

**Strategic Environmental Assessment for  
Shale Gas Development in South Africa  
Meeting Notes**



**Shale Gas Strategic Environmental Assessment Public Outreach, Round 2:**

**Key Questions and Comments raised by Stakeholders**

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# Strategic Environmental Assessment for Shale Gas Development in South Africa Meeting Notes



## List of acronyms

ANC	African National Congress
ANCYL	African National Congress Youth League
ASSAF	Academy of Science of South Africa
CARA	Conservation of Agricultural Resources
CGT	Cycle Gas Turbines
CGS	Council for Geoscience
COGHSTA	Cooperative Governance, Human Settlement & Traditional Affairs
CSIR	Council for Scientific and Industrial Research
DA	Democratic Alliance
DEA	Department of Environmental Affairs
DEADP	Department of Environmental Affairs and Development Planning
DEDEAT	Department of Economic Development, Environmental Affairs and Tourism
DMR	Department of Mineral Resources
DOE	Department of Energy
DST	Department of Science and Technology
DWS	Department of Water and Sanitation
EIA	Environmental Impact Assessment
EWT	Endangered Wildlife Trust
IDP	Integrated Development Plan
LM	Local Municipality
NAMAQA	National Environment Management: Air Quality Act.
PPP	Public Participation Process
SADTU	South African Democratic Teachers Union
SALA	Subdivision of Agricultural Land Act
SANBI	South African National Biodiversity Institute
SANParks	South African National Parks
SEA	Strategic Environmental Assessment
SGD	Shale Gas Development
UFH	University of Fort Hare
UFSED	Ubuntu Forum for Socio Economic Development
WITS	University of the Witwatersrand

# Strategic Environmental Assessment for Shale Gas Development in South Africa Meeting Notes



## Camdeboo Local Municipality Pre-Meeting

Location	Venue	Date	Time	Attendance number
Graaff Reinet	Robert Sobukwe Building	18 July 2016	13:00- 14:30	10

## Attendance register

Name	Organisation	Email	Telephone
Andile Dlodla	CSIR	ADludla1@csir.co.za	021 888 2482
Bob Scholes	Wits/ CSIR	bob.scholes@wits.ac.za	082 292 6769
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Vadapalli, V.R.K.	CGS	Vvadapalli@geoscience.org.za	012 841 1385

## Agenda for Public Briefing

- The proposed agenda for the stakeholder meeting was presented to the municipality and was accepted.

## Stakeholder engagement

- The Municipality indicated that they have assisted in advertising the stakeholder meeting in the following ways:
  - Informed stakeholders from their database.
  - Distributed flyers in the wards.
  - Notified senior members of the municipality.
  - Identified a representative from the municipality will be present to chair the stakeholder meeting.

## Graaff-Reinet

Location	Venue	Date	Time	Attendance number
Graaff-Reinet	Masizakhe Community Hall	18 July 2016	17:00- 20:00	~43

## Agenda for Public Stakeholder Meeting

Welcome	Municipal Official
Introduction	National Government Representative

# Strategic Environmental Assessment for Shale Gas Development in South Africa Meeting Notes



Draft findings	Scientific Team
Questions and Discussion	Local Community & Scientific Team
Vote of Thanks	Municipal Official
Closing	National Government Representative

## Attendance Register

Name	Organisation	Email	Telephone
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## Strategic Environmental Assessment for Shale Gas Development in South Africa Meeting Notes



### *Questions and Answers on Scientific Assessment Process*

- 30 days opportunity for comments was not sufficient; however, the SEA has been a very meaningful exercise. Treatment of economic potential in this area hypes the issue and creates unrealistic expectations and polarize the community. Studies like this should be objective, so that decision-makers can make informed decisions and not emotional decisions. The SEA will be very useful if policy makers take the assessment into strong consideration.

