Carbon Capture and Storage (CCS)

Towards a regulatory and legal regime in South Africa

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Carbon Capture and Storage (CCS): Towards a regulatory and legal regime in South Africa

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Responsibility for its contents remains the authors' own.

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Glossary of Acronyms

AMD	Acid Mine Drainage
CARA	Conservation of Agricultural Resources Act 43 of 1983
CC	Constitutional Court
CCS	Carbon Capture and Storage
CCSR	Carbon Capture and Storage Ready
CDM	Clean Development Mechanism
CO_2	Carbon Dioxide
COP	Conference of the Parties to the United Nations Framework Convention on Climate Change
DEA	Department of Environmental Affairs
DMR	Department of Mineral Resources
DoE	Department of Energy
DS&T	Department of Science and Technology
DWA	Department of Water Affairs
EA	Environmental Authorisation
EEZ	Exclusive Economic Zone
EGR	Enhanced Gas Recovery
EMF	Environmental Management Framework
EMI	Environmental Management Inspectors
EOR	Enhanced Oil Recovery
EU	European Union
GHG	Greenhouse Gas
LTMS	Long Term Mitigation Scenario
LUPO	Land Use Planning Ordinance
MEC	Member of Executive Council
MPRDA	Mineral and Petroleum Resources Development Act 28 of 2002
MW	Mega Watt
NEMA	National Environmental Management Act 107 of 1998
NEM:ICMA	National Environmental Management: Integrated Coastal Management Act 24 of 2008
NGO	Non-Governmental Organisation
PAJA	Promotion of Administrative Justice Act 3 of 2000
RMDEE	Regional Mining Development and Environmental Committee
SACCCS	South African Centre for Carbon Capture and Storage
SANEDI	South African National Energy Development Initiative
SANS	South African National Standard
SCA	Supreme Court of Appeal
SEA	Strategic Environmental Assessment
UK	United Kingdom
UNFCCC	United Nations Framework Convention on Climate Change

Executive Summary

Introduction

Carbon Capture and Storage (CCS) is a technology designed to prevent anthropogenic carbon dioxide (CO_2) emissions, for example, from the burning of coal and gas to generate electricity, from entering the atmosphere and driving further human-induced climate change. CCS seeks to achieve this objective either by stripping CO_2, a major greenhouse gas, from the smokestack of conventional power stations, or by burning the fuel in special ways to produce exhausts of pure CO_2. The greenhouse gas is buried underground, usually, but not always, in exhausted oil and gas reservoirs. Apart from the relevance of CCS to the power generation industry, all indications are that other industries, such as Sasol's Coal to Liquid (CTL) process which produces a particularly pure stream of CO_2, are likely to be significant users and beneficiaries of CCS in SA.

Drivers for CCS in South Africa and government response

The main driver for CCS in South Africa is the fact that the country is blessed with abundant reserves of both high- and low-grade coal. It is ranked in the top six countries in terms of hard coal production. Coal has driven South Africa's energy economy not only in the past but is likely to do so in the immediate and foreseeable future, the government having embarked relatively recently on the development of two large scale coal power plants, Medupie and Kusile. South Africa is also mindful of its international responsibilities to mitigate its greenhouse gas emissions.

During 2009 the government established the South African Centre for Carbon Capture and Storage (SACCCS) with an initial five-year mandate to champion the development of CCS in South Africa. SACCCS is located within the South African National Energy Development Institute (SANEDI). In the South African context CCS can be carried out either onshore or offshore as reported on in the *Atlas on Geological Storage of Carbon Dioxide in South Africa*. For geological reasons terrestrial storage space is limited and the *Atlas* reports that the largest potential for CCS is offshore. However for practical economic reasons plans are underway to have an onshore demonstration project in place by the year 2020. During May 2012 the South African Cabinet identified CCS as one of the options to reduce carbon dioxide emissions as one of governments option in its long-term mitigation scenarios plan.

Key and novel legal issues regarding CCS in South Africa

In considering a CCS legal and regulatory regime, a key underlying feature is that South African mining law is in many ways pertinent to CCS although the activity in question is the converse. This is because mining entails the extraction of a natural resource whether it be solid, liquid or gaseous from underground, while CCS entails injecting or inserting a processed highly dense gas having fluid properties, termed "supercritical" by the technicians, into the ground.

Some of the key and novel legal features canvassed in this report include:

- questions around ownership of the "pore space" into which it is anticipated that the CO_2 will be injected. Related to this is the question of ownership of the CO_2 itself, in the event that these two notions are separated from one another. These issues around ownership are likely to impact on a range of related legal considerations relevant to a CCS project, including the question where liability would lie in the event that the project is the cause or origin of environmental degradation or impacts on health or safety;
- whether the injection of a "supercritical" substance into the ground amounts to disposing of a "waste" or "hazardous waste" as defined in the NEM: Waste Act 59 of 2008. The report concludes that under current waste legislation the substance in question indeed constitutes "waste" and is likely also be considered as "hazardous waste", because of the broad definitions of these terms in the Act. As such the Waste Act will have to be complied with amongst other environmental legislation;
- potential long-term liability issues, including the required mechanisms to secure responsibility for the project over extended periods of time. Typical questions in this context are whether liability for the project, including the project site and the sequestered CO_2 should be transferred to the State on the understanding that it is likely still to be extant for many years, possibly hundreds of years, in contrast to private companies. Such considerations around transfer of liability to the state include: site closure procedures and responsibility for

ongoing monitoring; determining the point in time and the associated circumstances in which liability might be transferred to the state; and, the types of financial and logistical preparations that may be required to be in place before transfer of liability can be effected;

- possible conflicts around uses of the storage site, including potential conflicts between surface owners and CCS operators;
- administrative and cooperative governance arrangements including the respective roles of national, provincial and local tiers of government. The report has as its point of departure that the Department of Energy is the focal point for CCS related activities. However a number of other government departments will have an interest in CCS, including the Departments of Environmental Affairs, Health, Mineral Resources and others;
- possible provincial or local government stumbling blocks; while the report does not identify major pitfalls under this head, it does identify the necessity for compliance with provincial and local authority planning laws;
- fiscal implications including the state of play of incorporating CCS into the Clean Development Mechanism under the Kyoto Protocol and the financial implications, for CO_2 emitters, of the introduction of a Carbon Tax in South Africa – essentially the cost–benefit dynamic between the cost of the carbon tax and the cost of sequestering CO_2 via a CCS project.

Conclusion and recommendations

South Africa has a myriad of natural resource and pollution-related laws in place which have a bearing on CCS-related activities. These include a suite of environmental laws which include the need to carry out a public policy process with interested and affected parties as well as stakeholders. The authors are of the view that while these may be adequate to proceed with a demonstration project, in the longer term a dedicated CCS legal and regulatory regime needs to be put in place to govern this new and unique technology.

A. The geo-physical and policy context

1. The South African context for a CCS legal framework

1.1 Introduction

Carbon Capture and Storage (CCS) is a technology designed to prevent anthropogenic carbon dioxide (CO_2) emissions, for example, from the burning of coal and gas to generate electricity, from entering the atmosphere and driving further human-induced climate change. CCS seeks to achieve this objective either by stripping CO_2, a major greenhouse gas, from the smokestack of conventional power stations, or by burning the fuel in special ways to produce exhausts of pure CO_2.[1] The greenhouse gas is then buried underground, usually, but not always, in exhausted oil and gas reservoirs. In the South African context this can be either onshore or offshore as reported on in the *Atlas on Geological Storage of Carbon Dioxide in South Africa (*the *"Atlas")* elaborated on in 5.1 below.[2]

During 2009 the government established the South African Centre for Carbon Capture and Storage (SACCCS). It is governed by a Charter and is a public/private/international partnership, financed from local industry, government and international sources. It is located within the South African National Energy Development Institute (SANEDI) and has an initial five-year mandate to champion CCS development in South Africa.[3]

In May 2012 the South African Cabinet approved a plan to capture and store carbon dioxide in deep geologic formations. More specifically Performance Monitoring and Evaluation Minister, Collins Chabane, stated in a media briefing that "Cabinet had endorsed the Carbon Capture and Storage (CCS) Roadmap" and that CCS has been identified – in government's long-term mitigation scenarios plan – as one of the options to reduce carbon dioxide emissions, one of the main drivers behind global warming.[4]

A novel feature of CCS elaborated on in 8.1 below is that South African mining law (common law and statute law) is in many ways pertinent to CCS although the activity in question is the converse. While mining entails the extraction of a natural (solid, liquid or gaseous) resource from the ground, CCS entails injecting or inserting a processed highly dense gas having fluid properties, termed "supercritical" by the technicians, into the ground.[5]

1.2 Drivers for CCS in South Africa

The main driver for CCS in South Africa is the fact that the country is blessed with abundant reserves of both high- and low-grade coal.[6] The former tends to be exported while the latter is harnessed to drive domestic economic needs. Coal has driven South Africa's energy economy not only in the past but is likely to do so in the immediately foreseeable future, the government having embarked relatively recently on the development of two large-scale coal power plants as elaborated on below. During 2009, 65.9 % of electricity production came from coal.[7] In addition South Africa has a buoyant coal-to-liquids conversion industry which meets approximately 30% of its domestic transportation fuel-oil demand needs. The economy has thus always been, and will be in the future, highly reliant on coal.

South Africa is among the top 15 most energy intensive economies in the world and emits over 400 million tonnes of CO_2 every year. The country is ranked as the 13th largest CO_2 emitter in the world,[8] while on a *per capita* basis it is in the top six.[9]

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1 It must be borne in mind that CCS in the power generation industry is only one use. There is the likelihood that Sasol's Coal to Liquid (CTL) process will be the primary customer for CCS in SA as well as conventional power generation processes.

2 Council for Geoscience, *Atlas on the Geologocial Storage of Carbon Dioxide in South Africa*, 2010, at p 50.

3 http://cefgroup.co.za/index.php?option=com_content&view=article&id=124:establishment-of-a-south-african-centre-for-carbon-capture-and-storage-ccs&catid=4:press-releases&Itemid=25 See generally: www.sacccs.org.za

4 Available at http://www.globalccsinstitute.com/institute/news/cabinet-approves-carbon-capture-plan [accessed 22 August 2012].

5 Whether this amounts to "waste" or "hazardous waste" as defined in the NEM: Waste Act 59 of 2008 is discussed in 8.2 below.

6 South Africa is ranked in the top six countries in terms of hard coal production; total output in 2009 was 247 million tonnes: Eberhard A, "*The Future of South African Coal: Market, Investment and Policy Challenges"*, Program on energy and Sustainable development, Working Paper no 100, Freeman Spogle Institute for International Studies, Stanford 2011.

7 Council for Geoscience (2010). *Atlas on Geological Storage of Carbon Dioxide in South Africa.* see also International Energy Agency (2011) *CO_2 Emissions From Fuel Combustion Highlights* available at http://www.iea.org/co2highlights/co2highlights.pdf [accessed 28 June 2012] at p 27.

8 Beck, B., Surridge, T., Liebenberg, J., & Gilder, A. (2011). The current status of CCS development in South Africa. *Science Direct*, p 6157.

9 South Africa produced 337,42 million metric tonnes of CO_2 (Mt CO_2) from fuel combustion alone during 2008. International Energy Agency 2010 *Key World Energy Statistics 2010* available at http://www.iea.org/textbase/nppdf/free/2010/key_stats_2010.pdf [accessed 1 September 2010] at p 56. See also South Africa's Second National Communication to the UNFCCC *http://unfccc.int/resource/docs/natc/snc_south_africa.pdf* . DEA 2011.

A further driver for CCS in South Africa is the fact that South Africa, a non-Annex 1 United Nations Framework Convention on Climate Change (UNFCCC) "developing" country Party, is committed to demonstrating good international corporate citizenry by meeting international obligations and addressing climate change. A short time prior to the opening of the Fifteenth Conference of the Parties to the United Nations Framework Convention on Climate Change (COP15), held in Copenhagen, Denmark, in December 2009, South African President Jacob Zuma pledged that the country would voluntarily seek to reduce its greenhouse gas emissions by 34% below a business-as-usual emissions growth trajectory by 2020, and 42% by 2025, provided that South Africa received financial and technological support from developed countries.[10] This level of emissions reductions was developed in line with South Africa's cabinet-approved Long Term Mitigation Scenarios (LTMS). This in turn indicates that CCS will play a significant role in meeting the reduction target of South Africa, while simultaneously constructing coal power plants.[11]

In addition, both the National Climate Change Response Green Paper (October 2010) and the National Climate Change Response White Paper (November 2011) identify CCS as a future technology option for the country. The latter provides for a Carbon Capture and Sequestration Flagship Programme as a near-term priority and indicates that the programme is led by the Department of Energy, in partnership with the South African National Energy Development Institute (SANERI), of which SACCCS is a component. The programme includes the development of a Carbon Capture and Sequestration Demonstration Plant to store the process emissions from an existing high carbon emissions facility.[12]

A further driver of the carbon-based economy is the fact that South Africa experienced major electricity shortages during 2008 when it was subject to regular "load-shedding".[13] Since that time electricity shortages have been evident and electricity prices have escalated putting a strain on the economy. While alternatives such as natural and shale gas, as well as renewable energy are available, their development has been relatively slow. As a result South Africa requires a short-term increase in electricity production and the prevailing wisdom, as expressed on a number of occasions by government officials, is that this short-term increase will be derived from coal.

A significant, relatively recent, development bearing out the above has been the commissioning of the development of two new large-scale coal power plants, Medupi and Kusile, with World Bank financing. The plants will use supercritical technology, with boilers that are among the most efficient in the world, and will be developed as zero-liquid effluent discharge power stations, the emissions of which will be continuously monitored.[14] The Kusile station, expected to be the world's third largest coal-fired power plant upon its completion,[15] will consist of six units, each rated at approximately 800 Mega-watts (MW) installed capacity generating a total of 4800 MW, on completion.[16] The annual greenhouse gas (GHG) equivalent emissions for Kusile will be in the order of 36.8 million tons. This would increase South Africa's energy sector emissions by 12.8% and South Africa's total contribution to climate change by 9.7%.[17]

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[10] The actual volume of emissions reductions represented by this voluntary pledge is uncertain, although the Integrated Resource Plan for Electricity 2010–2030 (IRP 2010) assumes a greenhouse gas emissions constraint of 275 million tonnes of CO_2e in 2024. A concerted attempt to bring some level of certainty to the pledge is contained in a report entitled *South Africa's Carbon Chasm* (August 2011). The report uses emissions data captured for the 2010 Carbon Disclosure Report from the top one hundred companies listed on the Johannesburg Stock Exchange, taken against the best available approximation of the country's 2020 absolute greenhouse gas emissions, namely a 34% deviation below the so-called "Growth Without Constraints" scenario in South Africa's Long Term Mitigation Scenarios. The result, concludes the report, is a "chasm" between business-as-usual greenhouse emissions and the 2020 voluntary pledge, i.e., 34% deviation below a business-as-usual emissions growth trajectory, of some 253 million tonnes of carbon dioxide equivalent (CO_2e).

