Introduction

• South Africa has an abundance of coal resources, estimated at 150 Gt with 33 Gt reserves as reported in 2010
• In 2009 fossil fuels contributed 89.2% towards primary energy usage
• Coal represent 65.5% of primary energy sources, followed by Oil (25.3 %) and Gas (2.8%), and the balanced sourced from Nuclear (3.2%) and Renewable Energy (7.6%) in South Africa
  • South Africa - a coal-based economy
• SA recognises and shares global concerns that: greenhouse gases (GHG) contribute to climate change, growing energy demand will accelerate GHG emission and technological solutions and management interventions are required
• ~ 400 Mt CO₂ emitted p.a. mainly from coal beneficiation – CTP & CTL
• Coal-to-liquids (CTL): 150,000 bpdoe (out of ~708,000 bpdoe) capacity
• Diversifying the energy mix – renewable, nuclear
• Clean Coal Technologies (CCT) in view of our natural resource endowment
• Promoting carbon capture and storage (CCS)
  • Exploring and developing CCS for coal fired power stations and all CTL plants.
Integrated Resource Plan (IRP) 2010

- South Africa requires ~40,000MW of new power generation capacity by 2030.
  - Basis: 2.8% p.a. electricity demand growth to support a 4.5%p.a. GDP growth
  - Existing coal fired power stations envisaged to be decommissioned around 2020
- The Integrated Resource Plan (IRP) 2010: continued use of coal in a less environmentally unfriendly manner, while employing clean coal technologies (CCTs) like CCS and energy efficiency programmes, to phase in renewable energy
- The envisaged new electricity generation capacity is shared roughly as follows:
  - 23% Nuclear;
  - 15% Coal;
  - 9% Open-cycle gas turbines (OCGTs);
  - 6% Imported gas (LNG);
  - 6% hydro power; and
  - 41% Renewable energy (solar and wind)
- Other considerations
  - Cost per kWh produced (energy as input cost in the economy)??
  - Resource endowment
  - Convergence of energy carriers
- Integrations with other Government's strategic objectives, policies and plans – taking due consideration of relevant recommendations
  - Integrated Energy Plan; Industrial Policy Action Plan (IPAP); New Growth Path; National Development Plan
  - Human capital development and redressing past imbalances

Review of pieces of legislation relating to petroleum products; natural gas, fuel specifications and standards, CCS
Coal reserves study undertaken by DMR, shale gas discourse, etc
## IRP programme committed capacity

<table>
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<th>Year</th>
<th>Coal (PF, FBC, imports, own build)</th>
<th>Nuclear</th>
<th>Import hydro</th>
<th>Gas – CCGT</th>
<th>Peak – OCGT</th>
<th>Wind</th>
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1. Built, owned & operated by IPPs  
2. Commitment necessary due to required high-voltage infrastructure, which has long lead time  
3. Commitment necessary due to required gas infrastructure, which has long lead time  
4. Possibly required grid upgrade has long lead time and thus makes commitment to power capacity necessary
SA CCS Road Map – Approved by Cabinet

- **Preliminary Potential Investigation of 2004**
  - Showed sequestrable and non-sequestrable CO₂ and potential underground geological storage sites.

- **2010 Atlas on geological storage of CO₂ in SA:**
  - Potential storage sites and their characterisation completed
  - Atlas initiated and financially supported by SANEDI, Eskom, PetroSA, Sasol, Anglo American and Petroleum Agency of South Africa, and conducted by Council for Geoscience – launched by Minister on 10-Sep-10.

- **CO₂ Injection Experiment in 2016/2017 (10s thousands of t):**
  - Understanding of the suitability and geology of storage medium.
  - Understand dispersion and transformation reactions of the carbon dioxide in the storage medium.

- **Demonstration Plant planned for 2020 (100s thousands of t):**
  - To test an integrated operating system under local conditions and forms an essential link between pilot plant and a full scale commercial plant.

- **Commercial plant planned for 2025 (millions of t):**
  - Depends on success of prior milestones, a commercial plant will store millions of tonnes of CO₂.
Establishment of CCS Interdepartmental Task Team

- The DoE established an Interdepartmental Task Team, which involve all Departments on which CCS cuts across.
- The CCS Task Team will coordinated different views from policies, acts and regulations of relevant Departments and thus integrate to give the government position.
- The commitment and progress achieved by South Africa on CCS matters is derived from an ongoing support demonstrated by the International community, both technically and financially.

The Department of Energy has also put a lot of effort in expediting the development of other CCTs like underground coal gasification (UCG) but awaits progress by other parties involved.
South African Coal Roadmap

Purpose of the coal roadmap is to recommend:

• on infrastructural investments by private & public sector;
• possible technological trajectories, which optimise production taking into account, amongst other things, air quality standards, efficient coal extraction, production and utilisation practices within local and international norms and standards that govern the coal industry;
• on the research and development needs;
South African Coal Roadmap

• Guide on technology acquisition and implementation that considers sustainable use of coal, premised on CCT development and deployment
• on the appropriate occupational health, safety and environment development needs for the South African coal industry
• On building capacity, developing and retaining critical skills in the coal industry
• All projects / initiatives are driven by Government and other stakeholders, including the industry, state-owned enterprises, academic and research institutions.
International Cooperation

• COP 15 in Copenhagen: South Africa committed to reduce CO₂ emissions by 34% in 2020 and by 42% in 2025, subject to the technical, financial and capacity support from developed countries

• Local & International collaboration on CCS / CCUS development:
  • World Bank, International Energy Agency (IEA), Carbon Sequestration Leadership Forum (CSLF) and the Global Carbon Capture and Storage Institute (GCCSI), CEM, bilaterals, etc

• Shining example thus far: the South African Centre for Carbon Capture and Storage (SACCCS) under SANEDI launched on 30-Mar-09
  • COCATE CO₂ Transport Workshop to be held on 7-8 Nov 2012

Noted: development w.r.t. CCS in CDM. National Designated Authority established within the DoE
Conclusion

• Coal is and will continue as the most important source of primary energy in RSA albeit in a more environmentally benign manner.

• South Africa is committed to low carbon economy
  • will continue to research for optimal ways of using coal - CCTs (incl. CCS and other methods / technologies)

• Multi-faceted cooperation is critical:
  • Government is working together with Coal Industry, Research Institutions and Universities – PPP highly regarded
  • Cooperation at international level is critical, considering that GHG emissions know no country boundaries
Thank you

Ke a leboha

Spasibo

Asante sana

Inkomu

Merci beacoup

Muito obrigado

Mucho gracias

Vielen dank!

Ndiyabulela

Tusen takk

Ke a leboga

Ngiyathokoza

Shukran gazilan

Ngiyabonga kakhulu