Government intervention in the South African broadband market

A COUNTRY CASE STUDY PREPARED FOR THE GSMA

September 2014

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The South African Government has set ambitious targets for broadband availability

The Government in South Africa recognises the importance of the ICT sector and broadband on the wider economy. As part of its National Broadband Plan (South Africa Connect), the Government has set ambitious targets for broadband availability.[1]

In its plans, it cited its desire to "*ensure universal service and access to reliable, affordable and secure broadband services by all South Africans, prioritising rural and under-serviced areas and stimulating economic growth.*"

Our understanding is that the Government has identified two key barriers that it will need to overcome to achieve its targets:

- **Coverage and availability** – it believes that broadband coverage is currently too low

- **Affordability** – it refers to the 'cost to communicate' and believes that the price of broadband services is currently too high for a large proportion of the population[2]

To address the issues of coverage and affordability the Government is currently considering its options. We understand that a combination of both fixed and mobile technologies will likely play a key role in achieving the Government's ambitious targets. At the moment, there are no concrete proposals in the public domain. However, the National Broadband Plan states that:

"*The Minister of Communications will consider the viability and competitive impact of the introduction of open access fibre and wireless broadband networks.*"

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[1] http://mybroadband.co.za/news/government/93243-south-africa-connect-the-new-broadband-policy.html

[2] In 'South Africa Connect', the Government also refers to a previous plan ('Vision 2020'), in which it sets another target that spending on broadband access should represent no more than 2.5% of average monthly income by 2020

ICASA – the communications regulator – initially proposed to create a 'wholesale open access network' to help achieve these targets. However the plans have since been withdrawn.

In December 2011, ICASA released proposals to industry stakeholders on its plans regarding the (then) upcoming licensing of the 800 MHz and 2.6 GHz spectrum bands to be made available following the digital switchover.[3]

The proposals referred to the wider Government policy objectives regarding universal access for broadband.[4] ICASA proposed to create a 'wholesale open access network' that would be mandated to roll out to underserved areas, and operate as a wholesale provider only.

The plans proposed to assign this new operator a portion of high-value spectrum made available in the coming years including part of the Digital Dividend. In particular, this included:

- 2 x 20 MHz in the 2.6 GHz frequency band
- 2 x 10 MHz in the 800 MHz frequency band

However, exact details of the proposed 'wholesale open access network' were limited. Details on timing, ownership structure, funding, linkages between fixed and mobile, and the wider implications on spectrum were not clear.

Ultimately the plans were withdrawn.

There has recently been a change in Cabinet in South Africa – but we understand that the agenda remains unchanged

In the intervening period, the (then) Department of Communications published not only South Africa Connect, but also a National Integrated ICT Policy Green Paper. The Green Paper raised more general questions about spectrum licensing going forward and called for further investigation into the issue.

Also, in May 2014, there was a change in South African Cabinet. The Government announced a new Department of Telecommunications and Postal Services with a new Minister, along with a change to the responsibilities of the Department of Communications and a new Minister of Communications.

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[3]   It is not yet clear when the digital switchover will happen. However, we understand from industry sources that it may not occur within the next two years.

[4]   ICASA's 2011 proposals predated the official release of 'South Africa Connect' (in December 2013). However, based on discussions with industry stakeholders, we understand that the Government's targets for universal access in general (later officially set out in South Africa Connect) were to some extent known within the industry at the time of ICASA's 2011 proposals.

The new Minister of Telecommunications and Postal Services has announced that "the Government is committed to an open access regime", indicating that the concept remains on the agenda.[5]

We understand that the Department of Telecommunications and Postal Services is currently in the process of undertaking a feasibility study to consider the costs and benefits of various approaches to open access networks. It is not clear whether ICASA's initial proposal – or a reworked version – remains as one of the options.

The Government can consider a combination of 'industry-led' approaches to help achieve its targets

We believe that the policy debate would first benefit from a robust and comprehensive analysis of the South African broadband market, with the key aim of turning the *national* broadband targets into clear action points at the *local* level.[6] This would provide greater clarity on the size of the task ahead – and in particular, identify areas which the market may be able to cover (with little or no intervention) and areas which may require greater intervention.

By 'industry-led' initiatives, we refer to Government policies that can **incentivise the markets to deliver desired outcomes**. There are gaps between the current market outcomes delivered by network competition and the Government's medium- and long-term targets, as set out in South Africa Connect. However, we believe that the Government has a range of mechanisms at its disposal to leverage industry experience to help achieve its goals.

In this report we discuss the following options as a means to increase broadband coverage in South Africa:

- efficient use of spectrum – covering spectrum auctions with coverage obligations and other issues around spectrum efficiency

- promoting network-sharing agreements to reduce the cost to new rollout in rural areas

- efficient use of universal service funding

- government intervention in subsidising backhaul connectivity

- creating a wholesale network in truly 'under-served' areas only

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[5]   Address by the Honourable Minister of Telecommunications and Postal Services, Dr Siyabonga Cwele on the occasion of the Budget Vote Speech, 16 July 2014

[6]   We understand the Government has already produced some analysis of this kind in a 2012 study from BMI-T. This piece can provide a solid basis from which to continue the analysis.

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We note that these solutions are not mutually exclusive. For example, the Government could use spectrum auctions *and* promote network-sharing agreements, or any combination of approaches.

Also, even with some of the interventions listed above, there will likely be a need for demand-side initiatives to tackle affordability and increase take-up. Therefore, in this report, we also provide a discussion on some demand-side initiatives. These come under the following headings:

- reducing the cost of access to end-users
- increasing the perceived benefits of broadband

We note that, to some extent, there is a trade-off between supply-side initiatives aimed at increasing coverage and demand-side initiatives aimed at increasing penetration.

For example, one way of increasing take-up in rural / under-served areas is to effectively lower retail prices. However, in areas which are already of relatively low-demand and not viable for commercial operators to cover, a reduction in price can only decrease the viability even further. As such, supply- and demand-side initiatives should not be considered in isolation. Successful Government intervention will require a careful combination of both.

Executive Summary

1 Introduction

1.1 The purpose of this report

Frontier Economics has been commissioned by the GSM Association to produce a report considering the current situation in the South African broadband market.

In particular, the South African Government has set ambitious targets for broadband access, speeds and affordability between now and 2030, with milestone targets also set for 2016 and 2020.

To help achieve these targets, ICASA – the communications regulator – initially proposed in 2011 to license a 'wholesale open access wireless network' that would be mandated to roll out to underserved areas and operate as a wholesale provider only. The invitation to apply issued by ICASA proposed to assign this operator a portion of highly valuable low frequency spectrum made available in the coming years. However, this invitation has since been withdrawn.

The purpose of this report is to provide an overview of the current situation in South Africa, and to discuss some of the high-level options that the Government has at its disposal to increase broadband availability and stimulate demand in South Africa.

We recognise that the Government has already set specific access, speed and affordability targets. The purpose of this report is not to evaluate those targets, or comment on how realistic they may be. Instead, this report focuses on increasing broadband availability and stimulating demand in more general terms.

1.2 The South African Government has set ambitious broadband targets

The South African Government recognises the importance of the ICT sector and broadband on the wider economy. As part of its National Broadband Plan (South Africa Connect), the Government has set ambitious targets for broadband availability.[7] In its plans, it cites its desire to "*ensure universal service and access to reliable, affordable and secure broadband services by all South Africans, prioritising rural and under-serviced areas and stimulating economic growth.*"

In particular, the Government has planned for milestone targets to be achieved in 2020 and in 2030:

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[7] http://mybroadband.co.za/news/government/93243-south-africa-connect-the-new-broadband-policy.html

- By 2020:
  - 90% of the population to have access to 5 Mbps broadband
  - 50% of the population to have access to 100 Mbps broadband

- By 2030:
  - 100% of the population to have access to 10 Mbps broadband
  - 80% of the population to have access to 100 Mbps broadband

The plans also target that 100% of schools, health facilities and Government facilities will have access to 10 Mbps broadband by 2020.

Table 1 below provides a comprehensive overview of the targets.

Table 1. Targets set out in South Africa Connect

Target	Penetration measure	Baseline (2013)	By 2016	By 2020	By 2030
Broadband access in Mbps user experience	% of population	33.7%* Internet access	50% at 5Mbps	90% at 5Mbps; 50% at 100Mbps	100% at 10Mbps; 80% at 100Mbps
Schools	% of schools	25% connected	50% at 10Mbps	100% at 10Mbps; 80% at 100Mbps	100% at 1Gbps
Health facilities	% of health services	13% connected	50% at 10Mbps	100% at 10Mbps; 80% at 100Mbps	100% at 1Gbps
Government facilities	% of government offices		50% at 5Mbps	100% at 10Mbps	100% at 100Mbps

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Source: South Africa Connect

*Note from South Africa Connect: 2013 level from Research ICT Africa 2012 ICT Access and Use Survey. Census 2012 surveys households not individuals and this figure is defined as households where at least one member had access to or used the Internet either at home, work, place of study or Internet café.

