Africa’s Internet Timeline

**1870’s**
- **FIRST TELEPHONE**

**1990’s**
- **FIRST EMAIL**

**2000**
- **START OF Deregulation in Africa**

**2010**
- **Huge Leap in Undersea Cable Capacity & Price Drop**

**2020**
- **WHERE TO NEXT?**

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**% Internet Penetration**
- 1870’s: 2%
- 1990’s: 2%
- 2000: 14%
- 2020: 65%

**Innovation**
- **Launch of Prepaid Mobile & Data**
- **Birth of Mobile Money**
- **Content**
- **The Internet of Things**

*Source: ITU & Teraco*
Deregulation Necessity: South Africa Story

- Key to success has been liberalisation on Telco market
- SA Telco deregulated in 2008
- Dark Fibre introduced by DFA in 2009
- Several new Telco’s launched 2009 – 2012
- Teraco first neutral facility in Africa established 2009
- ISP’s begun to build own fibre networks
- International bandwidth pricing drop (2008 – 2013): 2008 $4000 per 1 Mbps vs today $50.00 per 1Mbps
- Global Telco’s & Content entering SA Google, Akamai, Microsoft, Cloudflare, BT, Level3, AT & T etc.)
SA Nuances driving Growth in Colocation

- Many enterprise DC’s are beyond useful life due to power and cooling limitation
- IT loads increasing from 1.5kw per cab to 3kw plus
- Location is key! Access to available space, reliable power key for future growth
- Ever growing computing load = growing cooling load = growing electrical load
- Inability to access additional power from council/landlord
- Business need has evolved over time to a need for 99.999% resilient solution
- Cost of reinvestment massive (R/$, skills, n+1 solution)
- Secondary power as important as primary electrical source. What is your back up to Secondary power=more capital?
  - Eskom/load shedding (3 year reality)
  - Cable Theft/Transmission failure
  - Voltage/load fluctuations
- Logistics around diesel storage and securing deliveries in time of need
**Power, Power Power......**

- Eskom – Services Southern Africa Region e.g. South Africa, Swaziland, Lesotho etc.
  - Ongoing Load Shedding – No leadership and 3x over their budget
- Two years behind maintenance e.g. Silo collapsed November 2014
- Medupi power station was meant to go live in 2013, only at full capacity in 2018 with 6x800MW Turbines – only just meet current demand;
- Annual power Cost of power estimated more than CPI;
- Reality is additional Council power only ready in 2019 which can only meet current demand
### Load Forecasting

**Projected Peak and Annual Energy Demand**

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<th>12/13</th>
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<th>20/21</th>
<th>21/22</th>
<th>22/23</th>
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<tbody>
<tr>
<td>% Gth in Basic Demand</td>
<td>5%</td>
<td>6%</td>
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<td>6%</td>
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<tr>
<td>Basic Demand (MW)</td>
<td>1,354</td>
<td>1,435</td>
<td>1,521</td>
<td>1,613</td>
<td>1,709</td>
<td>1,812</td>
<td>1,921</td>
<td>2,036</td>
<td>2,158</td>
<td>2,288</td>
<td>2,425</td>
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**VISION "2030" FL. SH**

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<tr>
<td>ICT Cities</td>
<td>10</td>
<td>30</td>
<td>40</td>
<td>60</td>
<td>80</td>
<td>100</td>
<td>120</td>
<td>150</td>
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<td>Lamu Port/Lapset</td>
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<td>40</td>
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<td>60</td>
<td>80</td>
<td>100</td>
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<td>Railways</td>
<td>10</td>
<td>20</td>
<td>30</td>
<td>40</td>
<td>60</td>
<td>80</td>
<td>100</td>
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<tr>
<td>Mining Industries</td>
<td>20</td>
<td>40</td>
<td>60</td>
<td>70</td>
<td>80</td>
<td>90</td>
<td>100</td>
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<tr>
<td>Other Industries</td>
<td>10</td>
<td>20</td>
<td>40</td>
<td>60</td>
<td>80</td>
<td>100</td>
<td>120</td>
<td>150</td>
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<tr>
<td>Total Demand (MW)</td>
<td>1,354</td>
<td>1,435</td>
<td>1,521</td>
<td>1,643</td>
<td>1,809</td>
<td>1,982</td>
<td>2,171</td>
<td>2,356</td>
<td>2,558</td>
<td>2,778</td>
<td>3,025</td>
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<td>Ann. Energy (GWh)</td>
<td>8,124</td>
<td>8,611</td>
<td>9,128</td>
<td>9,856</td>
<td>10,856</td>
<td>11,892</td>
<td>13,024</td>
<td>14,135</td>
<td>15,348</td>
<td>16,665</td>
<td>18,149</td>
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**Av. Annual Load Growth = 8.3%**

