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South African National Energy
Development Institute (SOCI) Ltd.



Evolution of CCS in South Africa

Trinidad & Tobago CCS W/S
29 October, 2019

Dr A D Surridge: GM Cleaner Fossil Fuels & Head SACCCS

ENERGY INNOVATION FOR LIFE



SA CCS Genesis, Mandate & Infra-Structure



1. Carbon Sequestration Leadership Forum
Inaugural Meeting
Washington, 2003
2. Then Department of Minerals and Energy
Commissioned CSIR to examine
feasibility of CCS for South Africa, 2004
3. Then Department of Minerals and Energy
Workshop 2006
Focus on geological storage





**Establishment within SANEDI
South African Centre for Carbon Capture & Storage
2009
Minister Sonjica Presiding**





- CCS is part of the Long Term Mitigation Scenarios
Department of Environmental Affairs
- CCS is one of South Africa's eight Near-term Priority Flagship Programmes of the *National Climate Change Response White Paper*, October, 2011
- Cabinet endorsed the South African CCS Road Map during May, 2013
- CCS is thrice included in the National Development Plan 2030
- CCS is included in the Integrated Resource Plan (Electricity Generation)

CCS Technical Road Map



2004: CCS Potential - **Done**

2010: Carbon Atlas -

Launched by Minister Oct2010

2019: Pilot CO₂ Storage Project -

Current Phase [10s thousands tonnes]

2022: Integrated Demonstration Plant -

Planned [100s thousands tonnes]

2030: Commercial Operation -

Planned 2030 [millions tonnes]



energy

Department:
Energy
REPUBLIC OF SOUTH AFRICA



Council for Geoscience

ATLAS

on
geological storage of carbon dioxide in South Africa



sasol
reaching new frontiers



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South African Institutional Capacity



- Department of Mineral Resources and Energy
Policy and Regulatory Regimes
- Department of Environmental Affairs
Implementation of the *National Climate Change Response White Paper*
- Inter-Departmental Task Team for Carbon Capture and Storage
Inter-Departmental Co-ordination
- South African Centre for Carbon Capture and Storage
Technical development of Carbon Capture & Storage in South Africa
- South African Bureau of Standards – ISO TC 265 CCS standards
- Technical Institutions;
 - *Council for Geosciences*
 - *Petroleum Agency*
 - *PetroSA*
 - *Universities:*
 - *University Witwatersrand*
 - *University Pretoria*
 - *University Western Cape*
 - *University KZN*
 - *University Zululand*



- Carbon Sequestration Leadership Forum (CSLF)
- International Energy Agency Greenhouse Gas Programme (IEA-GHG)
- Global Carbon Capture and Storage Institute (GCCSI)
- Petroleum Technology Research Centre (PTRC)

