SEPTEMBER 2014

NATIONAL BROADBAND NETWORK AND SCHOOLS CONNECTIVITY

EXECUTIVE SUMMARY

- The objective of the National Broadband Network Company ("NBNCo") is to provide genuine National Broadband Coverage at an affordable price. National broadband coverage is critically important in the provision of education and healthcare services in all areas but particularly deep rural areas. Clearly business and employment opportunities will also follow.
- NBNCo will be an Open Access, Data Only, Broadband, Mobile Network enabling:
  - Active infrastructure sharing via non-discriminatory commercial arrangements;
  - MVNO data services via non-discriminatory commercial arrangements;
  - Retail data services via non-discriminatory wholesale commercial arrangements

  Robust competition at a price and service level will exist through Retail, MVNO and MNO licensed entities. LTE infrastructure will be made available at a non-discriminatory regulated price derived on a cost-plus return basis.
- All unallocated 3G, LTE and LTE+ spectrum must be issued *exclusively* to the NBNCo
- Control will reside with private investors, appropriate state-owned entities (e.g. InfraCo, Sentech and Telkom) with government support to enhance feasibility and sustainability
- NBNCo is a legal entity funded through 50:50 debt/equity capital structure
- Equity will be driven largely by assets, including spectrum and existing infrastructure, that are valued and transferred into NBNCo
- In order to ensure that the target of 100% population coverage is achieved, underserviced rollout will be prioritised

ORGANISATIONAL SET-UP

The National Broadband Network company should be funded jointly through public and private investments

Organisational aspects	Proposal
Legal set-up	• New legal entity (NBNCo) with its own ECNS licence • 30% BEE/HDI requirement needs to be met • NBNCo will only be entitled to provide wholesale services

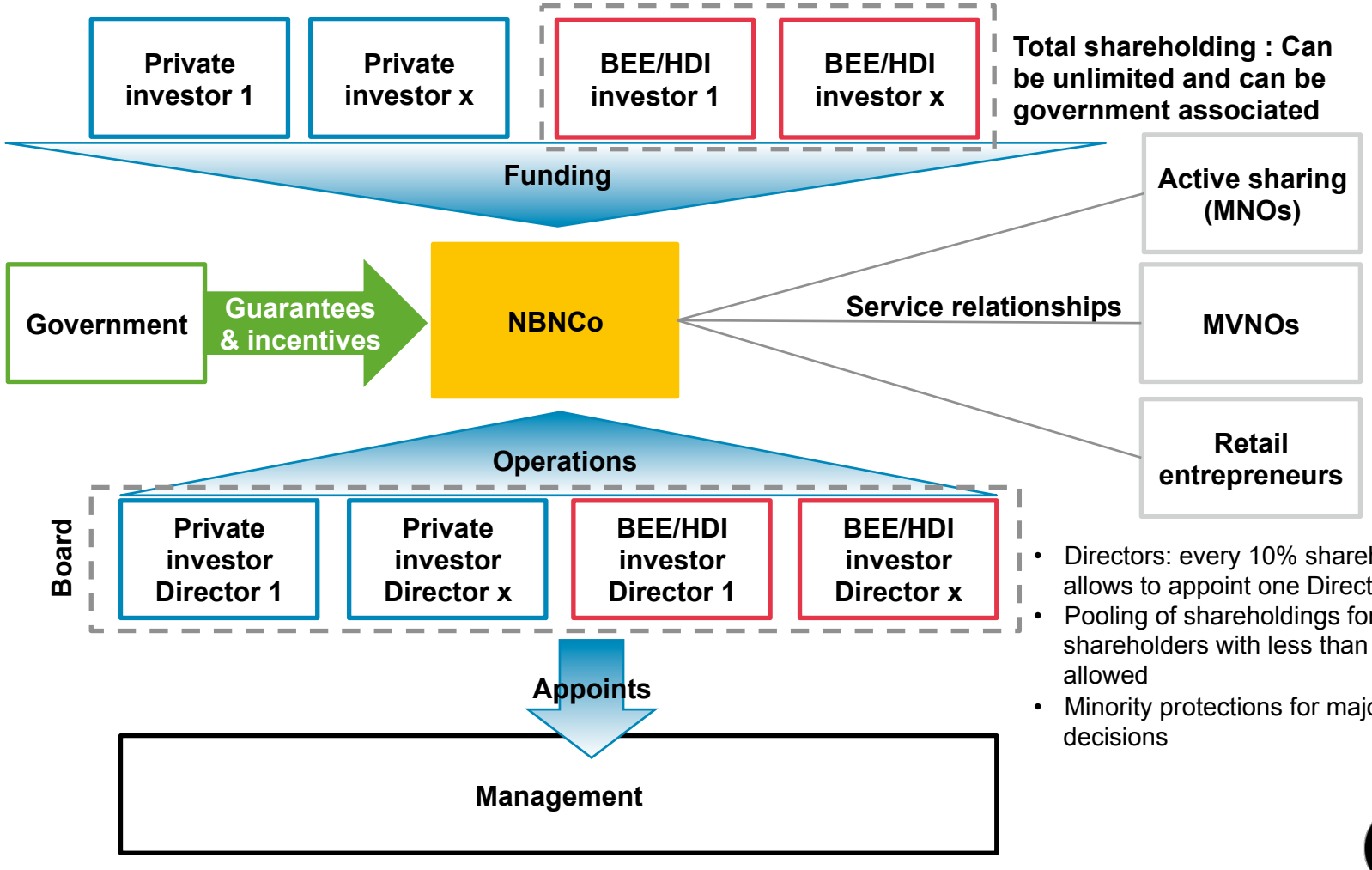
Ownership & Funding	• Joint funding
	  – Government guarantees and incentives
	  – State owned entities (e.g. InfraCo, Sentech and Telkom)
	  – Private investors (shareholders could be mobile operators, other telco players or non-telco companies)
	  – Private debt
	• Board representation does not necessarily have to be proportional to the percentage of shares held by each shareholder
	  – A shareholder with a larger customer base can extract more value out of the open access broadband network than a smaller player
	• Non-mobile operators as shareholders could be beneficial (e.g. FibreCo, InfraCo, Sentech)
	• Spectrum and infrastructure could be valued as an input to equity funding