According to South Africa Connect, in 2013 only around one third of the population had access to broadband.[8] This implies that to meet the targets, broadband access will need to almost treble over the period 2014-2020. Also, there will need to be a significant increase in average broadband speeds provided in the country to reach the 2030 targets.[9]

The Government has also set a separate target (in its plan 'Vision 2020') that by 2020 all South Africans will have access to broadband at a cost of no more than 2.5% of average monthly income.

1.3   The structure of this report

The rest of this report is structured as follows:

- In **Section 2** we provide an overview of the background to the current situation in South Africa. This covers:

    - the Government's intention in general to intervene in the broadband market

    - ICASA's initial proposal in 2011 to license a 'wholesale open access wireless network'[10]

    - a summary of more recent developments in the market and in the policy debate – including South Africa's recent Cabinet change and the Government's creation of a new Department of Telecommunications and Postal Services

- In **Section 3** we set out our view that, before making any decisions, the Government can build upon existing studies and conduct a comprehensive analysis of the market to shed greater light on the true size of the challenge

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[8]   This is based on 'Research ICT Africa' 2012 and 'ICT Access and Use Survey'. Census 2012 surveys households not individuals and this figure is defined as households where at least one member had access to or used the Internet either at home, work, place of study or Internet café.

[9]   According to Ookla Net Index, the average download speed in South Africa was 5.8 Mbps (see http://www.netindex.com/download/2,46/South-Africa/ accessed on 10 July 2014).

[10]   However, we note that these plans have since been withdrawn.

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ahead. It can also turn targets at the *national* level into more concrete plans at the *local* level.

- In **Section 4** we provide examples of various options of 'industry-led' supply-side initiatives and discuss how they can be a key lever in helping the Government increase broadband coverage and achieve its access targets.

- In **Section 5** we discuss how demand-side initiatives are also likely to be needed to stimulate demand.

- In **Section 6** we provide a short conclusion.

1.4 Acknowledgements

As part of the research for this report, we conducted a series of interviews with some of the key stakeholders in the current policy debate. This included:

- the (former) Department of Communications (DoC)
- the regulator of communications, ICASA
- the South African Communications Forum (SACF)
- the Competition Commission
- mobile operators[11]

We would like to thank all stakeholders for their cooperation and insights.

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[11]   Vodacom, MTN, Cell C, and Telkom.

Introduction

2   Background to the current situation in South Africa

In this section we provide an overview of the background to the current situation in South Africa. This covers:

▫ the Government's intention in general to intervene in the market

▫ ICASA's initial proposal in 2011 to license a 'wholesale open access wireless network' (however, we note that these plans have since been withdrawn)

▫ recent developments in the policy debate – including the Cabinet change in South Africa and the Government creating a new Department of Telecommunications and Postal Services

2.1   The Government is planning to intervene in the market to achieve its targets

Our understanding is that the Government has identified two key barriers that it will need to overcome to achieve its targets:

● **Coverage and availability** – it believes that broadband coverage is currently too low.

● **Affordability** – it refers to the 'cost to communicate' and believes that the price of mobile services is currently too high for a large proportion of the population.[12]

The Government wants to address these issues and also to address what it believes is a widening digital divide, within South Africa and between South Africa and the rest of the developed world.

To address the issues of coverage and affordability, (and to promote other objectives[13]), the Government is currently considering its options. We understand

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[12] In 'South Africa Connect', the Government also refers to a previous plan ('Vision 2020'), in which it sets another target that spending on broadband access should represent no more than 2.5% of average monthly income by 2020.

[13] We understand that the Government also wishes to promote other wider policy objectives in the sector: (i) Broad-based black economic empowerment (B-BBEE) – for example, one of the main objectives of the Electronic Communications Act, 2005, is to 'promote the empowerment of historically disadvantaged persons, including Black people'; and ii) Government ownership – the Government is keen to have some level of ownership in key sectors of the economy – including telecoms. This would be similar to its ownership of Transnet in the ports, rail and pipelines sectors.

that a combination of both fixed and mobile technologies will likely play a key role in achieving the Government's ambitious targets.

At the moment, there are no concrete proposals in the public domain. However, the National Broadband Plan states that:

"*The Minister of Communications will consider the viability and competitive impact of the introduction of open access fibre and wireless broadband networks.*"

In the next section we set out ICASA's 2011 proposals to license a 'wholesale open access wireless network'.

2.2 ICASA initially proposed licensing a 'wholesale open access wireless network' – but the plans were withdrawn

In December 2011, ICASA released proposals[14] to industry stakeholders on its plans regarding the (then) upcoming licensing of the 800 MHz and 2.6 GHz spectrum bands to be made available following the digital switchover.[15]

The proposals referred to wider Government policy objectives regarding universal access for broadband – although the proposals pre-dated South Africa Connect (released in December 2013) and the National Integrated ICT Policy Green Paper (released in January 2014) which called for further investigation into the different options for spectrum licensing going forward.

Referring to conditions in 2011, ICASA said that while South Africa had a population of 49 million people, there were only 4 million fixed lines in the country[16] – with the majority in urban areas. It recognised that while the lack of fixed line infrastructure was an obstacle in achieving universal access, mobile technologies could play a key role – in combination with fixed technologies – in achieving the targets.

ICASA proposed to license a new mobile entity that would be mandated to roll out to underserved areas and operate as a wholesale provider only.

However, we note that the Government already has some level of ownership in the industry through its holdings in Telkom, Broadband InfraCo, and Sentech.

14   *Government Gazette* 15 December 2011 – Notice 911 of 2011

15   It is not yet clear when the digital switchover will happen. However, we understand from industry sources that it may not occur within the next two years.

16   More recent estimates report the population in South Africa at around 53 million (Statistics South Africa, Mid-Year Population Estimates 2013) and the number of PSTN lines at 4.4 million (TeleGeography GlobalComms 2013).

The plans proposed to assign a new operator, (which, if created, was required to meet local-ownership criteria), a portion of high value spectrum made available in the coming years including part of the Digital Dividend.[17] In particular, this included:

- 2 x 20 MHz in the 2.6 GHz frequency band
- 2 x 10 MHz in the 800 MHz frequency band

However, exact details of the proposed 'wholesale open access network' were limited. Details on timing, ownership structure, funding, linkages between fixed and mobile, and the wider implications for the allocation and use of spectrum were not clear. Even the phrase "wholesale open access" was not defined with reference to existing or proposed regulatory or commercial requirements.

This process was ultimately suspended after an 'Invitation to Apply' in relation to spectrum was issued by ICASA and withdrawn before interested parties could respond.

2.3   Recent developments

In the intervening period, the (then) Department of Communications published not only South Africa Connect but also, in January 2014, a National Integrated ICT Policy Green Paper. The National Integrated ICT Policy Green Paper raised more general questions about options for spectrum licencing and called for further investigation into the issue.

Also, in May 2014, there was a Cabinet change in South Africa. The Government announced a new Department of Telecommunications and Postal Services and new Minister. There was also a change to the responsibilities of the Department of Communications and a new Minister of Communications.

The new Minister of Telecommunications and Postal Services has announced that "the Government is committed to an open access regime", indicating that the concept remains on the agenda.[18] Also, we understand that ICASA's strategic objectives for 2015-2019 include:

- issuing an Invitation to Apply for 800 MHz, 2.6 GHz and also 700 MHz spectrum in 2014/15; and

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[17]   ICASA's 2011 proposals did not refer to 700 MHz spectrum. However, we understand that it has since moved to include 700 MHz spectrum in its plans going forward.

[18]   Address by the Honourable Minister of Telecommunications and Postal Services, Dr Siyabonga Cwele on the occasion of the Budget Vote Speech, 16 July 2014.

□   commissioning a report for internal use on the costs and benefits of open access regulation of copper, fibre and wireless access networks.

We understand that the Department of Telecommunications and Postal Services is currently in the process of undertaking a feasibility study to consider the costs and benefits of various approaches to open access networks. It is not clear whether ICASA's initial proposal – or a reworked version – remains as one of the options.

Background to the current situation in South Africa

3   A comprehensive 'gap analysis' can shed greater light on the size of the challenge ahead

The fixed network in South Africa has relatively poor coverage – in the access network in particular – compared to mobile.[19] Going forward, both fixed and mobile technologies will need to play a key role in achieving the Government's targets.

We believe that the policy debate would benefit from a robust and comprehensive analysis of the South African broadband market to turn the *national* broadband targets into clear action points at the *local* level, and provide greater clarity on the size of the task ahead.

