



Government of Malawi

NATIONAL BROADBAND STRATEGY 2019 - 2023

**Ministry of Information
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FOREWORD

The Malawi Government through the National ICT Policy of 2013 has a deliberate policy whose objective is to ensure that all its citizens access ICT services which are a catalyst for socio economic development. Further, through the Malawi Growth and Development Strategy (MGDS III), Government recognizes that access to ICT services including advanced internet services are key to national development and focuses on ICT infrastructure development.

Considering that Internet and Broadband are globally recognized as the basis for transformation to a knowledge-based economy, and in line with the National ICT Policy and MGDS III, the Government has developed a five year National Broadband Strategy (2019 -2023) whose objectives are to promote broadband deployment, increase broadband adoption and usage as well as ensure availability of broadband services at affordable prices. The development of the Strategy is in line with the advancements in technology which are rapidly transforming the way we communicate, work, access information, and do various daily operations. These new capabilities are driving economic growth and innovations that were not possible a decade ago. However, most Malawians still lack a critical connection to the wealth of opportunities that the broadband technology presents.

The latest statistics indicate that about 16 per cent of Malawi's population lives in areas that are unserved by mobile coverage of any kind. Statistics show that 2G has a population coverage of 84% while 3G and 4G/LTE coverage is at 56% and 25%, respectively, however, this is mostly in the urban and semi-urban areas. This calls for the government interventions of which this Broadband Strategy strives to address. The Government is committed to addressing the challenges identified in the Broadband Strategy and calls for cooperation among all stakeholders who are key to the achievement of the targets in this Strategy.

Hon. Gospel Kazako
MINISTER OF INFORMATION

PREFACE

Access to broadband is rapidly becoming a prerequisite for being able to benefit from basic social services and for participating completely in society. Access to broadband provides various opportunities in life and has in recent years transformed peoples' lives in different ways and continues to shape the modern economy. The World Bank Report on Information and Communications for Development considered broadband impact on growth in some 120 countries for a period of 25 years from 1980 to 2006. The report indicates that each 10% increase in broadband penetration results in 1.21% increase in per capita Gross Domestic Product (GDP) in developed countries, and 1.38% increase in developing countries. This shows that broadband penetration has an impact on GDP.

The National Broadband Strategy seeks to achieve an increase of broadband penetration from 4.5% to 35% in 2023 and improve broadband bandwidth from 256 kilobytes per second (kbps) to 5 megabytes per second (mbps) between 2019 and 2023.

The strategy underscores the role of both the public and private sector in funding of broadband infrastructure and emphasizes the participation of government, private sector investments and development partners in financing broadband projects particularly by incentivizing infrastructure rollout in remote areas and in areas encumbered by challenges concerning the profitability of broadband investments.

Ernest Kantchentche
Principal Secretary
Ministry of Information

ACRONYMS

3G	3rd Generation
3GPP	3rd Generation Partnership Project
4G	4th Generation
ARPU	Average Revenue Per User
BB	Broadband
BWA	Broadband Wireless Access
CAPEX	Capital Expenditure
CIR	Committed Information Rate
CPE	Customer Premise Equipment
DSL	Digital Subscriber Line
EDGE	Enhanced Data rates for GSM Evolution
ESCOM	Electricity Supply Company of Malawi
FTTx	Fibre To The... (Kerb, Cabinet, Premise, Building)
FWA	Fixed Wireless Access
GDP	Gross Domestic Product
GPRS	General Packet Radio Service
GSM	Global System for Mobile
HEI	Higher Education Institution
HOM	Higher Order Modulations
HPSA	High Speed Packet Access
HW	Hardware
ICT	Information and Communications Technology
ISP	Internet Service Provider
IT	Information Technology
ITU	International Telecommunications Union
KPI	Key Performance Indicator
LTE	Long Term Evolution (4G)
MACRA	Malawi Communications Regulatory Authority
MAREN	Malawi Research and Education Network
MoI	Ministry of Information
MIMO	Multiple Input Multiple Output
MOCN	Multi Operator Core Network
MoF	Ministry of Finance
MORAN	Multi Operator Radio Access Network

