The Future of Fibre in South Africa

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FTTx challenges – Build Landscape

- South African Urban Density is Lower than other markets.
  - Low density increases Household Pass (HHP) Cost.

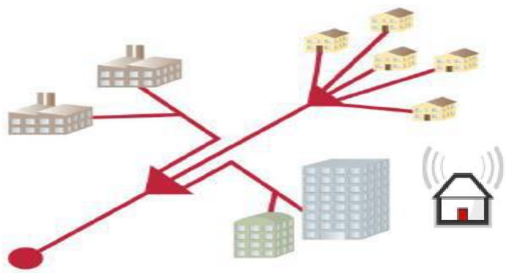
	Jo'burg	London	Nairobi	Delhi
Households per km^2	612	1,918	1,415	1,722

  - FTTB: 3 businesses per building in CBD's, 2 in Office Parks

- Poor quality demographic data increases fixed build risk
  - Broadband propensity models are not readily available

- Poorly defined regulatory landscape
  - Limited access to incumbent brownfield infrastructure – mostly greenfield build
  - Infrastructure ownership vs. infrastructure procession is not clearly defined
  - Home building codes don't include telecommunication infrastructure access standards

FTTx | Concept and definition of the technology



Fibre-To-The-x

Access Fibre Technologies

Technology	Characteristics
GPON	• Current • Lower capacity • Down 2.5 Gb/s
XGS PON	• Soon • Medium capacity • Down 10 Gb/s
NG PON2	• Future • High capacity • Down 40 Gb/s
Active Ethernet	• Current • Medium Capacity • 100 / 1000 Mb/s
PtP Ethernet	• Current • Med / High • Dedicated link

Shared capacity

FTTx is defined as an access network architecture from a central point directly to individual buildings in which the connection to the subscribers premises is Optical Fibre. The fibre optic communications path is terminated within the building for the purpose of carrying communications services such as data, voice and video at unprecedented high-speed access for the subscriber.

Use cases

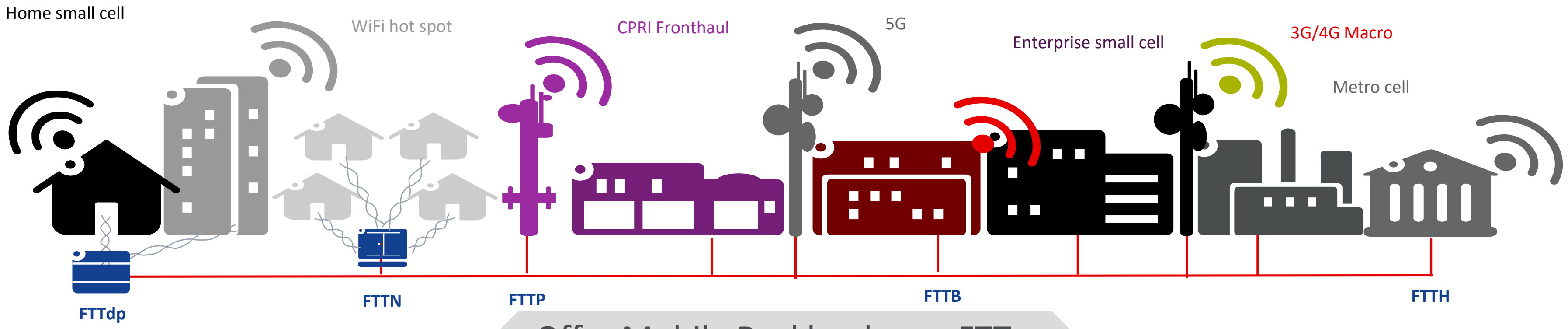
- **FTTH – Fibre to The Home for high speed internet connection with relatively high contention ratio.**
- **FTTS – High capacity Fibre To The Site (Mobile Base Stations)**
- **FTTB – Fibre To The Business with low contention ratio for guaranteed performance**
- **FTTC – Fibre To The Curb / Cabinet**