[11] The report on the *Long Term Mitigation Scenarios – Strategic Options for South Africa* describes four strategic options for South Africa's response to the climate change challenge, as follows: Option One: "Start Now", Option Two: "Scale-up"; Option Three: "Use the Market". While these three options are modelled to determine their likely economic and emissions reducing consequences, the variables of a fourth option, called "Reaching for the Goal" (of the levels of mitigation required by science, in this case the science which underpins the Fourth Assessment Report of the Intergovernmental Panel on Climate Change), are regarded as being too uncertain to be be subjected to such modelling. Both options two and three include the introduction of CCS into South Africa in their assumptions. As regards Kusile and Medupi see http://www.engineeringnews.co.za/print-version/water-and-air-pollution-key-environmental-issues-for-kusile-development-2009-05-15.

[12] Department of Environment, *National Climate Change Response White Paper*, October 2011, at p 32.

[13] See generally: http://switchedon.ukzn.ac.za/WhatisLoadShedding12621.aspx

[14] http://www.power-technology.com/projects/medupi-power/

[15] http://www.power-technology.com/projects/kusilepowerstation/

[16] Eskom. (n.d.). Retrieved February 24, 2011 from http://www.eskom.co.za/c/article/58/kusile-power-station/

[17] South African Kusile 4,800-MW Coal-Fired Power Project Background Information and Fact Sheet available at http://action.sierraclub.org/site/DocServer/Kusile_Power_Project_Factsheet.pdf?docID=5541

Medupi, which is currently under construction and scheduled to be brought online in 2013, will ultimately also have a maximum installed capacity of 4800 MW (6 × 800 MW) and will contribute to climate change with "… coal consumption of 17,117,436 tones per annum, 29,895 kilotonnes of CO_2, 0.342 kilotonnes of N_2O with equivalent CO_2 of 30,001 kilotonnes per annum. These emissions represent an increase in the energy sector's emissions of 9.2% and an increase in the country's contribution to global warming of 7.3%".[18] Medupi will be the world's forth largest coal fired plant upon completion.

As these developments will result in increased emissions from burning fossil fuels the (then) Department of Environment Affairs and Tourism (now the Department of Environmental Affairs (DEA)), declared during 2009 that coal stations need to be "carbon capture ready", a fact which has been corroborated by SACCCS which indicates that South Africa is likely to be ready to test-inject carbon dioxide into underground storage cavities from 2017 to determine whether "carbon capture and storage" technology is viable.[19]

There is some debate as to the meaning of "CCS-ready" in the South African context and the issue is currently being investigated by SACCCS.[20] Nevertheless in this vein the 2006 Record of Decision for the environmental authorsation for the Kusile power plant project[21] includes as a specific condition, under the heading "air quality abatement", the requirement that end of pipe measures must be taken in respect of CO_2, which measures "must include … carbon capture readiness". A further obligation stipulates that the applicant, Eskom, the national power utility and the entity that will undertake the activity for which the environmental authorisation has been granted, is required to submit "… a report detailing the preferred technology, for approval, before proceeding with construction".[22]

During a two-day state visit to Norway in September 2011, aimed at strengthening economic cooperation between the two countries, President Zuma, stated:

> "Carbon capture and storage brings a very big hope to countries, in particular like SA that have used deposits of coal, (as it) could be used to develop countries without creating emissions that are going to affect the globe".[23]

One of the CCS-related outcomes of this visit was that Sasol, the state-owned South African petro-chemical company and a prime candidate for CCS, obtained a 2.2% stake in the Technology Centre Mongstad which tests and improves CCS technologies.

2. CCS options potentially influencing a CCS legal and regulatory regime in South Africa: offshore/onshore storage; enhanced oil/gas recovery

If CCS is developed onshore a wide variety of competing regulatory interests could arise. These range from purely environmental considerations such as loss of biodiversity to economic interest such as mining, agriculture and others.

Similarly if CCS is developed offshore there could be different policy considerations and competing interests such as with South Africa's near-shore and offshore fishing industry, oil and gas exploration and exploitation, communication cables and related activities such as Enhanced Oil Recovery (EOR) and Enhanced Gas Recovery (EGR).

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[18] African Development Bank. (2009). *Executive Summary of South Africa: environmental impact assessment for the Medupi power plant project of Eskom* p 20.

[19] Business Day, 8 May 2012, http://www.businessday.co.za/Articles/Content.aspx?id=171198

[20] SACCCS has commissioned a report entitled *Carbon Capture Readiness (CCR): A Definition of Plant Readiness* which, at the time of drafting of this document, is in the process of finalisation. The report addresses the legislative, environmental and economic aspects of CCR in South Africa and seeks to understand at which point source carbon dioxide emitters in the country may be required to be "carbon capture ready".

[21] The Record of Decision for Project Reference 12/12/20/807: Construction of the Eskom Generation Project 5400MW Coal-Fired Power Station, Witbank (the proposed Kusile power plant). See also Faure, A. (2009). *South Africa's Climate Change Mapping Report,* p 34.

[22] World Bank Group, *High Level Review of the Legal, Regulatory and Institutional Framework for the Implementation of Carbon Capture and Storage (CCS) projects in South Africa*, Report prepared by IMBEWU Sustainability Legal Specialists (Pty) Ltd., December 2010, ("World Bank Report"). The condition specifically relates to capture readiness as CCS, i.e., CCR as opposed to CCS – there is a conceptual distinction between these two ideas. This distinction has also given rise to the notion of Carbon Capture and Storage Ready (CCSR). For a consideration of CCSR see: International Energy Agency / Carbon Sequestration Leadership Forum, *Carbon Capture and Storage: Progress and Next Steps*, Report to the Muskoka 2010 G8 Summit, 2010.

[23] Loyiso Langeni, "SA to show BRICS way to carbon capture", Business Day, 6 September 2011, http://www.businessday.co.za/Articles/Content.aspx?id=152624

3. The national roadmap for deployment of CCS in South Africa

SACCCS has prepared a roadmap towards full commercial uptake of CCS comprising the following five step process and depicted in Diagram 1 below:

- Measurement of CCS potential (completed in 2004)
- South African CCS conference and Atlas on Geological Storage of Carbon Dioxide in South Africa (released 10 September 2010). The Atlas identified four possible CO_2 geological storage basins in SA. Two are considered as possible Test Injection areas, onshore because of cost considerations (Zululand Basin with UK support) and (Outeniqua Basin with European Aid support)
- Test injection sequestration of some tens of thousands of tonnes of CO_2 at a site still to be identified – 2016
- Demonstration plant sequestering some millions of tonnes of CO_2 – 2025 and beyond
- 2025 full industrial operation (note: this coincides with the LTMS objectives/targets for 2025)

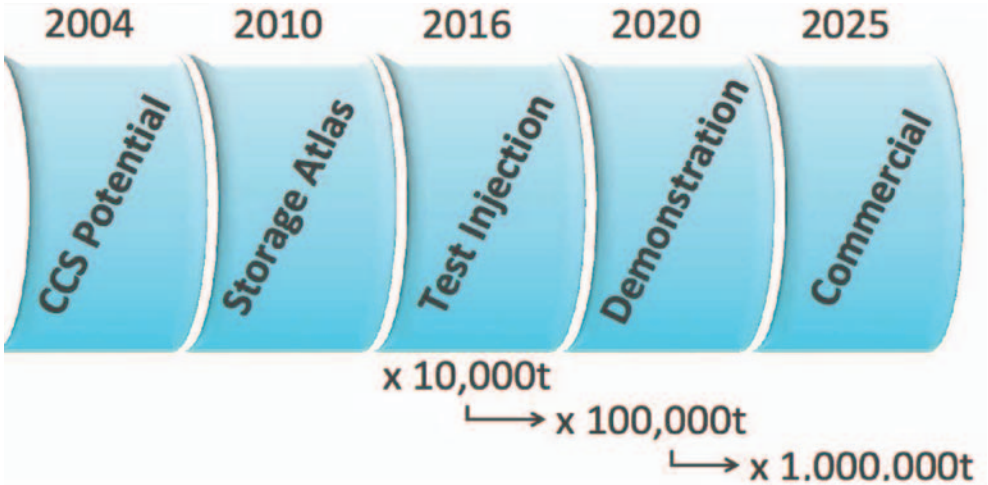

Diagram 1 (reproduced from: South African Perspective on CCS (South African Centre for Carbon Capture and Storage) http://unfccc.int/files/methods_and_science/other_methodological_issues/application/pdf/developing_national_demonstration_and_legal_framework.pdf

While South Africa has prepared this roadmap it lags in having a CCS-specific legal and regulatory regime in place within which to develop the technology. Nevertheless it has in place a suite of relevant environmental and other laws and sufficient time to develop an appropriate legal regime, as has been done in other jurisdictions.

4. Types of financial incentives available for CCS in South Africa

A broad distinction can be made between direct and indirect incentives both of which are currently still being developed in South Africa. While it is possible to identify a range of dynamically interacting drivers and incentives for CCS in South Africa (see section 1.2), e.g., government's determination to continue using the country's coal reserves juxtaposed with the country's international pledge to reduce its greenhouse gas emissions, there are at least two unique financial incentives that derive from the coalescing climate change legal regimes. This section briefly considers these unique financial incentives.

Firstly, a direct financial incentive is the fact that CCS qualifies as an eligible project activity under the UNFCCC's Clean Development Mechanism (CDM). This was decided relatively recently, at the Seventh Conference of the Parties Serving as the Meeting of the Parties under the Kyoto Protocol (CMP 7), held in Durban during December 2011. Decision 10/CMP.7 is entitled: *Modalities and procedures for carbon dioxide capture and storage in geological formations as clean development mechanism project activities*.[24] Provided that CCS projects: result in "real, measurable and long-term benefits related to the mitigation of climate change"[25] achieve emission reductions

[24] UNFCCC Conference of the Parties serving as the Meeting of the Parties 2010 *Decision 7/CMP.6: Carbon dioxide capture and storage in geological formations as clean development mechanism project activities* (FCCC/KP/CMP/2010/12/Add.2).

[25] Kyoto Protocol to the United Nations Framework Convention on Climate Change (1998) 37 *ILM* 22, Article 12(5)(b).

that are additional to those that would otherwise have occurred,[26] and assist in their host countries achieving sustainable development, such projects have the potential to earn Certified Emission Reductions, or carbon credits, under the CDM.

Secondly, as regards indirect financial incentives, a carbon tax is due to be implemented in South Africa in the near future.[27] The current suggestion is that the tax be introduced at a level of approximately R120 per ton of carbon dioxide equivalent, above specified thresholds.[28] This provides an indirect incentive for CCS, in that CCS would lead to reduced emissions, thereby lowering the liability of firms under the imminent carbon tax. A consideration in this context would be the relationship between the level of the carbon tax and the cost of CCS, reckoned in tonnes of carbon dioxide equivalent. A second draft discussion paper on the carbon tax is expected to be published for comment, by the Treasury, later in 2012.

Further economic investigation is suggested to assess the costs and benefits associated with the continued use of coal and invoking CCS in the short term as opposed to a more fundamental shift to renewables as a financial incentive for CCS. Related to this is the question of the financial incentive that would flow from an elevated international carbon price. This is because the financial incentives are likely to more than CDM and the carbon tax.

These aspects are touched on again in paragraph 23 below.

5. Considering the options: a policy preference for onshore storage or offshore storage or for transportation to another country

The *Atlas* indicates the existence of about 150Gt of potential storage capacity, or "pore space", in three geological storage types namely:

- deep saline formations;
- unmineable coal seams; and,
- depleted oil and gas reserves. [29]

These are located both onshore and offshore in Mesozoic basins that run along both the east and west coast of South Africa.

More pertinently the *Atlas* states that less than "... 2% of the estimated storage capacity of South Africa occurs onshore". The resultant 98% offshore total capacity is located in the Orange, Outeniqua and Durban/Zululand Basins, respectively – all within 240 km of the shore.[30] Any future legal and regulatory regime will have to take particular account of South Africa's International Law of the Sea obligations as well as its domestic coastal area legislation touched on below.

The *Atlas* also provides the map (see overleaf) and pertinent information.

The following should be noted:

Firstly, the estimated capacity of geological storage in South Africa is around 150 Gt (150 000 Mt) of CO_2; 0.46 Gt for the onshore Zululand Basin; 0.40 Gt for the onshore Algoa Basin; 1.2 Gt for the coalfields of South Africa. [31] This begs the question as to what is the likely CO_2 storage need. The SACCCS has been investigating this question with regard to the test injection site which has been initiated and will report in due course on this.

Secondly, there is some highly disaggregated potential for storage associated with Enhanced Coal-bed Methane [Recovery] (ECBM) from deep un-mineable coal seams, should an ECBM industry develop in South Africa.

While offshore capacity amounts to 98% of the total available storage, South Africa has announced plans for an onshore test injection project which will likely be financially more viable than an offshore test. This is planned for the Outeniqua basin in the Eastern Cape alternatively, or in addition to, the Zululand basin in northern KwaZulu Natal.

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[26] Ibid, Article 12(5)(c).

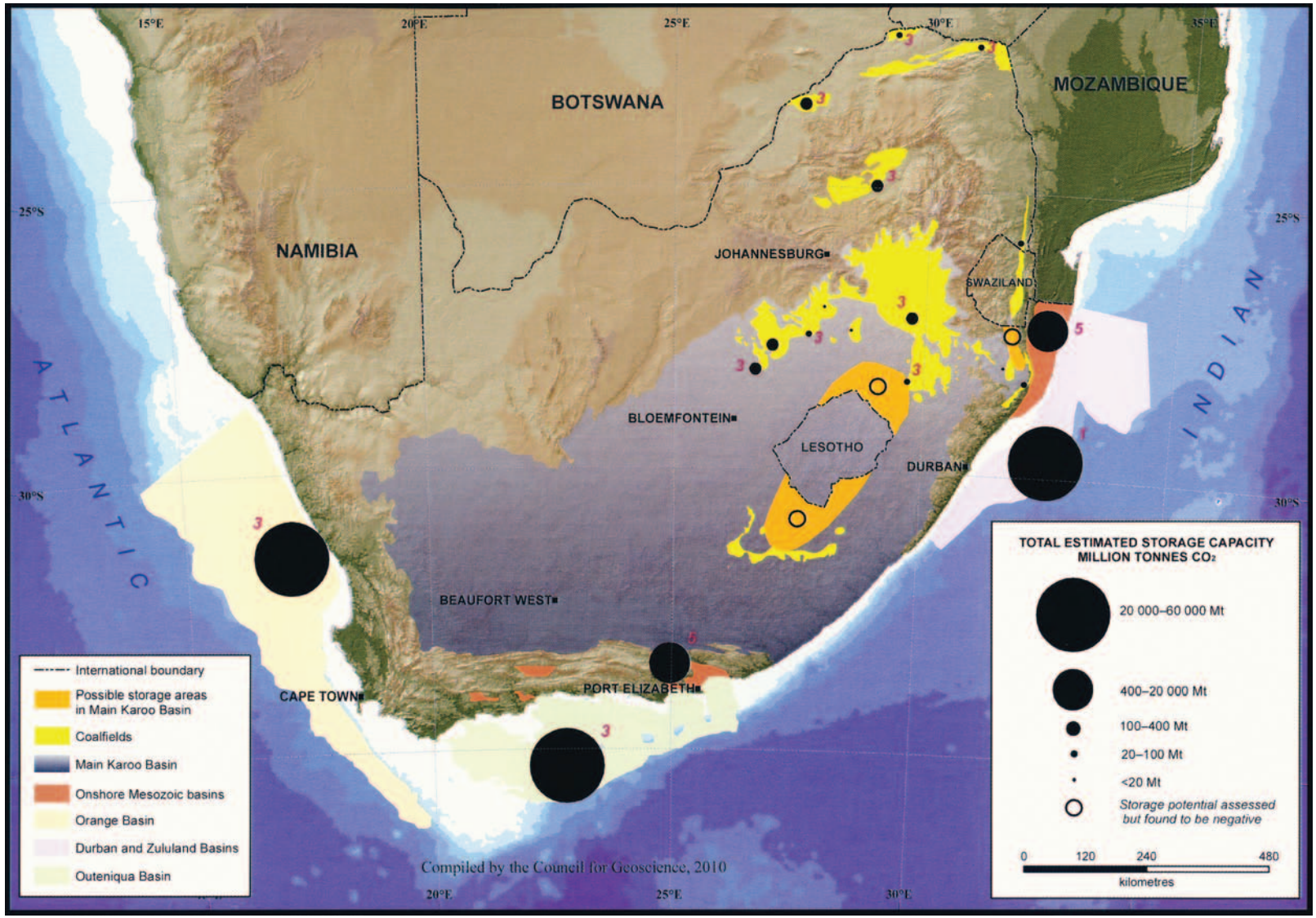
[27] Discussion Paper for public comment: *Reducing Greenhouse Gas Emissions, The Carbon Tax Option*, December 2010, National Treasury. The Paper promotes the idea of carbon tax to encourage emissions reductions. No reference is made to CCS in the document – however, carbon tax may work as impetus for further CCS development in SA. See also Minister of Finance Mr P Gordhan *2012 Budget Speech* (22 Feb 2012) p 16.