This analysis would broadly cover the following steps:

- **Broadband mapping** – to identify the current levels of broadband coverage across South Africa[20.]

- **Demand mapping** – to identify areas of relatively low demand such that it may not be profitable for commercial operators to roll out networks between now and the milestone years in 2016, 2020 and 2030, as set out in South Africa Connect.

- **Gap analysis** – to identify a list of truly 'under-served' areas – on an evidenced basis – that would require some form of intervention (subsidy or otherwise) to be covered[21].

- **Cost modelling** – to identify the most cost-effective technology solution to cover those under-served areas.

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[19]   According to data from the GSMA, in 2013, the 3G network of Vodacom – the largest operator in South Africa – covered 89% of the population, with take-up of around 43%. Although we recognise the limitations of 'coverage' as a performance indicator (e.g. coverage does not control for speed or for differences in quality across the country), at first glance, the level of coverage appears to provide a reasonable starting point from which to promote access and take-up.

[20]   We understand the Government has already produced some analysis of this kind in a 2012 study from BMI-T. This piece can provide a solid basis from which to continue the analysis.

[21]   We recognise that ICASA already has a list of over 190 local municipalities which it deems to be 'under-serviced' – as part of Government Gazette No 35675. However, we believe that this list should be revised with reference to a revised definition. We discuss this in more detail in Section 3.3 below.

We discuss these points in more detail below. However, ultimately, the key output of this analysis will be identifying a list of truly under-served areas that the market is unlikely to cover in the short run. If the Government wishes to achieve its targets in these areas, some form of Government intervention will be required. In Sections 4 and 5 we provide examples of different policies that the Government could take to promote coverage in these areas and also tackle affordability and, therefore, take-up.

We note that, to some extent, there is a trade-off between supply-side initiatives aimed at increasing coverage and demand-side initiatives aimed at increasing penetration. For example, one way of increasing take-up in rural / under-served areas is to effectively lower retail prices. However, in areas which are already of relatively low-demand and not viable for commercial operators to cover, a reduction in price can only decrease the viability even further. Therefore, supply- and demand-side initiatives should not be considered in isolation. Successful Government intervention will require a careful combination of both.

3.1   Broadband mapping

This would shed greater light on the current levels of broadband coverage by technology type throughout the country – at the local level. This would cover both fibre and copper access technologies in fixed, and 3G and 4G in mobile (and potentially also include speed testing).

Given the Government has set faster targets for schools, health facilities and Government facilities, the analysis could pay greater attention to them.

We understand the Government has already produced some analysis of this kind in a 2012 study from BMI-T. This piece can provide a solid basis from which to continue the analysis.

3.2   Demand studies

This would map the true demand for broadband services across the country and identify areas which may be of low-demand such that they may not be viable to support commercial operators rolling out both now and in the near future.

A demand study may involve:

- identifying in a given area the main drivers of broadband take-up (such as income levels, computer literacy and the number of businesses)

- primary research at the local level such as surveys and face-to-face interviews designed to gain a better understanding of peoples' attitudes to broadband – this can include a needs ranking and a willingness to pay assessment

A comprehensive 'gap analysis' can shed greater light on the size of the challenge ahead

The outcome of the demand study would result in constructing an estimated demand curve. From this, it is possible to estimate expected broadband demand at a given price point in different geographic locations in South Africa and, subsequently, to derive expected revenues available from the local demand.

3.3   Gap analysis

As a result of the mapping and demand studies, the gap analysis would effectively categorise each local area in South Africa by its level of commercial viability (in terms of revenues). This would therefore identify which areas will likely not be covered by commercial operators and may require some form of intervention (in the form of a subsidy or otherwise).

We recognise that ICASA already has a list of over 190 local municipalities which it deems to be 'under-serviced' – as part of *Government Gazette* No 35675. However, based on our discussions with stakeholders, we understand that this list includes municipalities such as Rustenburg, Buffalo City and Mangaung, all of which have a cell-phone penetration rate in excess of 75%. It is vital, that a clear definition of what is deemed to be a rural or under-serviced area is agreed upon by stakeholders.

For mobile broadband in particular, any given area in the country can be categorised as one of the following three types:

- **Areas which will be covered by network competition** – these are areas of relatively high demand (such as city centres) where mobile operators would expect to comfortably make a profit by covering them.[22]

- **Areas which can only be covered with some degree of network-sharing** – these are areas that lack the demand to support multiple operators each rolling out their own networks independently such that in the event of multiple operators rolling out, at least one would make a loss. In these areas operators lack a clear business case for deciding to roll out independently. This lack of certainty may result in no operators rolling out, and the area remaining uncovered. However, the level of demand may be sufficiently high to support at least one network without subsidy. This means that by engaging in some form of network-sharing (we discuss network-sharing in Section 4.2 and provide some examples) operators could remove the risk

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[22]   By attaching roll-out obligations to licences the Government (through ICASA) can increase the level of coverage that network competition can deliver – but this needs to be done carefully, as imposing stringent roll-out obligation increases the fixed costs of mobile operation and could deter entry and/or dampen the incentives of operators to invest in quality, new technologies, etc.

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light on the size of the challenge ahead

and uncertainty of rolling out independently and jointly cover the area instead

- **Areas which can only be covered with some form of subsidy** – these are areas with relatively low levels of demand such that even network-sharing is not a viable option for operators. Examples include sparsely-populated rural areas. In these areas, some form of subsidy would be required for operators to consider rolling out. (In Section 4, we set out some examples of initiatives that can effectively 'subsidise' these areas in some form).

An illustration is provided in **Figure 1** below.

Figure 1. Conceptual overview of market analysis – categorising areas by viability of mobile coverage
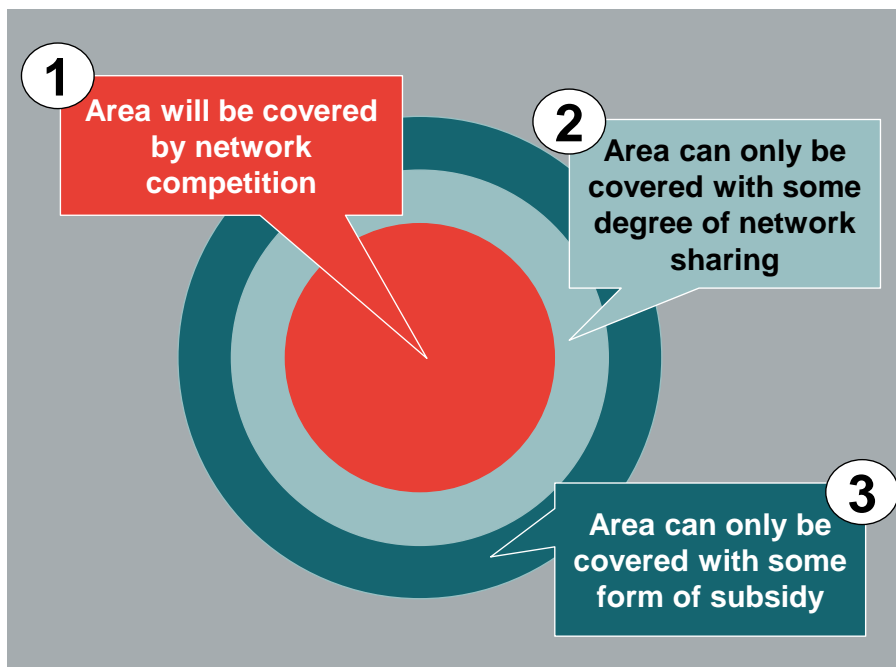
Source: Frontier illustration

We also note that:

- **The proportion of areas which will be covered by network competition is likely to increase over time and some areas that could initially only be covered with some form of subsidy may become viable to cover with some form of network-sharing** – demand in rural areas is likely to grow organically as incomes increase over time. And the cost of rollout may decrease over time because equipment typically becomes cheaper. Therefore, areas which may currently be unprofitable for operators to cover may become profitable over time. As a result, any Government intervention

A comprehensive 'gap analysis' can shed greater light on the size of the challenge ahead

needs to consider the issue of timing. It may prove wasteful for the Government to intervene in areas that the market would ultimately cover anyway with time. Market analysis would shed more light on the timings.

- **Reducing costs/barriers to network-sharing can increase the viability of network sharing** – barriers to network-sharing (e.g. excessive administrative procedures, anti-competitive actions, high prices, etc.) effectively represent an added cost to roll out. (We discuss barriers to network sharing and potential remedies in Section 4.2.) Any measures that can reduce this cost will effectively increase the number of areas that are viable to cover through network-sharing agreements.

- **Not all methods of subsidy yield the same results – some are more effective than others** – the Government is faced with a range of possible options and mechanisms to increase coverage. In Section 4 we provide a discussion on possible options.

