travels horizontally for around one kilometer into the rock. The drill has to pass through layers of underground water to reach the gas in the shale layers below. Shale is a particular kind of rock which geologists call sedimentary, deposited under the earth millions of years ago.

The contents of the drilling fluid include large amounts of water, but also sand in the form of silica, and about 1% is made up of a cocktail of toxic and non-toxic chemicals. The pressure of the drilling allows the sand molecules to force very fine crevices in the layer of shale, opening up fissures (small cracks) and releasing the gas lodged inside the rock. This way of cracking the rock is called **fracturing**. The gas is collected and transported to the surface through the drilling machinery. However, large amounts (estimates vary between 30% and 70%) of the water and toxic chemicals remain underground after the drilling.

The drilling fluid, which reaches the surface after the fracking, is toxic and also radioactive and needs to be treated as hazardous and radioactive waste.

Fracking can also be used for the extraction of other minerals and gases, such as coal-bed methane. The slick-water technology for extracting shale gas in economically viable form was first used in 1998. Other forms of the technology have been around for longer.

What is shale gas?

Petrol, coal and gas are hydrocarbons, or fossil fuels. They are made up of very old decayed organic matter deposited in the earth or under the sea. Shale gas is a hydrocarbon, trapped in sedimentary rock up to four kilometers underground. Shale gas is often referred to as being an unconventional gas or a tight gas. It can only be extracted by means of using the drilling technique discussed in the previous question.

When the gas is extracted, most of it consists of methane (made up of four hydrogen atoms to each carbon atom, CH_4). Methane is a defined as a greenhouse gas in terms of the Kyoto Protocol. The Protocol was a binding agreement designed to get governments of the North to restrict and lower their greenhouse gas emissions. This is because the gases identified in the Protocol are seen as the main causes of global warming and human-caused climate change.

Extracting shale gas, which can be converted to electricity or liquid fuels for transportation, is therefore postponing the targets set for reductions in greenhouse gases. Using shale gas extends the chances of global warming and harmful aspects of climate change.

Methane is many times worse for the environment and climate than carbon dioxide, the main greenhouse gas. It is estimated that about onetwelfth (8%) of the methane extracted during shale gas fracking ends up as 'fugitive' gas released into the atmosphere.

Because it is expensive to drill, extract and transport the shale gas, only large companies with significant financial resources are able to undertake this. Most of those capable of doing the fracking are foreign-based transnational corporations, some of which have experience of doing fracking elsewhere.

Where is it found... globally... and in South Africa?

Shale gas is found all around the world, in every inhabited continent. China, the US and Canada have extensive resources and are amongst the countries that are already involved in extraction and commercialization of the gas. According to the US government's Energy Information Administration, the following countries have the highest estimated shale gas resources (see table).

Since these figures were published in June 2013, the EIA has reduced its estimates downward to 390 tcf, placing South Africa below Australia on the table. These figures are contested by those given to parliament by the current regulator, the Petroleum Agency for South Africa, whose estimates were 90% lower at 40 tcf. Some geologists argue that there is little gas left after centuries of dolerite intrusions into the shale layer, which released most of the gas.

Is it economically viable to exploit this reduced level of gas? One of the applicants to extract gas in the Karoo, Shell, argues that it will only know the answer to this question after doing some test fracking. Neill Kramer, Shell's upstream manager, stated in March 2014 that "no one knows the number" of estimated gas. Shell could only decide to go ahead after a period of exploration, by drilling between six and 24 exploratory wells (Gosling, 2014). Like the other companies, Shell has not yet begun fracking in South Africa, since no exploration permits have been issued to date. Some countries like the US, China, Argentina, Poland, and the United Kingdom have gone ahead enthusiastically with fracking. Others like France and Bulgaria are not in favour of fracking taking place. In some countries, state/provincial or local authorities have banned fracking in their territories.

In South Africa, most of the shale gas is said to be in the Karoo basin, in particular in the Great Karoo, but also in parts of the Free State and KwaZulu-Natal. An area of the Kalahari has also been earmarked for fracking. Around 200 000 km2 , or about a fifth of South Africa's land surface, has been set aside for fracking purposes.

TECHNICALLY RECOVERABLE SHALE OIL AND SHALE GAS RESOURCES

Country	Estimated technically recoverable resource in trillion cubic feet
China	1,115
Argentina	802
Algeria	707
United States	665 *(Down from 862)*
Indonesia	580
Canada	573 *(Up from 388)*
Mexico	545
South Africa	485 *(Later revised to 390)*
Australia	437
Russia	285

Source: *US Department of Energy, Energy Information Administration, 2013, Technically Recoverable Shale Oil and Shale Gas Resources: An Assessment of 137 Shale Formations in 41 Countries Outside the United States. Washington: EIA, 13 June.*

What will mining of shale gas involve?

In the regions (also called plays) where shale gas is found, the oil and gas company will apply for the right to extract gas. Each company that is allocated an area will establish 'pads' on which a number of drilling rigs will be established. Water, sand and chemicals will have to be trucked (or piped) in from sometimes quite distant areas. The amount of trucks could cause traffic jams in once-quiet areas, but on gravel roads will stir up a dust pollution problem that could affect farming and tourism activities.

Since there is no one with fracking experience in South Africa, the drilling teams will be brought in from other countries, under sub-contracts. It is likely that the menial service jobs will remain to locals. If farming and tourism are made difficult by fracking, jobs will be lost in those sectors. Farm workers who lose their jobs will also lose their accommodation.

House prices will go up, as fracking industry employees seek accommodation, making housing less affordable for local people. Services in local towns may boom temporarily before the fracking ends. Then these towns will experience a recession. Prostitution and the threat of sexually-transmitted diseases will grow in fracking areas.

Landowners under South African law do not own the mineral rights under the land. Therefore if these rights are allocated to gas companies, they will be allowed to drill on land they do not own. In the US, people in shale gas areas have reported a number of illnesses and water contamination on their properties which they attribute to the activities of the shale gas industry.

Water in large quantities will have to be sourced for the fracking, and this may have to be brought in from other areas, since fresh water in the Karoo is scarce. There is a significant danger that local underground water will be contaminated.

In its research on the quantity of trucks involved, Treasure the Karoo Action Group state on their website that there are likely to be 2,500 truckloads of water per frack.

The waste water which returns to the surface after fracking will need to be disposed of as hazardous and radioactive waste. Currently the provinces are responsible for this, but their budgets and expertise do not allow for extra burdens.

There is a chance that fracking may be the cause of increased seismic activity (tremors and earthquakes), as occurred in the UK. Extensive damage to property can ensue.

