Presentation Outline

1. South Africa’s Energy Planning

2. Cross Border Opportunities.
   1. Gas, Hydro and Oil
   2. Coal fleet decommissioning
   3. Gas opportunities

3. Enabling environment.
1. National Energy Planning

South Africa’s Energy Planning Context:


• Further anchored in the **National Energy Act, 2008** (Act No. 34 of 2008)
  
  • [Mandates Minister of Energy to develop and publish and review the Integrated Energy Plan].

Integrated Energy Plan:

• **Electricity Master Plan**
  
  • Provides least cost electricity generation mix, including consideration for imports and exports

• **Liquid Fuels Infrastructure Roadmap**
  
  • Future supply/demand analysis and provision for required infrastructure (refinery)

• **Gas Master Plan**
  
  • Market development – increased demand for gas in South Africa
1. National Energy Planning

Integrated Energy Plan

Global Data Parameters (e.g. GDP, Discount rate, Exchange Rate, Fuel Costs)

**SCOPE**

- Electricity generation build plan
- Transmission build plan
- System Adequacy
- Electricity Price Path
- All primary energy carriers

**KEY DATA PARAMETERS**

- Technology Costs (Capital, O&M)
- Plant performance
- Plant operational life
- Other technology parameters

**IRP**

- Liquid Fuel Supply Options
- Liquid fuel supply infrastructure
- Location and logistics
- All primary energy carriers

**Liquid Fuels**

- Technology Costs (Capital, O&M)
- Plant performance
- Plant operational life
- Production slates
- Other technology parameters

**Gas**

- Gas development scenarios
- Gas price scenarios
- Gas supply and infrastructure
- Legislation and policy
- Indigenous and imported gas

**Level of maturity of national planning**
Cross Border Opportunities
2. Cross Border Opportunities

1. Hydro electricity scheme;
   - Grand Inga (2500 MW) - import
   - Cahorra Bassa (1000 MW) – import/export

2. Gas importation
   - Gas –to- power (new) 3500 MW.
   - Coal conversion.
   - Gas market development (industrial, commercial and residential)

3. Retiring Refineries
   - New Oil refinery (opportunities for cleaner fuel specification)
South Africa’s Coal Fleet Reaching End Of Life*

<table>
<thead>
<tr>
<th>Calendar Years</th>
<th>2019</th>
<th>2020</th>
<th>2021</th>
<th>2022</th>
<th>2023</th>
<th>2024</th>
<th>2025</th>
<th>2026</th>
<th>2027</th>
<th>2028</th>
<th>2029</th>
<th>2030</th>
</tr>
</thead>
<tbody>
<tr>
<td>Camden*</td>
<td>U6</td>
<td>U7</td>
<td>U8</td>
<td>U5</td>
<td>U4</td>
<td>U3</td>
<td>U2</td>
<td>U1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>U9</td>
<td>U8</td>
<td>U7</td>
<td>U4</td>
<td>U5</td>
<td>U6</td>
<td>U2</td>
<td>U8</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hendrina</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Arnot</td>
<td>U1</td>
<td>U2</td>
<td>U3</td>
<td>U4</td>
<td>U5</td>
<td>U6</td>
<td>U9</td>
<td>U8</td>
<td>U7</td>
<td>U4</td>
<td>U5</td>
<td>U3</td>
</tr>
<tr>
<td>Komati*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grootvlei*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kriel</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Malwa</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| Total MW       | 186   | 941   | 888   | 565   | 608   | 190   | 494   | 2173  | 950   | 1384  | 1420  |
| Cumulative MW  | 186   | 1127  | 2015  | 2580  | 3188  | 3378  | 3872  | 6045  | 6995  | 8379  | 9799  |

Financial Years:
- Apr-20
- Apr-21
- Apr-22
- Apr-23
- Apr-24
- Apr-25
- Apr-26
- Apr-27
- Apr-28
- Apr-29
- Apr-30

*Source: Eskom 2018 Tariff Application. EOL @ 50 years
Opportunities

1. Replacement of coal fleet - options
   1. Clean coal technologies
   2. Conversion from coal-to-power → to gas-to-power
      1. Will require increase in gas import.

2. New power generation technologies –
   1. Lenders bias towards funding cleaner tech.

3. Need for cross border energy trading (oil, gas and electricity).
   1. Will require transportation infrastructure to be strengthened.
Ongoing local gas initiatives – Opportunities to convert diesel power plants to gas power.

- Eskom

**Ibhubeisi gas field (2018)**
- Proven reserves of 0.2 TCF
- GSA Negotiations delayed due to OCGT utilisation profile changes

**Ankerlig Power station (operating)**
- Multi-fuel Siemens OCGT (1,338 MW)
- Dual fuel burners conversion completed

**Gourikwa Power station (operating)**
- Multi-fuel Siemens OCGT (746 MW)
- Engagement continues between Eskom and PetroSA for feedback on fuel sourcing

**Waterberg CBM (pilot operating)**
- Reserves estimated at 2-14 TCF
- Company’s involvement is yet to be clarified

**Karoo shale gas (2030)**
- Ranked top 10 in the world with estimated 15-485 TCF gas reserves
- Strategy allows Eskom to participate as main offtaker
- Company’s involvement is yet to be clarified

*1. SOURCE: IEA; press search; PDD*
Cross Border Opportunities. Gas Discoveries

- **Kudu gas field (2021)**
  - 1.3 Tcf estimated reserves

- **Botswana CBM (desktop studies underway)**
  - Estimated recoverable reserves of 6.7 Tcf

- **Zimbabwean CBM (info unavailable)**
  - 765 Bcf estimated reserves

- **Gasnosu North-South pipeline (2022/3)**
  - Proposed pipeline intended to transport gas from Rovuma to south Mozambique and South Africa
  - Will be anchored by 5000MW of generating capacity between Mozambique and South Africa

- **Rovuma Basin – onshore and offshore (2023)**
  - Reserves estimate 170 TCF

- **Rompco pipeline (operating)**
  - 865 km from Pande and Temane
  - Eskom can source gas at the field or through the pipeline to generate ~600MW

- **Tanzania Songo-Songo and Mnazi fields (operating)**
  - 8 Tcf estimated reserves
  - Total Tanzanian estimated reserves: 42.7 Tcf

1 Range from Energy Information Administration (EIA)

SOURCE: IEA; press search; PDD
What is required

1. Cross border regulatory framework.
   1. Gov-to-Gov collaboration (at a policy level)
   2. Legislative amendments.
   3. Respective country regulators need to re-calibrate processes

2. Regional Energy Plans

3. Bankable projects

4. Coordinated project development – appropriate risk allocation

5. International experience incorporated into regional projects.
Thank You

Physical address:
Mzimba House
92 Visage Street
Cnr Paul Kruger & Visage Streets
Pretoria

Postal address:
Private Bag X96
Pretoria
0001

Telephone number: +27 12 406 7540
Fax number: +27 12 323 5646
Email address: publication@energy.gov.za
Website: www.energy.gov.za

ISBN: 978-1-920435-14-1