3.4 Cost modelling

Having identified a list of truly under-served areas, a cost-modelling analysis would identify the most cost-effective solution / technology type to provide broadband coverage.

Figure 2 below provides an illustration.

A comprehensive 'gap analysis' can shed greater light on the size of the challenge ahead

Figure 2. Cost modelling – feasibility of different broadband technologies
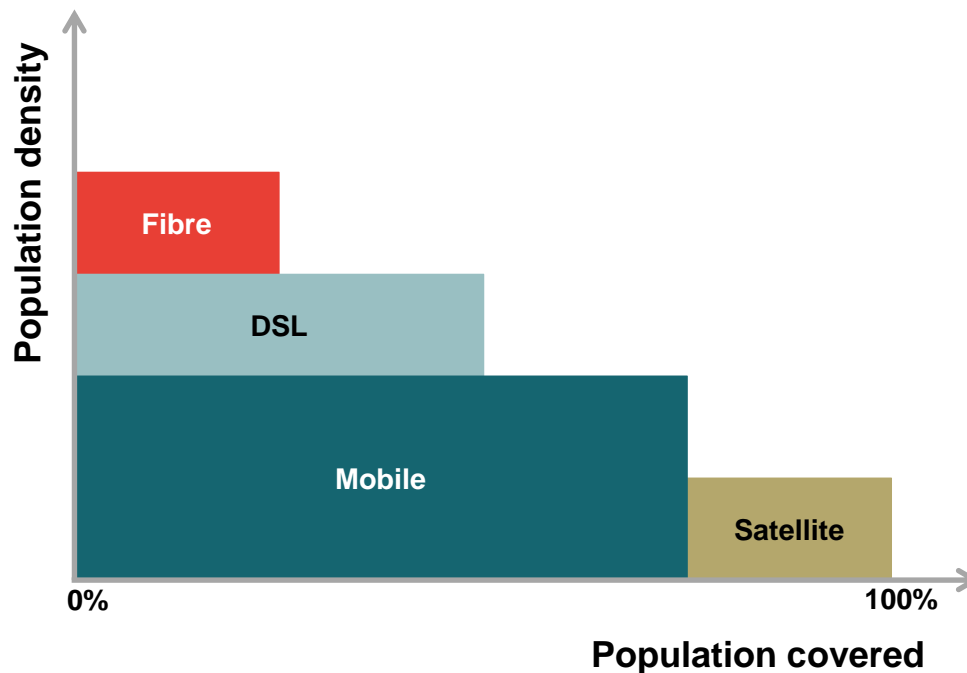
Source: Frontier illustration

As illustrated in **Figure 2**, it will be feasible to cover only a relatively small proportion of densely populated areas through fixed broadband technologies such as xDSL and FTTx. This is because fixed networks typically require significant investment in the access network (for example trenching costs) and require a larger subscriber base over which to recover costs.

Mobile technologies will likely be able to reach the majority of the country's population – including some level of overlap with fixed networks in high-demand areas. However, in particularly remote, low demand areas, there may still be a small proportion of consumers for whom it may not be viable to cover with mobile technologies *even with* some form of Government subsidy. In these areas, it may be more cost-effective to deploy alternative wireless technologies (e.g. satellite).

However, we note that telecommunications is a particularly fast-moving industry in technological terms. It is difficult to predict whether mobile or other wireless technologies (e.g. satellite) will be the most cost-effective solution to cover the most rural parts of South Africa between now and 2030 (the final milestone year in South Africa Connect).

A comprehensive 'gap analysis' can shed greater light on the size of the challenge ahead

4 Industry-led initiatives can be a key lever in helping the Government achieve its coverage and access objectives

In this section we set out some examples of 'industry-led' initiatives that the Government can use to help achieve its objectives.

By 'industry-led' initiatives, we refer to Government policies that can **incentivise the markets to deliver desired outcomes**. There are gaps between the current market outcomes delivered by network competition and the Government's medium- and long-term targets, as set out in South Africa Connect. However, we believe that the Government has a range of mechanisms at its disposal to leverage industry experience to achieve its goals.

In this section we discuss the following options:

- efficient use of spectrum

- promoting network-sharing agreements to reduce the cost to new rollout in rural areas

- efficient use of universal service funding

- government intervention in subsidising backhaul connectivity

- creating a wholesale network in truly under-served areas *only,* as defined in market analysis described in Section 3 above

We discuss each of these points in more detail below.

We note that these solutions are not mutually exclusive. For example, the Government could use spectrum auctions *and* promote network-sharing agreements, or any combination of approaches. In fact, network-sharing may be a necessary adjunct to the award of high demand spectrum licences.

Also, the measures listed above are supply-side and largely aimed at increasing coverage. In Section 5 we discuss demand-side initiatives aimed at tackling affordability and increase take-up.

4.1 Efficient use of spectrum

In this section we set out how the Government can use spectrum as a powerful tool to help achieve its targets. In particular, we discuss:

□   spectrum auctions, as a well-functioning mechanism to allocate scarce spectrum and promote mobile coverage[23]

□   other spectrum considerations

We discuss these points in turn below.

4.1.1   Spectrum auctions

The Government can use spectrum auctions with coverage and wholesale access and/or national roaming obligations to assign valuable 700 MHz, 800 MHz, and 2.6 GHz spectrum.

The digital switchover in South Africa is expected to take place at some point over the next few years. This presents the Government with the opportunity to auction (or otherwise assign) licences for high demand spectrum in an economically efficient way.

There are a number of examples of spectrum auctions in Europe in recent years that have included coverage and speed obligations[24] and, (in some cases) promoting entry through imposing national roaming obligations.

Table 2 provides some details on spectrum auctions in Europe in recent years.

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[23]   There are other methods of awarding spectrum licences – for example 'beauty contests'. However, in our experience, international best practice in Europe has tended towards spectrum auctions as the preferred method by which to achieve a substantial return for Government, but also to ensure bidders that are best able to make good use of the spectrum participate.

[24]   Coverage obligations may also make a distinction between indoor and outdoor coverage – where indoor coverage is technically more challenging to achieve.

Industry-led initiatives can be a key lever in helping the Government achieve its coverage and access objectives

Table 2. Examples of recent spectrum auctions in Europe[25]

Country	Spectrum	Obligations
Czech Republic (2013)	800 MHz, 1800 MHZ and 2.6 GHz	800 MHz: obligation to provide 95% population coverage[26] over seven years to an increasing number of defined areas (with some priority to sparsely-populated districts), with a minimum speed of 2 Mbps (increasing to 5 Mbps after seven years); 1800 MHz: obligation to provide 50% population coverage within eight years, with a minimum speed of 2 Mbps (increasing to 5 Mbps after eight years) 2.6 GHz: obligation to provide 10% population coverage within seven years, with a minimum speed of 2 Mbps (increasing to 5 Mbps after seven years) All bands: obligation to provide wholesale access to MVNOs
Norway (2013)	800 MHz, 900 MHz and 1800 MHz	The winners of the 800 MHz lots were obliged to cover 40% of the population within four years, while the winner of a predefined lot in the 800 MHz band was obliged to cover 98% of the population within five years with a minimum average speed of 2 Mbps[27]
Slovakia (2013)	800 MHz, 1800 MHz and 2.6 GHz	800 MHz: coverage targets rising to 70% population coverage by the end of 2018, with access speeds of 2 Mbps 1800 MHz: coverage targets rising to 50% population coverage by the end of 2018, with access speeds of 2 Mbps (or 12.2 kbps for GSM services) 2.6 GHz: coverage targets rising to 25% population coverage by the end of 2018 with access speeds of 2 Mbps
Ireland (2012)	800 MHz, 900 MHz and 1800 MHz	All licence holders were obliged to achieve a minimum coverage of 70% (in population terms) within three years Licence holders could achieve this target using any combination of spectrum (i.e. across different bands) However, at least half the coverage (representing 35% population coverage) had to be met using spectrum in the 800 MHz, 900 MHz and/or 1800 MHz bands.
Spain (2011)	800 MHz, 900 MHz, and 2.6 GHz	The winners of the licences in the 800 MHz band had a joint-obligation to provide access to at least 30 Mbps broadband to towns with less than 5,000 inhabitants by the end of 2019.

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[25] We have not conducted a detailed evaluation of these spectrum auctions. For the purposes of this report, we highlight these auctions as examples of instances where Governments have tied-in coverage obligations.

[26] 95% population coverage with 75% probability of indoor coverage without the use of external antennas and 85% probability of indoor coverage with the use of external antennae.

[27] Winning bidders were also required to co-ordinate with broadcasters to mitigate the risks of interference with DTT.

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We recognise that conditions in South Africa are different from those in European countries – and this should be considered when setting obligations. For example:

- **Demand:** in terms of GDP per capita, income in South Africa is less than half the level in Slovakia (which is the country with lowest income per capita of the European countries listed in **Table 2** above)

- **Coverage:** in terms of area, South Africa is more than twice as large as Spain (which is the largest of the European countries from **Table 2** above above). This presents challenges for coverage targets in terms of percentage of area covered.