[28] South African Revenue Service *Tax Proposals Budget* 2012, pp 8–11.

[29] Council for Geoscience, *Atlas on the Geologocial Storae of Carbon Dioxide in South Africa*, 2010, at p 50.

[30] *Atlas*, ibid, at p 50 and fig 3.17.

[31] Ibid.



Map of possible deep saline formation storage opportunities onshore and offshore along the coast of South Africa and for the deep coalfields of the Karoo Basin. From: *Atlas on Geological Storage of Carbon Dioxide in South Africa,* 2010, Council for Geoscience, p 48. (Reproduced with permission.)

B. The legal and regulatory framework for CCS in South Africa

6. The state of legal and policy developments to enable CCS in South Africa and possible challenges that need to be overcome

6.1 Introduction

In 1994 South Africa transformed from a system of parliamentary sovereignty to a constitutional democracy underpinned by a progressive Bill of Rights contained in chapter 2 of the Constitution which is now the supreme law. Notwithstanding these developments and particularly relevant to CCS is the fact that underlying the Constitution is the South African common law, the historic Roman Dutch legal system, which reflects aspects of both the European civil law as well as English common law traditions. This system, supplemented by a growing body of statute law,[32] is to a large extent still intact today, and underpins many of the legal issues brought up by CCS such as ownership of "pore" space as well as the liability issues, discussed below.

6.2 Policy and legislative landscape

Currently there is no dedicated policy and/or legislative system for integrated CCS in South Africa; nor has the country promulgated any CCS specific legislation. However, CCS has featured in a number of policy documents such as both the Climate Change Response Green and White Papers elaborated on below. Furthermore, the Department of Energy (DoE) has initiated steps towards the development of a policy and legal regime for CCS in South Africa, in conjunction with the World Bank by issuing a tender for the development of a CCS regulatory framework.[33]

Other government departments that may, by virtue of their mandate, have an interest in CCS include: the Department of Mineral Resources (DMR), the Department of Science and Technology (DS&T); the Department of Water Affairs (DWA) and the Department of Environmental Affairs (DEA). The Department of Co-operative Government was established under the Minister of Co-operative Governance and Traditional Affairs with the objective of achieving co-operative governance alongside various government departments, including those mentioned above, as well as to deal with the administrative challenges that arise from overlapping spheres of governmental authority. It administers the Intergovernmental Relations Framework Act 13 of 2005 referred to in paragraph 16.1 below. In addition there are inter-ministerial committees comprising national Ministers and members of the provincial Executive Committees (the members of which are termed Members of an Executive Council (MECs), the mandate of which is to facilitate cooperative governance between government departments.[34] These include the MINMECs; for example the MINMEC: Environment and Nature Conservation – the members of which are the national Minister of Environmental Affairs, Deputy Minister as well as the provincial MECs of the nine environmental and nature conservation departments. Its purpose is to co-ordinate nature conservation and environmental management issues between national and provincial levels of government. There is a similar committee, known as MINTEC, consisting of the national Director-General of the DEA and the nine Directors of the provincial nature conservation departments. There are also the various Portfolio (national) and Standing (provincial) Committees, made up of members of Parliament and Provincial legislatures respectively, which facilitate public involvement and debate and amend policy and legislation. Working Groups, comprised of officials from the DEA and provincial departments and chaired by the Chief Directorate in DEA have also been established.

While CCS specific legislation and/or regulations are not currently in place but can be foreseen as being developed in the future, a number of existing legislative provisions ranging from environmental assessment regulations to common law liability principles would be the subject matter before the above committees and discussed below.

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[32] Of relevance is the Mineral and Petroleum Resources Development Act, 28 of 2002 discussed in para 9.2 below.

[33] World Bank / South African Department of Energy, *Terms of Reference for the "Development of a regulatory framework for Carbon Capture and Storage (CCS) – South Africa"*, 27 February 2012.

[34] "MINMEC" is thus a condensed acronym of "Ministers" and "MECs".

6.3 Regulatory developments

As indicated in both the World Bank Report (2010),[35] as well as in an international survey undertaken by Baker & McKenzie for the period November 2010 to June 2011,[36] there have been a number of relatively recent amendments and/or refinements to existing South African legislation and regulations that are relevant in the CCS context. These changes are on-going and include:

- Changes to relevant South African National Standards for the transport of hazardous / dangerous substances (CO_2 falls under the definition of "class 2 dangerous goods" in terms of South African National Standard (SANS 10228:2006 4th Edition). These national standards represent industry best practice or standards and are typically reviewed after a 2–5 year timeframe and on a case-by-case basis.
- During June 2010, the Department of Environmental Affairs published a new suite of environmental impact assessment (EIA) regulations and listed activities (GN R543, 544, 545, 546 and 547 of 18 June 2012, as amended). These were published with an aim of streamlining the authorisation application process and the activities required to be authorized prior to commencement.
- In July 2011 the Department of Environmental Affairs published a number of draft waste regulations and norms and standards for comment. These include but are not limited to the Draft Waste Classification and Management Regulations (GN 435 of 1 July 2011) and the Draft National Norms and Standards for the storage of Waste (GN 436 of 1 July 2011).
- Proposed amendments to the National Environmental Management: Integrated Coastal Management Act.
- Integrated Resource Plan 2010 – provides for electricity planning up to 2030.

6.4 Policy developments

- The DoE as the lead agency in CCS matters, refers to CCS in its annual 2011 Strategic Plan.[37] It sets out the mandates of the DoE, planned policy initiatives, organisational structure, a "situation analysis", strategic objectives of the DoE and links to other plans. CCS is listed as an "intermediate outcome" with regard to the "strategic outcome" of "mitigation against and adaptation to the impacts of climate change".[38] The strategic plan sets out the targets/milestones in regard to meeting this outcome, including that the first draft of the CCS regulatory framework was to have been published by the end of last year and a second draft is to be submitted for approval by the end of June 2012.[39]
- The *National Climate Change Response White Paper* (October 2011) identifies CCS as one of the medium term mitigation options with the biggest mitigation potential. Under the heading "The Carbon Capture and Sequestration Flagship Programme" it states:

  "Led by the DoE in partnership with the South African Energy Research Institute, the programme includes, among other initiatives, the development of a Carbon Capture and Sequestration Demonstration Plant to store the process emissions from an existing high carbon emissions facility"[40]

The White Paper also refers to CCS as a mitigation option in the synthetic fuels industry.[41]

- *The National Climate Change Response Green Paper* which preceded the above mentioned White Paper (November 2010) amongst other things referred to the need to support accelerated research, development and implementation of CCS applications for CO_2 rich industrial process emissions, especially those related to the coal-to-liquid process. It also refers to the fact that some greenhouse gas emissions are not specifically energy-related, such as the process emissions associated with the coal-to-liquid conversion process and in the manufacturing of cement and draws the conclusion that significant reductions for these sources will only be achieved through the use of technology that is still under development and potentially very expensive such as CCS. It also notes that a legislative policy and regulatory framework needs to be developed to support CCS in South Africa.

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[35] World Bank Group, *High Level Review of the Legal, Regulatory and Institutional Framework for the Implementation of Carbon Capture and Storage (CCS) projects in South Africa*, IMBEWU Sustainability Legal Specialists (Pty) Ltd., December 2010 (World Bank Report 2010).

[36] Baker & McKenzie (2011). *Report to the Global CCS Institute on Legal and Regulatory Developments related to Carbon Capture and Storage between November 2010–June,* 2011 p 65.

[37] *http://www.energy.gov.za/files/aboutus/DoE%20Strategic%20plan%202011_12%20-%202015_16.pdf*

[38] At p 21.

[39] At p 78.

[40] At paragraph 8.7 p 32.

[41] Para 6.3 p 27.

- A further policy development is *South Africa's National Development Plan 2011* which identifies CCS as a necessary activity to move to a different energy context by 2030.[42] It states that cleaner coal technologies will be promoted by among other things the development of carbon capture and storage.
- A further relevant policy-related development includes the award, by the World Bank, of a consultancy contract for the development of a CCS regulatory framework in South Africa. It is anticipated that the work will commence in July or August 2012 and is scheduled to run for eleven months. The deliverables of the consultancy contract include
  - "Gap and barrier analysis of South African legal and regulatory environment, including concrete recommendation how they can be mitigated, proposed timeline and drafts of the proposed legislative changes.
  - Detailed prioritisation of the necessary steps and action plan for development and implementation of the CCS regulatory framework in South Africa.
  - At least two training sessions for South African government officials, expected to last a few days. The aim of the first session will be to familiarise the participants with the basics of the CCS technology and regulatory environment, while the second session will be focused on the outcome of the consultants' work and recommendations.[43]

CCS is accordingly on the policy agenda but barriers to its implementation include funding constraints, lack of capacity and support and slow moving policy and regulatory frameworks.

7. Legal processes which are or will be followed and undertaken to implement CCS in South Africa

The conventional route is for the lead agency, in this case the DoE, to publish first a Green Paper hypothetically titled *Towards a regulatory regime for Carbon Capture and Storage in South Africa* for discussion and comment purposes. Its formulation would include public participation with all stake-holders. These will be identified in the environmental assessment process required under the NEMA "June 2010" environmental assessment regulations referred to below. This would be typically followed up with a White Paper on the subject.

Ostensibly to this end an Inter-Departmental CCS Committee has been established which commenced it its work at time of writing (June 2012). Thereafter the conventional route would be for the DoE to develop draft legislation which would be tabled in Parliament. This process is likely to take a few years and in the interim, until dedicated CCS legislation is enacted, specific impediments could be addressed by inclusion in existing legislation by way of amendment as discussed further below.

C. Integration with existing environmental law generally

8. Novel legal issues not yet encountered in existing national environmental/energy law but raised by CCS activities

8.1 Introduction

CCS-related activities raise some novel or "not encountered before" mining and/or environmental law issues. This is mainly because while mining entails the extraction of a natural (usually solid) resource from the ground, CCS entails injecting or inserting a possibly harmful substance into the ground. The nature of the substance injected is also novel in that it does not fall neatly into one of the conventional categories of "solid", "liquid" or "gas" but is "supercritical" in form according to scientists, thus raising new questions around whether it is

[42] National Development Plan p 153.

[43] World Bank, *Terms of Reference – Development of a CCS Regulatory Framework in South Africa*, 27 February 2012, at p 7.

a "waste" as discussed in the next section.[44] Thus while mining law is liked to CCS-related activities it is not directly applicable to it.

A further linkage is that historically the DMR and the DoE fell under the administration of one Minister – the Minister of Minerals and Energy. But in 2009 with President Zuma taking up office these were split with a new Minister being appointed to head up the DoE. Although the DoE has enacted the Energy Act 34 of 2008, it does not contain any licensing provisions; these remain with the Minister of Mineral Resources who is empowered to issue licences for not only mineral related activities but also energy resource extraction such as petroleum and gas extraction under the Mineral and Petroleum Resources Development Act 28 of 2002. There are thus many energy related activities which for historical reasons still reside within the Department of Mineral Resources. Nevertheless the Department of Energy appears to be the lead agency for CCS related activities.

8.2 Novel legal issues

Following on from the above some novel legal issues include the following:

- Although South Africa is a party to the 1972 London Dumping Convention, it has not as yet adopted the 1996 Protocol. The question nevertheless arises whether offshore CCS amounts to dumping as defined in the Conventions as well as falling in the definition of "dumping" in the National Environmental Management Act: Integrated Coastal Management Act 24 of 2008 which repeals and replaces the Dumping at Sea Act, 73 of 1972.
- The question of who owns the pore space is discussed in detail in paragraph 12 below.
- The environmental right in the Bill of Right includes a right to an environment which is not harmful to health and well-being as well as among other things referring to the right of future generations. This leads to the question whether potential future liability for stored CO_2 may invoke the notion of inter-generational rights. The environmental right has so far been used circumspectly by the courts and the right of future generations has not been specifically referred to in the courts. It is thus unlikely that the notion of inter-generational equity will present an obstacle in the development of a CCS regulatory regime.[45]
- More likely is the application of the "precautionary principle" which is included in the National Environmental Management Act, 107 of 1998 (NEMA) national environmental management principles in the following terms:

  "... a risk-averse and cautious approach is applied which takes into account the limits of current knowledge about the consequences of decisions and actions".[46]

  The precautionary principle is novel in South African law and has not yet been tested in a court.
- A further novel question brought about by CCS is whether the liquid (or "supercritical") CO_2 which is deposited amounts to either "waste" or "hazardous waste" both of which are defined in the NEM Integrated Waste Act 59 of 2008 (the "Waste Act"). The Waste Act defines "waste" as:

  "any substance, whether or not that substance can be reduced, re-used, recycled and recovered –
  (a) that is surplus, unwanted, rejected, discarded, abandoned or disposed of;
  (b) which the generator has no further use of for the purposes of production;
  (c) that must be treated or disposed of; or
  (d) that is identified as a waste by the Minister…
  and includes waste generated from the mining, medical or other sector, but:
  (i) A by-product is not considered waste; and
  (ii) Any portion of waste, once re-used, recycled of recovered, ceases to be waste".[47]

From a reading of (a) to (c) above it seems clear that "supercritical CO_2" intended for the purposes of CCS falls into the definition of "waste". The implication of this is that the CCS project proponent will have to comply with the licensing requirements of the Waste Act which include requirements for the storage and handling of waste, especially hazardous waste. These are more onerous than the requirements for the handling of substances or products including by-products used in industrial processes.

However the question which then arises is whether the supercritical carbon amounts to a "by-product" because, if so, it will excluded from the definition of "waste". The term by-product is defined in the Waste Act

[44] As discussed below it is unlikely that this would be regarded as a "hazardous waste" as defined in the NEM: Waste Act 59 of 2008 discussed below. The phrase "supercritical form" has been described above.