Who will extract the shale gas?

The task of extracting the shale gas is being allocated to applicants for licences. So far there have been four applications in the Karoo basin and one in the Kalahari. In most cases, the applicants are foreign oil companies. In one case a local company has launched an application with no experience in the oil and gas sector. So far it has been very difficult to get information on Moonstone, the company applying to extract shale gas in the Kalahari. Our focus should therefore be on the four companies applying in the Karoo.

Shell: The most famous of these is Shell, or, to use its full name, Royal Dutch Shell. From its name you might assume it is Dutch, but it is actually partly Dutch and partly British. Shell has applied to frack in 90,000 km2 of the Karoo. It has been fracking actively in the United States. Of all the companies in South Africa wanting to frack in future, it has the most influence and the most presence. Shell has been criticized for its oil extraction in the Niger Delta in Nigeria, where it collaborated with the state to persecute local activists, including the execution of Ken Saro- Wiwa. In South Africa it has been notorious for the environmental spills from the Sapref refinery in South Durban which it shares with BP. Its activities in Ireland and the United States have attracted large protest campaigns. And during apartheid Shell was severely criticized for its support for the South African military which it continued to supply with fuel. It was also involved in illegal breaking of oil sanctions in Rhodesia, which the Dutch, British and other governments imposed against white minority rule.

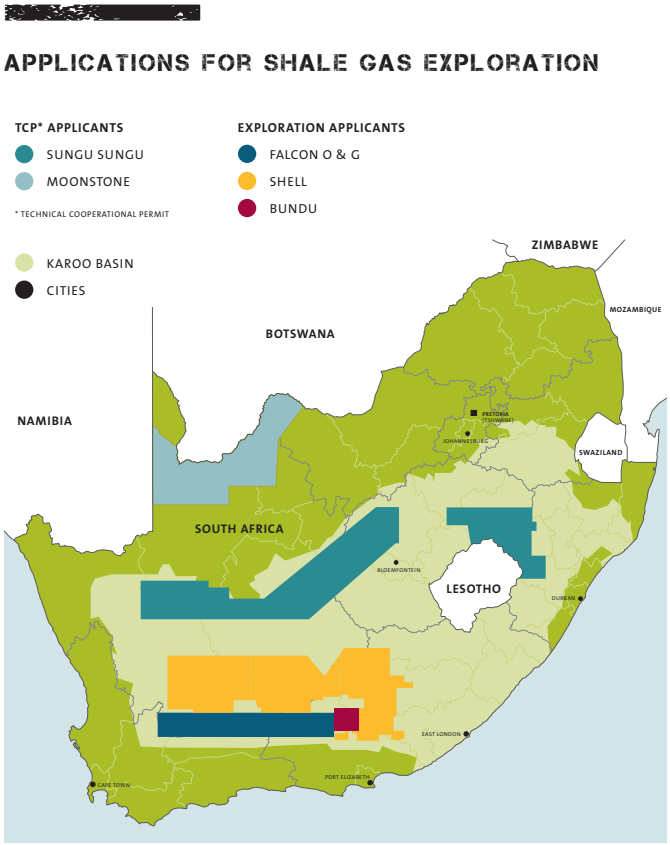
In today's South Africa, Shell imports, refines, and distributes petrol and other fuels, and most towns have Shell petrol stations. Media in South Africa have pointed to the fact that Thebe Investments Ltd, majority owned by ANC's Batho Batho Trust, has a 25% interest in Shell's distribution, marketing and refining operations. This means that government party ANC has a direct interest as a party in gaining revenue from fracking activities.

Shell has been active in the Karoo, spreading its public relations message, holding public meetings, and supporting a pro-fracking forum. Early in 2011, it commissioned an Environmental Management Programme Report from Golder and Associates, and held a number of public meetings to launch this. At each of the public meetings, widespread opposition to its plans was expressed.

Falcon: A second company with eyes on the Karoo is Falcon. Falcon has its head office in Dublin, Ireland and is busy exploring in Australia (with help from Sasol) and Hungary. It submitted its application to explore 30,350 km2 of the Karoo Basin in August 2010. Two years later, it made an agreement with Chevron, one of the oil majors in the United States, to co-operate for five years in exploiting shale gas in its allocated portion of the Karoo.

Bundu Gas and Oil: A third company is Bundu Gas and Oil (Pty) Ltd, owned by the Australian company Challenger Energy. It has applied to extract shale gas from a small 3,100 km2 area of the Karoo, near Pearston. The site is the historic Cranemere farm made famous by Eve Palmer in her memoirs, *The Plains of Camdeboo*. Challenger has only one other investment, a failed project to extract shale gas in the United States, which caused it to plug and abandon its single well. This lack of experience and capital shows up Bundu quite badly, and it is likely to have to find strategic partners to assist it.

Sungu: Fourthly, Sungu Sungu is a local group of companies with investments in coal and other mining interests, as well as having applications for exploration of offshore petroleum and onshore shale gas. Sungu Sungu's application for shale gas is extensive, 100,000 km2 over two blocks which extend from the Northern Cape, through the Free State and into KwaZulu-Natal. These blocks had earlier been the sites of applications by Sasol and its partners Chesapeake (US) and Statoil (Norway), withdrawn in 2012. Despite its applications, Sungu Sungu has no practical experience of oil and gas investments.



Applications for shale gas drilling in South Africa by different energy companies. Shell has applied to explore for very large-scale fracking operations in the Karoo, as shown in yellow on the map. ***Source:*** *Treasure the Karoo Action Group (TKAG)*

2

HOW WILL FRACKING CHANGE THE KAROO?

Camdeboo National Park, Karoo. Both nature and agriculture in the Karoo are heavily dependent on scarce water resources.
© Jose Gil Paris, Stichting Schaliegasvrij

Fracking will not bring development and jobs to the Karoo

The fracking industry will not provide local people with decent, sustainable (long-lasting) jobs, because during the exploration phase, the oil companies will use foreign workers experienced in fracking to do most of the skilled work. There is no programme so far set up to train local people to do these jobs. Some jobs will be created to do menial, low paying work such as security and road construction. Truck drivers will be engaged, possibly also not from local sources.

Each well can only be fracked a few times. Then the company moves on to frack other wells in other areas. Therefore the service industries that originally benefit from fracking in the area will no longer have work when the fracking of those wells ends. The work will go to people in another area. We call this the "boom-and-bust" effect, where the service jobs will not last for very long. Shell has stated that the company won't be creating many jobs (Gosling, 2014).