However, these experiences are a useful benchmark in terms of the policy approach applied. Spectrum auctions can be designed in line with international best practice and can incentivise operators to increase coverage – at no direct cost to the Government (aside from foregone award proceeds).[28] Also, commercial operators may be able to draw upon economies of scale in rolling out and may therefore be able to do so at a lower cost compared to Government-led rollout.

As mentioned above, spectrum auctions can be used in combination with other measures. The Government can use spectrum auctions with coverage obligations to increase coverage to a point – and tackle the remainder through other measures.

4.1.2   Other spectrum considerations

We recognise that the current fragmented allocation of spectrum in South Africa may potentially result in inefficient use of spectrum. However, there are potential actions that the Government can take to increase the efficiency in the market. For instance:

- rationalising spectrum use by aggregating licensed frequencies in contiguous blocks

- increasing market certainty by issuing spectrum licences of sufficiently lengthy duration (e.g. 15-20 years)

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[28]   Attaching/increasing coverage obligations to spectrum licences can result in greater costs being imposed on the eventual winners. This in turn will reduce their valuation of the licences and therefore willingness to pay.

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    ▫   liberalising spectrum rights by allowing pooling of sub-scale allocations could further help meet the needs of rural users

These approaches may increase the efficiency with which spectrum is used in South Africa. This, in turn, may increase user experiences.

4.2 Promoting network-sharing agreements to reduce the cost to new rollout in rural areas

It may be the case that in some areas there is insufficient demand to support multiple operators rolling out independent networks. However, there may be enough demand to support one operator (or a combination of operators involved in network sharing) rolling out without subsidy. A simple illustration is provided in **Figure 3** below.

Figure 3. Network sharing agreements may lead to increased coverage
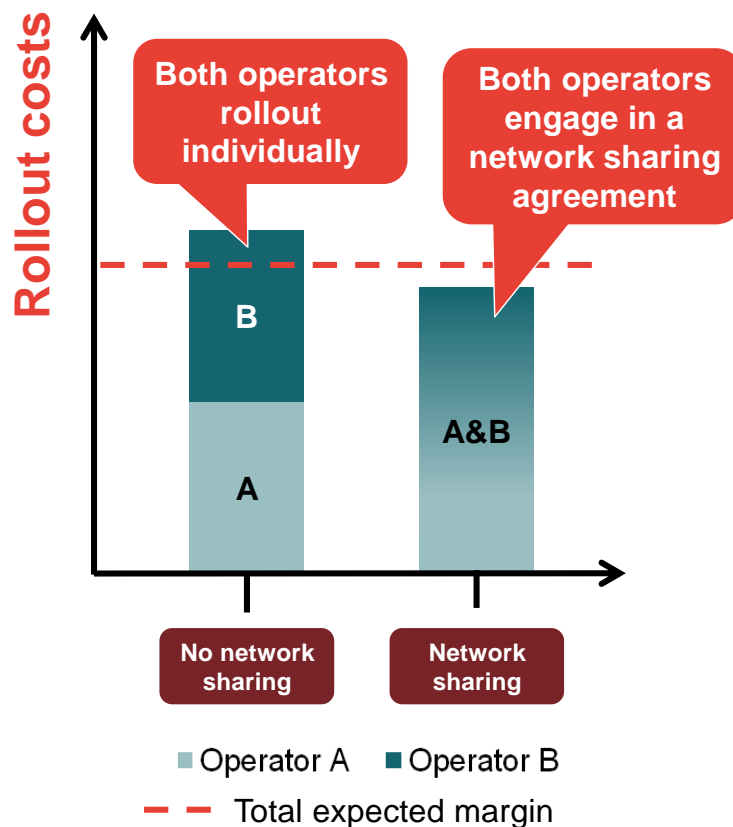

Source: Frontier illustration

Figure 3 provides a simplified example of a low-demand area that cannot support multiple operators rolling out independent networks. In this example, if

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both operators were to roll out, then at least operator (and potentially both) would make a loss. As a result, both operators may respond to the uncertainty by deciding to not roll out, in which case the area would remain unaddressed. However, it is possible that through network-sharing (the details of which we set out below), the operators may be able to share infrastructure and save costs by avoiding duplication such that it is profitable to jointly roll out.

Figure 4 below provides an indication – from a Vodafone report[29] – of the potential cost-savings that may be achievable through network-sharing. The level of cost-savings depends on (i) the type of network-sharing (greater sharing leads to greater cost-savings); and (ii) the number of operators involved in the sharing.

Figure 4. Potential cost savings from network
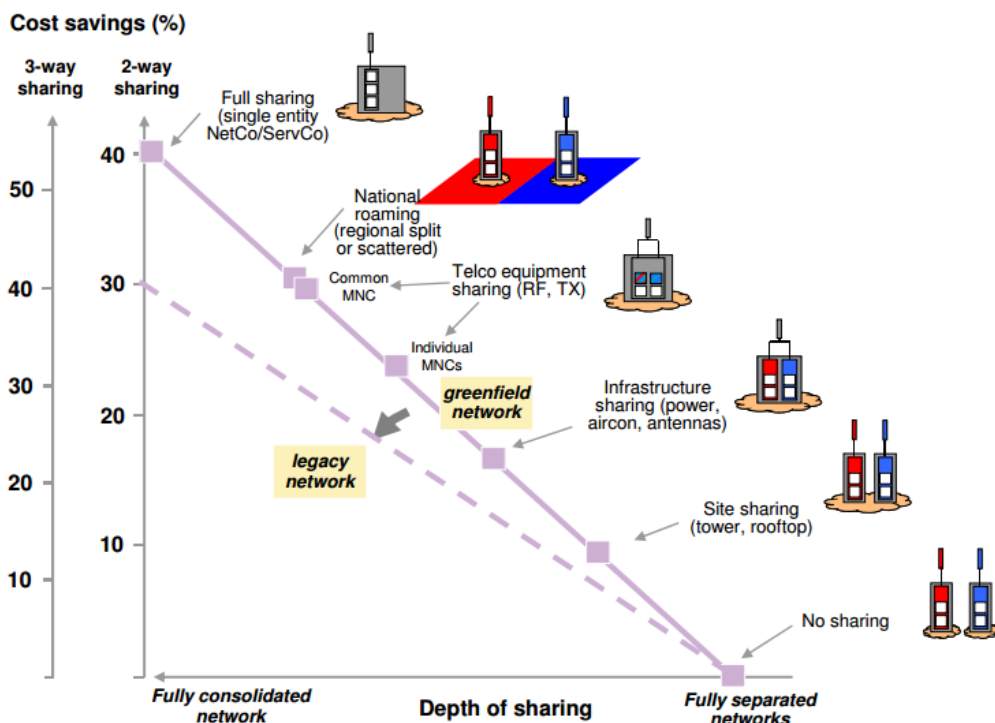
Source: Vodafone 'Network Sharing in Vodafone'

In many countries around the world, operators have voluntarily entered into commercially negotiated agreements to share certain parts of their network infrastructure. This sharing effectively represents a reduction in rollout costs and, in low-demand areas, this cost saving may be the difference between operators

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29   http://www.gsma.com/mobilefordevelopment/wp-content/uploads/2012/06/Vodafone1.pdf

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deciding to, or not to, roll out. For instance, a voluntary network sharing joint venture in Sweden led to capex savings up to 46% and opex savings up to 29%.[30]

In the rest of this section, we set out:

different types of network-sharing
examples of obstacles that may prevent operators from engaging in network-sharing – which the Government can therefore aim to tackle
how network-sharing agreements can be structured in a way that minimises competition concerns (e.g. collusion)

4.2.1   Types of network sharing

Network-sharing can take several forms but ultimately involves a certain part of the network being used by more than one operator. The options range from sharing only passive elements (e.g. sites and masts) to sharing active elements (from antennas in the access networks, to equipment and transmission up to, and including, the core network.)[31]

The different types of infrastructure sharing are summarised in **Figure 5** below.