### *Questions /Answers on the Draft Findings*

#### Governance

- The report highlights potential risks to local authorities and therefore the community, not only should capacity be developed, but also the increased capacity needs to be funded, for instance, the municipality needs to employ more people. That national level feels the benefits, but the local communities carry the costs of the development. What about the Academy of Sciences South Africa (Assaf) report on technical readiness? Not available and is disappointing as it could add value to the SEA. Local authorities should be positioning them to be able to attach conditions to authorizations, or national government should think how they could have more positive feedback into local communities.
  - Bob Scholes explained that the Assaf report would not have changed the findings of this assessment; the experts also flagged potential capacity issues.
- Is there a process that allows young people to be equipped with skills to benefit from SGD?
  - Bob Scholes stated that one of the main this is how the country decides to develop shale gas and whether young people will be capacitated to benefit from this, there is a long time before SA has a gas industry and there is an opportunity to upskill people and generate local capacity. This is a decision that will get written into policy.

#### Tourism

- Are there precedence for cooperation between tourism and industry and departments? Would the tourism industry have enough muscle to stand up to DMR and SGD?
  - The stakeholder must relay this question to the tourism team, or we can do so on their behalf with their permission.
- Tourism industry experienced a phenomenon with the World Cup where opportunists invested in housings and flooded the market, and negatively impacted the local economy, pushing out tourists, especially post SGD.
  - Bob Scholes indicated that this was discussed more in the economics and social chapters not the above way that inequities may be increased.

## Strategic Environmental Assessment for Shale Gas Development in South Africa Meeting Notes



### Waste

- Can the waste from SGD be used to generate energy such as Biogas?
  - Bob Scholes explained that Biogas is generated from organic waste that decomposes and produces gas, but the waste from shale gas is mostly building material, rock and contaminated water.

### Water

- What about cross contamination between deep and shallow aquifers? Mitigation?
  - Bob Scholes explained that cross contamination between deep and shallow is not likely, and the water would have to migrate upwards, which is very unlikely, leaks from the top will pose the main risk to surface water contamination. A big aspect of the mitigation is around capacity, enforcement, institutions. Legacy issues after SGD around who is responsible for problems arising from abandoned wells, SA legislation takes into account funds from developers for legacy issues.
- What about water requirements?
  - Bob mentioned the findings are that exploration doesn't need as much water, but each frack requires huge amounts of water, but the water can be re-used for subsequent fracks. There is not enough water in the Karoo, it cannot come from the same source as drinking and agricultural water.

### **Meeting Closure**

- Greg Schreiner provided feedback on commenting period and way forward.
- Mr Hendricks (Camdeboo Municipal Manager) gave his final words and closure of the meeting.

### **Victoria West Public Stakeholder Meeting**

- The proposed agenda for the stakeholder meeting was presented to the municipality and was accepted.
- Xolani Malgas (Municipal Manager) indicated that they have assisted in advertising the stakeholder meeting in the following ways:
  - Informed stakeholders from their database.
  - Distributed flyers in the wards.
  - Notified senior members of the municipality.
  - Announced Meeting details in town with a loudhailer

# Strategic Environmental Assessment for Shale Gas Development in South Africa

## Meeting Notes



### Victoria West

Location	Venue	Date	Time	Attendance number
Victoria West	Victoria West Town Hall	19 July 2016	17:00- 20:00	37

### Agenda for Public Stakeholder Meeting

Welcome	Municipal Official
Introduction	National Government Representative
Draft findings	Scientific Team
Questions and Discussion	Local Community & Scientific Team
Vote of Thanks	Municipal Official
Closing	National Government Representative

### Attendance Register

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## Strategic Environmental Assessment for Shale Gas Development in South Africa Meeting Notes

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### Questions/Comments and Answers on Scientific Assessment

- Where is the gas present?
  - Bob Scholes stated that the gas is very deep and you can drill approx. 3 km horizontally, if you need to go further it would not be economically viable. Well pads are far apart. Since you can manoeuvre subsurface you have flexibility to miss very sensitive surface areas, areas like national parks will be avoided, and many very high sensitive areas may well be no-go.
- How many hectares will be affected by SGD?
  - Bob Scholes explained that the wellpad is about 2 ha and then the road networks will also contribute to the footprint. Overall less than 0.001 of the study area is anticipated to be occupied by physical infrastructure footprints, even at a large scale scenario of 20 Tcf.
- Is the next step in the SEA is to fine tune the report using the documents?
  - Bob Scholes concurred that is the direct next step, after the report is finalised we take the evidence in the report and help government decide what regulation should be in place.
- Does negative consequence outweigh the positive?
  - Bob Scholes explained that Shale gas isn't a yes-no thing, there is a range of possibilities. Decision that has been made is that it would be good for SA to know if it has shale gas, to actually develop shale gas is not a government decision, it is the decision of the public sector they will decide to explore/produce if the economics and technicalities are in order.
- Where will the money for SGD come from?
  - If you have an economically viable activity you have a tax stream, you have more money that is being consumed, then it is a government fiscus decision about how money is spent and how / who funds aspects of development.
- A comment was made that South Africa suffers from the lack of implementing and policing regulations.
- A comment was made that Informal settlements determine how towns develop, not really spatial planning.



