Demand expected to grow strongly across the region

Annual energy (GWh) +43% by 2030, by country

Peak demand (MW) +52% by 2030, by country

Source: regional government planning documents, official forecasts
Historically, generation capacity is challenged

Morupule B operated <300MW for most of 2016

Botswana average daily demand was 400-500MW in the same period

Source: Data obtained by Mott MacDonald staff from the National Control Centre (NCC) at Segoditshane Substation in Gaborone, Botswana on 4th August 2016
leading to a heavy reliance on imports from Eskom

Botswana native generation supply and imports, 2015-16

Source: Data obtained by Mott MacDonald staff from the National Control Centre (NCC) at Segoditshane Substation in Gaborone, Botswana on 4th August 2016
A situation likely to continue

Botswana demand projected to grow strongly

Morupule B hourly generation curve plotted against load forecasts

Balance will need to be met by reliable new capacity or imports


Source: Mott MacDonald analysis
Botswana supply options

- Match long-term growth in peak demand against committed dispatchable capacity.
- Non-dispatchable capacity (such as solar or wind power) is often not considered in capacity planning as it may not be available at system peak.
- Demand-supply balance grows tight, even assuming new projects are delivered.

Traditional capacity planning approach (dispatchable power only)

Source: Mott MacDonald analysis
Botswana supply options

• Botswana will need to add up to 500MW of committed, dispatchable electricity generating capacity by 2040, in order to keep pace with demand.

• If projects slip in schedule, imports will increasingly be relied upon.

• As shown in the following slides, it is expected that the supply-demand balance will tighten across the region in coming years, in line with the historically cyclical nature of power market supply-demand (surplus-deficit-surplus).

• Given the possibility of new wind and solar capacity in the region, backstop technologies such as gas CCGT/OCGT have a role to play in the supply balance - e.g. the South Africa Draft IRP states that “Gas and Renewables forms the biggest chunk of installed capacity by 2050”

• Botswana has options to contribute to its own self-sufficiency and exports into the region using quick start gas generation.
~USD80bn in new generation capacity required across the region by 2030, to keep pace with demand

- Zimbabwe USD8.8bn (50% of 2016 GDP)
- South Africa USD57.4bn
- Namibia USD4.2bn
- Zambia USD5.9bn
- Botswana USD1.8bn:
  - 100MW solar w. storage 2019
  - Morupule B (5&6) 2020
  - 100MW gas CCGT 2021

Source: regional government planning documents, official forecasts
Regional supply

- Historically, new power generation projects in the region have not been rolled out in a timely fashion
- Many are currently stalled, and may not proceed
- It is unclear how ~USD80bn of new power capacity in these countries will be financed
- For example, USD8.8bn of new investment in Zimbabwe
- Regional Government supply plans assume new projects will be rolled out, on time, every 1-2 years in perpetuity, however this is not the case in past experience
Supply deficit will emerge by mid next decade, even assuming all projects delivered

We analysed 3- and 5- year delays to new capacity, which could lead to severe power shortages in the next decade.

Power markets move in cycles of 1) supply surplus, 2) under-investment, then 3) deficit. The current Eskom supply overhang and cheap tariffs will not last.

Eskom was in major supply deficit in 2008 and again in 2014.

Source: regional government planning documents, official forecasts, Mott MacDonald analysis
Reliance on Eskom for long-term supply security is unsustainable

South Africa faces power crisis and blackouts

South Africa is facing an electricity crisis as the country's power utility struggles to meet demand.

Power utility Eskom has been rationing supplies for the first time since 2008 in order to ease the pressure on the national grid.

The power cuts are being blamed on poor maintenance practices stretching back many years.

Nomsa Maseko reports.

04 Feb 2015
## Tariffs are currently low

<table>
<thead>
<tr>
<th>Country</th>
<th>Average Indigenous Generation Tariff in USc/kWh</th>
<th>Average Import Tariff in USc/kWh</th>
<th>Large customer Tariff in USc/kWh</th>
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</thead>
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<tr>
<td>Zimbabwe</td>
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<td>7.29</td>
<td>7.84</td>
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<tr>
<td>South Africa</td>
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<td>5.43</td>
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<tr>
<td>Namibia</td>
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<td>5.31</td>
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<tr>
<td>Zambia</td>
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<td>5.43</td>
<td>3.3</td>
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<tr>
<td>Average Regional Tariff</td>
<td>unknown</td>
<td>5.67</td>
<td>6.94</td>
</tr>
</tbody>
</table>

Source: [MM] *Large hydro and Hwange coal **Predominantly Cabora Bassa

Source: Mott MacDonald analysis of regional data
But unsustainable ……..