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[30]   Frontier analysis based on a release from Telenor: http://www.telenor.com/wp-content/uploads/2013/09/03_CMD_2013_Telenor_Europe_FINAL.pdf

[31]   Network sharing in mobile is discussed in more detail in a separate GSMA report 'Mobile Infrastructure Sharing': http://www.gsma.com/publicpolicy/wp-content/uploads/2012/09/Mobile-Infrastructure-sharing.pdf

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Figure 5. Overview of types of network sharing
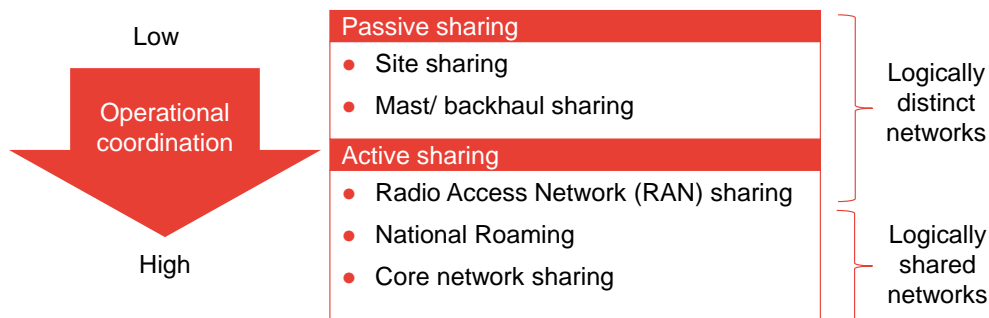
Source: Frontier Economics

4.2.2   Barriers to network sharing agreements and regulatory and competition concerns

In principle, network-sharing can lead to cost savings which may result in some low-demand areas becoming commercially viable for operators to cover.

However, in reality there may be barriers to voluntary network-sharing. These barriers effectively represent an additional cost which may result in some areas not being covered. Also, there are some potential regulatory and competition issues that may arise from network-sharing agreements.

We understand that in South Africa, American Tower Company (ATC) acts as an independent third-party owner and operator of shared wireless infrastructure. This is a means to help facilitate passive network-sharing.[32]

Table 3 below lists some examples of potential barriers to network-sharing and regulatory / competition concerns. Potential solutions and safeguards are also provided.

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[32]   However, there are also potential competition and market power concerns that may arise if a third-party owns facilities that are 'essential' for operators – or where alternative solutions may be too costly.

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Table 3. Typical barriers to voluntary network-sharing agreements, regulatory and competition concerns that may arise, and potential remedies

Barrier / concern	Potential remedy
Shared ownership may cause delays if one operator needs permission from another to make on-site changes	Oblige operators to maintain planning independence - e.g. European Commission's 2003 decisions in the UK and Germany both regarding network sharing agreement between O2 and T-Mobile) [33] [34]
Administrative barriers – e.g. planning permission	Simplify bureaucratic procedures – e.g. in the Netherlands, no planning permission is required for deploying small antennas
Lack of financial incentives for larger operators – e.g. a larger operator may already have a 2G presence, so smaller operators may have more to gain	The Government may be able to provide subsidies
Possible collusion due to information exchange	Limit the degree of information sharing between operators - e.g. implemented by the German regulator RegTP in its 2001 general guidelines concerning network-sharing. Also referred to the in the European Commission's 2003 decisions on the O2 / T-Mobile network sharing in the UK and Germany

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[33]   Case COMP/38.369: T-Mobile Deutschland/O2 Germany: Network Sharing Rahmenvertrag (http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32004D0207).

[34]   Case COMP/ 38.370 —O2 UK Limited / T-Mobile UK Limited (http://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1396368263143&uri=CELEX:32003D0570).

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4.3   Universal service funding

In principle, Universal Service Funding allows operators to apply for subsidies to roll out in areas that would otherwise not be profitable to cover. This is illustrated in **Figure 6** below.

Figure 6. Universal service funding
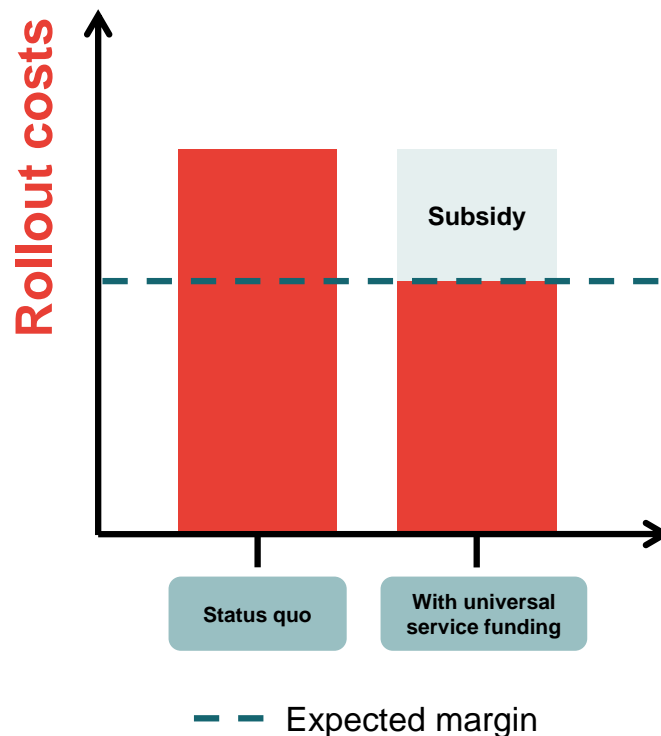
Source: Frontier illustration

In low demand areas, an operator may estimate that the expected rollout costs exceed the expected margin that it would generate from potential subscribers in the area. As a result, it would be loss-making to roll out so the area will remain unaddressed.

However, the Government could provide funding to bridge the gap between costs and margins such that with universal funding the area becomes viable to cover.

We understand that South Africa already has a Universal Service Fund – the Universal Service and Access Fund (USAF)[35]. The Electronic Communications

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[35]   http://www.usaasa.org.za/usaif/

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Act, 2005 (ECA) allows operators to apply for subsidies from USAF to roll out in areas that will otherwise not be covered, although there are as yet no processes in place for applications to be made.

We understand that USAF has not yet achieved its objectives. Operators have commented that USAF has set aside a significant subsidy for two projects, which will be for (i) schools' connectivity; and (ii) set-top boxes (STBs) to facilitate the migration to digital broadcasting. However, no major payment has been made to date. As a result, the future of USAF and its ability to act as a universal service fund in the conventional sense is not clear.

Still, based on international experience, in principle, universal service funding could be an option that, with effective management, could help increase coverage.

4.4 Government intervention in backhaul connectivity

It may be the case that, in some local areas, there is sufficient demand to support operators rolling out a radio access network. The difficulty may lie in providing backhaul connectivity to the core network in a cost-effective way. In remote areas, a lack of backhaul connectivity (or the high cost where it does exist) may result in operators deciding not to roll out in areas that would otherwise be commercially viable.

As a result, the Government could further decrease the cost of rollout in remote areas by supporting the extension of a national backhaul network (e.g. Broadband InfraCo[36] or Telkom, etc.) to bring broadband connectivity closer to rural consumers.

This could come in the form of either public subsidy (either paid to existing operators or used to finance a Government-led rollout) which provides fibre backhaul on an open access basis (and crucially on affordably terms), or through promoting backhaul network-sharing. This would make it more cost-effective for mobile operators to roll out their wireless access networks.

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[36] The Broadband InfraCo Act mandated the creation of a Government-owned fibre backbone network with the main objective of extending coverage to rural and underserved areas. However, we understand that to date, the state-owned company has not been successful in achieving national coverage. With a commercial mandate, it is also labouring under the heavy cost (absent investment) of rural infrastructure and connectivity.

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4.5   Wholesale network in underserved areas only

As set out in Section 3 on market analysis, there are likely to be some truly 'under-served' areas in South Africa. These are areas where commercial operators are unable to roll out in the short- to medium-run, even taking into account potential cost savings associated with network-sharing.

In these areas, it may be possible for the Government to create some form of publically funded (or co-funded) single wholesale network (SWN). This entity would act as a wholesale provider only (i.e. not be present in the retail market), and would provide non-discriminatory access to the network to other mobile operators, allowing them to serve the rural population.

If the Government wishes to create an SWN in underserved areas only ('rural SWN' hereinafter[37]), there will be a number of issues and challenges related to the establishing and running the network. In a separate report prepared for the GSMA[38] we provide a more detailed discussion of the key issues that Governments (in general) will need to consider in this regard.

In the rest of this section we discuss the following issues:

- Flexibility regarding the footprint of the rural SWN

- Spectrum management

- Funding and ownership

- Regulating the SWN

We discuss these points in turn below.

4.5.1   Flexibility regarding the footprint of the rural SWN

In the context of the mapping and gap analysis described in Section 3, (and in **Figure 1** in particular), we believe that any such wholesale network should only be considered in areas which are truly 'under-served' (in **Figure 1** these areas are illustrated under 'Area 3'). The rural SWN should not be present in any areas that are already covered (or will be covered in the short run) either through the model of network competition ('Area 1'), or through some form of network-sharing agreement ('Area 2').

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[37]   For brevity, we use term 'rural SWN' to refer to single wholesale network to rollout to only underserved areas, where underserved areas are defined on the basis of the market analysis described in Section 3 of this report, rather than rural areas more widely.