## Strategic Environmental Assessment for Shale Gas Development in South Africa Meeting Notes



### *Questions/Answers on the Draft Findings*

#### Agriculture

- What about current legislation like Conservation of Agricultural Resources (CARA)?
  - Bob Scholes stated that the agriculture team has found that the current legislation is sufficient to protect the interests of farmers, but there are questions around the implementation capacity.

#### Economics

- Property values in towns are expected to rise, but how does the Karoo compare to counties in America? And what are the differences in using local labour?
  - Property values around towns would in all likelihood rise if there was a functioning gas industry in the region, the international literature supports this. Cases reported from the rural parts of the U.S.A are not entirely different to the Central Karoo, although there is a much higher degree of both existing (and well-functioning infrastructure e.g. WWTW, roads, pipelines) and human skills capacity and local governance efficiency.

#### Energy

- Nuclear energy is not included? But coal has been considered, why?
  - Bob Scholes explained that it is not in the assessment because it was not part of the mandate of the study. The base load can come from nuclear and from coal, coal would be the main thing to be displaced by gas.

#### Governance

- How soon should the municipality be expected to plan for these types of developments?
  - Bob Scholes responded by saying that quite a lot of time and it needs to be done very thoroughly, it will take a few years.

#### Human Health

- American reports say that there are major health effects?
  - Bob Scholes stated that many of those reports are epidemiological, people are sick but a causal relationship showing that it is fracking, is not proven. He added that Health effects are not too well known now, and it will take time (if SGD occurs) to prove.

#### Terrestrial Biodiversity

- Land rehabilitation post SGD and Land acquisition? E.g. SKA expanded.

## Strategic Environmental Assessment for Shale Gas Development in South Africa Meeting Notes



- Pipelines and new roads, for the pipe they will have the shortest possible routes, therefore it will be large areas that will be cleared, and these are difficult to rehabilitate.

### Social Fabric

- A comment was made on increasing inequalities, the people who have will get more, the people who don't have, will have even less.
  - Bob Scholes highlighted that the social fabric chapter recognizes the risk of growing inequalities that may be created by SGD.
- How was spatial planning and social fabric affected by the World Cup?
  - Bob Scholes stated that World Cup was boom and bust characteristics.

### Tourism

- Victoria West may not be identified as a sensitive tourism town, but they want to invest in tourism for their livelihood.
  - Bob Scholes explained that the assessment looks at available information now, at an EIA stage there should be opportunity to consider emerging trends (that were not evident at the time of the assessment) that will be negatively impacted by SGD.
- A comment was made on the future of tourism in Victoria West may look different than is captured in the report. Concerned that the levies in Vic west apart from agriculture is tourism. To look at tourism the community and the municipality must work together to develop tourism in line with the IDP.

### Waste

- How do you store flow back?
  - Bob Scholes highlighted that SA legislation prescribes that it must be stored in closed containers, no open tanks or lagoons are allowed.
- Flowback get stored, but what if the gas is finished, does the tank stand there forever?
  - Bob indicated that waste disposal at proper facilities, however, hazardous waste needs to go to special facilities outside the Karoo (Cape Town or Port Elizabeth).

### Water

- It is best practice and best technology for casing and drilling, but you are working "blind" and accidents happen.

## Strategic Environmental Assessment for Shale Gas Development in South Africa Meeting Notes



- Bob Scholes stressed that risk of failure is very small but it does exist, however contamination event are mainly contained. Fluids do not move easily laterally in aquifers.
- Is there radioactivity in flowback?
  - Bob Scholes indicated that there is radioactivity is present but current samples (soekor and hot springs) shows that it is present.