"THE STATE OF OUR ENVIRONMENT IS FRAGILE AND NEEDS EVERY CITIZEN'S INVOLVEMENT TO PROTECT IT. OUR PEOPLE ARE BOUND UP WITH THE FUTURE OF THE LAND. OUR NATIONAL RENEWAL DEPENDS UPON THE WAY WE TREAT OUR LAND, OUR WATER, OUR SOURCES OF ENERGY, AND THE AIR WE BREATHE."
Nelson Mandela, September 1995
(Building a New South Africa, vol. 4, 1995: ix).

When Shell commissioned the Econometrix consultancy to estimate job creation, it came up with figures ranging from 300,000 to 700,000 (Econometrix, 2012). These jobs would not be in the Karoo, but other in areas of the economy that would profit if shale gas was viable. Some economists such as WWF's Saliem Fakir, have criticized the logic of Econometrix's estimates saying that these have been highly exaggerated due to the use of inappropriate economic modelling and overoptimistic pricing of the gas (Fakir, 2012).

Fracking will not solve the need for jobs and doing away with poverty in the Karoo. The Karoo is not its own province, but falls under four other provinces. Economic development in each of these provinces is a challenge. For example, the Eastern Cape is the poorest of all the provinces. Services tend to be concentrated in the high population density areas of the province, and not in the Karoo. There is no specific government plan for Karoo development, nor is the Karoo mentioned in the National Development Plan. If the government is serious about ensuring sustainable socio-economic development in the Karoo, they need to put together a plan that looks at all opportunities, not just the unsustainable exploitation of fossil fuels for a temporary period. They need to look at how historic inequalities, especially related to land ownership will be overcome. During apartheid, the black majority was only allowed ownership of 13% of the land surface, and squeezed out of the mainstream commercial farming sector. This situation has not changed much since the advent of democracy twenty years ago.

Fracking will not improve the lives of people in the Karoo

When Shell commissioned the study from Econometrix on future employment, their study did not deal with the prospects of job loss in the Karoo as the result of shale gas mining. If fracking pollutes the soil, air and water of the Karoo, it will have an impact on the number of farming enterprises that will stay in business. Tourism will be adversely affected, since people are not keen to travel in areas where pollution is a problem.

Some farmers in the Karoo believe that farming and fracking will be incompatible with one another. If fracking is introduced, farming will suffer. If there are farm closures, job losses will happen. The accommodation of farm workers in the Karoo is generally tied to their job on the farm. The loss of a farm job therefore also means the loss of accommodation. More homeless people will wander around the region looking for shelter and work.

In the Karoo, the *karretjiemense* (itinerant workers) travelled the region in donkey carts, offering their services especially at shearing time. Nowadays, shearing is more automated, so their services are not required so much. This has led to displacement and further poverty. Is the economy of the Karoo strong enough to withstand another epidemic of homelessness and joblessness?

Evidence in the US and elsewhere has pointed to the health impacts of the fracking industry. The fracking industry will depress farm prices, as a number of farmers will choose to move off the land, and new purchasers will be wary of the fact that fracking will be happening on the land. The fracking industry will be responsible for the "boom and bust" effect in the local towns. During the "boom" it will attract some supporters, who do not realize that their fortunes will change with time.

The fracking industry will not be able on its own to undo poverty, provide decent job opportunities or change existing inequalities on the land.

Kudu, one of many endemic grazing species of the Karoo.
© Ike Teuling, Milieudefensie

3

FRACKING AND THE ENVIRONMENT

Karoo landscape at Camdeboo National Park.
© Mirjam Bemelmans, Stichting Schaliegasvrij

How much does the Karoo depend on underground water?

The icon of the Karoo is the "*windpomp*", found on every farm and in all the towns. This is the steel windmill that lurks on the surface of the earth, and is a crucial conduit for bringing underground water to the surface.

Without underground water, the Karoo's farming economy would not be viable. Streams are perennial and so don't always flow. Dams exist, but their water can evaporate in very dry, hot times.

The recent experience of Beaufort West, the Karoo's largest town, is telling. The level of water in boreholes dropped considerably after a drought in 2010, water restrictions were put in place, and the town had to appeal to visitors to donate bottled water to help remedy the problem.

Research by the Department of Water Affairs has shown that 94% of Karoo municipalities depend wholly or partially on underground water for survival (Greeff 2012: 8-9).

What are the chances of water pollution?

With fracking, at least three paths to contaminating underground water are possible. The first is if the concrete casing around the drill fails. The drill passes through the aquifers, or bodies of underground water. Failures of the casing will allow the toxic fracking fluid to enter underground fresh water supplies.

The second arises from the result of fracking. After fracking, up to 70% of the fracking fluid remains behind in the rocks. This fluid can, over time, migrate towards the surface, through fissures in the rock. Since the underground water lies close to the surface, the migration of the fracking fluid upwards could contaminate the aquifer.

The third possibility also occurs after fracking. The fracking fluid that reaches the surface has to be contained and treated as hazardous and radioactive waste. If not properly contained, this waste can leak out and leach into the underground water supply.

Recently deceased Professor Gerrit van Tonder, a geohydrologist working at the Institute of Groundwater at the University of the Free State, started out as a supporter of fracking. But his research into the geology of the Karoo led him to believe that if fracking were to be permitted, the pollution of underground water would be unavoidable.

Water is needed in the fracking process – but where will it come from?

Treasure the Karoo Action Group has estimated that 2,500 truckloads of water are needed each time a well is fracked (www.treasurethekaroo. co.za). This water has to be sourced from and transported to remote sites.

South Africa is water scarce. Providing sufficient water for fracking may be expensive and difficult. Shell has gone on record stating it will not use any water for fracking if it competes with the needs of local farmers. However it does not ever indicate how it is going to source sufficient water, or from where this will be taken. This is something that the public needs to know.

Recent studies show that most of South Africa's fresh water resources are already under considerable demand, and that extensive extra infrastructure, inter-basin transfers, pollution protection and other management interventions will be necessary if the demand were to be expanded (Muller et al., 2012).

Rivers in the Karoo are mostly perennial (they do not flow throughout the year) and while some reservoirs have been built, these tend to dry out during years of drought. The demand is to service household, agricultural, municipal and other needs. Fracking's additional demand cannot be met by the existing fresh water resources in the Karoo.

Options to source water for fracking from brackish aquifers, from desalination plants at the coast, or from inter-basin transfers each have their own problems, whether technical, environmental or economic.

Roads and air pollution

In the exploration stage, up to 24 wells will be drilled by Shell alone. If production goes ahead this number could multiply considerably, depending on how quickly existing wells are fracked, and how much gas there is.