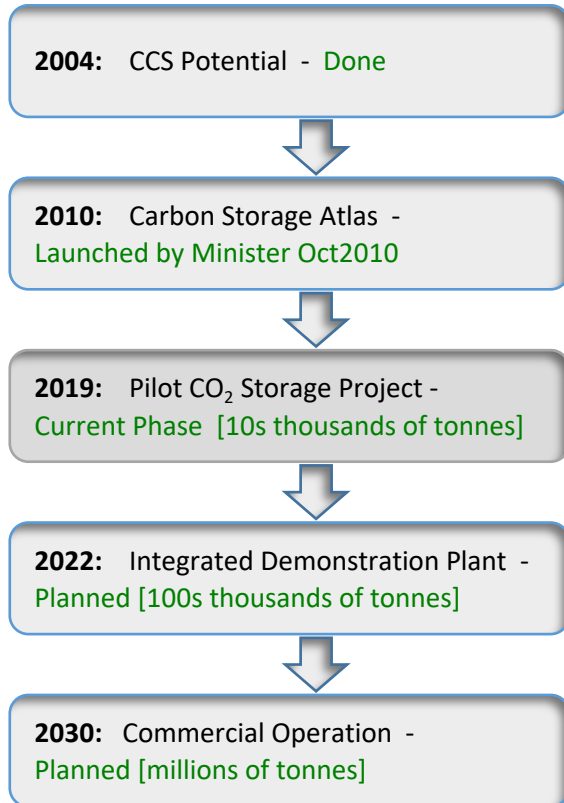




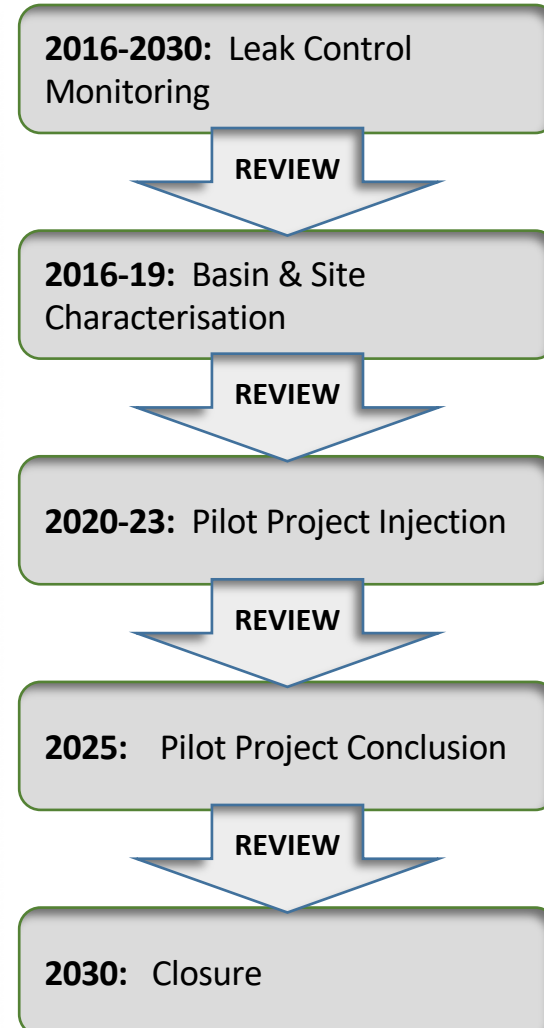
Planning the first South African Pilot CO₂ Storage Project

Pilot Project Tangible Outputs

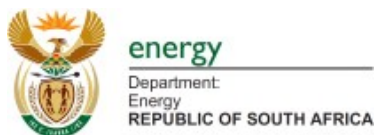
South African CCS Road Map



PCSP Tangibles



The Project Team Enables Collaboration and Local Capacity Development



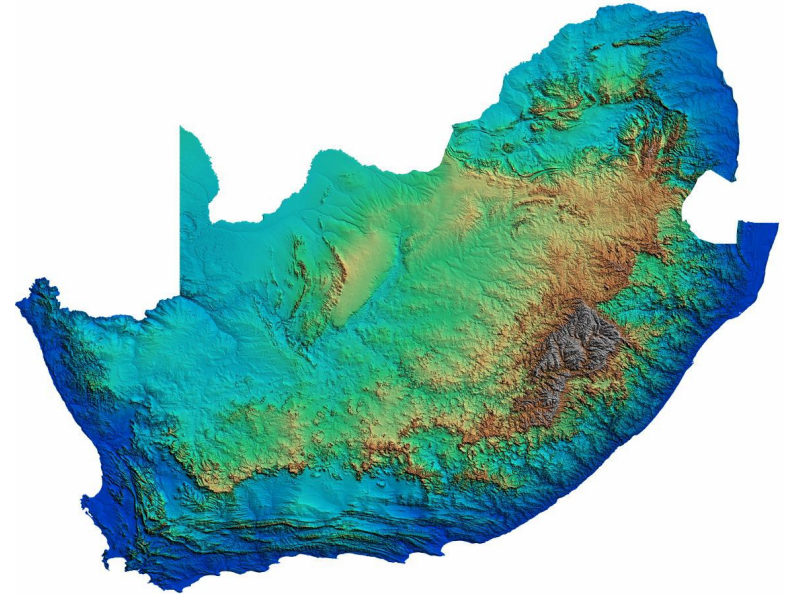
- Technical analysis by numerous team members in South Africa
- Technical guidance by Project Storage Sub-Committee (PSSC) members
- Project funded through World Bank CCS Trust Fund and South Africa Department of Energy