[45] The notion is more likely to be invoked by the anti-nuclear lobby but there are no indications that this will be the case.

[46] S 2(4)(a)(vii).

[47] Section 1.

as "a substance that is produced as part of a process that is primarily intended to produce another substance or product and that has the characteristics of an equivalent virgin product or material".[48] A technical guideline on the definition of waste, produced by the DEA, provides further insight into the question and indicates that: "... a by-product must fulfil the following conditions:

- The substance produced must be produced as part of a process that is primarily intended to produce another substance or product;
- The substance must demonstrate the equivalent chemical and physical characteristic of an equivalent virgin product or material;
- The substance or object can be used directly without any further processing."[49]

It appears that the (liquid) supercritical CO_2 intended for the purposes of CCS is not a by-product as defined in the Waste Act. We are accordingly of the view that the substance falls within the definition of "waste". In consequence the more onerous requirements flowing from the Waste Act, for the storage and handling of the supercritical substance to be stored will have to be complied with.[50]

A further and related question is whether the "supercritical" carbon dioxide injected into the storage space amounts to "hazardous waste". The Waste Act is defines "hazardous waste" very widely, namely:

> "*any waste that contains organic or inorganic elements or compounds that may, owing to the inherent physical, chemical or toxicological characteristics of that waste, have a detrimental impact on health and the environment;*"[51]

It is submitted that supercritical carbon is likely to fall into this broad definition. This is supported by the classification of CO_2 in SANS code 10228 namely as a Class 2 Dangerous Good which is a gas that is non-flammable, non-toxic and is either an asphyxiant or oxidizing. It is concluded that the CO_2 to be sequestrated would be considered hazardous waste in South Africa's current waste management legislation. Although all indications point in this direction little detail can be obtained as to the implications of such classification and it is currently unclear how different types of hazardous wastes will be treated in the Act. In July 2011, the Department of Environmental Affairs published for comment Draft Waste Classification and Management Regulations (GG 34417 GN553 of 1 July 2011). It has been confirmed by the Department that these Regulations were to be promulgated in the first half of 2012 but as yet this has not been done. When they are promulgated they will provide a much needed classification and management system for the hazardous waste management regime.

These requirements will have to be carried out by the "holder of waste". The latter term is defined as: "... any person who imports, generates, stores, accumulates, transports, processes, treats, or exports waste or disposes of waste."

While we are of the view that supercritical carbon does fall into the definition of (hazardous) waste, it should be pointed out that in some jurisdictions the notion of CO_2 being a commercial product has led to CO_2 not being classified as a waste for the purposes of a CCS project.[52]

9. Application of existing national mining, environmental and energy laws; assessment of their implementation in practice

9.1 Introduction

A distinction must be made at the outset between environmental laws on the one hand and energy laws on the other because the former (particularly environmental assessment legislation) has been on the statute book and implemented for about two decades while energy legislation, particularly the National Energy Act 34 of 2008, has only appeared in the statute book relatively recently and its implementation remains largely untested. Reference is also made to mining laws because, although these apply to natural mineral resource extraction and CCS entails the insertion of a "supercritical" substance into the ground, there are many analogies as mentioned in paragraph 8.1 above.

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48 See section 1.

49 Department of Environmental Affairs, *Understanding the Definition of Waste*, 9 June 2010.

50 Section 20 of the Waste Act.

51 Section 1, the National Environmental Management: Waste Act 59 of 2008.

52 The EU CCS Directive excludes it from the definition of "waste".

9.2 Mining laws

The central legislation currently regulating virtually all aspects of mining in South Africa is the Mineral and Petroleum Resources Development Act 28 of 2002 (the MPRDA), which came into force in May 2004.[53] A distinctive feature of the Act is the emphasis on sustainable development and environmental protection.

9.3 Environmental laws

The umbrella environmental statute is the National Environmental Management Act, 73 of 1998 (the NEMA). This provides for detailed environmental assessment regulations (the latest being the June 2010 EIA regulations referred to in 6.3 above) which repeal and replace previous environmental assessment regulations. These have over the years been subject to judicial scrutiny. In the result there is a fairly sophisticated body of environmental jurisprudence dealing with not only environmental assessment but related issues such as public participation, access to information and administrative decision-making in the environmental law sphere.

Amongst other things the NEMA provides for a general statutory duty to take "reasonable measures" in certain stipulated circumstances (section 28 titled "Duty of Care"), elaborated on in 13.3.1 below. In so doing the section provides for a liability regime if the designated person fails to take the necessary stipulated measures. This section complements traditional common law liability under the law of delict (tort law).

In addition the Department of Environmental Affairs established the posts of Environmental Management Inspectors (EMIs or so-called "Green Scorpions") during 2004 to enforce not only the NEMA (a number of enforcement related amendments were inserted into the NEMA at this time) but also a number of related "specific environmental management acts" such as the NEM: Protected Areas Act 57 of 2003.

9.3 Energy laws

As mentioned these have not been extensively implemented as the Energy Act is a relatively new piece of legislation. Be that as it may existing national mining, environmental and energy laws will play a guiding role in the legal development of CCS activities since these laws provide a detailed framework of procedural, liability and other issues. These existing regulations and measures should form a basis upon which CCS legislation and policy are developed and built-on, as well as a measurement as to what amendments are necessary, what regulations have taken effect and what supplementary issues need to be addressed.

10. Constitutional provisions relating to the environment or other matters that will have a significant influence on the way CCS legislation and regulation will be developed

As mentioned in paragraph 7.1 above, South Africa has shifted from a system of parliamentary sovereignty to a constitutional democracy underpinned by a progressive Bill of Rights contained in chapter 2 of the Constitution which is now the supreme law of the land. All law and conduct need to be consistent with the Constitution. Chapter 2 of the South African Constitution contains the Bill of Rights which applies to all law, binds the legislature, the executive, the judiciary and all organs of state. Apart from containing a right to an environment in section 24, the Bill of Rights includes Property rights (section 25), a right of Access to Information (sect 32) and the right to Just Administrative Action (sect 33).

In Earthlife Africa (Cape Town) v Director-General: Department of Environmental Affairs and Tourism and Eskom,[54] the applicant NGO took the decision of the Director-General authorising Eskom to construct a pebble-bed modular reactor (PBMR) on review. It argued that the right to procedural fairness under the Promotion of Administrative Justice Act, 3 of 2000, (PAJA) includes the right to fair public participation. The court held that the *audi alteram partem* ("let the other side be heard") principle is applicable not only at the first stage of public participation, where NGO is able to comment on the initial draft environmental impact report, but also that the right applied to further drafts which may be submitted for consideration by the competent authority. The court thus found that procedural fairness required that the *audi* rule also be applied at the second stage of the environmental assessment process.[55] This accepted principle of law will be applied to the development of CCS-specific policy and law, and to the implementation of CCS projects.

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[53] On 1 May 2004, Proc R25 in *Government Gazette* No 26264 dated 23 April 2004.

[54] 2005 (3) SA 156 (C).

[55] At para 58.

D. Ownership of pore space

11. The question considered here is whether the national law is clear on who owns the pore space suitable for CO_2 storage, both onshore and offshore?

11.1 Introduction

In the CCS context geological formations contain microscopic spaces more commonly referred to as "pore space". This "pore space" is the space into which the CO_2 to be sequestrated is absorbed. While the geological formation itself may be fairly large (e.g., instances where depleted natural gas reservoirs are used for CCS), the actual pore space into which the injected CO_2 will migrate is often microscopic, e.g., the spaces existing within porous rock; alternatively the space may not be completely empty prior to the injection, e.g., where the pore space is provided by an underground saline aquifer.

As noted above, the CCS Atlas indicates that 98% of the potential for CCS lies offshore. Nevertheless it is important to understand the legal dimensions of onshore storage for the reason that although the majority of South Africa's CCS storage capacity is offshore, the South African government has indicated that the first CCS project, a test injection, will commence at a selected onshore geological storage site primarily due to logistical and capacity building considerations. A further consideration is that the South African onshore legal regime continues to apply to the offshore, in varying degrees and largely dependent on distance from the shore. However it is not necessary to consider South Africa's jurisdiction beyond the Exclusive Economic Zone (EEZ) of 200 nautical miles, as current indications are that all offshore storage capacity is located within the EEZ. Consequently, certain conclusions drawn with regard to the application of the onshore CCS legal regime will continue to apply, to some extent, to the offshore area.

As regards the question of who owns the CO_2 intended for injection into the pore space. Ownership of the pore space and of the CO_2 should be differentiated, i.e., ownership of these may vest in different entities / persons. Various considerations flow from this differentiation. For example, the likelihood exists that the owner of the pore space and the owner of the CO_2 will need to conclude a rental agreement for the utilization of the pore space for CCS. Such rental agreement will likely specifically assign, to one or other of the parties, those responsibilities that usually follow ownership / control of land but which can be modified by contract, e.g., liability for damage that might be caused by activities undertaken on the land. The specific question to be addressed is whether the national law is clear on who owns the pore space suitable for CO_2 storage, taking into account both onshore and offshore sequestration potential. In this regard both the South African common law as well as statute law, particularly the minerals legislation and case law, are instructive.
Using the analogy of mining law, there are three categories of land in South Africa pertinent to CCS:

- Alienated state land (state land): where the land and mineral rights are owned by the State;
- Un-alienated state land: where the land is not owned by the State but it has reserved the mineral rights attached to that land; and,
- Private land: where the land is privately owned.

Although we are not, necessarily, concerned with mining law in the CCS context, the above three categories may be relevant to compliance and planning law procedures where CCS is to occur in the terrestrial environment; only state land is pertinent to the marine environment.

At present specific South African environmental legal provisions seeking to regulate ownership of pore space intended for CO_2 sequestration do not exist. In the absence of such activity-specific law, this section considers how ownership of pore space might be regulated according to the common law and by taking some guidance from peripherally relevant legislation, such as that dealing with mining and minerals extraction. Ownership is an issue that is likely to receive further consideration as the regulatory provision or policy gets underway.

11.2 Onshore

In the absence of specific regulation of the ownership of pore space, it is necessary to seek to apply certain common law principles, which relate to the ownership of land, to this question. The common law principle of *cuius est solum, eius est usque ad coelum et ad inferos* (*"whoever owns the soil, it is theirs up to the heavens and down to hell"),* has

relevance in this regard. This principle was re-iterated in South African law in the matter of *London and SA Exploration Co v Rouliot (1891) 8 SC 75*[56] and, more recently, was confirmed by the Supreme Court of Appeal, in *Anglo Operation Ltd v Sandhurst Estates (Pty) Ltd and Others (2006) SCA 146 (RSA),* in which it was held the "the owner of the land not only owns the surface of the land but everything below and above it."[57] Under this common-law maxim it can be argued that, in the absence of legislative and/or contractual provisions to the contrary, the owner of the surface of the land located above the geological formation identified for CCS (and therefore the pore space in such formation) not only owns the surface of the land and everything above but would also own the subterranean pore space. It therefore follows that once the CO_2 has been injected into the pore space, the owner of the surface of land above the pore space is also likely to become the owner of the CO_2.

While the MPRDA is the primary South African statute dealing with subsurface rights it is not, currently, directly relevant to the implementation of CCS projects primarily due to its defined application.[58] However, the manner in which the MPRDA treats ownership rights in the subsurface is instructive. Essentially, the operation of the MPRDA determines that the ownership of minerals found in the subsurface of privately owned land lies in the custody of the South African State.[59] However, the mine shaft, pit and crevice from which the minerals are extracted would (assuming a scenario in which the landowner is also the holder of the mining right permitting the extraction of the minerals and in the absence of contractual provisions to the contrary), remain the property of the surface land owner.[60] This is, effectively, the common law position in regard to subsurface rights *sans* the landowner's common law right of ownership of the minerals which would, in the absence of mineral-specific legislation, arise by operation of the landowner's right to own not only the surface of the land, but everything below and above it. The landowner's common law right of ownership of the minerals has been assumed by the State (by operation of the MPRDA), i.e., the landowner's common law right in the land remains intact but for the right of ownership of the minerals. Given that pore space is not a mineral and, consequently, not regulated by the MPRDA, the landowner's right of ownership of the pore space is not affected by the MPRDA's approach to the ownership of mineral rights.[61]

It is essential to note that the above discussion of the common law position is capable of being varied by operation of contract and legislative provisions. Consequently, this common law analysis is not the final word on the question of ownership of pore space but is, rather, the point of departure for context-specific analysis, e.g., the context provided by the facts of an identified CCS project (location of the injection site, ownership of the land and the terms according to which the activity of injection is to be undertaken). The remainder of this part considers a few (non-exhaustive) implications flowing from this analysis of pore space ownership:

- Geographical extent of pore space: Subsurface geological features used for CCS projects are unlikely to respect the boundaries of landownership imposed at the surface. This means that the potential exists that such subsurface geological features may extend under land owned by a number of different individuals / entities and, consequently, be subject to a range of legal regimes.
- Accession of CO_2 to the pore space: While not directly relevant to the question of who owns the pore space, the common law principle of *accessio* (accession) is likely to have implications for who has responsibility / liability for the CO_2. In certain instances the operation of this principle in the CCS realm would mean that the owner of the land in which the pore space is located would, by virtue of his / her / its ownership of the pore space, and in the absence of contrary agreement, also become owner of the CO_2. The assumption is that the CO_2 accedes to the pore space which would be the case where, over time, the CO_2 actually bonds with the rock in the geological formation, i.e., becomes mineralised, thus becoming indivisible from the rock. The situation might be less

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[56] *London and SA Exploration Co v Rouliot (1891) 8 SC 75,* at 83.

[57] *Anglo Operation Ltd v Sandhurst Estates (Pty) Ltd and Others (2006) SCA 146 (RSA*), at 16. The principle of c*uius est solum, eius est usque ad coelum et ad inferos* is discussed in the World Bank Report drafted by IMBEWU Sustainability Legal Specialist (Pty) Ltd entitled *"High Level Review of the Legal, Regulatory and Institutional Framework for the Implementation of Carbon Capture and Storage (CCS) projects in South Africa"* dated December 2010.

[58] The MPRDA primarily regulates the winning of minerals or petroleum products from the ground. In terms of the current definitions of "mineral" and "petroleum products" as contained in the Act, CO_2 is not included and therefore falls outside the scope of the Act.

[59] The MPRDA "recognizes the internationally accepted right of the State to exercise sovereignty over all of the mineral and petroleum resources…" within South Africa (section 2(a)), and that such resources are "the common heritage of all the people of South Africa and the State is the custodian thereof for the benefit of all South Africans" (section 3(1)).

[60] It is fairly typical, in South Africa, for a mining house that is not the owner of the land from which the minerals are to be extracted to conclude a lease agreement for utilization of the land as a mine, with the landowner. The point is that, while authorization to extract the minerals comes from the State, permission to use the land derives from the landowner.

[61] An analysis of the ownership of pore space in the United States (Wyoming) produces a similar result. In that state, when a mining license is given over a particular piece of land, the permission extends to the extraction of the minerals and the reasonable use of the land in order to achieve that extraction, while at all material times the land and earth surrounding the minerals continues to belong to the landowner. Anderson, O., L., "Geologic CO_2 Sequestration: Who Owns the Pore Space?" *Wyoming Law Review*, Volume 9 (2009) Number 1 at 2.

clear if the CO_2 remains separate, e.g., if the CO_2 is retained in the subsurface by an impermeable cap rock or where the reservoir used for the CCS project is a depleted oil or gas field.