MVNO	Mobile Virtual Network Operator
MW	Microwave
NBS	National Broadband Strategy
NGO	Non- Governmental Organization
NRRD	Network Redundancy, Reliability and Diversity
OPEX	Operating Expenditure
POP	Point of Presence
PPPC	Public Private Partnership Commission
QoE	Quality of Experience
RAN	Radio Access Network
RF	Radio Frequency
RIO	Reference Interconnection Offer
SME	Small and Medium sized Enterprise
SMP	Significant Market Power
SW	Software
SWOT	Strengths, Weaknesses, Opportunities, Threats
TCO	Total Cost of Ownership
UHF	Ultra-High Frequency
UMTS	Universal Mobile Telecommunications Service
UPS	Uninterruptible Power Supply
USF	Universal Service Fund
USO	Universal Service Obligation
VAT	Value Added Tax
VDSL	Very high speed Digital Subscriber Line
VSAT	Very Small Aperture Terminal
W-CDMA	Wideband Code Division Multiple Access
WRC	World Radio-communication Conference

EXECUTIVE SUMMARY

This document presents the National Broadband Strategy for Malawi for the period 2019 – 2023. It identifies realistic and appropriate targets for broadband service delivery in Malawi for the period of the Strategy separated between urban and rural areas. This is presented as target headline speeds as well as Committed Information Rates (CIR) that should provide an appropriate level of customer experience in Malawi when using broadband service. The proposed target speeds and penetration rates are shown in the following figures. The Strategy proposes an increase in broadband access minimum speed from 1Mbps to 5Mbps for the year 2023. The Strategy further proposes a broadband access penetration rate to increase from the current 4.5% to 35 % in 2023.

The Strategy identifies Seven Strategic Priority Areas where actions are required and include both network and service provision as well as user support and demand stimulation. These Strategic Priority Areas are:

1. Increase access speeds and capacity of existing network infrastructure
2. Increase access network coverage into underserved (unserved) areas
3. National Backbone Network capacity
4. International Network capacity
5. Availability of broadband
6. Affordability of broadband
7. Promote demand

A range of individual Initiatives have subsequently been identified and documented within each Strategic Priority area. These 25 Initiatives make up this National Broadband Strategy for Malawi. They are presented to show the issues involved, responsible organizations, likely level of impact, implementation difficulty, time-period for implementation, risks and broad costs together with KPIs for each Initiative.

An implementation plan in the form of a road map is presented in the Strategy which includes an assessment of the impact, difficulty of implementation and broad cost for each of the initiatives. These are subsequently analyzed using a high level economic and social return on investment framework to rank the potential importance of the initiatives.

The Strategy is developed upon technology neutral principles whereby appropriate wire-based or wireless technologies will be preferred depending on reliability characteristics and capabilities. Where one type of technology is not practical, other types of appropriate technologies shall be deployed.

Responsibility for the successful ongoing development of broadband services in Malawi rests with a range of organizations including government, MACRA, existing network operators and service providers, new network operators and service providers, international organizations and users, especially within the public sector, as well as businesses and SMEs. In order to manage and coordinate these extensive activities it is recommended that a coordination function is set up as described in the Strategy to manage the implementation of the National Broadband Strategy

1.0 INTRODUCTION

A number of activities have been undertaken in Malawi in recent years which are directly relevant to a National Broadband Strategy. These form the foundations upon which such a Strategy and Action Plan should be based.

Malawi developed a ‘National Information and Communications Technology (ICT) Policy’ in 2013, a ‘National ICT Master Plan’ for the period 2014 – 2031. These documents set out the strategic objectives for the ICT sector. The National ICT Policy provides for ten (10) priority areas which includes ICT Infrastructure Development, E-Government Services and Growth Sectors Development and Universal Access to ICT services. These priorities are the basis upon which the Strategy has been built on since ICT Infrastructure deployment is prerequisite to broadband services but also that broadband services facilitate e-government services. Further, the ICT Policy emphasizes universal access to ICT services in order to address the digital divide between the rural and urban areas in the country.

Further, a range of other initiatives, including the development of a Master Plan for Wireless Broadband Access 2015-2019, support the Broadband Strategy. This Wireless Broadband Access Strategy identified a range of issues expected to impact the growth and development of broadband access in Malawi.

Another significant element of the policy and legal environment which has been taken into account is the significant improvements in the powers and mandate of MACRA under the 2016 Communications Act, implementation of which is ongoing. Particularly with respect to subsidizing access to otherwise non-viable areas (through the newly established Universal Service Fund) and with respect to additional competition-regulating powers, it is expected that this new legal framework will, once implementation is complete, contribute substantially to regulator-driven efforts toward a more competitive sector and improved incentives for broadband deployment.

