POLICYbrief

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The Karoo Fracking Scenario:

Can Development and Environmental Wellbeing Coexist, or Must One of Them Prevail?

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South Africa is now exploring the idea of exploiting the field of shale gas in the Karoo in order to derive energy fundamental for development. The proposal is that shale gas could play a critical role in the country's energy mix in order to meet the demand for energy, thus promoting industrialisation for economic growth. Other benefits could include employment creation. There are, however, concerns about the impact that fracking will have on the environment. The lack of a clear environmental impact assessment of the effects of fracking prior to the issuing of permits by the Department of Mineral Resources (DMR) has raised concerns from environmentalists, economists and the public. This brief attempts to examine whether development and environmental health can coexist in the Karoo. The brief recommends that government undertake extensive research around the entire fracking process, to determine the viability of the project and also its environmental impact.

Introduction

Fracking, or hydraulic fracturing, is a technique used to extract gas from deep underground, which involves digging wells up to 4 km deep. The technique uses a mixture of water, sand and chemicals. The mixture is injected at high pressure to crack the shale rock and release the gas, which then is brought to the surface.[1] Fracking is not a new practice; it dates back to the 1860s in the United States (US) and started to be used commercially in 2009. Currently almost 95 per cent of US states use fracking techniques.[2]

In South Africa, formal interest in fracking began in 2008, the potential area of interest being the Karoo. Since then there have been a number of applications for exploration rights from companies such as Bundu Oil and Gas, Shell SA and Falcon Gas and Oil.[3] However, there are safety concerns, and modern fracking techniques use a great deal of water. This raises questions as to whether this could result in competition for water in areas that are already prone to water scarcity.

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Fracking, or hydraulic fracturing, is a technique used to extract gas from deep underground, which involves digging wells up to 4 km deep

Figure 1: Geographic location of the Karoo, South Africa.

Geographic location and context of the Karoo

The Karoo is a semi-desert area situated in the Western and Northern Cape in South Africa (Figure 1). It is characterised by harsh temperatures and sparse vegetation of low, bushy trees. It is a vast open area that has always attracted tourists and artists. The economic activities in the area include farming and tourism.

However, this might change in the near future if the Government of South Africa allows fracking.[4] The government granted permits for exploration, but because of the lack of proper research, public consultation and regulation, a heated debate has arisen as to whether fracking should be allowed in the Karoo or not. Although research by Econometrix shows potential benefits to the economy of South Africa, there is a great deal of concern about the long-term environmental impact of such activities in the Karoo, coming mainly from environmental groups and community members who are going to be directly affected.[5]

Because of the lack of proper research, public consultation and regulation, a heated debate has arisen

Karoo: home of the SKA telescope project

The Karoo is also the location of the multi-billion dollar Square Kilometer Array (SKA) telescope project. The success of the MeerKAT project over the years led to the development of the SKA project.[6] The project is an international effort to build the world's largest radio telescope; it is designed to perform ground-breaking science and will enable South Africa to become a leader in the world of science and technology. However, the likelihood of fracking in the Karoo raises much concern as to whether the SKA project will be compatible with shale gas drilling. Most importantly, the SKA project is governed by the Astronomy Geographic Advantage Act 21 of 2007, which states that areas of distinctive optical and radio astronomy significance should be conserved and guarded at all times.[7] Fracking poses a threat to this act and the success of the SKA project, as this exercise is new in South Africa.

Potential benefits of and concerns about fracking in the Karoo

South Africa faces an energy demand that currently exceeds supply. This is evident from frequent blackouts and the fact that some areas are still without electricity. Shale gas could become one of the sources of electricity. This would reduce dependence on coal-based electricity, which could lead to lower electricity prices, a decline in the carbon footprint and, more importantly, help to minimise greenhouse gas emissions.[8] According to an Econometrix report, it is estimated that developing the Karoo shale gas could make a significant contribution to the country's GDP, amounting to R200 billion and the establishment of up to 700 000 jobs. 'If the shale gas was to be

confirmed, the country stands to have 400 years' worth of energy supply'. Fracking could also bring some form of development in the area and could help to reduce the poverty that exists in the area.[9]