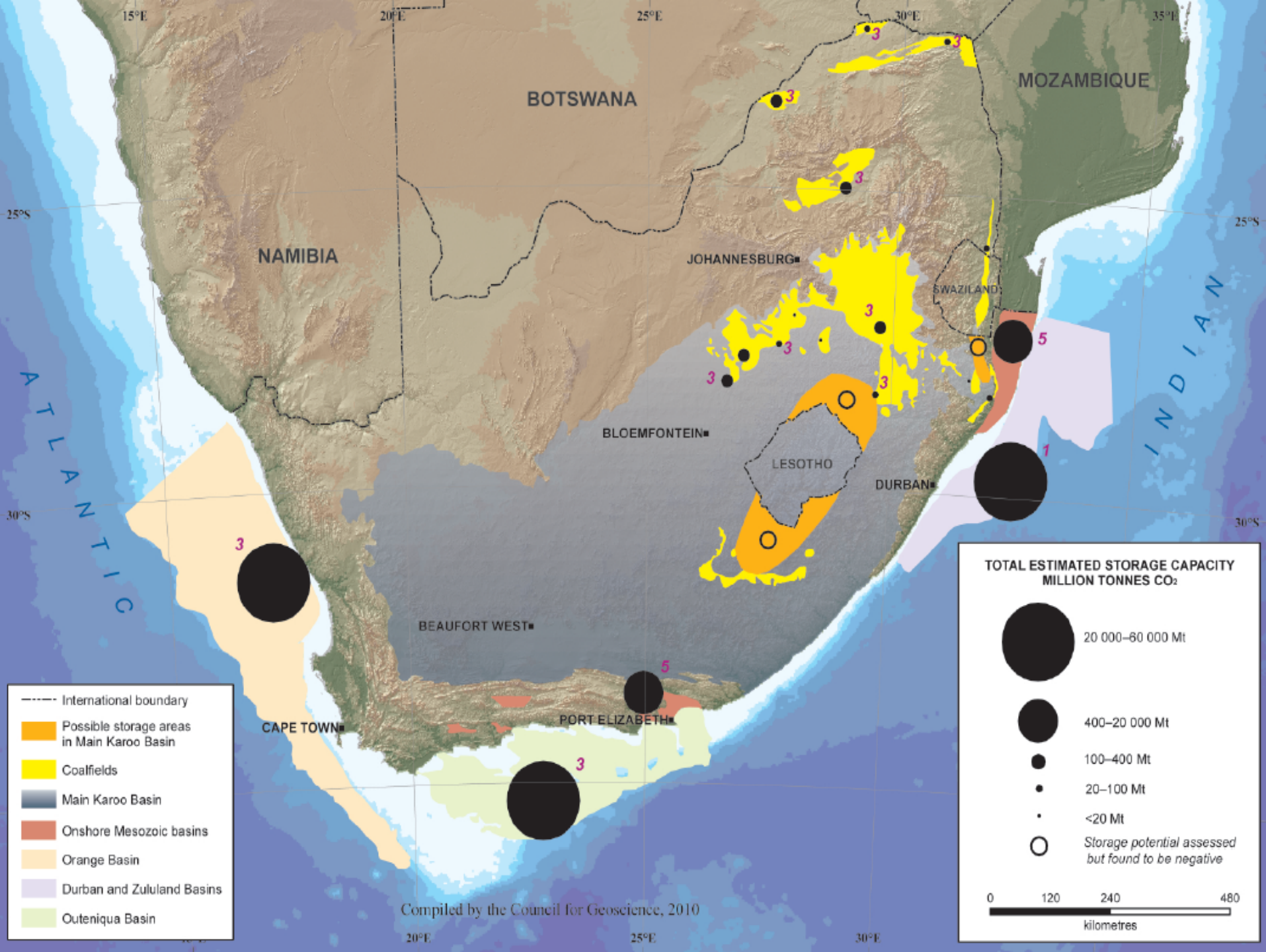


Key Objectives: Pilot Carbon Storage Project (PCSP)



- Increasing South African human and technical capacity for CO₂ storage
- Raising awareness of potential importance of CCS to the public
- Working with government to ensure the development and operations within the country's legal and regulatory environment
- Planning/executing a pilot-scale (10,000 to 50,000 tonnes) CO₂ storage test in onshore Zululand Basin with concurrent capacity building
- Demonstrating safe and secure CO₂ handling, injection, storage, and monitoring under South African conditions







Pilot Project Stakeholder Engagement



- 🌱 The engagement objectives include:
- ✓ Raise awareness of CCS as one of the Climate Change mitigation measures;
 - ✓ Outline the benefits and potential risks of the CCS technology;
 - ✓ Build mutually beneficial relations with stakeholders; and
 - ✓ Dispel stakeholders perceptions to ensure that they are factually informed.