Each well pad will need to be serviced by road. Most of the roads in the Karoo are unsurfaced. If an average of 2,500 truckloads of water are used, in addition to further amounts of sand and chemicals, traffic will be heavy. A considerable problem of dust and noise pollution will arise, with increased opportunities for traffic jams, spills and outright accidents.

There is nothing obliging the oil companies to take responsibility for paving the roads they will use to get to the wells and therefore contribute to alleviating problems of safety, congestion and pollution. However, if road improvements are made, these are likely to be at the expense of the taxpayer.

Waste management

As we have seen, fracking entails the pumping at high pressure of toxic chemicals, with water and sand, into underground shale rock formations. The toxic chemicals used vary between wells, depending on their geology. Some of the fracking liquid returns to the surface after use, and has to be disposed of without causing harm to the environment. On site there must be lined ponds or tanks to receive what is both toxic and radioactive sludge. Some of this will have to be transported to hazardous waste management sites. In the US, home to about a million wells, 25% of wells transgress the rules of safe waste management, and the regulatory agencies find this very difficult to enforce.

In South Africa, hazardous waste management is a provincial function. The Eastern Cape is likely to be called upon to manage much of the hazardous waste of the fracking industry. Capacity is lacking and will have to be funded and planned into the system. Most municipalities in the province are still struggling with the management of ordinary household and industrial waste.

Seismic activity

Recent mining related tremors in South Africa have underlined the fact that there are many areas of the country vulnerable to earthquakes. In some countries, such as the UK, fracking has triggered off seismic events.

If the same happens in South Africa, this will not only have consequences for personal safety and the integrity of property, but it may also impact upon sensitive technology used in the Square Kilometre Array astronomical project, also located in the Karoo.

Climate impact

Most of the gas produced by fracking consists of methane, a fossil fuel whose impact on climate is even larger than CO_2. It is a greenhouse gas, emissions of which are harmful to our climate. Inevitably, something like 8% of the fugitive methane from fracking will enter the atmosphere. And there will be other impacts on climate from the amount of fuel burned up in production and in the transportation of water and other supplies.

Although some scientists argue that the impact on climate of shale gas is less harmful than coal, this has been heavily contested by recent research from Cornell University. This shows that shale gas has a larger greenhouse gas footprint than coal, in fact 20% more, rising to 40% more over twenty years and becoming lower than coal only after about 100 years (Howarth et al., 2011; reviewed by Hughes, 2011).

The oil industry still claims that shale gas is less harmful to the climate than coal, and therefore should be considered as a "transitional" fuel, enabling us to move away from coal. But investment in shale gas – especially state investment in the infrastructures necessary for the industry to operate – crowds out investment that should be going into renewable energy. Renewables need a jump-start, but can operate all over the country, employ many more people and has a shorter construction time. We know there is plenty of sun and wind energy available, but the jury is still out on the amount of economically viable shale gas available. Support for the shale gas industry (and for coal power stations) compromises the international commitments made by President Zuma at COP15 in Copenhagen that South Africa would lower its greenhouse emissions significantly.

SOUTH AFRICA

4 FRACKING AND HEALTH PROBLEMS

One of many anti-fracking protest posters. Nieu Bethesda, Karoo.
© Jose Gil Paris, Stichting Schaliegasvrij

Is there evidence of fracking affecting health?

In her recent film Unearthed, an exploration of shale gas in the Karoo and the United States, Jolynn Minnaar interviews many residents of areas of the United States where fracking is taking place. Many of them complain of contracting illnesses after the commencement of fracking. The illnesses go unreported because the gas industry provides minor compensation in exchange for an agreement that the victims will not talk to the media about their illnesses or about contamination of their water.

After three years of research, The Colorado School of Public Health issued a report showing that air pollution caused by fracking may be contributing to acute and chronic health problems for those living near drilling sites. Researchers found a number of potentially toxic petroleum hydrocarbons in the air near the wells, including benzene, ethylbenzene, toluene and xylene. Benzene is a well-known carcinogen.

What are the implications for health management in the Karoo?

There are no systematic studies of the health status of Karoo residents, but it is possible to aggregate this by analyzing the information provided by health districts. We need to ensure that health workers in the Karoo are informed of the risks to public health posed by the fracking industry. Local clinics and hospitals need to be geared up to meet the demand for treatment similar to those experienced in other parts of the world where fracking occurs.

The government should undertake a baseline health study of the affected districts prior to the beginning of fracking. It will be against this baseline study that future contracting of frackingrelated diseases can be measured. This is an external cost to government imposed on it by the fracking industry, which should be held liable for its costs, and for those of followup studies. The industry should also be held liable for the costs of treatment of any victims of provable fracking-related diseases.

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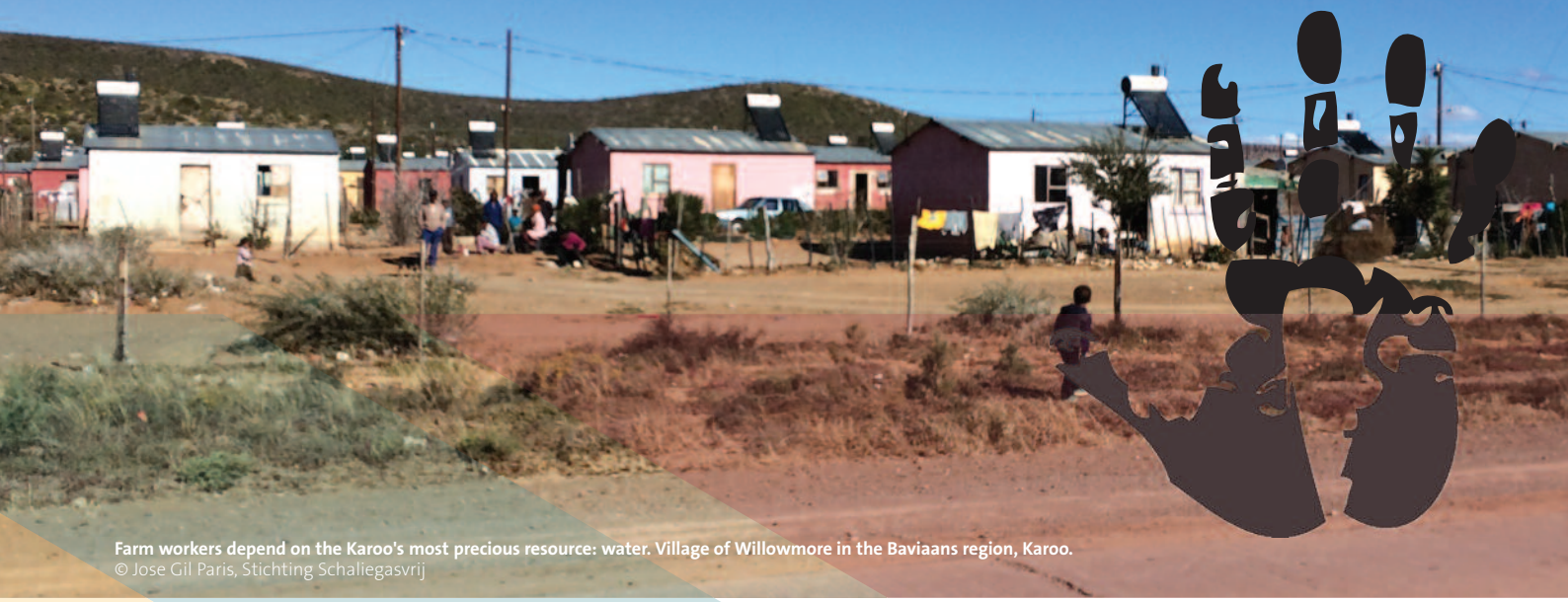
DIFFICULTIES IN REGULATING THE INDUSTRY EFFECTIVELY