*Already at 80% of power demand with underestimated annual growth*
Roadmap provides 40,000MW by 2020 of which 200,000MW is actually required to sustain growth.

Currently delivering 4,400MW which peaks at 4,517 MW with a short fall of over 1,482MW.

Alternative Energy is key to the survival.
Benefits of Outsourcing IT Infrastructure

There are several benefits of outsourcing IT infrastructure using a utility-based model:

- Cost reduction or containment
- Infrastructure scalability and flexibility
- Improved Quality of Service (QoS)
- Enhanced security
- Reduced administration time
- Faster time-to-market
- Environmental considerations
- Ease-of-provisioning
- Ability to leverage innovative platforms more quickly
- Future-proofing infrastructure
- Support for variable traffic needs and dynamic business requirements

Source: Fast Forward: Savvis
Cost of DC Ownership… more than just space

- Civil Structure, Substation, Transformers
- Power Plants, Cooling, VESDA and Security
- Operational and monitoring systems
  - Capacity requirements over the next 3-8 years
  - Power requirements – electrical and cooling kw/m²
  - Location – access to sufficient power
  - Location – access to multiple fibre rings
- Average “white space” costs convert at around R200k/m², which moves to R250k/m² for Tier III configuration (99.999% uptime) with upgradable power capacity

CAPITAL COSTS
Cost of DC Ownership… more than just space

OPERATING COSTS

- Staffing and operational environment 24*7
- Network costs, primary and redundant fibre connections
- Facility rentals
- Security
- Annual facility and infrastructure maintenance
- Staff skills
- Power, Power, Power (100% increase over 5 years)
  - IT load power plus facilities power (cooling etc.)
  - A typical DC design 1.4, effective 1.7
  - Facilities consume between 1 and 2 units of power for each unit consumed by IT kit
We are extending our existing facilities by 5 000m² and 10MW

- Total of 16 MW of power
  - 30 000m² of structure
  - 10 000m² operational space
  - 4 100 cabinets
- Total 10 year investment in JB facility once all phases operational in the region of R1bn
- 16 MW of power equivalent to 30 000 households (actually a net saver to the grid)
Operational Intent

Operational Intent

Design Capacity

Utilised Capacity
- Space
- Power
- Cooling
- Network

Operational Intent

Lost Capacity

Time

Utilisation

Next data center project started

Next data center brought on-line

Source: The Elephant in the Room is Lost Capacity
The Reality

Source: The Elephant in the Room is Lost Capacity
Carrier/ISP Facility – Transit Effect

 Carrier/ISP Environment
Delivery Times sometimes questionable

Provider A
$120.00 Fibre Cross Connect

Exchange Point

Provider B
$70.00 per 1MBPS

Provider C
$70.00 per 1MBPS
Teraco’s Secret Sauce: Open, Cost Effective Interconnection

NEUTRAL ENVIRONMENT
SLA Delivery within 72 hours

PROVIDER A
$0.00 PER CONNECTION

OPEN PEERING EXCHANGE POINT

PROVIDER B
$0.00 PER CONNECTION

PROVIDER C
$50.00 PER CONNECTION

$50.00 FIBRE CROSS CONNECT

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$50.00 FIBRE CROSS CONNECT
Ecosystems key to Data Centre Growth!

<table>
<thead>
<tr>
<th>Year</th>
<th>CT1 500m²</th>
<th>JB1 1,750m²</th>
<th>DB1 2,450m²</th>
<th>EXP. 3,570m²</th>
<th>EXP. 6,200m²</th>
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<tr>
<td>2010</td>
<td>3</td>
<td>35</td>
<td>70</td>
<td>135</td>
<td>185</td>
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<td>2011</td>
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<td>2014</td>
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</tbody>
</table>
Thank you – Questions?
andrew@teraco.co.za