- Licensed disposal of waste: South African CCS projects will require a number of environment legal authorisations for their commencement and operation. The requirements of the authorisations will have some impact on the rights and responsibilities usually associated with ownership. For example, it has been pointed out above that the injection of CO_2 under current South African legislation would be regarded as the disposal of waste, for which a Waste Management License is required. In this case the responsibility and liability attached to the CO_2 would be borne by the holder of Waste Management License while, in the absence of contrary agreement, ownership of the surface and subsurface land will remain with the landowner.

11.3 Offshore

In addition to elements of the common law a suite of legislation has application in South Africa's coastal and offshore areas, the operation of which tends to complicate the question of ownership of pore space. Turning, firstly, to the segmentation of the whole area included in the terms "coastal" and "offshore", the Maritime Zones Act No 15 of 1994 is relevant:

- Section 3 provides for "internal waters", namely those waters landward of certain baselines drawn with respect to longitudinal and latitudinal coordinates provided for in the Schedule to the Act and with an outer limit demarcated as the outermost harbour works which form an integral part of the harbour system.
- Section 4(1) provides that the "… sea within a distance of twelve nautical miles from the baselines shall be the territorial waters of the Republic", and section 4(2) provides that "*any law in force in the Republic, including the common law, shall also apply in its territorial waters and the airspace above its territorial waters*" (our emphasis).
- Section 7(1) of the Maritime Zones Act provides that the sea "… beyond the territorial waters … but within a distance of two hundred nautical miles from the baselines, shall be the exclusive economic zone of the Republic". In terms of section 7(2) of the Act, *within its exclusive economic zone South Africa has, subject to other law of the Republic and in respect of all natural resources in the exclusive economic zone, the same rights and powers as it has in respect of its territorial waters.*

The coastal zone is specifically regulated in terms of the National Environmental Management: Integrated Coastal Management Act 24 of 2008 (NEM: ICMA) which largely repealed the Sea Shore Act No 21 of 1935. Section 1 of the NEM: ICMA defines "coastal zone" to mean "the area comprising coastal public property, the coastal protection zone, coastal access land and coastal protected areas, the seashore, coastal waters and the exclusive economic zone and includes any aspect of the environment on, in, under and above such area".[62] The Act is administered by the DEA and section 11(1) provides that the ownership of "coastal public property" vests in the citizens of South Africa and is held in trust by the State of behalf of those citizens. The Act further provides that coastal public property is inalienable and cannot be sold, attached or acquired by prescription and rights over

[62] Section 1 of NEM: ICMA defines "coastal public property" to mean coastal public property referred to in section 7 of the NEM: ICMA and section 7 provides that "coastal public property" consists of –
(a) coastal waters [which are defined as "marine waters that form part of the internal waters or territorial waters of the Republic referred to in sections 3 and 4 of the Maritime Zones Act, 1994 (Act No. 15 of 1994), respectively"];
(b) land submerged by coastal waters, including –
  (i) land flooded by coastal waters which subsequently becomes part of the bed of coastal waters; and
  (ii) the substrata beneath such land;
(c) any island, whether natural or artificial, within coastal waters, but excluding –
  (i) any part of an island that was lawfully alienated before this Act commenced; or
  (ii) any part of an artificially created island (other than the seashore of that island) that is proclaimed by the Minister to be excluded from coastal public property;
(d) the seashore, but excluding –
  (i) any portion of the seashore below the high-water mark which was lawfully alienated before the Sea-Shore Act, 1935 (Act No. 21 of 1935), took effect or which was lawfully alienated in terms of that Act and which has not subsequently been re-incorporated into the seashore; and
  (ii) any portion of a coastal cliff that was lawfully alienated before this Act took effect and is not owned by the State;
(e) the seashore of a privately owned island within coastal waters;
(f) any admiralty reserve owned by the State;
(g) any State-owned land declared under section 8 to be coastal public property; or
(h) any natural resources on or in –
  (i) any coastal public property of a category mentioned in paragraph (a) to (g);
  (ii) the exclusive economic zone, or in or on the continental shelf as contemplated in sections 7 and 8 of the Maritime Zones Act, 1994 (Act No. 15 of 1994), respectively; or
  (iii) any harbour, work or other installation on or in any coastal public property of a category mentioned in paragraphs (a) to (h) that is owned by an organ of State".

it cannot be acquired by prescription. The State is responsible for the management, control and conservation of the coastal public property, which responsibilities must be carried out in the interest of the whole community.[63]

A minor anomaly in the operation of NEM: ICMA is that section 11, which provides for the vesting of ownership of coastal public property in the citizens of the Republic, is not yet in operation. This means that the legal position pertaining prior to the promulgation of the NEM: ICMA is currently applicable, namely the position prescribed by the Sea Shore Act No 21 of 1935. Section 2(1) of the Sea Shore Act provides that the State President is the owner of the sea-shore and the sea which shall not be capable of being alienated or let except as provided by the Sea Shore Act or any other law, and shall not be capable of being acquired by prescription (section 2(3)).[64] To summarise the abovementioned geographical / jurisdictional considerations:

- The Maritime Zones Act provides that South African legislation and common law applies to its "territorial waters" which extend for a distance of twelve nautical miles from the coast.
- The net effect of the Sea Shore Act read with NEM: ICMA is that (currently) the President owns the sea which comprises the water and the bed of the sea below the low water mark and within the territorial waters of the Republic and the sea-shore. It is anticipated that this situation will change, in time, upon the final repeal of the Sea Shore Act and full operation of the NEM: ICMA.
- Upon the final repeal of the Sea Shore Act, the citizens of the Republic will own the "coastal public property". The State is responsible for the management, control and conservation of the "coastal public property", which responsibilities must be carried out in the interest of the whole community.
- "Coastal public property" includes "coastal waters" which cover "territorial waters" and "internal waters", the latter likely to include the sea-shore (although this is not explicitly provided for in the NEM: ICMA).
- Subject to other South African law, the country has the same legal rights in respect of all natural resources in a two hundred nautical mile exclusive economic zone as it has in its "territorial waters".

The following implications flow from these geographical / jurisdictional considerations in the context of the question of ownership of pore space in the offshore environment:

- Up to the extent of the territorial sea:
  - Current position: the President owns the subsurface of the sea shore and the sea-bed to the extent of the territorial sea, including the potential pore space to be utilised as storage site for a CCS project.
  - Upon the final repeal of the Sea Shore Act: In ensuring that the rights contained in section 24 of the Constitution, namely the environmental right, the State must safeguard the implementation of NEM: ICMA as the trustee of the "coastal zone". By operation of the definition of "coastal zone" (the area comprising coastal public property, the coastal protection zone, coastal access land and coastal protected areas, the seashore, coastal waters and the exclusive economic zone and includes any aspects of the environment on, in, ***under*** and above such area), the State will own the subsurface including the pore space potentially to be used for CCS projects.
- Beyond the territorial sea up to the extent of the exclusive economic zone, or in or on the continental shelf: the citizens of the Republic own natural resources found in these areas (because these natural resources are part of "coastal public property"). It is not a foregone conclusion that pore space in the exclusive economic zone, or in or on the continental shelf can be regarded as a natural resource. However, given that the set of natural resources beyond the territorial sea and up to the extent of the exclusive economic zone, or in or on the continental shelf, typically, includes minerals (which occur in the subsurface of the seabed), it is certainly arguable that pore space (which also occurs in the subsurface of the seabed) can also be regarded as a natural resource and is owned by the citizens of the Republic. Note, however, that the conceptual certainty that comes with the application of the common law principle c*uis est solum* (*"whoever owns the soil, it is theirs up to the heavens and down to hell"),* in the area up to the extent of the territorial sea cannot be obtained beyond the limit of the territorial sea. This is for the reason that the right of ownership in the area beyond the territorial sea is limited to the ownership of natural resources and does not include the full bundle of rights that accrue with unencumbered ownership.

It is currently unclear as to which technology CCS project activity located offshore will utilise as the means of injection CO_2 into the identified storage reservoirs. Options might include direct injection of CO_2 from a pipeline running from an onshore installation. The Gas Act regulates gas transmission, storage, distribution, liquefaction and

[63] Section 12 of NEM: ICMA.

[64] The Sea Shore Act (section 1) defines "sea" to mean "the water and the bed of the sea below the low water mark and within the territorial waters of the Republic…", and "sea-shore" to mean "the water and land between the low water mark and the high water mark".

regasification facilities for specified gases (predominantly hydrocarbon gases). The National Heritage Resources Act stipulates that any person who intends to undertake a development categorized as "the construction of a . . . pipeline" must notify the responsible heritage resource authority.

E. Liability and transfer of responsibility

12. The issue of potential long-term liability and the way forward

12.1 Introduction

Liability issues can be operational (capture, transport, injection & storage) as well liability related to leakage and/or migration of CO_2. Long-term liability refers to "any liabilities arising after the permanent cessation of CO_2 injection and active monitoring of the site".[65]

12.2 Common law

Underlying any statutory provisions dealt with in 12.3 is a rich body of common law known as the law of delict (law of tort in the English common law jurisdictions) which will be pertinent to both short and long term liability for CCS-related operations. The South African law of delict seeks to compensate the injured party and at the same time it "prescribes a set of ethical rules and principles for social interaction."[66] Du Bois *et al* state that "[a] delict … [is] committed when the defendant's wrongful and culpable conduct causes harm to another in the form or either patrimonial loss or infringement of an interest of personality."[67]
For purposes of CCS related operations the following are the essential requirements for delictual liability:

- there must have been an act or omission;
- the act or omission must have been wrongful;
- fault, in the form of either intention or negligence, has to be present;
- harm to person or property must have been suffered in the form of quantifiable monetary damages, referred to as patrimonial loss (although sometimes pure economic loss is also recoverable);
- there must have been causation, in that the act or omission of the defendant must have caused the harm, and this must be present in both the factual and legal sense, the latter usually being referred to as the issue of remoteness.

Although the general rule for delictual liability is that the defendant must have been at fault, there are some instances of *strict liability*,[68] meaning that liability is not dependent on the fault or negligence of the defendant. In such cases liability may arise in terms of either common law (e.g. liability for harm caused by animals) or statute, for example in terms of the Genetically Modified Organisms Act 15 of 1997.[69]

In addition to providing a remedy following actual harm, the law of delict also provides the rules for determining whether someone's actions or omissions that merely threaten loss to another, may be interdicted. Interdicts may also be utilised when litigating public and private nuisance claims or when applying the principles

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[65] International Energy Agency. (2011). *Carbon Capture and Storage: Legal and Regulatory Review 2nd Edition,* p 9.

[66] Loubser *et al, The law of delict in South Africa* (2009) at p 5.

[67] Du Bois *et al, Wille's Principles of South African law* (2007) at p 1091.

[68] Strict liability includes those circumstances where a person is *vicariously liable* for a delictual act of another. Loubser *et al,* identify the following three elements that are usually required before such liability will arise:
- A delict: Someone must have committed a delict, in that the delictual elements set out have been met.
- A relationship: A relationship between the wrongdoer and the defendant, which the law recognises as being of such a nature as to warrant the imposition of liability. This relationship is usually an employment relationship, but can also include other relationships that could be said to be akin to that of employer and employee, for example, mandate and partnership.
- Course and scope: The delictual conduct must fall within the ambit of the defendant's instructions, be for the defendant's benefit, or fall within the risk created by the defendant when establishing the relationship with the wrongdoer. (Loubser *et al, The law of delict in South Africa* (2009) at p 30).

[69] In terms of s 17 of the Genetically Modified Organisms Act, a user of a genetically modified organism (GMO) is liable for harm caused by using or releasing a GMO. Only if an inspector appointed in terms of the Act possesses such an organism, will the user's liability be limited to the extent that the user foresaw, or should have forseen, harm and could or should have prevented the harm but failed to do so. Loubser *et al, The law of delict in South Africa* (2009) at p 366.

of neighbour law, which are concepts that "straddle both the law of delict, where damage caused by negligent conduct is addressed, and the law of property, where wrongful impairment of a neighbour's use and enjoyment of property is redressed by an interdict."[70]

As CCS is a new technology one can only speculate on the question of what type of incident or damage may give rise to delictual claims. Issues which may arise fall into the realm of neighbour law if for example leaking gas causes contamination to a surface owner's crops; more esoterically leaking gas may contribute to climate change, hence action brought by NGOs and other interested and affected parties in the recent past in the USA. However there is no current indication of such litigation being brought by South African environmental NGO who are concerned with more immediate issues such as the construction of nuclear facilties or hydraulic fracturing ("fracking").

Legal issues which will require further investigation in the context of CCS related activities include: who may sue and who may be sued for harm caused by such operations; the requirements for delictual liability particularly that of causality; the availability of an interdict for threatened harm; and the concept of statutory liability discussed in the next paragraph.

12.3 Statute law

Given current and ongoing developments it is safe to say that the question of liability remains uncertain and forms part of the ongoing legislative and policy development. Of relevance is however:

12.3.1 *Section 28 of the NEMA* titled "Duty of Care". This section provides for a general duty to take "reasonable measures" in the following circumstances:

> Every person who causes, has caused or may cause significant pollution or degradation of the environment must take reasonable measures to prevent such pollution or degradation from occurring, continuing or recurring, or, in so far as such harm to the environment is authorised by law or cannot reasonably be avoided or stopped, to minimise and rectify such pollution or degradation of the environment.[71]

The significance of this section lies in its generality. A number of aspects should be noted. Firstly, the category of persons on whom this obligation is imposed is non-exhaustive, in that it refers to "every person". Nevertheless, the next subsection specifically includes the following three classes of persons: firstly, an owner of land or premises; secondly, a person in control of land or premises, for example a lessee; and thirdly:

> . . . a person who has a right to use the land or premises on which or in which –
> (a) any activity or process is or was performed or undertaken; or
> (b) any other situation exists, which causes, has caused or is likely to cause significant pollution or degradation of the environment.[72]

This third category would include sub-lessees, contractors and sub-contractors.

A second significant aspect is that the section appears to have retrospective effect as indicated in the phrase ". . . causes, *has caused* or may cause . . ." (authors' emphasis). However, in *Bareki NO and Another v Gencor Ltd and Others*,[73] it was held that section 28 does not have retrospective application. In considering the question of possible retrospective application of section 28, the Court referred to the presumption against retrospectively and noted that it is based on the principle of fairness in that "individuals should have an opportunity to know what the law is and to conform their conduct accordingly."[74] The Court held that no such intention was shown and even the use of the words "has caused" did not indicate that section 28 should be applied retrospectively. The Court further held that the retrospective application of section 28 would cause great unfairness and encroach on the rule of law by creating unreasonably strict or absolute liability.[75] The Court concluded by holding that the applicant had failed to rebut the presumption against the retrospective application of section 28.[76]

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[70] Du Bois *et al Wille's Principles of South African law* (2007) at p 476.

[71] S 28(1). See generally Soltau F, "Liability for environmental damage: the duty of care under South Africa's National Environmental Management Act" (1999) 7 *Environmental Liability* 60.

[72] S 28(2).

[73] 2006 (1) SA 432 (T).

[74] Supra fn 71 at p 439.