Farm workers depend on the Karoo's most precious resource: water. Village of Willowmore in the Baviaans region, Karoo.

Who will pay for the externalized costs?

Externalised costs are those costs which are not included in the profit calculations of companies. Unless specific arrangements are made for the industry to cover the externalized costs, these will be passed on to others.

Examples of externalized costs include:-

- The costs of government setting up a strong agency to regulate fracking and of covering its operational budget.
- The costs of government providing hazardous and radioactive waste disposal facilities for use by the shale gas industry.
- The costs to government of road and other infrastructural improvements in the areas of shale gas extraction.
- The costs to government of compensating people for job loss in other sectors caused by fracking activities.
- The costs to government and victims of health care in cases of provable fracking-related diseases.
- The costs to those who experience a slide in property values as a result of fracking activities.
- The cost to government of social security measures arising from physical displacement or loss of job-related accommodation of individuals in sectors negatively affected by fracking.
- The costs to government of mitigation or rehabilitation of any water, air or soil pollution resulting from activities of the shale gas industry.

These are only some of the costs which the oil industry in effect is passing on to the South African taxpayer. By avoiding paying these costs, the industry is being subsidized by the taxpayer.

What kind of regulation is needed?

In South Africa and elsewhere, the ideology (set of political ideas) of neo-liberalism is very powerful. This rejects the need for government interference in business. It favours the deregulation approach. In the case of the shale gas industry, government in South Africa is not keen to regulate the industry very strongly. In October 2013 it published "technical regulations" for controlling the drilling, and invited public comment. Many organisations concerned with the potential harm that could be done by the fracking industry responded. Their submissions argued for much stronger regulations, not just on the technical side, in order to comply with the Constitution and basic laws on environment and public participation (e.g., CER, 2014). They pointed out that the technical regulations looked very similar to those drafted by the oil industry itself in the US, represented by lobbying group the American Petroleum Institute, for voluntary application.

If the government adopts the technical regulations it proposed, there will be very weak controls over the industry. Government has given some indication that the amendments may be adopted in October 2014.

The Constitution – is it protecting our rights?

Environmental rigths in South Africa are protected by section 24 of the Constitution. This gives the people in South Africa the right to an environment that is "not harmful to one's health and wellbeing" and calls on the state to protect the environment for present and future generations "through reasonable legislative and other measures that – prevent pollution and ecological degradation, promote conservation, and secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development." (Constitution of the Republic of South Africa, 1996, sec. 24). So, under the Constitution, we have a right to expect that fracking will be regulated through reasonable legal measures. If these measures are unreasonably lax, and threaten the environment, or do not promote development, we are able to challenge them through the legal system.

Anti-fracking protest poster in Graaff Reinet, Karoo.
"Fracking will pollute our water."
© Gaby Cheminais, Southern Cape Land Committee

What are the difficulties with regulation now and in the future?

At present the law governing fracking is the same law that governs mining and petroleum extraction. This is the Minerals and Petroleum Resources Development Act (MPRDA), no. 28 of 2002. The Act was written and passed through parliament long before there was any understanding in the fracking of shale gas or the potential harm entailed in its extraction.

A regulatory body for petroleum and gas was set up under the Act, and was known as the Petroleum Agency of South Africa (PASA). This body issues different kinds of licences to frack. PASA began to develop some technical knowledge about fracking and shale gas. However, the problem was that PASA was not only set up to regulate the industry but also to promote it. This meant that there was a conflict of interest within PASA. You cannot be the supporter and the watchdog of an industry at the same time. During the last session of parliament before the elections of May 2014, amendments to the Act were passed. These called for the abolition of PASA, and the allocation of the regulatory function to regional offices of the Department of Mineral Resources (DMR). Each region would also form a committee to ensure that the DMR take environmental considerations seriously. While this arrangement might work for mining, it is not appropriate for petroleum and gas regulation. Dispersing the function of the regulator across a number of different offices in different regions will mean that there will no longer be a central regulator with sufficient expertise. The expertise will be diluted across the regions. This will mean weak regulation, and different approaches to the industry may arise in different regions. The gas companies will be able to play these off against one another and there will be a race to the bottom. The DMR will not be able to Act as watchdog or protect the public.

Although these amendments were hastily passed through parliament, they have not yet (early August 2014) been signed into law by the President. Instead, the new minister of mineral resources, Ngoako Ramathlodi, has called for a rethink of the amendments. Although he is not concerned about the problem of weak regulation, nevertheless the stalling of the process allows more time for civil society to persuade government that stronger regulation is imperative.

The minister has also argued that the mining and petroleum/gas law needs to be separated out into one law for mining and another for petroleum and gas.

This makes sense, because the MPRDA is inadequate as a means of governing both sectors at present. This would also give a chance to civil society to try to shape the contents of the new, separate law. Calls for strengthening the regulatory function will have to be heard.

Exploration leads to production

Under the MPRDA, applications for permits to extract petroleum or gas can take three forms:

Step 1: Technical co-operation permit
Step 2: Exploration permit
Step 3: Production permit

Step 1: The *technical co-operation permit* is granted for a year and cannot be transferred to another company or renewed. No other permit will be given out for the area under consideration. The applicant must conduct technical studies to establish the viability of going forward. At this stage, all applicants in South Africa hold technical co-operation permits, but these stay valid beyond a year because the companies have also lodged applications for exploration permits.