### Meeting Closure

- Greg provided feedback on commenting period and way forward on behalf of the project team.
- Final word and closure was done by municipal manager, Mr. Malgas.

### Beaufort West

Location	Venue	Date	Time	Attendance number
Beaufort West	Beaufort West Municipality	17 May 2016	13:00- 14:00	10

### Attendance register

Name	Organisation	Email	Telephone
Andile Dlodla	CSIR	ADlodla1@csir.co.za	021 888 2482
Bob Scholes	Wits/ CSIR	bob.scholes@wits.ac.za	082 292 6769
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Hendrik Kotze	University of Stellenbosch	Hendrik.Kotze@usb.ac.za	082 784 7284
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Vadapalli, V.R.K.	CGS	Vvadapalli@geoscience.org.za	012 841 1385

- **Agenda for Public Briefing**

The proposed agenda for the stakeholder meeting was presented to the municipality and was accepted.

### Stakeholder engagement

- Llewellyn Lakay (Municipal Representative) indicated that they have assisted in advertising the stakeholder meeting in the following ways:
  - Informed stakeholders from their database.
  - Distributed flyers to the community.
  - Announced Meeting details in town with a loudhailer.

# Strategic Environmental Assessment for Shale Gas Development in South Africa Meeting Notes



Location	Venue	Date	Time	Attendance number
Beaufort West	Rustdene Community Hall	17 May 2016	17:00- 20:00	~ 84

## Agenda for Public Stakeholder Meeting

Welcome	Municipal Official
Introduction	National Government Representative
Draft findings	Scientific Team
Questions and Discussion	Local Community & Scientific Team
Vote of Thanks	Municipal Official
Closing	National Government Representative

## Attendance Register

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## Strategic Environmental Assessment for Shale Gas Development in South Africa Meeting Notes

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Victor Malowizz	-	-	078 616 3326
Victor Olivier	-	-	-
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Vuyisile Bartman	-	-	-
W. Bezadenhoudt	Private	-	082 770 8243
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### Questions/Answers on Scientific Assessment Process

- If new information arises it would be included in the document how will that be regulated?
  - Bob Scholes stated that these assessments are not regularly re-done, smaller issues would not constitute an upgrade, if something substantially changes the assumptions of the assessment it will have to be considered in some way and perhaps at an EIA stage.

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- The study is independent and is not to make a decision for or against shale gas, but it has been indicated that a decision will be made. At what point will communities have an opportunity to make proper inputs into such a decision? The community should be given opportunity to influence decision on how, when and where.
  - Bob Scholes pointed out that Knowledge empowers communities, this assessment provides that knowledge. In SA constitution is committed to a participatory style of governance. This is a strategic assessment looking at the big picture, as soon as there are specific details "I want to drill here" and this will require an EIA for which PPP must be done. There aware also opportunities to comment on policy and legislation.
  - Henri Fortuin added that even though national department may approve an EIA, there are many other licenses that need to be required. A community must start a zoning committee/ local council to give planning permission (if they do not give planning permission fracking cannot go forward), land use planning, IDP, stakeholders have opportunity to interact on local, provincial and national level as well, a range of authorities must all say yes.
- A comment was made on Public participation at EIA phase can be quite technical and difficult to understand, there is a call for departments / provinces / councils to aid communities to understand issues and be able to sufficiently provide inputs.
- Further there is an understanding that reference scenario is not static and that it changes, have you considered the cumulative impacts of uranium?
  - Bob Scholes stated that this is not a uranium SEA, but we have pointed out that shale gas is not the only thing going on and that it would be in addition to other changes. These issues should attract an EIA, hopefully the SEA provides information to support some of the other things as well and that it sets a standard for assessments.
- How would you mobilize an assessment of cumulative impacts of multiple developments?
  - Bob Scholes stated that Provincial and other authorities should determine when an SEA is necessary and is in addition to and EIA.
  - It was added that decision on uranium is taken by national government, so provincial doesn't have a say even if they didn't want it. A large study like this would be welcomed, the Western Cape SDF does touch in issues like this, but do not have much control over mining.
- SEA Process in relation to the legislative process on to frack or not to frack, how many years?
  - Bob Scholes indicated that the SEA process goes on until March 2017 (the decision making framework), the process of policies will run as usual. Fortunately it seems there is a breathing space, with the low oil prices there is not a great rush for SGD, we may see exploration and will have a warning.