Source: Adapted from FTTX Council

Building Codes and Access

- **House Building codes should in future include Telecommunications infrastructure**
  - Standards adopted
  - Ducts
  - Home Access Point
- **Road building standards should allow slitting and micro trenching**
  - Gated communities
  - Suburban roads
- **Municipal relaxation for Over Head build**
  - Leafy suburban areas where overhead power lines are already in place
- **Relaxation of trenching depth standards in suburban areas**
  - 450mm in areas of low civil activity
- **Grants of Rights in estates is still a 6-18 month process**
  - Market is moving faster than HOA's

5 FTTx | Increasing synergies between Fixed and Mobile



Offer Mobile Backhaul over FTTx

Deliver on the promise of 5G

Metro & small cells	More Dense	Deep fiber penetration
MBH, Fronthaul, Midhaul, WiFi offload	More Diversified	FTTH, FTTN, FFTDp, FTTB, HFC
C-RAN, LTE-A, 5G	Technology Evolution	Vectoring, G.Fast TWDM-PON
Explosive mobile traffic growth	Rapid bandwidth increase	Gigabit Networks with up to 10 Gbps for residential users

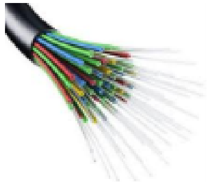
THE MOBILE OPERATOR PERSPECTIVE | **THE FIXED OPERATOR PERSPECTIVE**

Source: Adapted from Nokia

Connectivity | Customer expectations

Ambition | Leading footprint and performance

CPE Evolution — Introduction of 1Gbps home routers by 2018/2019



FTTx

10Gbps

2.5Gbps

- Upgrade from GPON to NG-PON2
- Greater capacities and wider footprint
- Focussed roll-out to key target-market

Market view (available today): Ultra-fast 802.11ac dual-band Wi-Fi router boosts speeds up to **3167 Mbps** for low-latency online gaming, smooth 4K UHD video playback and extremely fast file-sharing.

Vodacom FTTX

Vodacom FTTX | Success , Improvements and Acceleration

Sales Acceleration

- External Direct Sales force significantly increased
- Significant increase in Retail Store sales

Service Delivery - Optimized Build

- New Standards implemented to achieve greater efficiencies
- Home Drop Cost savings
- Fast and Simplified single visit Home install

Distribution Network Build

End Points Passed YOY growth

- Significant growth on self-build
- Increased HHP rollout speed
- OSP build costs significantly reduced

1 Million HHP Target

Supplier Development and Build Partners

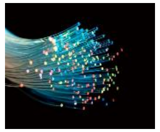
- Custom build partners
- Transfer of Existing Dark Assets
- Leased Fiber models
- Development of a regional build and support structure

FTTX Network Build Strategic Options

FTTX Target Market

- 3.6 mil households FTTX addressable market
- Vodacom has set a 1 mil passed target in 4 years
- **1 mil HHP Target – best revenue, best cost, highest deployment speed**

1 Excisting Dark Fibre Assets



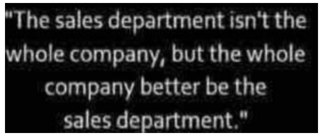
- Existing Fibre networks not deployed specifically for FTTH market, IRU's, Shares
  - Additional build required
- Shared existing fibre networks
- New Custom Deployment Leased Fibre
- Joining forces with Property Developers
- **Total Target HHP about 20%**

2 FTTX Build

- **About 50% of build still required**
- Build at about 10-20K HHP per month for 3 years
  - 45 – 60 Regional Contractors
- JV's, Co-build partner
- Appropriate Unit cost, Specification, Master Plan prioritization
- Future support partners

Supplier Development

3 The Bitstream Market



- Vodacom will Connect to about 15 Bitstream Networks this year
- Current Bitstream Suppliers – about 450K HHP with significant overlap
  - About 13 % of total addressable market
- **About 30% of Total HHP Market**