Step 2: The *exploration permit* allows for applicants to begin drilling in their assigned area to establish the location and extent of the resource. The permit lasts for up to three years but can be renewed three times for a period of two years each. This means that exploration can take place over a nine-year period. Up to the present (August 2014) no exploration permits have been issued. The previous minister of mining stated at the African Mining Indaba in February 2014 that shale gas mining would go ahead "decisively but responsibly". However since then there has been no issuing of permits. This is because of disarray in government arising from the May 2014 elections, the resulting cabinet reshuffles, and other factors which have disrupted smooth policy implementation.

Step 3: The *production permit* means that the company can begin selling its products in the market. The permit lasts for 30 years, but can be renewed indefinitely for extra periods of 30 years. It is likely that production will only begin between 3-9 years after the exploration permit is granted. Although the applicants have to comply with environmental and social plans under the law, these are not capable of being enforced due to the lack of expertise within the DMR.

Experience has shown – for example in mining – that a company that has previously acquired an exploration permit, and wishes to convert to a production permit, is rarely refused by the DMR. The argument given is that the company has made the investment, judged the resource to be viable economically, and therefore should receive the production right without too many extra hurdles.

The implications for this are that once the company receives the original exploration right, its foot is in the door, and it will not be ejected for lack of compliance with environmental or other considerations, despite what is written in the law. If this is so, the granting of the exploration right automatically triggers off an almost automatic next step of production. The exploration right also allows for fracking to take place, thus triggering off the environmental and social impacts that are cause for concern.

The issuing of the exploration permits is therefore a crucial turning point. Once these are issued, it is likely that the whole production process will be unleashed. It is therefore imperative that before this happens, steps are put in place to ensure legal compliance with the Constitution and strong regulation to ensure the full implementation of the law.

Beervleidam, Karoo.
© Jose Gil Paris, Stichting Schaliegasvrij

The problems with Environmental Impact Assessments

In most industries in South Africa, the construction of a new development needs to have an EIA – an environmental impact assessment. The EIA is a study of the multiple factors that will measure change to the environment and associated social issues if the project goes ahead. The study must be undertaken independently but at the cost of the developer, and allow for extensive public participation and comment.

Should the changes brought about by the development affect the environment negatively, the developer will have to assure the Department of Environmental Affairs (DEA) about what it will do to alleviate any damage.

Sometimes, an EIA is not enough, because it is site-specific. If the development is likely to impact on multiple sites, best international practice is for a Strategic Environmental Assessment (SEA) to be undertaken. SEAs are not yet part of South African law.

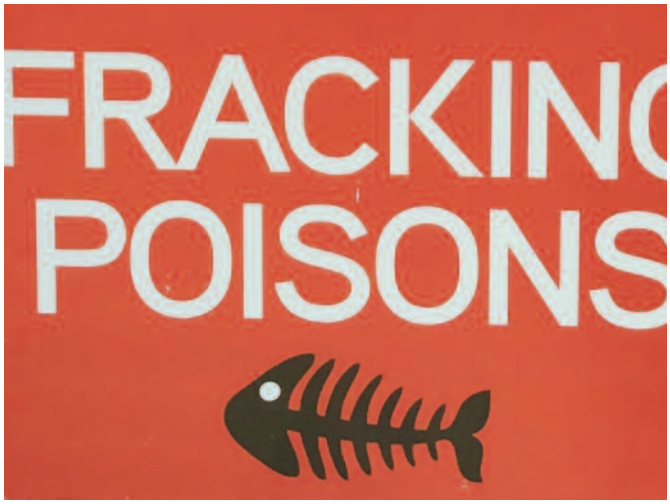
Over the years, developers have regarded EIAs as a 'brake' on development, being too time consuming and stringent to allow for easy investments to be made. The government has been persuaded to 'streamline' the regulations on EIAs, and new rules were introduced to take effect on 2 August 2010.

However mining – and by extension, oil and gas – are not under the same regulations as for other industries. For many years, EIAs were not required in the mining sector. Instead, an inhouse Environmental Management Report, overseen by the DMR, was used instead. The DMR lacked the expertise to implement the necessary regulations. This left the mining sector free to ignore environmental management provisions. Even government began to recognize this as an anomaly that had to be corrected. An agreement was made between Mineral Resources and Environmental Affairs that both departments would change their legislation to normalize the situation, and make mining developments subject to EIAs under oversight of the DEA. The DEA made the necessary amendments to its Act, but the DMR only had its legislation ready in June 2013. When the amendments become law, the DMR originally had a period of 18 months in which it will remain the competent authority, and then it needs to negotiate a phasing in of the DEA as competent authority. However since then then it has become clear that the DMR will retain jurisdiction over EIAs in the mining, oil and gas industries. Only if there is an appeal against the EIA, will the jurisdiction of the Department of Environmental Affairs kick in. In other words, the fracking industry will not have to answer to the DEA during any environmental assessment unless there is an appeal in process. This means that the less environmentally-skilled authority, the DMR, will generally be in control of the implementation of environmental regulations in fracking. This situation will apply to any EIA commissioned by Shell or the other oil companies with respect to shale gas.

It is clearly very important for civil society to participate in and monitor the implementation of the EIAs for shale gas, and to keep insisting that the highest assessment standards apply. If there is to be a new law for oil and gas it should specify the DEA as the competent authority for EIAs. A new law should insist that there be Strategic Impact Assessments covering multiple sites, because EIAs are generally site-specific, and fracking will have a footprint over a wide area.

Will fracking require water licences?