Management	• NBNCo will be managed by an independent management team appointed by its equity holders

ORGANISATIONAL SET-UP

NBNCo would be primarily financed through upfront 50:50 debt:equity, with Government providing guarantees for debt, provide incentives and looking for BEE/HDI entities

- Debt as an important source of funding



- Directors: every 10% shareholding allows to appoint one Director
- Pooling of shareholdings for shareholders with less than 10% allowed
- Minority protections for major decisions

TECHNICAL IMPLEMENTATION

NBNCo will have to implement the RAN (for all service offerings), the core (for non-MNO offerings) and MVNE and Retail billing facilities

Implementation principles

- Use of existing towers of mobile operators as much as possible
- Outsourcing of passive RAN elements could be considered
- Ownership of active RAN elements is with NBNCo
- Transmission to be provided by shareholders and 3rd parties (e.g. Telkom and Infraco, which would give state owned companies a role)
- Core network to be built by NBNCo for MVNO and retail
- Roll-out parameters to be set by ICASA (for both geographic and population coverage) based on priority to underserviced areas balanced against commercial viability from urban revenues
- Interface for network provisioning to be provided by NBNCo as well as a wholesale billing system
- All spectrum for broadband data going forward must be allocated exclusively to the NBNCo entity
- Broadband data network provided through LTE and LTE Advanced technology (SDR radios), 3G to be evaluated as Phase 2

Implications

- MNOs will provide their own core and be able to offer seamless service to their own customers incorporating NBNCo broadband data services. This will be on the basis of an active (RAN) sharing commercial model.
- Wholesale services to non-MNOs will essentially be MVNOs and NBNCo will potentially offer related services including billing and customer management
- NBNCo will be empowered to offer retail services through a wholly owned subsidiary, NBN Retail Co, subject to independent management and control.

TECHNICAL RATIONALE FOR A NATIONAL BROADBAND NETWORK

Single broadband network benefits

- The Broadband RAN capacity can be utilised more efficiently as all customers (wholesale and retail) sharing partners have access to the same equipment as compared to fractional use of several Broadband networks by each operator
- Simplified transmission network

Allocating unallocated 3G, LTE and LTE+ data spectrum to a single company

- Each operator individually will only have a limited spectrum available for LTE and therefore cannot realise the fastest speeds offered by LTE or LTE Advanced
- When the spectrum is pooled and issued *only* to NBNCo, it is obvious that the speeds achievable will be multiples of the individual bands with the following to be considered:
  - Currently LTE RAN support a maximum of 20 MHz instantaneous bandwidth so having more than the 20 MHz currently will have no further speed benefit and when using two 10 MHz bands these have to be adjacent.
  - With LTE Advanced this limitation is removed and multiples of 20 MHz bandwidths can be pooled (aggregated) up to 60 MHz in total (will increase with time) and the bands do not have to be adjacent
  - LTE Advanced will also allow for the aggregation of different frequency bands and different bandwidths, in order to be possible to pool say 5 MHz of 2100MHz with 20 MHz of 2600 MHz, etc.