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### *Questions/ Answers on Draft Findings*

#### Governance

- Why was functionality of governance not assessed? The reports assume that mitigation will be applied, and that governance is effective.
  - Bob Scholes highlighted that almost every chapter asks about institutional readiness, many of them raised uncertainties and concerns. In many instances the legislations found to be sufficient.

#### Sense of Place

- It all boils down to the economy and to money, people who do not know the Karoo have totally different values, to start up a business in the Karoo for a short time and you steal the soul of the Karoo. Make money, pack up and leave and leave the mess behind in the Karoo. Rather go the other gas routes, from Mozambique and offshore, economically it would be a far better advantage for South Africa.
  - Bob Scholes response was that Sense of place is understood to some extent and these points are made in the report, however little evidence to base an assessment on. Many people think that the govt. decides whether to go ahead with fracking, but in the end it is up to the economics and technical viability that will be determined by the fracking companies. It is important to understand the opportunities and understand the risks and then make informed decisions, the pose decisions will be made by the govt. by the fracking companies and by civil society.

#### Social Fabric

- When it comes to a small town like Beaufort there are two different worlds, the rich, and the people who are struggling for food every day, and many people do not understand economics and oil prices etc.
  - Bob Scholes highlighted that Social fabric touches on growing inequalities, and the economy chapter looks at who could benefit from the income from SGD. Recommendation around mitigating these impacts are suggested in the reports and will be packaged in a way to help govt. make good decisions.

#### Terrestrial Biodiversity

- Grassland biome covers many ha but doesn't seem to be assessed, and only Karoo threatened species considered.
  - Bob Scholes stated that all biomes within the study area have been assessed.

#### Tourism

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- A comment was made that dysfunctional municipality, in certain areas it is important to recognize that they may not have IDPs and they are definitely not being implemented. A community forum in Loxton has identified tourism as being the best patch way to create jobs and develop communities. Fracking will hinder sustainable tourism opportunities.
- It was added that it would be interesting to see what the investment opportunities will be for fracking vs tourism. Consider economic opportunities against other sectors.
  - Bob Scholes highlighted the fact that at a strategic level there is not enough info to do a full cost benefit analysis, until exploration for gas is done you cannot know what the value of it will be, these studies are surely to arise when better resource estimates are known.

### Waste

- Will there be a lot of radioactive material in the waste stream generated from flowback?
  - Bob Scholes stated that this is considered in the water section, water that goes deep down will be contaminated with radioactivity. Current measures of radioactivity are known through soekor holes and hot springs, the levels of radioactivity is not very high, but higher levels may be encountered when drilling. He also added that Fracking companies would have to deal with the waste, they would not be allowed to be burdened with fracking waste. The SEA was commissioned is to gain information of what is happening in the South African context.

### *Meeting Closure*

- Greg Schreiner provided feedback on commenting period and way forward.
- Mr. Booysen (Municipal Manager) shared his Final words and closure.

### *Shale Gas SEA Workshop for Registered Stakeholders*

Location	Venue	Date	Time	Attendance number
Cape Town	Iziko Museum	22 July 2016	10:30- 15:30	~35

### *Attendance Register*

Andile Dlodla	CSIR	ADlodla1@csir.co.za	011 888 2482
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Niall Kramer	-	niall.kramer@gmail.com	-
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### Questions and Answers on Scientific Assessment Process

- What is the value of the full report?
  - Bob Scholes highlighted that the full report is in the public domain, and the information is available to other studies. The document will be published electronically. The Summary for Policy Makers will almost certainly come out as a hard copy as well. The client is government, but the specific report is a public domain report. Paid for by government, but for use by all. Government gets this entire report, and our support feeding this into a framework for decision making