[38]   Frontier Economics (2014): Assessing the case for single wholesale networks in mobile communications ("SWN Report" hereinafter).

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The main reason for this is that the Government should seek to minimise the public subsidy necessary to achieve its aims and to maximise the use of private capital invested by the existing operators.

However, we recognise that the boundaries between these different models or 'areas' (i.e. between (i) network competition and network-sharing; and (ii) network-sharing and a rural SWN) are likely to be fluid and subject to change over time. This is illustrated in **Figure 7** below.

Figure 7. 'Boundaries' between different approaches should be flexible
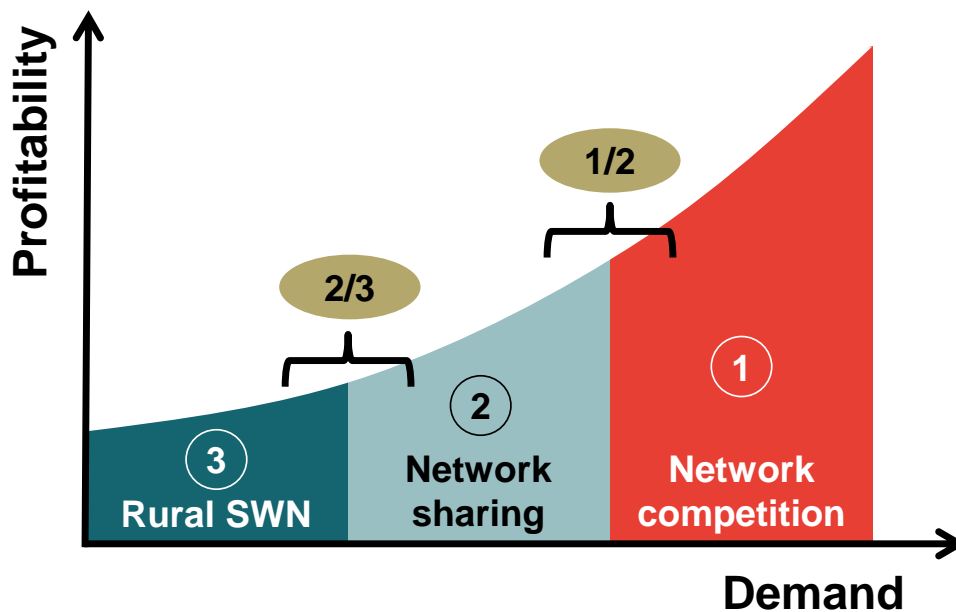
Source: Frontier illustration

For example, as equipment becomes cheaper over time and income-levels (and therefore demand) increase over time[39], areas that were once only profitable to cover through some form of network-sharing agreement may become sufficiently profitable for operators to roll out competing networks. This represents a move from 2 → 1.

By allowing operators to determine which model to adopt in a flexible way – provided that they meet the overall coverage targets – means that the

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[39]   GDP per capita is forecast to grow in South Africa. However – as set out later in Section 5 – the nature of income inequality in South Africa means that affordability will be an issue for the poorest in South Africa.

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Government will not need to determine exactly where the boundary between these approaches lies.

A similar approach can be adopted for determining the boundary between the rural SWN and the model of network-sharing. The broadband mapping exercise referred to earlier will give the Government (and operators) a better understanding of where the boundaries may lie – but, again, the models should allow for a degree of flexibility.

For example, it may be the case that operators jointly build a single privately funded network, only to discover that it is economically unsustainable without a degree of public subsidy. At a later date, this element of the network could potentially be transferred into the rural SWN (representing a shift from 2 → 3). Or on the other hand, the SWN may initially build a monopoly network in areas which were thought to require a degree of public subsidy, only for them to be transferred out of the SWN into private ownership by the operators – representing a shift from 3 → 2. This would therefore reduce the cost to the Government.

How these transfers will be affected will require considerable thought and agreement amongst the parties, but our 'three model' approach recognises that the boundaries between different models are likely to change over time.

4.5.2   Spectrum management

ICASA's 2011 proposal involved licensing spectrum at the *national* level to a wholesale open access network with the aim of increasing rollout in uneconomic areas (i.e. at the *sub*-national level). Allocating spectrum at the national level comes at the cost of depriving existing operators of more spectrum in urban areas where they have most demand for it. Therefore, one of the challenges in setting up an SWN is ensuring that spectrum is available to allow the SWN to operate in rural areas, whilst not depriving existing operators from using it in urban areas.

One solution to this would be to grant the mobile operators use of spectrum nationwide but to allow (or require) them to assign spectrum to the SWN in uneconomic areas where they are not using the spectrum. A number of potential business models could be put in place to allow the SWN to operate using spectrum in uneconomic areas.[40]

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[40]   For instance, the SWN could operate a Multi-Operator Radio Access Network (MORAN) in uneconomic areas, where each MNO operates a virtual network on top of the SWN with their own spectrum, and this would allow seamless handover and for operators to maintain ownership of spectrum.

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In practice, there may be some challenges in implementing this model. One challenge relates to radio frequency planning on the geographic boundaries between the rural SWN and areas which are covered commercially. Also, technical arrangements will need to be made to allow users to roam seamlessly between these networks – e.g. moving from the rural SWN to an adjacent network.

However, the participation from operators in operating and managing of the SWN should help overcome these difficulties. For instance, co-ordination between the SWN and each individual operator to ensure seamless roaming is readily achievable and each party has an interest in ensuring it will work. Nonetheless, the technical arrangements for ensuring seamless handover will need to be agreed in advance.

4.5.3   Financing and ownership

Another important challenge will be in relation to the financing and ownership of the rural SWN. The rural SWN could be a complex and costly project, as it would effectively be a network operating in the least profitable areas of South Africa, where income levels are below the national average and rollout costs are likely to be higher than in more densely populated urban areas.[41] There is a question to what extent the South African Government will be willing or able to secure the necessary funds for financing the rural SWN and the costs it would incur in doing so.[42]

The Government may wish to seek some form of private financing for the rural SWN. Also, the rural SWN is more likely to succeed from an operational and management perspective if the existing mobile operators are involved as (partial) owners of the network.[43] This is particularly important if there will, subsequently, be transfers of assets into and out of the SWN as the boundaries between the models shift, (as discussed above). As a result, we believe that a public-private ownership which includes the existing network operators is likely to be the preferred approach when establishing a rural SWN in South Africa.

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[41]   As such, these areas are unlikely to be commercially viable (even with network sharing), without some form of public subsidy.

[42]   In June 2014, credit rating agencies Standard and Poor's (S&P) and Fitch both revised South Africa's credit rating. In particular: S&P downgraded South Africa's credit rating from BBB to BBB- with a stable outlook; and Fitch held the rating at BBB but lowered South Africa's outlook from stable to negative.

[43]   This argument is set out in more detail in the SWN Report.

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4.5.4   Regulating the rural SWN

Finally, the success of the rural SWN will largely depend on how efficiently it is regulated. As explained above, a well-designed rural SWN would operate only in areas that are not commercially viable for mobile operators. As such, it would be expected, absent some form of regulation, to have relatively weak incentives to invest, to seek to expand output, to reduce costs or to improve the quality of the services it provides. Therefore, some regulation may be required in an attempt to address these issues.

Also, we understand that internationally there are no examples of SWNs in mobile. As a result, this adds to the challenge of regulating the SWN since there are no direct examples from which to draw guidelines on best practice. However, regulators will need to set wholesale prices which are intended to encourage the monopolist to improve the efficiency of its operations (e.g. through RPI-X type wholesale price controls/caps), and to encourage retail operators relying on the SWN to expand their output (e.g. through 'two part' charges). They can also set coverage targets for the SWN in an attempt to accelerate or extend roll out, or require the SWN to upgrade its network at specified dates (e.g. by benchmarking against other countries). 'Regulation' in this context could take the form of clear and transparent rules or targets included in the licence granted to the SWN or in subsequent directions from the regulator.

Such measures could, if implemented well, go some way towards reducing the concerns of an SWN operating as a monopoly in the areas where it is present. However, the key question policymakers must consider is whether we could reasonably expect the rural SWN to be regulated effectively and, even if we could, whether it would outperform alternative and more 'market-based' solutions discussed in previous sections. This is why the scope of the SWN should be restricted to those geographic areas which cannot be served sustainably by any other means.

Industry-led initiatives can be a key lever in helping the Government achieve its coverage and access objectives

5 Demand-side policies may still be required to meet the Government's affordability objectives

The proposals described above relate to supply-side measures. However, there is likely still a need for demand-side measures to stimulate take-up – especially among the poorest in South Africa.

In Vision 2020, the Government set a target that by 2020, all South Africans will have access to broadband at no more than 2.5% of monthly income. However, the nature of income inequality in South Africa means that the poorest people in the country – who have incomes substantially below the average – may still struggle with affordability. This is illustrated in **Figure 8** below.