Supplier Development

Supplier Development | ICT Sector Codes

The ICT Sector Codes target for Supplier Development

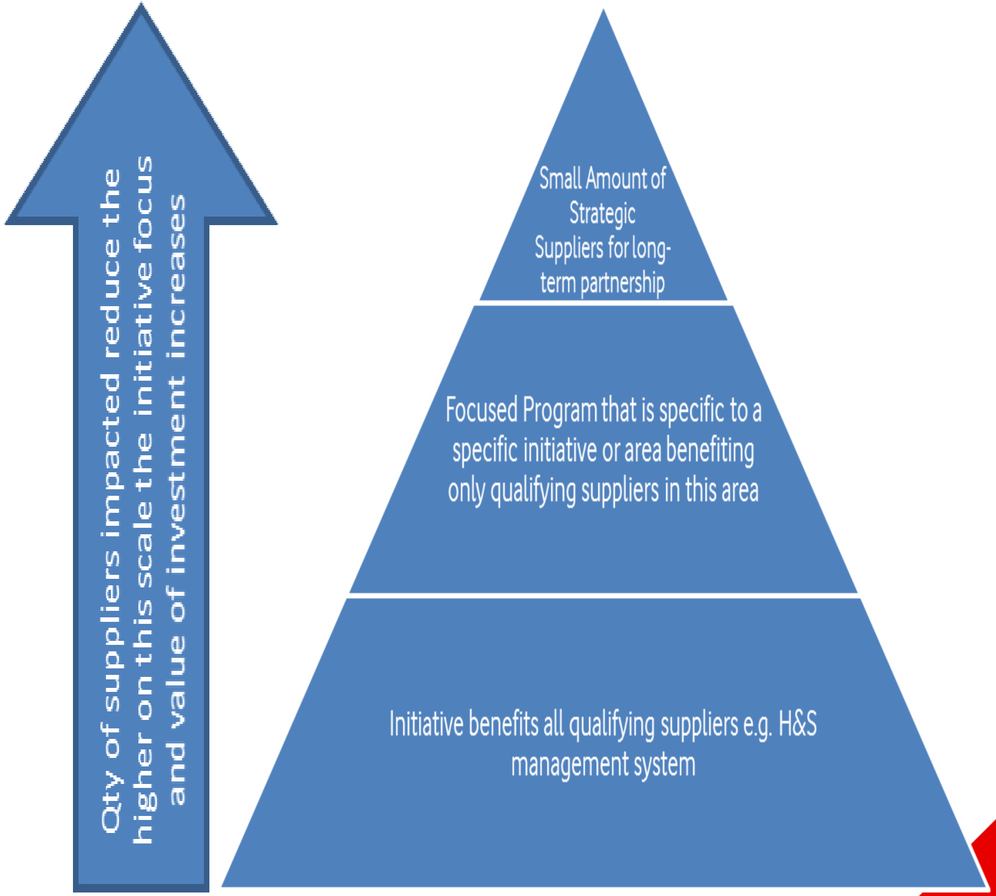
Who qualifies :

- Must have a valid B-BBEE affidavit
- Must be an EME/QSE entity
- Must be ≥51% Black Owned
- Must be Regionally based

Qualifying Contributions

Qualifying Contribution Types	Recognition Factor
• Grant Contribution	100%
• Direct Cost Incurred	100%
• Discounts above normal	100%
• Overhead costs for SD division	70%
• Interest-free loan	70%
• Standard loan	50%
• Guarantees provided	3%
• Lower interest rate	Prime - Actual
• Minority investment	70%
• Investment lower dividend	Ordinary - Actual
• Professional Services zero rated	60%
• Professional Services discount	60%
• Vodacom Employees Time	60%
• Preferential payment terms	<15 days