2.0 GUIDING PRINCIPLES FOR THE NATIONAL BROADBAND STRATEGY

The National Broadband Strategy articulates Malawi's Vision and Mission Statements for broadband adoption and usage as well as the core elements of Malawi's approach to improving access of high speed internet by the general public. The Strategy is aligned to the Malawi's National ICT Policy objective which gives direction to ICT development in the country to support the national goal of wealth creation and reduction of poverty. The Strategy is underpinned by a number of guiding principles that ensure the Strategy fosters extensive deployment and usage of broadband throughout the country. The following principles would enable effective implementation of the Strategy:

2.1 Vision

Broadband connected Malawi society that correspond to the users' need for connectivity by 2023.

2.2 Mission

"To promote the deployment of broadband services that provide always on connectivity to the citizens in the country"

2.3 Mandate

The development of the Strategy is drawn from the Communications Act, 2016 which gives mandate to MACRA to encourage introduction of new and innovative technologies. It also promotes universal access to ICT services which includes access to broadband technologies.

2.4 Goal

The goal of the Strategy is to improve broadband penetration rate from 4.5% to 35 % and to increase broadband speed from 1Mbps to 5Mbps by 2023.

2.5 Objectives

The main objectives of the Strategy are:

- (i) To promote Broadband deployment,
- (ii) To increase Broadband adoption and usage; and
- (iii) To ensure affordable broadband services.

2.6 Core Values

Implementation of the Strategy will be built on the following Guiding Principles:

- (a) **Open access:** Broadband access and use will be available without discrimination. Multiple service providers will be encouraged to compete on shared platforms and services.
- (b) **Technology neutrality:** Use of common, interoperable standards and protocols will be encouraged. All local broadband networks shall have the right to nondiscriminatory and cost-based interconnection with other broadband networks.
- (c) **Research and innovation:** Continuous research and development will be pursued.
- (d) **Multi-stakeholder approach:** The Strategy will seek to enhance the effectiveness of all key stakeholders in improving the deployment and adoption of broadband in the country by recognizing the various roles and responsibilities of different stakeholders in improving broadband connectivity in the country.
- (e) **Co-ordination and collaboration:** PPPs shall be promoted and encouraged. The ICT stakeholders and the governments institutions will work together to deploy infrastructure and build awareness and capacity for use of broadband.
- (f) **Sustainable initiatives and interventions:** Various initiatives will be promoted in order to build foundations for sustainable contestable markets including innovative technology solutions.
- (g) **Competitive choice of technologies:** Broadband technologies use both wire-based and wireless technologies with different transmission bandwidth, reliability characteristics and capabilities. Where one type of technology is not practical, other types of appropriate technologies shall be deployed.
- (h) **Market-based investment:** service providers opt to provide services in areas with appropriate return on investments and this will drive the provision of broadband connectivity by service providers. Where markets do not deliver services in a timely and affordable manner, government will intervene in the public interest.

3.0 STRATEGY LINKAGE TO OTHER POLICIES

The National Broadband Strategy will complement other strategies that are operationalizing the following policies:

- (a) The National ICT Policy (2013) - The policy recognizes that Malawi needs to address issues of gaps in the access of ICT services and has put up Universal Access to ICT services as one of the Strategic Priority areas in the Policy.
- (b) The National ICT Master Plan (2014 – 2031) - this is to operationalize the National ICT Policy.
- (c) Malawi Growth and Development Strategy III (2017 -2022) – This highlights the need to have developed ICT infrastructure and thereby facilitate broadband adoption and usage among all Malawians. The MGDS III facilitates conducive environment development of ICT infrastructure which is prerequisite to access of broadband services.
- (d) Master Plan for Wireless Broadband Access 2015-2019 which identifies a range of issues expected to impact the growth and development of broadband access in Malawi.

4.0 SITUATION ANALYSIS

4.1 Broadband Definition

A broadband network by definition is a network that is primarily designed to carry large volume of data in a manner that end-users experience an acceptable quality of service. This implies a network that should transit the data at a high speed. For the purpose of the National Broadband Strategy in Malawi the following definition will be adopted. This definition will be appropriate and relevant for the period of this Strategy and potentially a longer period into the future.

“Broadband is an ecosystem made up of high capacity, high speed and high quality communications networks, services, content and applications that provides high value information and communications to a variety of users and citizens.”

This definition recognizes that the use which will be made of broadband will change over time and that different user groups will make use of different services and

applications and will therefore demand different amounts of capacity and make use of different access speeds and at different levels of quality. Such user groups will include parastatals and large companies (not included as the target of Initiatives), small businesses and SMEs as well as individual users and their behaviors and needs will vary depending on their location (urban vs rural), spending power, access to terminal equipment, literacy levels and communications needs.