Tariffs would need to rise by up to 80% for BPC to recover costs

Source: BPC Annual Report, 2017
Regional utilities remain heavily subsidised

BWP 10bn (USD 1bn) required during 2017-2020

Source: BPC Annual Report, 2017
Eskom’s claw back

• On 14 June 2018 NERSA advised that it will allow Eskom to recover R32.69bn (USD~2.8bn) in non-recovered costs from the three years 2014-2016

• The costs are to be recovered through tariff increases to standard and international customers, and customers on ‘special pricing agreements’

• Eskom had claimed R66.6bn (USD ~5.6bn) of cost recovery, and has achieved roughly half with the NERSA decision

• “Tariffs to be more cost-reflective in structure i.e. fixed versus variable charges and in level”. Eskom Strategy report 2017
Summary of MM Market Study

• Electricity demand is projected to grow strongly across Southern Africa over the next 20 years
• New industry in the region will be seeking reliable base load electricity supply
• While the system is currently in surplus, due mainly to Eskom, this situation is not expected to last and the supply-demand balance is expected to tighten in the next five years
• Regional governments expect to be able to roll out a wave of new generating capacity by 2030. If projects slip, another regional supply-demand shortfall will emerge mid-decade
• Botswana has options to contribute to its own self-sufficiency and exports into the region using quick start gas, given the focus on renewables in South Africa
• Present tariff structure across the region is unsustainable and confers severe financial losses on regional utilities, and a disincentive to new investment
• A looming power crisis in Southern Africa?
Tlou Lesedi Project

• Onshore Gas-to-Power Developer in Botswana

• Market with huge future demand

• 1st mover advantage (Upstream EIA and Mining Licence in place)

• Ideal location in Botswana

• Significant Gas Reserves and Contingent Resource
The Company extracts CBM natural gas from coal, using horizontal drilling techniques. This CBM gas can then be used for electricity generation.

- **Tlou’s CBM extraction method**
  - Dual Lateral Pods, each comprising one vertical and two horizontal wells
  - Proven technology
  - Minimum footprint allowing agricultural use of land to continue
  - No fracking required
  - CBM can replace high carbon producing power generation such as diesel and coal fired power
Timeline of Tlou’s progress

- **2009**: Botswana operations commenced
- **2012**: First Contingent Gas Resources
- **2013**: ASX Listing
- **2014**: First Gas
- **2015**: Increased Contingent resources
- **2016**: Upstream Environment approval
  - First Gas Reserves
- **2017**: First gas fired power produced for field use
  - Development (Mining) Licence granted
  - BSE Listing and Placing to leading fund manager, African Alliance
- **2018**: Significant Increase in Gas Reserves and Contingent Resources
Project Benefits

➢ **For Investors**

- Leading CBM project in the region
- Significantly de-risked
- Enormous potential upside as the project moves into development and generates first revenue
- Much larger projects planned post the initial 10 MW

➢ **For Botswana**

- Creates vital direct and indirect employment
- Energy security by removing the need to import expensive power
- Develops a new industry to diversify the economy
- Delivers further royalties and taxes to the Government
Gas Reserves Summary

✓ Sufficient Reserves already in place for initial project development
✓ Further Reserves and Resources in place for significant expansion

2P Gas Reserves in place:  
~41 BCF  
• a 10 MW project for 25 years would require:  
  Approx. 28 BCF¹

3P Gas Reserves in place:  
~427 BCF  
• a 100 MW project for 25 years would require:  
  Approx. 274 BCF¹

3C Contingent Resources  
~3,043 BCF  
• This is sufficient gas¹ for 300 MW for 40+ years, based on a 50% recovery factor

¹. Billion Cubic Feet, based on 1 MW of power being produced from 300,000 standard cubic feet of gas per day.
Develop up to 10 MW of power:

- Targets first revenue while minimising initial capex requirement
- Sufficient gas reserves already in place
- Achieves grid connection and facilitates simple expansion
- Easily integrate solar generation

Strategy:

- Drill pilot wells sufficient for the first 2 MW
- Complete environmental approval for transmission lines and power generation assets
- Construct transmission lines and install generators
- Connect to local Botswana grid
- Sell power via an agreed Power Purchase Agreement or on the regional spot market