Economic Sectors and Infrastructure Development (ESID) Cluster Meetings (Technical & Cabinet)

- 🇳🇿 A Memorandum of Understanding (MOU) between SANEDI and Kwa Zulu-Natal Department of Economic Development, Tourism & Environmental Affairs (EDTEA) has been signed by both parties
- 🇳🇿 A Project Steering Committee (PSC) has been established
 - Terms of Reference for the PSC finalised
- 🇳🇿 The Study tour to Canada undertaken
 - KZN EDTEA and KZN Department of Agriculture and Rural Development (DARD) are scheduled to participate

Traditional Leadership Resolutions



National/Provincial/Local Houses of Traditional Leaders

- 🇳🇬 Traditional Leadership (Amakhosi) have supported the Basin Characterisation process in principle. The resolution is subject to consultation with affected stakeholders
- 🇳🇬 Amakhosi have proposed an engagement with Provincial leadership on the project. EDTEA is leading the coordination.
- 🇳🇬 Amakhosi requested the leadership and guidance of EDTEA, importantly on the technical aspect of the project, hence the participation of EDTEA in the Study tour to provide technical guidance to decision makers.

Major Concerns Raised



- Legacy;
 - Contamination of groundwater;
 - NIMBY;
 - Specific sites (maps etc.);
 - Immediate benefits for local community;
 - Long term project (Commercialisation Phase); and
 - CCS Technical Workshops.
- All these concerns are/have been addressed to satisfaction of the stakeholders***



Support CCS Road Map

Including: C Capture, Industry Requirements,
Mineralisation, Utilisation, C Tax, Non-Climate
Change Impacts



- **Bursary Support**
- Aim-build CCS technical capacity in South Africa
 - Honors, Masters, Doctorate, Undergraduate (PCSP Legacy)
 - 25 bursaries supported
- **Non-bursary Support**
 - travel, laboratory equipment or CCS projects by students
 - 13 CCS activities supported

SACCCS Research Projects (over past 9 years)



- Evaluation of how CCS and Related Low Carbon Technologies Could be Configured in a Low Carbon Growth Strategy for South Africa.
- Carbon Capture Readiness
- Scoping Study on CO₂ Mineralisation Technologies
- Scoping Study for the Test Injection Experiment of Carbon Dioxide into a geological Formation
- National and Local Stakeholder Engagement Plans
- Geology and Storage Potential of the Algoa Basin, South Africa
- Update to the CCS Geographical Information System
- Law and Relevance to the PCSP
- Funding Options
- The Zululand Basin Data Exploration Project
- Pilot CO₂ Storage Project and geological Skills Review
- Impacts of CCS on South African National Priorities beyond Climate Change
- Techno-Economic Analysis of the Implementation of CCS in South Africa
- Review of CCS Institutional Infrastructure in South Africa
- Alternative Sites for CO₂ Storage and High Level Technical Analysis of Commercial CCS in South Africa
- Analysis and Appraisal of Global Carbon Capture and Utilisation Technologies
- Carbon capture and Storage and the Carbon tax in South Africa
- Business case for Continued CCS in South Africa
- Bongwana: Surface Monitoring Protocols – Atmospheric Concentration of CO₂
- Bongwana: Surface Monitoring Protocols –Soil Concentration of CO₂
- Bongwana: Surface Monitoring Protocols –Water Concentration of CO₂
- Identification and Quantification of the Potential for Carbon Mineralisation for CO₂ Emissions Reduction in South Africa
- Survey – The Implementation Requirements of CCS Technology for the South African Industry