4.2 High-Level Statistics

Malawi population characteristics affect broadband demand and had been considered in the modeling and developing of the Strategy. These characteristics include -literacy levels, affordability and internet access and usage.

4.2.1 Literacy Levels

Adoption of broadband services need basic literacy. This is why the potential broadband user population is limited to literate individuals. Below are the population characteristics according to the 2015 /16 Demographic and Health Survey (DHS) ¹for the active user group for Broadband services (15 to 49) of age: 72% of women and 82.9% of men are literate; while 3% of the women and 5% of the men attained secondary education; and 60.6% of women and 65.5% of men can read a whole sentence.:

Literacy was illustrated as being able to read only or read and write. This is why the respondents who can read and write and those with higher education are given separately above and suggest a conservative approach to equating literacy with ICT-use ability.

These statistics implies that in case of the capability to access broadband services, **at least 28% of women and 17% of men will not have any demand for broadband for lack of basic skills** to access or use it. The potential user population though significantly small, the population may not be able to access even the simple applications. Language has also been as most applications are in English which is a language that most rural population are

¹ Malawi Demographic and Health Survey (DHS) 2015-16, Report by the Malawi National Statistical Office, published February 2017.

not conversant with. There is a huge literacy gap between urban and rural residents.

In considering broadband demand it has been noted from 2015-16 DHS that:

- (a) Older women have not attained the primary school certificate and cannot use ICT. Gender gap in education is nearly disappearing among the young, there exists hope that this issue may be overcome in the near future but meanwhile remains a gender-specific obstacle among older population groups.
- (b) Overall, the youngest generation entering adulthood and the labour market (15-24 year olds) show that the percentage of those having no education decreases substantially (4.4% of women in this age group relative to 12.1 for the overall 15-49-year-old cohort and 2.2% for men in the younger age group as opposed to 5.3% in the overall group).
- (c) There is a relationship between high literacy and wealth. This means the educated will afford and use broadband services. For example, 31% of women and 41% of men in the wealthiest quintile completed secondary school or higher.
- (d) There is a difference between urban and rural population in terms of literacy levels: While 59.4% of urban women and 76.8% of men have completed primary school or higher, the rural equivalent is only 14.1% of women and 37.8% for men.

Therefore, literacy levels will have to be considered when implementing the Strategy due to the effect that it has on broadband usage and adoption.

4.2.2 Affordability Indicators

Affordability indicators also affect broadband usage and access. Affordability applies to purchase of consumer device (i.e Smartphone, tablet, laptop, computer etc) and cost of subscription. In Malawi, consumers spend more on capital to acquire a terminal than on access. Affordability therefore acts as a barrier to access as the cost limits the demand for broadband.

Accord a total population estimate of 2018 estimates², of 18.8 million, the less-than thirty percent of the population above the international 1.90 USD per person and day poverty line amounts to less than 5.5 million persons even potentially able to afford a non-basic expenditure like broadband access.

In rural areas where agriculture is the main economic activity, not everyone has access to cash income. The cash income is not always steady across the year. For example, for women, less than two thirds (62.7%) of those having income from non-agricultural work are paid in cash or at least partly in cash, while in the agricultural sector only 21.8% claimed payment in cash or partly in cash (rather than solely in kind). This income is also unsteady across the year, with only 26.1% of women with agricultural and 51.3% with other sector incomes claiming year-round rather than part-year/sporadic work and hence income.

In terms of relevant household-level assets, the DHS 2015-16 data shows that terminal equipment ownership is nevertheless relatively widespread, though with a large divide as between urban and the rural areas. Comparatively, mobile phone ownership was 86.2% for the urban households against 47.8% for the rural households. Further, computer ownership was 15.5% for the urban households against 1.3% for the rural households.

Assuming that substantially less than all mobile phones will be smartphones capable of using broadband-enabled applications and services, it is likely that the rate of computer ownership (as an internet-capable terminal) may more properly reflect the segment of the population having the skills and income to afford broadband service and terminal devices – and suggesting that beyond the urban areas, demand and affordability will be relatively low.

Therefore, affordability indicators will have to be considered when implementing the Strategy due to the effect that it has on broadband access.