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- Potential alternatives is lacking in the report.
  - Development alternatives are required in an EIA level under law. The SEA deals with alternatives through the risks assessment, which looks at 4 different future alternatives, with and without mitigation. These all represents alternatives. There is also a “stopping” point. This is not an assessment of absolutely everything going on in South Africa.
- A comment was made on the importance of people to understand the fracking regulations and the permitting requirements and timeframes.
- What is the public participation going forward?
  - The public participation for the scientific assessment section is done now, after this is the policy development process, which consists of the PPP normal to those processes.
- This study focuses on shale gas only, did you look at other activities, such as uranium and gypsum?
  - Bob Scholes stressed that this SEA doesn't replace the EIA but directs it and provides a framework. The dynamic baseline of the Karoo (Ch 1) tries to capture that, we do not have full insight on those issues, such as uranium is also sort of a rumor it has not yet happened and cannot be taken into cumulative account. Our mandate is to look at shale gas. If the assumptions of the assessment changed substantially it would not be valid anymore, it would have to be revisited. See point above.
- What about National parks and protected areas, buffer zones?
  - Bob Scholes stated that those are definitely taken into account, and they are protected by law, which provides for protected are and buffers.
- There seems to be a decision that SGD will occur.
  - SGD is not only a government decision, but the decisions also rely on the private sector (developers) and civil society also needs to provide input into the decisions which will happen in the future. Re acknowledging uncertainties - when we wrote the SPM we didn't draw on the preface, perhaps draw preface into the SPM. Question to ask yourself is: if you knew more about this, would it change you decision? Or do you know enough to make a decision?

### *Questions/Answers on Draft Findings*

#### Scenarios and Activities

- How did you arrive at the impact drivers described in the Scenarios and Activities chapter (Ch1)? For instance 10 wells instead of 32 wells per wellpad, these differences are significant. Precautionary approach call for the worst case figure to be taken into account. The entire report is based on assumptions that may not be correct.

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- Bob Scholes responded by explaining that we worked closely with industry, and this was peer reviewed by international experts, and then chose the most reasonable assumption for a South African context. Strategic assessment taking the big picture in account, for permitting they need to be explicit. Proposed more wells at a well-pad could also be seen as proposing less impact i.e. fewer wellpads, fewer well bores and casing, fewer roads. It depends which way you look at it. But the international evidence is clear, in the region of 10 wellbores per wellpad is a very legitimate assumption.
- Is there a map indicating infrastructure?
  - Bob Scholes responded with No, because no development is proposed as of yet, it is all what-ifs. We have no idea where infrastructure would be placed. There are examples of infrastructure in chapter 1 as well as "imaginary" notional layouts.

### Air Quality & GHG Emissions

- What about flaring? Downwind movement of gasses from flaring. And air quality re: compressor stations. Therefore air quality issues not only on wellpad but along all infrastructure. Venting of gas and fugitive leaking.
  - Bob Scholes stated that it is not anticipated that there will be extensive flaring, and will be well within NEMAQA standards. Fugitive leakage is very well understood, industry would want to avoid that.
- Shale gas is potentially cleaner source if fugitive emissions can be mitigated, a US study...assumptions based on conventional gas...abandoned wells and fugitive emissions, based on info like this life cycle of gas would not be as GHG efficient. Shale gas would be lower than coal - this statement is not correct. (Stakeholder has submitted this comment)
  - Bob Scholes emphasised that there is a lot of literature in this, additional literature is welcome but would not change the finding that this is a critical issue.
- A concern was raised on GHG that a number of the chapters correctly record a number of scientific unknowns that renders it difficult or impossible to do a risk assessment. Concerned that one is not making the point strongly enough that where there is a lack of knowledge they should be cautious about making decisions that could influence aspects that are clouded by uncertainties.