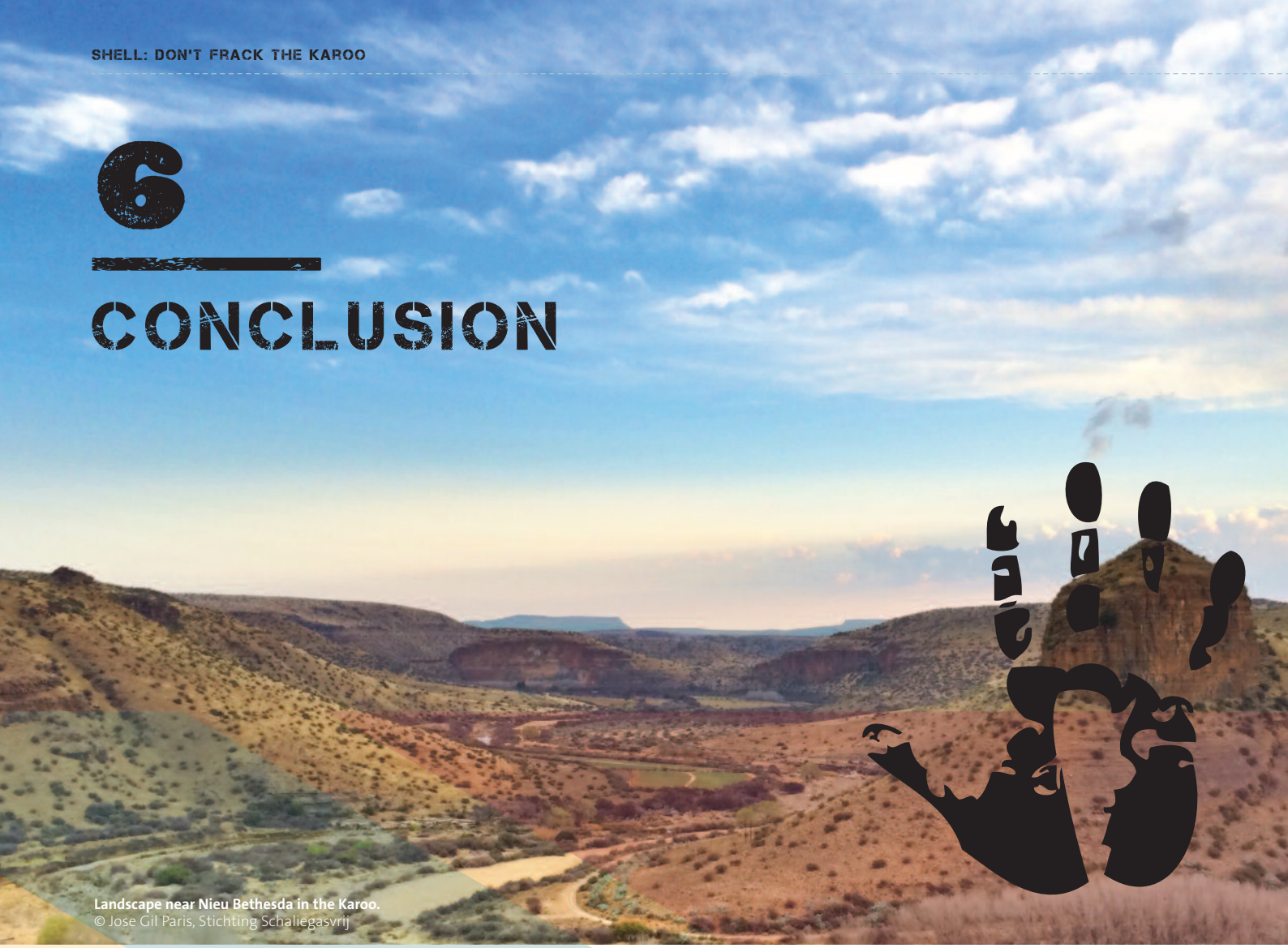
The previous minister of Water and Environment Affairs, Edna Molewa, in September 2013 declared fracking a controlled activity in terms of the National Water Act. This means that fracking becomes a "water use" under the Act. Companies seeking shale gas exploration permits will therefore have to apply for a water usage licence. Minister Molewa has retained the Environment portfolio in the current cabinet, so may be in a position to ensure that her earlier decision is respected by incoming Water minister Nomvula Mokhanyane.



Anti-fracking poster, Graaff Reinet, Karoo.
© Jose Gil Paris, Stichting Schaliegasvrij

Community garden in Willowmore.
© Jose Gil Paris, Stichting Schaliegasvrij

6 CONCLUSION



Landscape near Nieu Bethesda in the Karoo.
© Jose Gil Paris, Stichting Schaliegasvrij

Not too late to intervene

Fracking has not yet begun, but government statements have indicated that it could begin soon. However this must be challenged, because the current law the MPRDA, is inadequate and does not refer to fracking at all. The regulatory apparatus proposed in the amendments will dilute and disperse the state's expertise on fracking and this must be rethought urgently.

There is no compulsion for the gas industry to pay the external costs related to job loss, damage to health, damage to the environment, the management of hazardous waste, or the construction of tarred roads leading to the wells. The Department of Mineral Resources must hand over primary responsibility for environmental oversight of the fracking industry to the Department of Environmental Affairs. There should be independent public monitoring of any steps taken to initiate fracking. There should be extensive public participation in the environmental assessment process and in the implementation of regulations. There should be no granting of an automatic production permit, should a company's exploration permit come to an end; instead this would be the moment to reassess the situation. Until these and other demands are met, no exploration should be allowed.

The moratorium – why was it lifted?

Between April 2011 and September 2012, the government instituted a moratorium preventing any fracking from taking place. It set up the moratorium because it feared that anti-fracking groups would probably win litigation challenging the inadequacy of the EIAs that had been conducted by some oil companies.

The minister of Mineral Resources commissioned a report from a group of different government agencies to inform her about whether fracking should or should not go ahead (DMR, 2012). The problem with the task team responsible for the report, was that it excluded representatives from key government departments. Only certain voices were heard in the report. This does not reflect administrative justice, a right to which we are entitled under the Constitution.

Unsurprisingly the report favoured going ahead with fracking but only after the implementation of strict monitoring and supervision measures. Until such measures were in place, the report argued that fracking should be delayed as a means of exploration. Once it had been published, the minister felt that the report had given the green light for exploration to proceed. She rapidly lifted the moratorium.

This was a mistake, because of all the shortcomings suggested under the previous question. The minister acted irresponsibly in lifting the moratorium before ensuring that the legal foundation for regulating the industry was properly in place, and that full cognizance was given to mitigating the potential environmental and socioeconomic harm that the industry could do.

What is wrong with the draft Technical Regulations?

In October 2013, the minister issued draft technical regulations governing the shale gas industry. It is believed that the model for this document is one originally drawn up by the fracking industry in the United States. Since this draft was issued, numerous critical submissions have been made by various civil society organisations. Ten months later, there is an ominous silence coming out of government. Nothing has been issued by way of a revised document taking the body of critical public opinion into account. This inertia is open to legal challenge as it violates our constitutional right to administrative justice.

What are some of the critiques of the document?

- Fracking regulations must comply with the Constitution and existing law respecting environment, water and waste. They should also reflect best international practice.
- The regulations should be promulgated under the environmental, water and waste acts, not just under the mining and petroleum act
- There should be strict penalties stipulated for transgression of the regulations
- There should be independent expert review of all environmental assessment undertaken in relation to the shale gas industry

These and many other comments were submitted to the minister and are still awaiting a response.