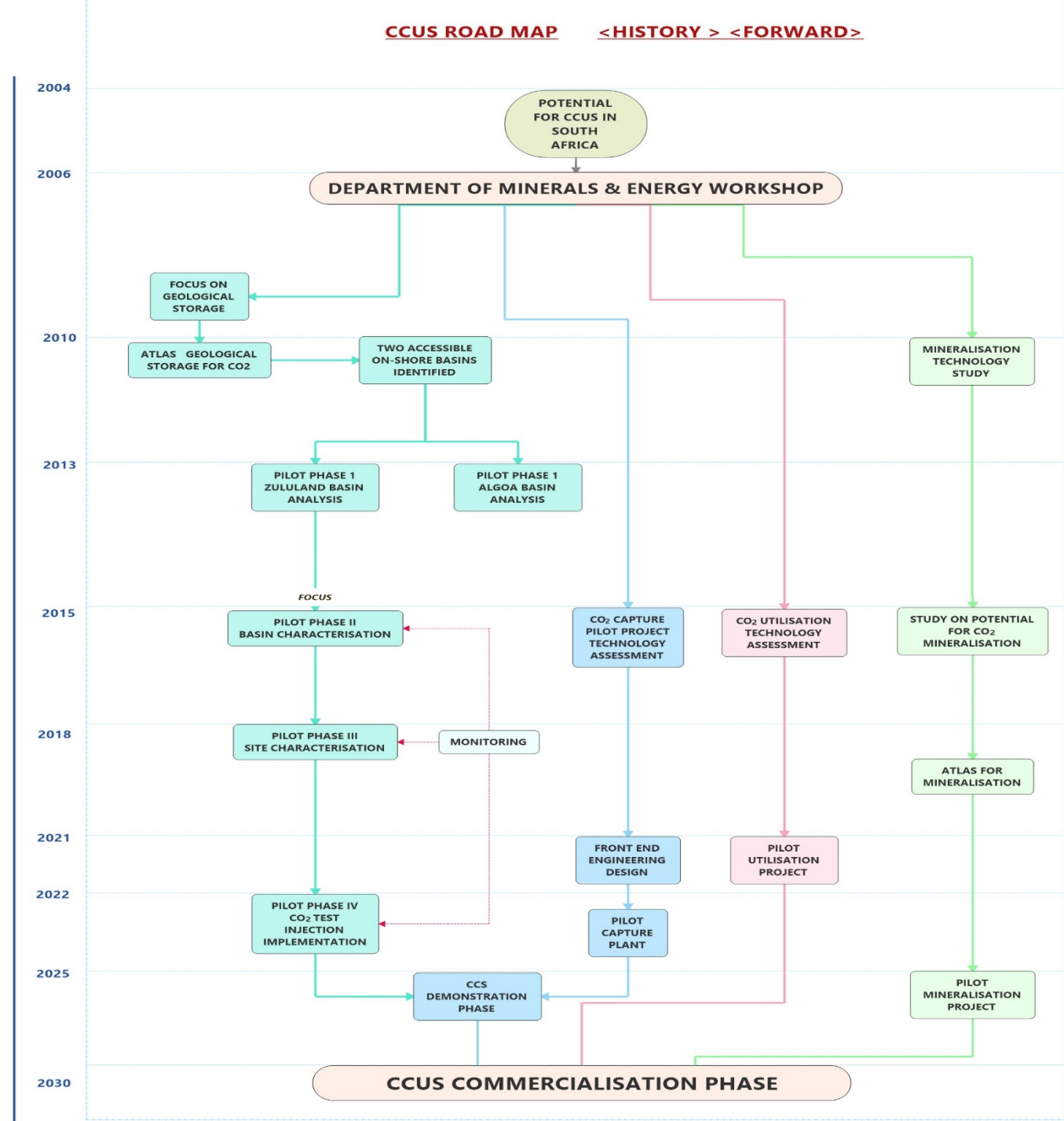




Stakeholder engagement to extend the understanding of CCS to the public:

- General public;
- Career/Science Expos
- **Biennial CCS Conferences**
 - 5th Biennial CCS Conference held 18/19 October, 2017
 - 6th Biennial CCS Conference scheduled to be held Feb 2020

Updated Road Map





Thank You

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