4.2.3 Internet Demand Indicator in Context

Current statistics for broadband penetration in Malawi is at 4.5%, however, the majority of those that access broadband services come from the urban

² Malawi National Statistical Office population projection for 2018 available at http://www.nsomalawi.mw/index.php?option=com_content&view=article&id=136%3A%3Amalawi-table-30-population-by-age-and-sex&catid=8&Itemid=3

population. Further, according to DHS 2015/16, the majority of demand for internet which might stand as a proxy for broadband was in the top 20% (quintile) wealthiest share of the population, with a second highest quintile accounting for most of the remaining present use. The subcategories for the frequencies of use further suggest that daily/near daily use is likely to be predominantly urban even for the wealthiest quintile. Usage of internet in rural areas is a mere fraction of urban demand as well as strongly gendered. Furthermore, men are dominating in the broadband access than women.

4.3 Observations

In the context of the infrastructure characteristics and limitations in Malawi, such as limited coverage of the power grid and reach of the (primarily wireless) infrastructure leaving substantial populations without coverage at present tend to suggest that demand for broadband in Malawi will be constrained by the following:

- (a) Skill limitations (literacy) of a substantial share of the population which, even as educational attainment is rising;
- (b) Affordability limitations due to widespread poverty and income insecurity/limitations on cash incomes, including likely with respect to both terminals and service costs;
- (c) With the bulk of demand for individual broadband access coming from the top 20% by wealth of the population, with the second highest quintile providing some additional demand; while
- (d) The remainder of the population and particularly large segments of the rural population will require subsidized/free access, including provision of terminals through measures like shared access/telecentres.

5.0 STRATEGIC PRIORITY AREAS

In order to promote the development of ICT in the country, the Strategy will be guided by the Seven Strategic Priority Areas in the deployment of broadband networks in underserved areas as well as in areas without broadband.

Furthermore, the Strategy will focus on improving access to high-speed broadband and to reliable high-quality mobile services. The Strategic Priority Areas are as follows:

- (a) Increase access speeds and capacity of existing network infrastructure
- (b) Increase access network coverage into underserved (unserved) areas
- (c) Increase National Backbone Network capacity
- (d) Increase International Network capacity
- (e) Improve Availability of broadband
- (f) Improve Affordability of broadband
- (g) Promote demand

5.1 Strategic Priority Area 1: Increase Access Speeds and Capacity of Existing Network Infrastructure

With a 2G penetration at 84%, there is a need to achieve the broadband speeds and penetration projection targets in Malawi. This can be achieved through rolling out 3G on all existing towers in the short-term and 4G in the longer-term. The decision to migrate from one technology to another and how it can be phased will require requires solid financial and business case planning. Nevertheless, this is a high impacting opportunity for achieving broadband roadmap targets. The most economical mechanism to increase the capacity is to add more spectrum. MACRA should work closely with the operators to assess the spectrum requirement/demand whilst ensuring spectrum is not hoarded, i.e. used efficiently. To increase the availability of connectivity, the deployment of renewable energy, in particular in remote areas will be advantageous due to low running cost therefore advocating the use of solar power under the Broadband Strategy program is essential to overcome the challenge of power blackouts.

5.1.1 Roll out 3G and 4G to all existing towers

Actions:

a) MACRA should

- (i) Review and revise license conditions
- (ii) Increase access speeds and capacity for existing networks

- (iii) Offer incentive spectrum pricing
- (iv) Ensure appropriate and relevant spectrum is available
- (v) Consider use of USF for hard to reach areas
- (vi) Ensure operators plans are submitted
- (vii) Monitor performance of operators
- (viii) Ensure appropriate plan is in place

b) Network operators should:

- (i) Devise a robust plan containing commercial and financial planning;
- (ii) Share the plan with MACRA;
- (iii) Report to MACRA on a regular basis;
- (iv) Provide KPIs in alignment with broadband targets.

5.1.2 Migrate to Newer Technologies (3GPP Based)

Actions:

a) MACRA should:

- (i) establish and lead activities to:
 - Initially establish the objectives and governance of the group;
 - Discuss the issues associated with migrating to newer technologies;
 - Discuss operators' migrations plans, thus highlighting any technical, financial and commercial issues;
 - Formulate a migration plan based on the above upfront activities;
 - Meet at a regular interval to discuss progress on various items of the migrations plan.
- (i) Ensure that all relevant licenses are issued to support the migration plan.
- (ii) Review and revise license conditions to support the migration plan.
- (iii) Ensure migration plans are submitted.
- (iv) Ensure the availability of appropriate spectrum bands for access (see the figure below depicting the available bands suitable for LTE deployment). In particular, offer to the operators more suitable spectrum for wide area coverage.
- (v) Offer incentive pricing for spectrum for access and transport network.
- (vi) Consider use of USF for the migration plan.