Nonetheless, despite all these potential benefits, major concerns have been raised regarding the long-term environmental and health impacts of fracking in the Karoo. Environmental groups such as Treasure the Karoo Action Group (TKAG) and the Southern Cape Land Committee have openly challenged shale gas development in the Karoo. They have voiced fears about the environmental and health implications of such activities. They emphasise that the Karoo is already a dry area, the biggest concern being that fracking uses a lot of water. This could lead to a competition for water, particularly with farming, which most members of the community depend on. In addition, the Karoo has always attracted tourists because of its quietness and vast open wild areas; this could be affected by fracking.[10] There are, moreover, concerns that the water used in drilling shale gas is fused with sand and chemicals (corrosive inhibitors, surfactants, iron control chemicals, biocides, friction reducers and scale inhibitors).[11] When these are injected down the well, there is a strong possibility of their polluting underground water. Freshwater reserves can also be contaminated when the fluid is spilt at the sites of the well or in other accidental spills. Moreover, the fact that South Africa is new to the gas industry raises anxieties, as the country lacks the infrastructure, expertise, experience and regulation that is needed in the industry to conduct fracking safely.[12]

South Africa's research and engineering centres that are intended to train researchers, engineers and scientists are not adequately equipped to facilitate the training that is needed for a successful fracking process. It is therefore crucial that priority be given to these centres to support training that would be needed to locate and quantify shale gas reserves and, similarly, throughout the fracking process identify and prevent or mitigate complications that might arise during the procedure.

Drawing experiences from international countries

United States of America (US)

The US has been fracking for gas for many decades. Recently, international, private and state-owned companies have been partnering with US companies in order to exchange experience and learn drilling and fracking techniques that have been pioneered in the US. Fracking has played a significant role in the US gas industry and the growth of the economy. However, the technique has also been implicated in a number of instances of the contamination of water supplies across the country. A 2011 New York Times investigative report found that nearly three-quarters of more than 240 wells studied in Pennsylvania and West Virginia produced wastewater that had high levels of radiation, with at least 116 wells showing levels that were hundreds of times above the US EPA drinking water standards, and 15 wells with levels that were a thousand times over the drinking standard.[13] Nonetheless, it is critical to note that radioactive materials do occur naturally, and these figures may not necessarily mean that it was fracking that caused the radiation. It is therefore imperative that research be done in order to ascertain whether fracking increases water radioactivity.

France

By 2010 numerous companies had applied for permits for fracking and the French government had granted them. However, citizens of France challenged the decision of the government, arguing that the permits were issued without public involvement.[14] In 2011, there was a cancellation of exploration licences for companies, including Schuepbach Energy LLC and Total SA. A national ban on fracking was issued following protests by environmental groups.[15] At present the constitutional court of France has upheld a ban on fracking in order to protect the environment. This ruling came after Schuepbach Energy LLC appealed to the court after having two exploration permits withdrawn because of the ban.[16]

Bulgaria

In 2011, the government of Bulgaria also issued a national ban on fracking, following applications from various companies for shale gas exploration across the country. Environmental groups played an important role in the banning of fracking on the basis of environmental concerns. The law makers of Bulgaria voted 166 to 6 to prohibit fracking; this was the second country in the European Union (EU) after France to ban fracking in order to protect the natural environment.[17]

Poland

Poland has the highest estimated shale reserves in the world.[18] The Government of Poland had by 2012 approved about 100 permits for shale gas exploration across the country.[19] The government

However, the likelihood of fracking in the Karoo raises much concern as to whether the SKA project will be compatible with shale gas drilling

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had been pushing for the process to be intensified so that drilling could start as soon as 2014.[20] However, the process has been slowed down due to accusations of corruption between government officials and gas and oil companies.[21] In the past, 46 exploratory wells drilled by various venture companies could not produce commercial quantities of shale gas, and this has stimulated concerns as to whether it will be sustainable to proceed with the exploration and drilling of gas in the country. Environmental concerns, particularly worries about the danger to water supplies, have slowed down the adoption of the process in Poland.[22]