[75] Supra fn 71 at p 442.

[76] See McMichael L, "Liability for acid mine drainage" 2010 Responsa Meridiana 26.

As a result and with the purpose of dealing with the anomaly caused by the Bareki judgment, section 28 was amended in 2009,[77] by the addition of subsection (1A), which reads as follows:

(1A) Subsection (1) also applies to a significant pollution or degradation that –
(a) occurred before the commencement of this Act;
(b) arises or is likely to arise at a different time from the actual activity that caused the contamination; or
(c) arises through an act or activity of a person that results in a change to pre-existing contamination.

The words "occurred before the commencement of this Act" now indicate beyond doubt that section 28 of NEMA has retrospective application and overrule the Bareki decision. Thus any of the above persons who has caused pollution in the past is obliged to ensure that reasonable measures are taken to prevent ". . . such pollution or degradation from occurring, continuing or recurring . . .". It follows that a person who has stored or accumulated hazardous waste on his premises or property for years, falls under the purview of the section and is obliged to undertake the stipulated measures.

A third aspect of section 28(1) is that it refers to "*significant* pollution or degradation" (authors' emphasis) and the question of what is "significant" in this context now arises. This, and a number of other aspects of section 28, as well as a number of other aspects concerning pollution regulation, was considered in *Hichange Investments (Pty) Ltd v Cape Produce Company (Pty) Ltd t/a Pelts Products, and Others,*[78] which concerned the emission of chemical waste products by the respondent tannery in various forms. The court considered the meaning of "significant" in the context of subsection 28(1) and stated that "the assessment of what is significant involves, in my view, a considerable measure of subjective import . . . [and] . . . that the threshold level of significance will not be particularly high".[79] In so-doing, the court corroborated the view that "significant pollution" must be considered in the light of the constitutional right to an environment conducive to health and well-being.[80]

12.3.2 *National Nuclear Regulator Act 47 of 1999*

An analogy can be made with liability for nuclear accidents and the role of the National Nuclear Regulator Act 47 of 1999. It provides for strict liability for nuclear damage.[81] The term "nuclear damage" is defined as meaning:

(a) any injury to, or the death, sickness or disease of a person; or
(b) other damage, including any damage to or any loss of use of property or damage to the environment,
(c) which arises out of or results from, or is attributed to, the ionising radiation associated with a nuclear installation, nuclear vessel or action.[82]

The relevant section imposes strict liability in that subject to certain subsections "only a holder of a nuclear installation licence is, whether or not there is intent or negligence on the part of the holder, liable for all nuclear damage caused by or resulting from the relevant nuclear installation during the holder's period of responsibility".[83] Such liability must be determined according to the provisions of the common law or the compensation for Occupational Injuries and Diseases Act 130 of 1993.[84]

It is clear that if and when a dedicated legislative regulatory framework is developed for CCS in South Africa, concepts can be borrowed from the nuclear laws example. In this regard it can be noted that Chapter 5 of the Act, headed Safety and Emergency Measures, provides for safety standards and regulatory practices,[85] duties regarding nuclear accidents and incidents,[86] emergency planning,[87] and related matters.

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77 By s 12(*a*) of Act 14 of 2009.

78 2004 (2) SA 393 ECD (cited hereafter as the *Hichange* case), also referred to in paras 3.2.5.2; 18.2.1.1 and 20.4 on atmospheric pollution.

79 At 414I–415A.

80 Expressed by Glazewski J, *Environmental Law in South Africa,* 2000, ch 5.2.8.2.

81 S 30.

82 S 1(xv) Definitions.

83 S 30(1).

84 S 32.

85 S 36.

86 S 37.

87 S 38.

13. Possible transfer of long-term responsibility to the State

The question of possible state long-term responsibility has arisen in other contexts in South Africa particularly as regards the recent and on-going issue of Acid Mine Drainage (AMD), a major and serious long term problem brought about by the mining industry as reported on by the Council for Geoscience (the "Council") among others.[88] The Council performed apportionment studies on behalf of the Department of Mineral Resources and found that while a number of mines are found to be "derelict and abandoned", they cannot necessarily be classified as "ownerless" and that liability of the impacts of the mines cannot automatically be assigned to the State in terms of Section 46(1) of the MPRDA.[89] The latter section is titled "Minister's power to remedy environmental damage in certain instances", and provides for financial measures for remedying environmental damage in the first instance by the (previous) holder of the mineral right, failing which the state in certain stipulated circumstances will step in. It is evident that ownership and/or control of the mine and licensing provisions inevitably play an important role in assigning liability.

The Council for Geoscience Report describes that in February 2010 the Department of Water Affairs (DWA) issued a media release stating that the DWA as part of the Government Task Team on mine closure and water management together with mining companies agreed on a model aimed at dealing with the AMD challenge in the Witwatersrand goldfields area. Parties agreed on co-operation in the form of a partnership between government and the relevant mining houses (public private partnership model) to formulate a collaborative solution to the AMD problem. This model provides for the establishment of a public private partnership and the establishment of a non-profit making entity which will assume the technical and operational responsibility for executing the technical solution to AMD in the Witwatersrand area. A contract between Government and the mining houses will be entered into since the funding of the entity will take apportionment of liabilities between both parties into account (as far as possible). Hopefully such a scenario will not develop in the CCS context but some kind of liability fund could be explored.

The Council for Geoscience Report also refers to the 2009 National Strategy for the Management of Derelict and Ownerless Mines in South Africa.[90] This strategy was developed by the Department of Mineral Resources and aims at addressing the liability of government for the thousands of derelict and ownerless mines. This strategy noted that impacts of mine closures cross-cut the jurisdiction of a number of government departments.

While the above initiatives to deal with liability for the AMD and related problems are reactive, the opportunity here is for the proponents for possible CCS liability to be proactive. It was suggested that a public private partnership based on the model used to formulate a collaborative solution to the AMD problem be explored. This would require further research particularly as regards sources of funding for incidents causing damage.

The question of potential liability for CCS-related environmental / other impacts remains an on-going debate and discussion. South Africa is in the process of working towards reviewing the current legislative system in order to assess a framework for CCS legislation and no decisions have been made regarding the question of long-term liability and the possible transfer thereof. Since CCS aims to be permanent there will be implications for liabilities associated with a storage site. With regards to CCS South Africa follows international developments. The trend towards liability transfer is followed in the EU, Australia, Canada and some US states. In EU, long-term liability arrangements in EU member states are set by EU CCS directive.[91]

There is much that needs to be considered beyond the preliminary question of transfer. Generally two requirements are imposed,[92] namely: no significant risk of physical leakage or seepage of stored CO_2, and secondly the elapse of a minimum time period.

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[88] See "Mine water management in the Witwatersrand Gold Fields with special emphasis on acid mine drainage." Report to the inter-ministerial committee on acid mine drainage, the Council for Geoscience, Pretoria, Dec 2010 (the "Council for Geoscience Report").

[89] The Council for Geoscience Report, fn 86 at p 12.

[90] Department of Mineral Resources, 2009. The National Strategy for the Management of Derelict and Ownerless Mines in South Africa.

[91] International Energy Agency, "Trend towards liability transfer" (2011). *Carbon Capture and Storage: Legal and Regulatory Review 2nd Edition.* p 9.

[92] Justine, G. (October 2011). *CCS liability and property rights – presentation at SACCS week.*

F. Potential conflicts around uses of the storage site

14. The question of regulating the interaction between CCS activities and other potential or existing subsurface or surface users or owners

14.1 Introduction

This issue can effectively be categorised into two sub-issues: firstly the possible competition and conflict between potential users amongst themselves; secondly conflict between the CCS operator and the surface owner. As regards the former a case in point is the fact that South Africa has relatively limited supplies of oil. The Sable Oilfield on the south-east coast is among the most important sources of local supply and the country imports the lion's share of its natural gas from Mozambique's Pande and Temane Gas Fields via a pipeline running cross-boundary between the two countries.

When one measures the findings of the *Atlas* against the fact that the region only enjoys limited actual and potential access to oil sources it becomes evident that the potential for conflict is limited at least in the area of hydrocarbon exploitation and sequestration. Thus the necessity for regulating competition between CCS usage of the subsurface and another usage, e.g., Enhanced Oil Recovery (EOR) or natural gas storage, while possible, is likely to be limited. However at this point we are not able to comment on the possible competition on the fishing industry.

A further factor is that the playing field is rather small in that the entities most likely to be sources of CO_2 for the purposes of injection, and the entities controlling existing infrastructure that might be utilized for CCS injection technology, are more likely than not already to be in informal communication with one another on a range of issues, including CCS. For example big players such as SASOL and PetroSA's oil drilling infrastructure on the Sable Oilfield would not be in competition in the strict sense of the word.

Further conflicts could result from protection of biodiversity and protected areas, regulated by the NEM Biodiversity Act 10 of 2004 and NEMA Protected Areas Act 57 of 2003 as well as agricultural and water interests, regulated by the Conservation of Agricultural Resources Act, 43 of 1983 (CARA) and the National Water Act, 36 of 1998 respectively.

14.2 Potential conflict between conflicting users

As explained elsewhere in this report, South Africa does not, currently, specifically regulate CCS activities. Consequently the interaction between CCS activities and other potential or existing uses of the subsurface cannot be regulated by reference to CCS-specific legislation or regulation at present. It is likely that this situation will evolve in the near future as the processes for the development of a national CCS policy and regulatory framework is initiated.

An important role in anticipating and resolving conflicts can in the first instance be played by the South African CCS Centre, established under the auspices of the South African National Energy Development Institute (SANEDI) referred to in 15.3 below. This provides a platform for a range of CCS stakeholders to communicate with one another. For example, the drafters of the World Bank Report have participated in informal discussions during which a scenario anticipating the injection of the 98% pure stream of CO_2[93] produced by SASOL in its Coal-to-Liquid fuel generation process, into the subsurface of the sea-bed (likely into currently exploited oil or gas reservoirs, with or without EOR or EGR), using existing offshore drilling installations was discussed. The idea which was mooted is that a pipeline transporting CO_2 from the coast out to the installation could run alongside the existing pipeline transporting oil from the installation to the coast.

A further conflict resolution process could be to follow the model in mineral and mining legislation with regard to dispute regulation where government mandated fora, such as the Regional Mining Development and Environmental Committee (RMDEC), to handle issues internally and speedily with the necessary knowledge to effect to correct decision. This process has had some success as a forum, which would balance the interests of the competing parties to ensure that legislative provisions have been met.

[93] SASOL is regarded as being well-placed to participate in CCS due to its easy access to this CO_2 stream, which is also the reason that SASOL is one of the core parties in the SACCCS. For information on SASOL's CO_2 stream see: "SASOL may become partner in Norway's carbon technology centre", *Engineering News*, 24 November 2009, http://www.engineeringnews.co.za/article/sasol-may-become-partner-in-norways-carbon-technology-centre-2009-11-24, last accessed on 9 March 2012.

The National Environmental Management Act, 107 of 1998 (NEMA) contains relevant conflict resolution provisions. Firstly the "section 2(4)" National Environmental Management Principles include a principle to the effect that "actual or potential conflicts of interest between organs of state should be resolved through conflict resolution procedures" and are applicable to all organs of state.[94] This could be for example applicable in a case between the DEA and DMR, over a right to mine in a protected area.

More generally South Africa enjoys conflict resolution measures across the "conflict scale" from informal resolution at the one end of the scale to mediation, arbitration and a sophisticated commercial litigation scene at the other end of the scale. In addition we discuss the role of environmental assessment, as a conflict resolution mechanism in 14.4 below.[95]

14.3 Potential conflict between CCS operator and surface owner

Here an analogy can be drawn with mining law where a sophisticated body of law exists regulating the relationship between surface owners and holders of mining rights both at common law and under the Mineral and Petroleum Resources Development 28 of 2002 (MPRDA). However it must be borne in mind that politically mining law "has been king" since the discovery of diamonds and gold in the nineteenth century and tends to override environmental and other considerations.[96] In this regard section 53 of the MPRDA requires any person who intends to use the surface of any land in any way which could have an effect on the mining of that particular area to obtain ministerial approval for such use. The Minister may "of his or her own volition cause an investigation to be conducted if it is alleged that a person intends to use the surface of any land in any way that could result in the mining of mineral resources being detrimentally affected."[97]

Moreover under the current mining law a prospecting or mining right can be granted "over the head" of a surface owner or user. The only requirement in this regard is that of consultation stipulated in section 10 of the MPRDA. On this the Constitutional Court noted in *Bengwenyama Minerals (Pty) Ltd and Others v Genorah Resources (Pty) Ltd and Others*, 2011 (4) SA 113 (CC), that section 10(1) of the MPRDA:

> "…requires consultation in regard to prospecting rights at different levels. Within 14 days of accepting a prospecting right application the regional manager must make known that an application has been received and must call upon interested and affected persons to submit their comments within 30 days from the date of the notice. If a person objects to the granting of the right the objection must be referred to the Regional Mining Development and Environmental Committee to consider the objection and advise the minister on them."[98]

The court went on to state:

> "One of the purposes of consultation with the landowner must surely be to see whether some accommodation is possible between the applicant for a prospecting right and the landowner insofar as the interference with the landowners rights to use the property is concerned. Under the common law a prospecting right could only be acquired by concluding a prospecting contract. The act's equivalent is consultation, the purpose of which should be to ascertain whether an accommodation of sorts can be reached in respect of the impact of the landowner's right to use his land.[99]

The MPRDA regulates access to and exploitation of mineral resources and is not applicable to CCS activities. However it is suggested that the above principles would apply to a CCS activities and should be built into a CCS regulatory regime. We state this as CCS is the only statute that seeks to regulate subsurface rights, and although not directly applicable to CCS the way it deals with conflicting interests may provide a useful analogy for CCS. Even if only to supplement informal discussions between stakeholders, there may be some potential for the need to regulate CCS and EOR interests based on the findings of the *CCS Atlas* in regard to EOR potential off the South African coast. The MPRDA will be relevant to such an example because the authorization to extract oil will have been granted in terms of this Act.

Given the specificity of the MPRDA and the novelty of CCS it is suggested that a CCS legal regime be introduced which will borrow from the mining sector where appropriate.

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94 S 2(4)(m) NEMA.

95 Chapter 4 of NEMA titled "Fair decision making and Conflict Management" contains sections on "Reference to conciliation" (section 17); Conciliation (section 18); Arbitration (section 19); Investigation (section 20) and others.

96 See however a contrary development in the Maccsands case outlined in 16.1 below.

97 S 53(3) Mineral and Petroleum Resources Development Act No 28 of 2002.

98 Par 62 p P138E–G.

99 Par 65 p139 D–F.

14.4 The Environmental Assessment process

South Africa has a sophisticated and detailed environmental assessment process in place which is driven by chapter 5 of NEMA titled Integrated Environmental Management. In theory this could play a role in resolving conflicts and two aspects are highlighted here.

Firstly a component of the environmental assessment process is that of Strategic Environmental Assessment (SEA) which potentially may resolve conflicts in that it is a process which proactively "facilitates the earlier consideration of environmental impacts, *the examination of a wider range of potential alternatives,* the generation of standard mitigation measures and the opportunity to address a wider range of impacts. . ." (authors' emphasis).[100] As such SEA can potentially consider and resolve land-use conflicts before they get off the ground.[101] This has been incorporated into SA law in the form of Environmental Management Frameworks (EMFs) provided for in the "June 2010" environmental assessment regulations, a component of Integrated Environmental Management generally.