Do we need another moratorium?

If the previous moratorium was lifted too early, there is an argument that the moratorium should be reinstated until a number of preconditions are met.

When the previous mining minister Susan Shabangu addressed the African Mining Indaba in Cape Town in February 2014, she stated that the exploration of shale gas would go ahead "decisively but responsibly". There is little evidence of government and oil industry seriousness about responsible implementation of fracking.

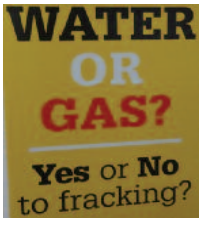
In a letter to the president on 22 July 2014, containing recent scientific information questioning the sustainability and other aspects of fracking, the Treasure the Karoo Action Group and partners AfriForum called for a new moratorium on fracking. Failing this, these organisations will make preparations to litigate.

Can fracking be stopped before it begins?

There are still a number of unknowns about fracking. For example, is there even sufficient shale gas in the Karoo to warrant an industry? Some scientists have argued that the Karoo is not the ultimate target for the energy companies. Instead the industry might be more interested in fracking coal-bed methane deposits in the Waterberg (Limpopo province) and Botswana.

The movement to stop fracking needs to develop a strong, large membership before it can become effective. It needs to be able to command support in order to convince a range of people – from unemployed workers in the Karoo to the president in the Union Buildings – that there are better alternatives and that the price to our people and environment is too high.

This message has to be well packaged and reach people through mobilization, using both conventional and social media. We need to take into account new developments in the political and trade union movements that reflect significant public discontent with the current status quo. Elected politicians and unelected officials need to become more responsive to these new articulations of our rights to a healthy world free from pollution, with clean affordable energy available to all, and a development path that respects and benefits all the people, in our generation and for the future.



(above) **One of many anti-fracking protest posters in Karoo villages.** © Mirjam Bemelmans, Stichting Schaliegasvrij

(left) **Anti-fracking protest in front of Shell office in Cape Town.** © Ike Teuling, Milieudefensie

ACRONYMS

ANC	African National Congress (South Africa's ruling party since May 1994)
EIA	Environmental Impact Assessment
EMPR	Environmental Management Programme Report
CER	Centre for Environmental Rights
CH	methane
DEA	Department of Environmental Affairs
DMR	Department of Mineral Resources
km2	square kilometre
MPRDA	Mineral and Petroleum Resources Development Act 28 of 2002
SADC	Southern Africa Development Co-operation
SEA	Strategic Environmental Assessment
tcf	trillion cubic feet
UK	United Kingdom (=Britain)
US	United States of America (= USA)
US EIA	US Energy Information Administration

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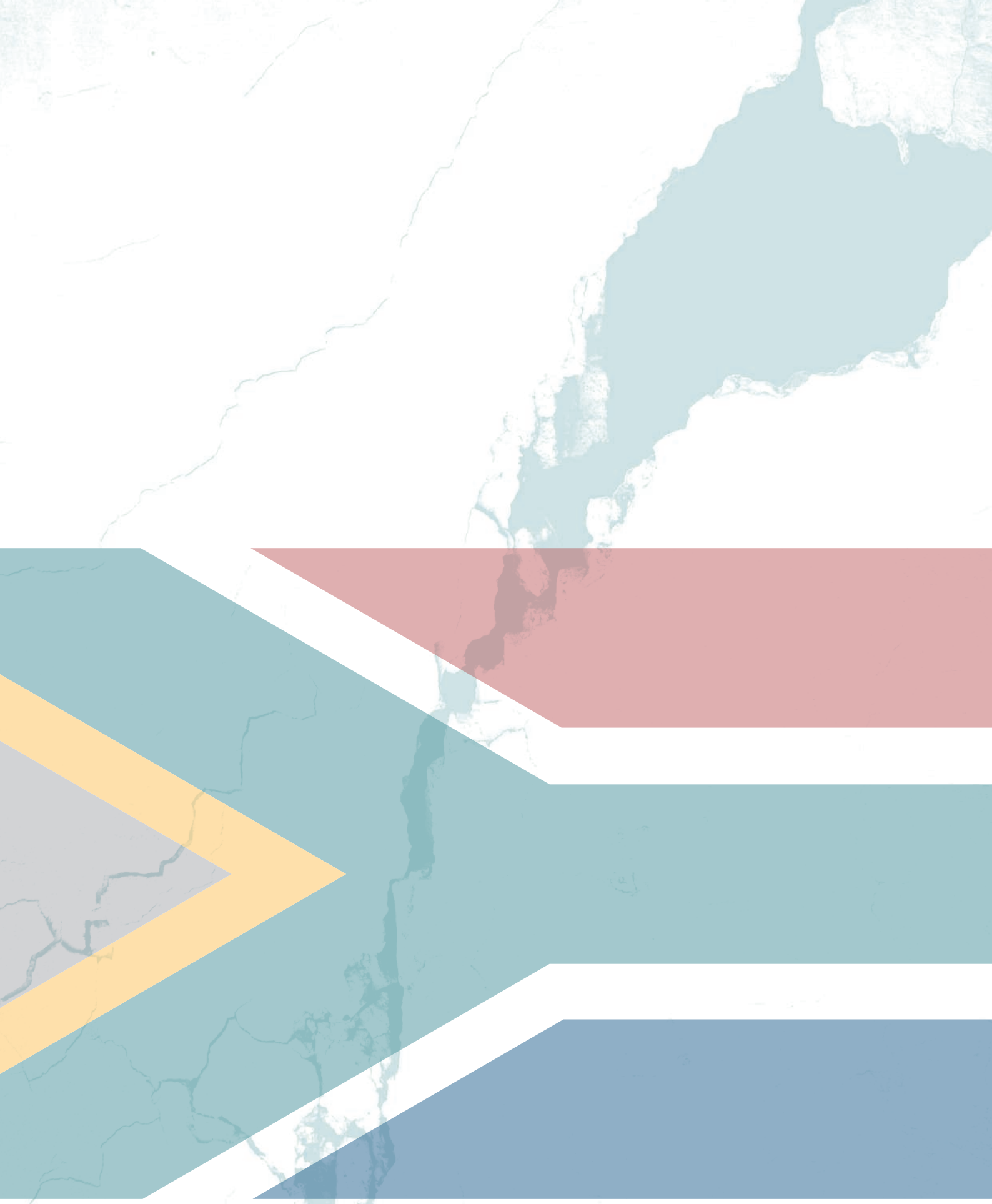

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