China

Although many countries around the world are against fracking, China is eager to join the shale gas revolution, even if it means drilling for oil in China's earthquake hotbed in the Sichuan region.[23] In November 2009, the US and China launched the US-China shale gas initiative to facilitate Chinese efforts to gain technical expertise in shale gas development.[24] By 2011 China had completed its first horizontal shale gas well in Sichuan, and the government has begun drafting a national strategy to identify a trillion cubic metres of exploitable resources by 2020.[25]

With the world now faced with major environmental impacts like global climate change, pollution, depletion of biodiversity and degradation of the landscape, countries are now more eager to practise sustainable development: development that takes into consideration environmental wellbeing. There is a need to conserve the environment and its resources so that future generations can also make use of them. It is therefore crucial that South Africa, being new to the gas industry, learns from other countries that have been practising fracking in order to make a decision on whether to go ahead with fracking in the Karoo despite the concerns that have been raised.

Conclusion

France has upheld a ban on fracking in order to protect the environment

The debate as to whether to practise fracking to derive the economic benefits or not to do so because of environmental concerns has made slight progress. Both parties, those for fracking and those against fracking, have made the debate difficult because of the convincing nature of their arguments. However, the question remains: Is it possible to practise fracking in such a way that the country can realise the economic benefits while avoiding the environmental damage? Researchers and engineers can play an important role in responding to this question by undertaking thorough research and analysis into the whole fracking practice. Thus far, experiences of other countries that have used fracking make it clear that fracking poses a major threat to the environment, particularly to the water, a scarce and precious resource in South Africa that needs to be conserved and its quality maintained at all times.

Recommendations

- This brief recommends that the government of South Africa should invest more in training researchers, engineers and scientists in order to identify and confirm whether the reserves that promise economic advantage are sufficient to compensate for the environmental costs to be suffered.
- This should lead to an improved decision-making process on the viability of fracking in the Karoo.
- Interrogation of the Econometrix report by scientists and economists is needed in order to validate the findings.
- There is a need for a comprehensive environmental impact assessment (EIA) report addressing water and environmental sector impacts and how they are to be mitigated.
- There needs to be collaboration and a holistic approach from the different stakeholders involved in the fracking process.
- There also needs to be clarity on the method that is going to be used to compensate farmers and members of the community that are going to be affected if fracking is to be permitted in the Karoo.

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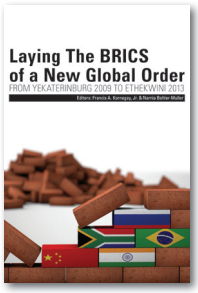
There is a need for a comprehensive environmental impact assessment (EIA) report



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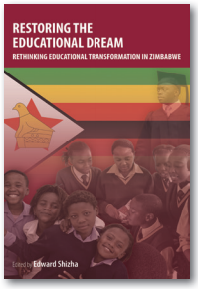

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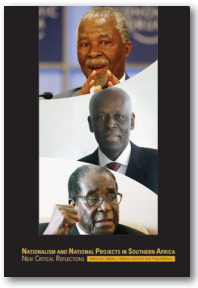

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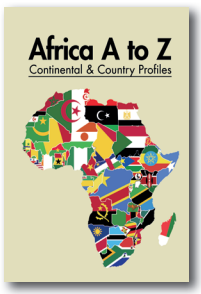

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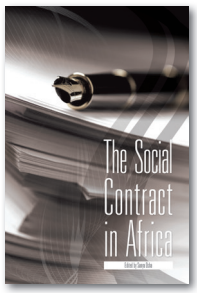

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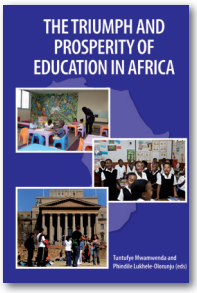

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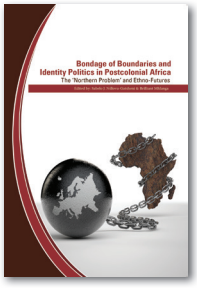

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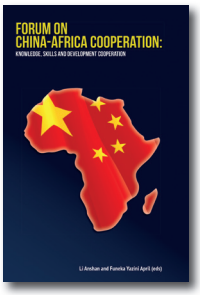

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