Strategic Focus Areas

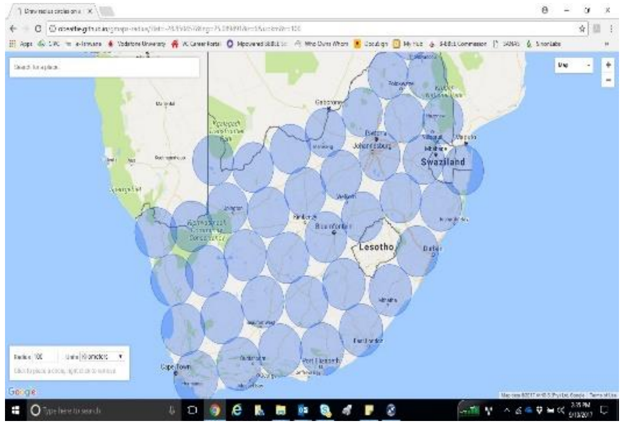


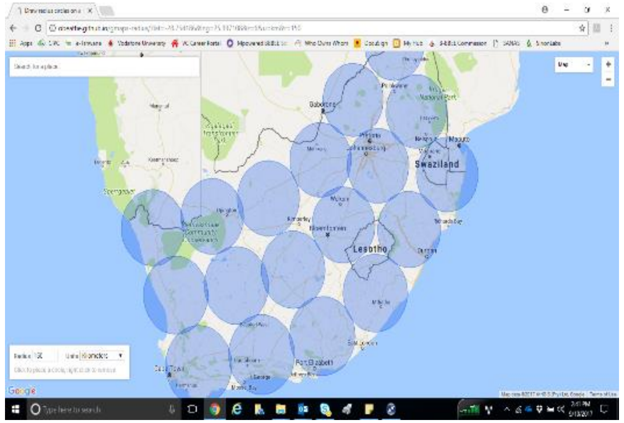
Supplier Considerations: Build and Support Model

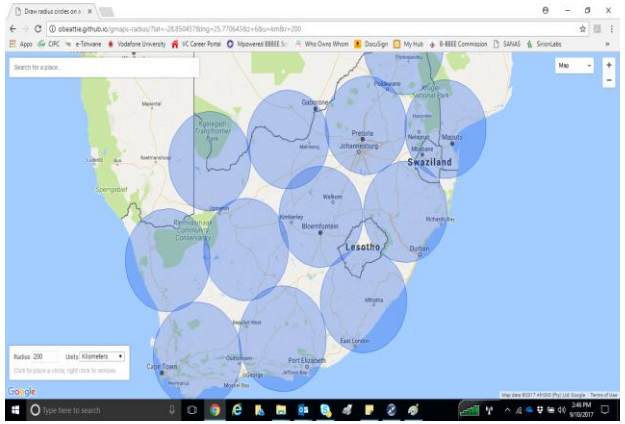
The below reflect if local suppliers in a specific area within a specific radius are appointed bearing in mind the H&S driving standards of limiting daily travel distance to 200km's and the fact that more suppliers are required in densely populated urban areas:

- 39 SMME's appointed on a radius of 100km's;
- 18 SMME's appointed on a radius of 150km's; and
- 12 SMME's appointed on a radius of 200km's.

The volume of available works per allocated area will significantly differ due to aspects like population in area, availability of Vodacom infrastructure in the area, etc.







Supplier Considerations:

FTTX Development Areas

- Quality of Work
- Reinstatements
- Project Management Certification
- Health and Safety Gate 1 & 2
- Multi-disciplinary build capabilities
    - Conventional trenching, Overhead Build, Micro Trenching, Drilling, Managing Engineering difficulties
- Detailed Fibre Planning
- Wayleave applications
- Fibre Splicing
- Home Drop and Service Activation
- After Sales customer support

- Based in Small Regions

Closing Remarks

- The greenfield build opportunity is still significant in the South African FTTX market

- Vodacom would welcome partners in all three pillars of the build challenge
  - Existing Dark Fibre
  - Co-build, JV's and Suppliers in the Greenfield build market
  - Bitstream Market

- Supplier Development will play a significant role in future build and support models