Figure 8. Vision 2020's target of broadband access costing no more than 2.5% of average monthly income may still be unaffordable for many
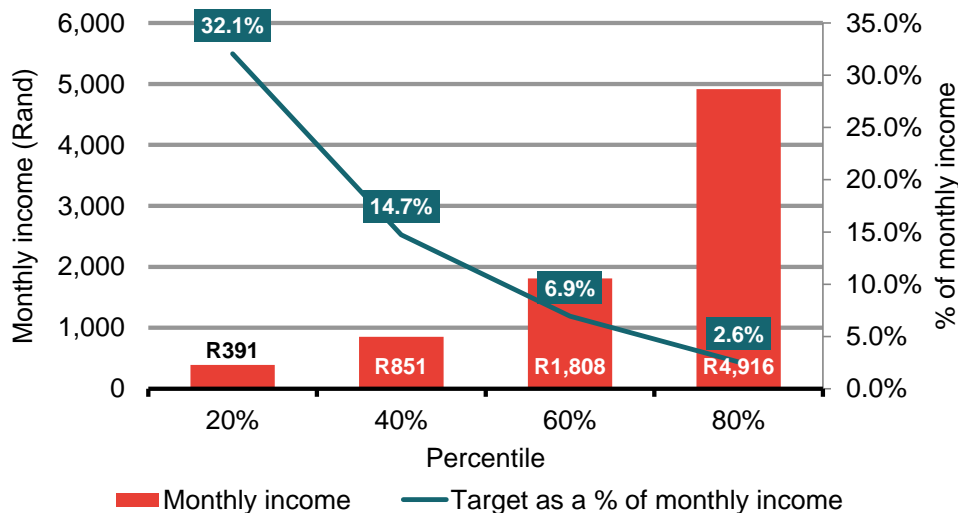
Source: Frontier analysis of data from the World Bank and Statistics South Africa.

Note: Based on 2012 data from the World Bank, 2.5% of monthly GDP per capita in South Africa is around $15 / R125. Statistics South Africa reports 'per capita income quintiles' for 2010.[44] We have grown these 2010 figures by applying GDP per capita growth rates for 2011 and 2012. This produces the bars in red. The figures in the green boxes are R125 expressed as a percentage of monthly per capita income per quintile – e.g. R125 represents around 32% of monthly income per capita at the 20th percentile, 15% of monthly per capita income at the 40th percentile, etc.

According to the World Bank, average annual income in South Africa – measured as GDP per capita – was around $7,500 in 2012 (cR60,000). Therefore, 2.5% of average monthly income, as targeted by Vision 2020, implies a cost of broadband access of no more than around $15 per month (cR125).

However, according to data from Statistics South Africa, this still represents a large proportion of income for the poorest in the country. We estimate that $15 per month represents:

- □   around one third of monthly income at the 20th percentile[45]

- □   around 15% of monthly income at the 40th percentile

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44   Income and Expenditure of Households 2010/2011 – Figure 9
        http://www.statssa.gov.za/Publications2/P0100/P01002011.pdf

45   That is where the '1st percentile' is the poorest individual in South Africa, and the '100th percentile' is the richest.

Demand-side policies may still be required to meet the Government's affordability objectives

To reach the affordability targets, there will also likely be a need for Government intervention on the demand-side. Demand-side measures typically fall under two headings:

● **Reducing the cost of access to end-users**. Examples include:

  ▫ tax breaks and customs waivers on hardware (e.g. handsets and laptops, etc.) – that can shut out the potential for arbitrage opportunities or reselling on the black markett

  ▫ direct subsidies or tax breaks on subscriptions and pay-as-you-go credits – for example we understand that the Government already offers subsidies for power-saving initiatives

● **Increasing the perceived benefits of broadband** to make broadband more attractive. Examples include:

  ▫ providing training sessions to increase digital literacy – for example at schools

  ▫ increasing the volume of online content (potentially in multiple local South African languages) to help encourage users to migrate certain activities online - for example, the Government could introduce online access to some health, education and commercial services also bringing economic benefits by reducing travel costs and freeing up time otherwise spent on travel to Government offices

  ▫ encouraging payment and financial services to be enabled by mobile platforms, thus improving perceived benefits of broadband and providing other economic benefits - the Government may have an important role in reforming financial services regulation to enable this

While demand-side policies can help stimulate demand, coverage is a prerequisite to increase take-up in under-served areas.

Demand-side policies may still be required to meet the Government's affordability objectives

6   Conclusion

The access targets set out in South Africa Connect envisage high levels of growth. **Figure 9** below provides an indication of the levels of growth that are required to achieve these targets – assuming an average compound annual growth rates between the milestone years in 2016, 2020 and 2030.

Figure 9. Broadband access targets - as set out in South Africa Connect
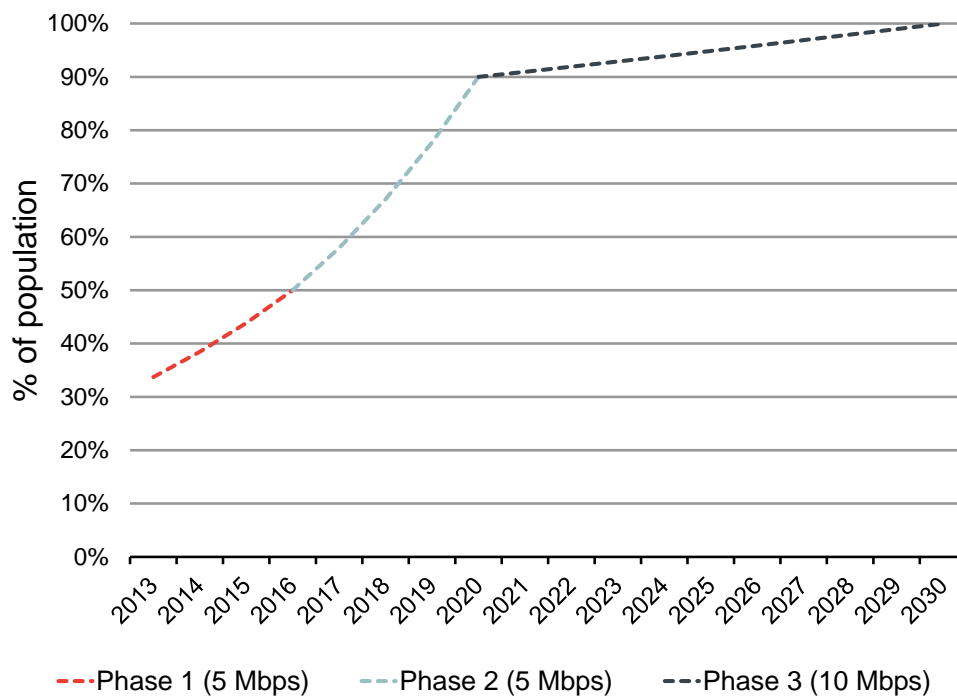
Source: Frontier analysis of targets set out in South Africa Connect

Notes: The speeds reported in the chart refer to the minimum targets set out in South Africa Connect. However, the plan also targets: (i) 50% of the popuplation to have access to 100 Mbps broadband by 2020; and (ii) 80% of the popluation to have access to at 100 Mbps by 2030.

The chart is based on the following compound annual growth rates between milestone years: 2013-2016: 14% per year; 2016-2020: 16% per year; and 2020-2030: 1% per year

The key barriers for the Government to tackle are:

- coverage and availability

- affordability

Network competition – left to its own devices – is unlikely to be able to achieve these targets. Therefore a combination of supply-side initiatives aimed at increasing coverage and demand-side initiatives aimed at increasing penetration are likely to be needed.

Conclusion

In this report we set out the following supply-side options:

- efficient use of spectrum – covering spectrum auctions, and other issues around spectrum efficiency

- promoting network-sharing agreements to reduce the cost to new rollout in rural areas

- efficient use of universal service funding

- government intervention in subsidising backhaul connectivity

- creating a wholesale network in truly 'under-served' areas only

We note that these solutions are not mutually exclusive. For example, the Government could use spectrum auctions *and* promote network-sharing agreements, or any combination of approaches.

We also briefly discuss the following demand-side initiatives:

- reducing the cost of access to end-users

- increasing the perceived benefits of broadband

We note that to some extent there is a trade-off between supply-side initiatives aimed at increasing coverage, and demand-side initiatives aimed at increasing penetration. For example, one way of increasing take-up in rural / under-served areas is to effectively lower retail prices. However, in areas already of relatively low-demand and not viable for commercial operators to cover, a reduction in price can only decrease the viability even further. Therefore, supply- and demand-side initiatives should not be considered in isolation, and successful Government intervention will require a careful combination of both.

Conclusion