A second aspect which needs to be considered is that of the requirement of "alternatives" to be considered in project development proposals. One of the general objectives of integrated environmental management as set out in section 23 of NEMA is to:

> "… identify, predict and evaluate the actual and potential impact on the environment, socio-economic conditions and cultural heritage, the risks and consequences *and alternatives* and options for mitigation of activities with a view to minimising negative impacts, maximising benefits, and promoting compliance…" with the NEMA section 2 principles. (own emphasis).

In theory alternative competitive interests should be considered in the EA process – whether this happens in practise is a matter of conjecture but will undoubtedly come up in the public participation process required in the EA process.

It is evident from the above that mechanisms for regulating competing interests, such as those contemplated by this question exist in South African law.

G. Administrative arrangements

15. The main administrative bodies involved in the implementation of the legal and policy framework for CCS and their respective tasks

15.1 The Department of Mineral Resources

Although there is a close alliance between mining related activities and CCS-related activities (and the Department of Energy and Department of Mineral Resources fell under one Minister until 2009) we are of the view that CO_2 sequestered by CCS projects is unlikely to be administered by the Department of Mineral Resources which administers the MPRDA (the mining legislation) unless this is amended. This is because section 1 of the MPRDA defines the infinitive verb "(to) mine" as the "winning any mineral on, in or under the earth." The generation of CO_2 to be sequestered in a CCS project clearly falls outside of this definition and in addition the MPRDA deals with "minerals" as defined – it is clear that the release of CO_2 by the burning of fossil fuel does not result in the generation of a "mineral" in the sense used by the MPRDA.

Thus while there is a linkage with CCS to mining activities and the MPRDA we are of the view that a new regulatory framework for CCS related activities may be developed under the auspices of the Department of Energy (DoE) described in the next section. Although the MPRDA could be amended in theory this would not only be ungainly from a legislative perspective but would also detract from the functions of the newly established Ministry of Energy.

In summary there are two reasons for giving responsibility to the DoE to develop a CCS regulatory regime. Firstly, it would alleviate any concerns about the respective "turf" of the DoE and DMR which were previously

[100] C. Wood, *Environmental Impact Assessment: a comparative review,* p 333.

[101] See "*Strategic Environment Assessment*" IEM Information Series 10 DEAT 2004.

under one ministry. In this regard it appears that the DoE has taken the lead as the designated CCS-related activities focal point. Secondly, it would be inadvisable to regulate CCS via the MPRDA due to the complexities associated with the operation of the Act. A simple example of such complexity derives from the fact that the Act applies to so-called "mining areas" and it would make little sense to define the small area associated with a CCS project as a "mining area", and to regulate the project via the MPRDA, when there is a myriad of existing environmental legislation that can, more easily, be applied to regulating the CCS project. The driver of the CCS process is accordingly the DoE to which we now turn.

15.2 The Department of Energy

The DoE, formerly coupled with the Department of Minerals under the same Ministry but now separated to fall under a new Ministry has taken the lead for CCS related activities.[102] It is tasked with overall oversight of CCS matters, including developing a regulatory framework for CCS.

The DoE has enacted the National Energy Act 34 of 2008 (Energy Act) but at the time of writing, only chapter 4 and sections 17–19, have commenced. The objects of the Energy Act are to:

(a) ensure uninterrupted supply of energy to the Republic;
(b) promote diversity of supply of energy and its sources;
(c) facilitate effective management of energy demand and its conservation;
(d) promote energy research;
(e) *promote appropriate standards and specifications for the equipment, systems and processes used for producing, supplying and consuming energy*;
(f) ensure collection of data and information relating to energy supply, transportation and demand;
(g) provide for optimal supply, transformation, transportation, storage and demand of energy that are planned, organised and implemented in accordance with a balanced consideration of security of supply, economics, consumer protection and a sustainable development;
(h) *provide for certain safety, health and environment matters that pertain to energy*;
(i) facilitate energy access for improvement of the quality of life of the people of Republic;
(j) commercialise energy-related technologies;
(k) ensure effective planning for energy supply, transportation and consumption; and
(l) *contribute to sustainable development of South Africa's economy*.[103]

Although CCS related activities appear not to fall directly into these objectives, the italicised sub-sections do appear to accommodate it. Nevertheless should the Act be amended, which we believe it will be, it would be appropriate to include an objective along the lines of "to promote and develop standards for the mitigation of the energy generating technologies". The definition section of the act does include a definition of "greenhouse gases" which are defined as:

> gases present in the atmosphere, which reduce the loss of heat into space thereby contributing to an increase in global temperatures through a process known as the greenhouse effect;

The Energy Act establishes the South African National Energy Development Institute ("SANEDI"),[104] which has obligations with regard to energy efficiency and energy, research and development, including to "increase energy efficiency throughout the economy"[105] and to "promote energy research and technology innovation".[106] The SANEDI is controlled by a Board, whose members are appointed by the Minister of Energy,[107] and must be persons "who have relevant qualifications and experience or who have special knowledge or experience in relation to one or other aspect of the South African National Energy Development Institute's functions".[108] These provisions came into effect on 1 April 2011.[109]

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[102] For example it commissioned and prepared Terms of Reference for CCS Policy Development which it subsequently released in collaboration with the World Bank.

[103] S 2.

[104] S 7(1).

[105] S 7(2)(*a*)(ii).

[106] S 7(2)(*b*)(ii).

[107] Such appointments must be made in consultation with the Minster of Science and Technology. S 8(2).

[108] S 8(9).

[109] In terms of GN 28 in *Government Gazette* No. 34175 dated 1 April 2011.

15.3 The Department of Environmental Affairs (DEA)

The Department of Environmental Affairs (DEA) administers a suite of legislation including the flagship National Environmental Management Act, 73 of 1998 (NEMA), NEM Biodiversity Act, the NEM: Protected Areas Act; the NEM Waste Management Act and others.

The NEMA provides a set of national environmental management principles in section 2(4) which apply to "all organs of state", including the precautionary principle (section 2(4)); a set of environmental assessment provisions in chapter 5, the detail of which is published in regulations; a statutory duty of care in section 28 and dealt with in 12.3 above, and conflict resolution procedures as seen in section 14.4 above.

While institutionally CCS is located with the DoE, the DEA is likely to be a key agent in ensuring that environmental considerations receive top priority in any CCS-related activity. There is on-going discussion about the creation of a climate change branch under the Department of Environmental Affairs (DEA). Currently the Department of Water Affairs (DWA) is advised by a National Committee on Climate Change (NCCC), a multi stakeholder forum, that stays up to date with CCS activities.

15.4 The Department of Water Affairs (DWA)

The Department of Affairs (DWA) falls under the same Ministry as the DEA referred to in the previous section. It administers the National Water Act 18 of 1998 as well as the Water Services Act 108 of 19078. Should CCS activities affect any water resources as defined in the Water Act, a water licence will be required.

15.5 Other national departments

These include the Department of Science and Technology; the Department of Labour, the Department of Public Enterprises; the National Treasury. The latter is driving the carbon tax initiative referred to in 23 below.

15.6 Non Governmental Agencies

The South African Centre for Carbon Capture and Storage (SACCCS) is established under the auspices of the South African National Energy Development Institute. It is the primary agency facilitating a range of national groundwork CCS related activities. These include: a tender to consider the definition of carbon capture-readiness in the SA context; a tender for a scoping study to be undertaken for test injections and national capacity building for CCS.

15.7 Key players from SA industry

Some of the key players in the Southern African industry and which are represented on the SACCCS steering committee include (among others): SASOL, ESKOM, Anglocoal, Estrata, PetroSA, Total SA. Substantial funding has been obtained from the UK and Norwegian governments.

16. The potential role and possible influence of provinces in the implementation of a CCS regulatory regime

16.1 The issue of cooperative governance

An important aspect is the notion of the Co-Operative Governance provided for in Chapter 3 of the Constitution. Related to this is the question of the respective powers and functions of national, provincial and local spheres of government, particularly in the light of the fact that the demonstration project will be located on the terrestrial environment.

Chapter 3 of the Constitution commences by stating:

40 (1) In the Republic, government is constituted as national, provincial, and local spheres of government which are *distinctive, interdependent and interrelated*. (own italics)

The next section titled "Principles of co-operative government and intergovernmental relations" includes a principle which provides that:

> All spheres of government and all organs of state within each sphere must –
> (g) exercise their powers and perform their functions in a manner which does not encroach on the geographical, functional or institutional integrity of government in another sphere.[110]

The Constitutional Court commented on these principles in *Ex parte: Chairperson of the Constitutional Assembly, In re: Certification of the Constitution of the Republic of South Africa, 1996,*[111] where it had to pronounce whether the final Constitution met certain constitutional principles set out in the Interim Constitution.[112] In so doing it noted that:

> These principles, which are appropriate to co-operative government, include an express provision that all spheres of government must exercise their powers and functions in a manner that does not encroach on the geographical, functional or institutional integrity of government in another sphere.[113]

The particular constitutional principle,[114] referred above, was considered in *The Premier of the Province of the Western Cape v The President of the RSA*,[115] where Chaskalson JP pointed out that this subsection:

> . . . is concerned with the way power is exercised, not with whether or not a power exists. That is determined by provisions of the Constitution . . . and . . . although the circumstances in which section 41(1)(*g*) can be exercised to defeat the exercise of a lawful power are not entirely clear, the purpose of the section seems to be to prevent one sphere of government using its powers in ways which would undermine other spheres of government, and prevent them from functioning effectively.[116]

Chapter 3, on Co-operative Government is particularly important, because it reflects a fundamental departure from the past in that the three traditional spheres of government – national, provincial and local government – are no longer regarded as hierarchical tiers with national government at the helm, but rather as three "distinctive, interdependent and inter-related" spheres of government.[117] This was borne out in *Fedsure Life Assurance Ltd v Greater Johannesburg Transitional Metropolitan Council which* although decided under the Interim Constitution, the Constitutional Court's comments on local government are as applicable to the final Constitution where it stated that:

> . . . the interim Constitution recognises and makes provision for three levels of government – national, provincial and local. Each level of government derives its powers from the interim Constitution although, in the case of local government, the powers are subject to definition and regulation by either the national or the provincial governments which are the "competent authorities" for enacting such legislation.[118]

In determining the respective competency or jurisdiction of national, provincial and local spheres of government to legislate and administer particular environmental matters, reference must be made to the above provisions as well as Schedules 4 and 5 of the Constitution. These two Schedules are headed "Functional Areas of Concurrent National and Provincial Legislative Competence" and "Functional Areas of Exclusive Provincial Legislative Competence" respectively. While each includes a number of items relevant to environmental concerns neither refers to mining and energy related matters with the result that these are national matters by default.

The Constitution provides that national Parliament may pass legislation on any matter, including a matter referred to in Schedule 4, but excluding a Schedule 5 matter unless it is a matter in which it can specifically intervene.[119] This section should be read with section 146 headed "Conflicts between national and provincial legislation" and deals with conflicts "between national and provincial legislation falling within the functional areas of concurrent competences listed in Schedule 4". It provides that national legislation prevails over provincial legislation if the national legislation meets certain stipulated conditions, including the provision that national

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110 S 41(1)(g).

111 1996 (10) BCLR 1253 (CC) (cited hereafter as the *First Certification Judgment*), paras 287–292 at pp 1346–1347.

112 Act 200 of 1993 (the Interim Constitution).

113 The *First Certification Judgment*, para 289 at p 1346.

114 Contained in section 41(1) (g) of the Constitution.

115 1999 (4) BCLR 382 (CC).

116 Paras 57–58 at pp 401–2.

117 S 40(1).

118 The *Fedsure Life Assurance* case, para 35 at p 1476.

119 S 44 (1)(*a*)(ii).

legislation which applies uniformly across the nation prevails over provincial legislation if it is necessary for ". . . the protection of the environment",[120] or "the maintenance of economic unity",[121] which arguably would apply to CCS-related activities. Finally it should be noted that a further provision stipulates that "Parliament may intervene … to prevent unreasonable action being taken by a province which is prejudicial to the interests of another province or the country as a whole."[122]

Thus, national Parliament enjoys "residual competence", in that it has exclusive legislative competence with respect to all matters which are not expressly assigned to the concurrent or exclusive competence of provincial legislatures.[123] As CCS-related activities are not mentioned it follows that national government has exclusive competence to deal with these. For reasons mentioned above our considered view is that the DoE is the lead agent for CCS related activities.

Finally under this head it should be noted that the Intergovernmental Relations Framework Act 13 of 2005, has as its objective the furtherance of the principles of co-operative government as set out in Chapter 3 of the Constitution, by providing a framework for national, provincial and local governments and all organs of state to facilitate co-ordination and implementation of policy and legislation.[124] These spheres of government are to achieve these objectives by, amongst other things, taking into account the circumstances, material interests and budgets of other governments and organs of state in other governments; consulting other affected organs of state in accordance with formal procedures, and in so doing realise national priorities.[125]

Various bodies with the objective of achieving co-operative governance exist alongside the Department of Co-operative Government as seen in 6.2 above. These include the MINMECs, that is, inter-ministerial committees comprising national Ministers and members of the provincial Executive Committees (MECs). An example of such a committee, which seeks to attain environmental co-operative governance, is the MINMEC: Environment and Nature Conservation, comprising the national environmental Minster and Deputy Minister, as well as the provincial MECs of the nine environmental and nature conservation departments.

16.2 Planning laws

We are of the view that it is the area of planning law that the provinces may be most influential in having some influence over CCS-related activities. We state this on the basis of some recent Constitutional Court decisions outlined below. Their overall effect is to give provinces greater authority over certain issues, particularly in the mining realm, which were previously regarded as being of exclusive purview national competence.

By way of background two general points are noted: first, historically the core of planning laws lay with the provinces, each province having its own planning act, and although the post-1994 government has overlain these with national planning laws the centre of planning laws and procedures still remains with the provinces. Secondly planning law spans national, provincial and local spheres of government and it is extremely difficult conceptually to isolate specific aspects thereof as being exclusive to any one of these spheres in practice, although certain practical responsibilities and procedures are clear. The respective planning law competencies of the national, provincial and local spheres of government are set out in Schedule 4 and 5 of the Constitution. Schedule 4 includes "regional planning and development" under its Part A; while Schedule 5 lists areas of exclusive provincial legislative competence and includes "provincial planning". This is not particularly helpful, as it is not possible to differentiate readily between regional and (exclusively) provincial planning.

16.3 Johannesburg Metropolitan Municipality v Gauteng Development Tribunal and Others[126]

In the *Johannesburg Metropolitan Municipality* case, the dispute concerned the constitutional validity of Chapters 5 and 6 of the national framework Development Facilitation Act 67 of 1995 (the DFA), which among other things provides for provincial Development Tribunals. The crisp question before the Court was whether the Constitution empowered the municipal or the provincial sphere of government, or both, to exercise powers relating to the rezoning of land and the establishment of townships. Johannesburg City contended that these powers are

120 S 146(2)(*c*)(vi).

121 S 146(2)(*c*)(iv).

122 S 44(2)(e).

123 S 44(1)(*a*)(ii).

124 S 4 of the Constitution.

125 S 5.

126 2010 (6) SA 182 (CC), 2010 (9) BCLR 859; 2010 (6) SA 182 (CC), 2010 (9) BCLR 859, 2010 (2) SA 554 (SCA).

components of "municipal planning", a function assigned to municipalities by section 156(1) of the Constitution, read with Part B of Schedule 4 to the Constitution, described above. The Gauteng provincial authority argued that the contested powers were elements of "urban and rural development" under Part A of Schedule 4 to the Constitution, a functional area falling outside the executive authority of municipalities.