SPECTRUM POOLING EXAMPLE

Spectrum pooling brings significant throughput and efficiency advantages

While giving all available spectrum to one player brings efficiencies...

- Spectrum to be made available:
  - 800 MHz: 62 MHz
  - 2,600 MHz: 120 MHz (+ 20 MHz (WBS) and 50 MHz (Sentech))

	Assigned bandwidth	Max. DL throughput per user
Operator 1, 2, 3 and 4	5 MHz each (1,800 MHz)	32 Mbps each

vs.

	Assigned bandwidth	Max. DL throughput per user
NBNCo	20 MHz (1,800 MHz)	150 Mbps

- Pooling the spectrum (example above) allows for:
  - >4 times the throughput per user compared to splitting it up among 4 operators
  - Approx. 17% higher total throughput through efficiency gains (150 Mbps vs. 4 x 32 = 128 Mbps)
  - LTE only allows for max. bandwidth of 20 MHz so further spectrum will not improve throughput per user but only capacity

...it also provides more room for the next mobile technology evolution.

	Assigned bandwidth	Max. DL throughput per user
Operator 1	10 MHz (1800 MHz)	70 Mbps
Operator 2	20 MHz (2600 MHz)	150 Mbps

vs.

	Assigned bandwidth	Max. DL throughput per user
NBNCo	30 MHz (1800 MHz and 2600 MHz)	220 Mbps

- LTE Advanced introduces the principle of Carrier Aggregation, i.e. two separate frequency bands can be used together to form a larger carrier
- Bands do not have to be adjacent or of the same frequency
- Currently up to 60 MHz is envisaged for the LTE-Advanced eNodeB equipment so 60 MHz can be pooled
- The equipment bandwidth will increase in the future

MANAGEMENT / OPERATIONS

Wholesale clients of NBNCo do not have to become shareholders

- Becoming a shareholder is not a prerequisite to becoming a wholesale client of NBNCo
- Wholesale clients will have to use their own number ranges and thus need to have an ECS licence in order to provide retail services
- NBNCo will also play in the retail space
- NBNCo to follow an open business model (Distribution, MVNO, National Roaming)
- Access to the national broadband network is possible for any player that
  a) Agrees to the (regulated) commercial wholesale rates and
  b) Sets up the necessary technical infrastructure and
  c) Meets all regulatory requirements
- Government subsidies for Broadband (Data only) devices in under serviced areas will be necessary in order to meet Government's objective of rural broadband access
- Services have to be limited to data only services (No Voice)

COMMERCIAL PRINCIPLES

Wholesale rates and SLAs are the same for all wholesale clients

Commercial principles	Considerations
Wholesale rates are to be set by ICASA	• Requires a cost-plus return analysis In order to provide incentives for companies to become NBNCo shareholders rather than being simply a wholesale client, the rates need to be on a cost-plus basis that allows NBNCo to make profits to be shared among the equity holders • Additional incentives in the initial formative years will be required in order to make becoming a NBNCo shareholder sufficiently attractive if an "outside-in" rollout obligation is imposed – e.g. a government guarantee to buy a certain minimum capacity per year from NBNCo
Wholesale rates are the same for all wholesale clients	• No volume discounts in order not to disadvantage smaller players • Wholesale clients that are at the same time shareholders will receive the same terms and conditions as non-shareholders
Network SLAs are the same for all wholesale clients	• If wholesale clients have access to the broadband network through a provisioning interface, liability by the wholesale client for damages needs to form part of the agreement (i.e. if network performance suffers due to the wholesale client's actions)

SCHOOLS CONNECTIVITY

SCHOOLS CONNECTIVITY AND USOS

- On 4 June 2014, ICASA published amended Universal Services Obligations under the Radio Frequency Spectrum Licenses for Cell C, Vodacom, MTN and Neotel.

- The revised USOS contemplate the provision of internet access to 1,500 public schools by each mobile operator and 750 public schools by Neotel over a 5 year period.

- The model proposed by ICASA is essentially a turn-key model with maintenance and repair obligations limited in time. Thereafter funding for maintenance and repair is to be obtained from the Universal Service and Access Fund.

- Cell C has concerns about these revised USOS and we are discussing these with ICASA. The turnkey model may not be sustainable where operational support, administrative skills and financial resourcing for maintenance are not certain.

- Cell C recommends a consolidated, co-operative approach where all stakeholders including the Department of Telecommunications and Postal Services, Department of Communications, Department of Basic Education, ICASA, USAASA, provincial and local Government, fixed and mobile operators and other stakeholders agree on a workable and sustainable model for the benefit of learners in South Africa.