### Agriculture

- Foliage damage to crops? Nitrogen deposition?
  - Bob Scholes highlighted that this should be covered in agriculture, related to dust pollution that could affect species within about 30 m of dirt roads. Nitrogen deposition is not really an issue in this area of the world.
- The Conservation of Agricultural Resources Act (CARA) and Subdivision of Agricultural Land Act (SALA) are old pieces of legislation. Agricultural legislation has been neglected and no

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- legislation is available to support agriculture, especially with regards to mining. Mining fraternities have shorter routes in terms of EIA and that is a constraint for agriculture.
- Bob Scholes stated that CARA is a good piece of legislation, but the implementation and policing capabilities of that is brought under question.
  - A concern was raised that the Agricultural chapter is based on a 1994 study, and a lot has changed in the agricultural sector, it is now a much more successful sector. Furthermore, it creates many jobs and provides other services to their workforce. Do not underplay the significance of chapter 8.
  - Radioactivity? Radioactivity can be found in the wool of sheep?
    - Bob Scholes indicated that this is dealt with in the groundwater chapter. Available levels from hot springs and soekor holes are low.
  - Will farmers who lease or sell their land to developers return to the areas?
    - Bob Scholes stated that experience shows that people would likely not want to return; this will not only be because of SGD but also due to other factors such as climate change. Somila Xosa added that Colorado shows examples of a co-existence between SGD and agriculture; however, it might be possible to do some agriculture but not all agriculture.

### Earthquake

- It is fine to say that fracking shouldn't happen close to towns, but would the legislation prevent that. Prevent creeping of SGD into towns and closer to sensitive areas.
  - This is around implementation and institutional capacity and available legislation and the shortcomings have been raised in all chapters.

### Economics

- Economic benefits of economics equations, do they account for GHG and full SGD life cycle?
  - Bob Scholes responded by explaining that a cost benefit analysis was not undertaken, as there is not enough information, so have not done that level of analysis. Combine Cycle Gas Turbines (CGTs) are efficient.
- Economic benefits of renewables to shale gas?
  - Bob Scholes explained a comparison can be made with the kW/h generations costs, wind is the cheapest, solar a bit more expensive, CCGT at is more expensive, new coal is very expensive, nuclear is most expensive. But you cannot from that say that we should only do wind, you cannot builds tire system just from the cost; you also need to look for reliability. This is analysed extensively in SA energy plans, looking at price, reliability energy independence etc.

### Human Health

- CANSA came out very strongly about the link between cancer and fracking.

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- Bob Scholes explained that health impacts from fracking are not dismissed, they are present in the likely vicinity of the well pads, but are not so substantial that it would remove this as a potential activity.

### Energy Planning

- Latest information contradicts statement that gas is relatively cheaper and can be used to compliment renewable energy.
  - Stakeholder must provide evidence of this

### Governance

- The issue of institutional capacity has come up most times and the report also highlights that as a key issues. Will you recommend that institutional capacity be consistently monitored to see how it berg ores and whether it is successful?
  - Bob Scholes responded by stating that the chapters address what institutions exist, are they fit for purpose, and how should they be augmented. Authors do not make specific recommendations; they provide the facts, in phase three such issues will be dealt with.
- One of the mitigation processes in by monitoring, but the player cannot be the referee
  - Bob Scholes stated that the monitoring should be independent or at least a hybrid arrangement, an obligation on developer to install equipment and do monitoring, with an independent auditing that. Post closure monitoring is also an important aspect.

### Social Fabric

- Social and labour plans routed as a good way for SED? National policy can't always be interpreted as being implemented.
  - Bob Scholes stated that the chapter draws extensively on examples from South Africa and around the world. Does draw on policy aspects such as how developers should invest money for local socio-economic development.

### Terrestrial Biodiversity

- What about birdwatchers?
  - Bob Scholes responded by stating that Birds should be considered in the biodiversity chapter (IBA map) important bird areas should be considered.
- What about avoiding surface features, and going underneath?

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- There is precedence for a coking coal company wanting to burrow under the national park, but it went to court and lost. Many of the fine-scale siting issues are considered at the EIA level.

### Visual

- Optical astronomy Sutherland and light and dust pollution?
  - Bob Scholes highlighted that light pollution and dust pollution is considered. Main source of dust would be from trucks on dirt roads. Potential light pollution effects on Optical astronomy are considered in the Visual chapter

### Water

- If water is not available, what are the impacts associated with the other sources available?
  - Bob Scholes pointed out that it is clearly painted out in the chapters.

### Waste

- What is hazardous waste generated by SGD?
  - Bob Scholes stated Brine, radioactivity, contaminated water. These cannot be treated in the study area, but must go to licensed area.

## **Meeting Closure**

- Greg Schreiner provided feedback on commenting period and way forward.