The Constitutional Court held that:

> [i]t is . . . true that the functional areas allocated to the various spheres of government are not contained in hermetically sealed compartments. But that notwithstanding, they remain distinct from one another. This is the position even in respect of functional areas that share the same wording like roads, planning, sport and others. The distinctiveness lies in the level at which a particular power is exercised. For example, the provinces exercise powers relating to provincial roads whereas municipalities have authority over municipal roads. The prefix attached to each functional area identifies the sphere to which it belongs and distinguishes it from the functional areas allocated to the other spheres.

In this instance, it was held that the term "municipal planning" should be understood to assume the particular well-established meaning it has long enjoyed, namely "planning which includes the zoning of land and the establishment of townships", and it was in this sense that the term was used in the Constitution, since there is nothing in the Constitution indicating that it carried a meaning other than its common meaning.[127]

The implication for CCS related activities is that if a national government department "plans" a CCS facility, this plan may well have to comply with municipal and provincial spatial development frameworks.

As regards the role of provinces in this case, the Court considered was whether the Constitution allocated the same power to the provinces. In concluding that it did not, the Court placed emphasis on the particular role of municipalities within government, holding that the Constitutional Scheme envisages a degree of autonomy for the municipal sphere, in which municipalities exercise their original constitutional powers free from undue interference from the other spheres of government. Of relevance was the Constitutional requirement that each sphere must respect the status, powers and functions of government in the other spheres and must not assume any power or function except those conferred on it in terms of the Constitution (section 41(1)).[128] This is amplified by section 151(4), which precludes the other spheres from impeding or compromising a municipality's ability or right to exercise its powers or perform its functions.[129] Accordingly, it could not be said that the Constitution assigned the same function to the provincial sphere under the power of "urban and rural development". It followed, therefore, that the impugned chapters of the DFA were inconsistent with section 156 of the Constitution read with Part B of Schedule 4, and were declared invalid by the Court. At the time of writing, the DFA appears likely to be repealed and replaced altogether by a Draft Spatial Planning and Land Use Management Bill, which was published for comment during 2012.

16.4 Maccsand (Pty) Ltd and Another v City of Cape Town and Others ("*Maccsand*")[130]

Perhaps more pertinent to CCS related activities is the *Maccsand* case where the respective powers of the national Department of Mineral Resources and the Western Cape Provincial authority for Local Government, Environmental Affairs and Planning came into sharp focus before the Cape High Court, the Supreme Court of Appeal (the SCA) as well as the Constitutional Court. The question was whether the granting of a mining right under the nationally administered Mineral and Petroleum Resources Development Act (the MPRDA),[131] overrode the need to obtain the requisite zoning authorisations under the Western Cape's provincial Land Use Planning Ordinance (the LUPO).[132]

The Cape High Court held that the competence to regulate mining under the national sphere did not trump local government's functional competence of municipal planning, and thus authorisations under both the MPRDA as well as the LUPO were necessary.[133] The SCA upheld this view, stating among other things that a municipality under the present constitutional dispensation:

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127 The *Johannesburg Metropolitan Municipality* case at para 57.

128 At para 56.

129 At para 58.

130 *City of Cape Town v Macsand (Pty) Ltd and Others* 2010 (3) SA 63 (WCC); *Macsand (Pty) Ltd and another v City of Cape Town and Others* 2011 (6) SA 633 (SCA); *Maccsand (Pty) Ltd and Another v City of Cape Town and Others* (103/11) [2012] ZACC 7.

131 28 of 2002.

132 15 of 1985.

133 At 20.

> "is not a mere creature of statute, otherwise moribund, save if imbued with power by provincial or national legislation" but an organ of State that "enjoys original and constitutionally entrenched powers, functions, rights and duties that may be qualified or constrained by law and only to the extent the Constitution permits."[134]

It went on to deal with section 152 of the Constitution as well as Part B, Schedule 4, pointing out that:

> It will be apparent, then, that, while national and provincial government may legislate in respect of the functional areas in Schedule 4, including those in Part B of that schedule, the executive authority over, and administration of, those functional areas is constitutionally reserved to municipalities. Legislation, whether national or provincial, that purports to confer those powers upon a body other than a municipality will be constitutionally invalid.[135]

It followed that not only did the mining company have to comply with the MPRDA but also with provincial planning laws, in this case LUPO. This was confirmed on appeal by both the Supreme Court of Appeal and the Constitutional Court where it held "It is proper for one sphere of government to take a decision whose implementation may not take place until consent is granted by another sphere, within whose area of jurisdiction the decision is to be executed."[136]

As regards the interplay between the MPRDA and NEMA the Constitutional Court stated in *Maccsand* that:

> "NEMA was enacted as a general statute that co-ordinates environmental functions performed by organs of state. It also provides for "co-operative, environmental governance by establishing principles for decision-making on matters affecting the environment". As is evident from the long title, NEMA was passed to establish a framework regulating the decisions taken by organs of state in respect of activities which may affect the environment. It lays down general principles which must be followed in making decisions of that nature." [137]

And:

> "In order to give effect to general objectives of integrated environmental management, NEMA requires the Minister for Environmental Affairs (now Minister for Water Affairs and Environment), with the concurrence of the MEC to identify activities which may not commence without environmental authorisation from a competent authority. These activities are listed in notices published in the Government Gazette."[138]
>
> "When listing activities, the Minister for Water Affairs and Environment must identify the competent authority responsible for granting environmental authorisation in respect of each listed activity. Section 24C(2) requires this Minister to be identified as the competent authority in relation to activities enumerated there."

16.5 Conclusion

The essence of these decisions is that both municipalities and provinces have wide-ranging powers over planning matters in their jurisdictions and cannot be arbitrarily over-ruled by the national government. Any CCS project will therefore have to obtain not only national government authorisation but also the requisite planning permission from the relevant local and provincial planning authority. In summary the Constitution provides for separation of powers between the three spheres of government; national, provincial and local (municipal). Each sphere has its own legislative authority and powers and its functions as determined by the Constitution. All three spheres of government have environmental and planning related legislative authority.

As such each phase of a CCS project will require a multiplicity of environmental authorisations obtainable from the three tiers of government assigned with different legal competencies. However administrative co-operation between different spheres of government will be required.

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134 At para 22.

135 At para 25, quoting with approval the SCA in the *Johannesburg Municipality* case.

136 Maccsand (Pty) Ltd and Another v City of Cape Town and Others (103/11) [2012] ZACC 7 [Unreported].

137 Par 9.

138 Par 10.

17. In the light of the above the question arises whether a province would have the legal power to ban the capture, transportation or storage of CO_2 within its territory and if so, is this a political possibility?

From a political perspective this is unlikely. Chapter 3 of the Constitution deals with co-operative government and sets out principles of co-operative government and intergovernmental relations. Section 41(1)(g) further determines that all spheres of government and all organs of state within each sphere must "exercise their powers and perform their functions in a manner which does not encroach on the geographical, functional or institutional integrity of government in another sphere. All chapters dealing with the three main spheres of government must be read with Chapter 3.

Section 104 of the Constitution provides for legislative competence of the nine South African provinces. Provinces share concurrent jurisdiction with national governments with regards to Schedule 4 items. "Environment" is listed as a schedule 4 and provinces therefore do not have exclusive jurisdiction over environmental matters but concurrent jurisdiction.

NEMA Chapter 3 "Procedures for Co-operative Governance" provides for streamlining and co-ordination between national and provincial spheres of government.

According to section 44(2) of the Constitution national parliament may intervene within a functional area listed in Schedule 5 when it is necessary for a number of stipulated reasons including the following:

> Parliament may intervene, by passing legislation in accordance with section 76(1), with regard to a matter falling within a functional area listed in schedule 5, when it is necessary –
> (a) to maintain national security;
> (b) to maintain economic uninty;
> (c) to maintain essential national standards;
> (d) to establish minimum standards required for the rendering of services;
> (e) to prevent unreasonable action taken by a province which is prejudicial to the interests of another province or the country as a whole.

Apart from section 44, intervention is also possible under the national override section contained in section 146(2). The section deals with conflicts between national and provincial legislation falling within the functional areas of concurrent competences listed in Schedule 4. It provides that national legislation prevails over provincial legislation if the national legislation meets certain stipulated conditions. Included here is the provision that national legislation which applies uniformly across the nation prevails over provincial legislation if it is necessary for among other things ". . . the maintenance of economic unity".[139]

18. The possible tension between government departments or government departments and provinces which may impact on the way CCS legislation and regulation is developed

In terms of the definition of the landward extent of coastal provinces and the designation of functional areas of national and provincial government departments in the Consitution, the provinces do not have jurisdiction below the high-water mark so any offshore CCS related activity will not be within the purview of the province concerned although it will no doubt be consulted by the relevant national government department (DoE).

In any event the relevant province is likely to welcome economic development in an abutting area as the relevant provinces are likely to be *ad idem* as regards socio-economic priorities.

However the Maccsand and Johannesburg City Council cases referred to above illustrate that the requisite planning authority should be obtained from the province and local authority concerned in the case of onshore CCS project.

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[139] S 146(2)(c)(ii).

H. Public engagement

19. Procedures to ensure public participation in the decision-making and access to information concerning CCS projects

The World Bank and DoE are undertaking a study on public engagement on CCS. The main objective of this study is to develop two public engagement plans (National Plan and a Local Plan). The CCS target audience for public outreach includes:

- National (policy developers, NGOs, research and academia);
- Local (community leaders, community residing in the area with the proposed storage facilities)

Test injection phase also allows for public participation; public participation is facilitated in the climate change White Paper. South Africa's environmental assessment regulations contain extensive public participation provisions as mentioned in 9.3 above.

20. A dedicated public body charged with dealing with public engagement with respect to CCS projects

The SACCCS has done a considerable amount of work on public participation. Thus far it has developed educational materials, the Atlas and placed media articles. Future work includes conferences and workshops to showcase CCS, further development of outreach material and further information on media platforms. The environmental assessment (EA) process governed by regulations includes detailed public participation rules.

21. The level of public perception of CCS activities in South Africa

Awareness about CCS is currently very low in South Africa. Barriers to public engagement include differences in languages, religions, cultures and preoccupation with meeting basic human needs.

22. The extent to which participation procedures are enshrined in general law, or are being developed specifically for CCS

The Constitution of the Republic of South Africa 1996: Section 33 – Just Administrative Action. Everyone has the right to administrative action that is lawful, reasonable and procedurally fair and everyone whose rights have been adversely affected by administrative action has the right to be given written reasons. The Promotion of Administrative Justice Act 3 of 2000 gives effect to section 33 of the Constitution. Also relevant is NEMA 2010 EIA Regulations Chapter 6 Public Participation.

I. Fiscal incentives

23. The question whether the possible inclusion of CCS within the CDM is a significant sufficient driver for CCS in South Africa

At COP 17 in Durban it was decided that CCS will be included within the CDM but the mechanics thereof still have to be ironed out.

It is suggested that inclusion of CCS within CDM will result in large scale funding opportunities. The 2009 IEA Technology Roadmap: Carbon Capture and Storage suggests that 65% of projects in 2050 (±3400 projects) will have to occur in developing countries, thus it is critical that CCS be successfully deployed in non-Annex I countries. Large scale funding through various markets will be needed. Currently the CDM is the only large-

scale CO_2 market-based funding mechanism operating in developing countries. The Cancun decision,[140] and Durban decision,[141] provide important first step towards an incentive mechanism that will assist in financing, regulating and supporting CCS projects in non-Annex I countries.

24. Progress towards a carbon tax in South Africa

National Treasury published a discussion paper in December 2010 entitled "Reducing Greenhouse Gas emissions: The Carbon Tax Option"[142] (the "Discussion Paper"). The Discussion Paper sets out the background to climate change, including its projected impacts on South Africa, as well as the contribution of South Africa to global climate change in terms of its greenhouse gas emission levels.[143] It is emphasised that climate change is a result of environmental costs not being included in market prices, and the role that government can play by intervening and controlling pollution through the imposition of policy instruments such as command and control regulations and market-based instruments is highlighted.[144]

The Discussion Paper identifies market-based instruments as "a least-cost way to reduce [greenhouse gas] emissions"[145] and these are said to be used increasingly alongside regulatory measures "to support improved environmental outcomes".[146] The two main market-based instruments for putting a price on carbon are carbon taxes and emissions trading schemes.[147] After considering the differences between and respective benefits of carbon taxes and emission trading schemes in a developing country context, the Discussion Paper concluded that a carbon tax appears to be preferable. This is because among other things its increased price certainty, transparency and its ability to "piggyback" onto existing tax administrative systems outweighs the benefits of emissions trading schemes.[148]

The Discussion Paper endorses the approach taken in the *Long-Term Mitigation Scenarios* document, namely to put a lower initial price on carbon, and increase it gradually over time.[149] The result will be to "provide a strong price signal to both producers and consumers to change their behaviour over the medium to long term".[150]

J. Specific circumstances

25. The South African government position at the recent (Durban) and next COP (Doha) with respect to CCS

The issue around CCS at the Durban COP was whether CCS should be included within the CDM. It was decided in the affirmative.[151] South Africa was of the point of view that according to the Marrakesh Accords, only nuclear activities should be excluded from the CDM. Including CCS under the CDM was not a key priority for SA during negotiations however CCS has been declared a national research priority by the South African government.[152]

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140 COP 16 – CCS should be included as an eligible CDM project activity. Cancun decision requests the SBSTA to elaborate modalities and procedures for the inclusion of CCS as a project activity under the CDM with a view to recommending a decision at COP17. These modalities and procedures are to address specified technical issues, including site selection criteria, monitoring, project boundaries, transboundary projects etc.

141 FCCC/KP/CMP/2011/L.4.

142 National Treasury "Reducing Greenhouse Gas Emissions: The Carbon Tax Option" *Discussion Paper for Public Comment* (December 2010) available at *http://www.treasury.gov.za/public%20comments/Discussion%20Paper%20Carbon%20Taxes%2081210.pdf* [accessed 15 December 2010].

143 *Supra* at 11–19.

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149 *Supra* at 24. See also para 50 at p 26.

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152 Dr Tony Surridge Head of SACCCS; Global CCS Institute: South Africa and CCC.

26. The extent and development of a CCS demonstration project in South Africa

A demonstration plant is planned for 2020 which will test an integrated system under local conditions. This forms an important link between trials and a full scale commercial plant. This demonstration plant is phase 4 of South Africa's CCS roadmap and will hopefully demonstrate the capture, transport and safe injection of CO_2 into SA geological formations. This demonstration plant is in the order of thousands of tonnes of carbon dioxide per year.

K. Conclusion

While a number of important building blocks have been put in place for getting CCS underway in South Africa, some significant questions and gaps have been identified as regards the policy, legal and regulatory regime. This includes the carrying out of an active public policy process engaging relevant stakeholders as well as developing a dedicated legal and regulatory regime.

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