- (vii) Monitor the progress of the migration plan by establishing mutually agreed KPIs.

5.1.3: Release More Spectrum

Actions

a) MACRA should:

- (i) Review existing spectrum holdings, spectrum utilisation, spectrum available and what else can be re-farmed for wireless broadband allocation, e.g. 700MHz band, in line with WRC and ITU regional allocations;
- (ii) Review and revise license conditions, if necessary;
- (iii) Ensure appropriate and relevant spectrum is available;
- (iv) Ensure that spectrum is priced appropriately, in particular its usage is incentivised in rural areas through appropriate pricing mechanism;
- (v) Review the MW bands assigned and used and ensure appropriate spectrum for backhaul (MW links) is available and assigned in alignment with the overall national broadband strategy;
- (vi) Monitor spectrum usage to ensure hoarding does not take place, especially with incentives.

b) Network operators should:

- (i) Provide evidence of efficient use of spectrum assigned and their needs for additional spectrum;
- (ii) Provide KPIs in alignment with the impact of using additional spectrum

5.1.4: Promote Use of Renewable Energy Sources

a) Government should:

- (i) Develop policies to promote rollout and use of renewable energy sources;
- (ii) Consider subsidies and incentives, including reduced import duties, for such equipment;
- (iii) Incentivise the use of renewable energies for operators;
- (iv) Incentivise the use of renewable energies for private sectors and SMEs.

b) MACRA should:

- (i) Conduct cost-benefit analysis of using renewable energies;
- (ii) Share its analysis as an input into the Government related policies;
- (iii) Consider use of USF to promote use of renewable energy sources.

c) Wireless network operators should

- (i) Provide MACRA with figures regarding power consumption, measured based on providing reliable service during black-out and their running cost, where they see renewable energy will benefit them;
- (ii) Deploy renewable energies in areas where the running cost justifies the cost of deploying them;
- (iii) Provide KPIs concerning the benefits of using renewable energy in maintaining the operation of their networks along with other means of power back up.

5.1.5 Network reliability, redundancy and diversity

Actions

a) MACRA should

- (i) Develop an ICT Network Redundancy, Reliability and Diversity (NRRD) framework through an intensive engagement with the network operators and governmental agencies to identify the underlying issues and how they may be addressed;
- (ii) Develop initiatives for increasing the reliability and availability of ICT networks;
- (iii) Conduct cost-benefit analysis as a result of increased reliability and availability;
- (iv) Share its analysis as an input into the Government related policies;
- (v) Bridge this initiative appropriately with the other broadband strategy initiatives;
- (vi) Consider use of USF to increase ICT networks reliability and availability.

b) Network operators should

- (i) Provide MACRA with reports on NRRD metrics of their networks;
- (ii) Provide MACRA with their business continuity plans and measures in place;

- (iii) Collaborate with MACRA in the development of the NRRD framework by providing the requested data including financial analysis of introducing NRRD in conjunction with revenue benefits that will yield as a result.

5.2 Strategic Priority Area 2: Increase access network coverage into underserved (unserved) areas

Broadband speeds and penetration projection in Malawi can be achieved through operating technologies that provide connectivity economically, have a long-term evolution path and facilitate/enable a multi-technology connectivity approaches and solutions. The best overall solution should consider the trade-off between cost, performance and reach. There is a need increase the coverage of the network, either through additional sites or using lower frequencies, generally termed “sub-1GHz”. The latter is the most economical mechanism to increase the coverage. In addition, sub-1GHz frequencies will be ideal for FWA operators to migrate to new technologies. For both enhancements, it is required to increase the bandwidth of the existing backhaul (transport) legs as well as requiring backhaul for the new radio sites.

Another way is to put in place regulatory incentives capable of lowering the cost of broadband-capable infrastructure deployment for wireless platforms (towers and air interfaces) through mandates enabling/requiring the sharing of such access infrastructures, including both passive and active network elements, and also specifically with regard to conditioning any infrastructure subsidies through the newly set up Universal Service Fund – including to expand coverage into presently unserved areas, bearing in mind the need for policy coherence in terms of broadband strategy and appropriate prioritization of initiatives within it to incentivize network extension and upgrades and implementation of competition, price control and collocation/facilities and network sharing remedies as well as Universal Service Fund subsidy structures.

5.2.1 Deploy new infrastructure – Mobile, FWA and use of broadband satellite

Actions

a) MACRA should

- (i) Initiate a “Measurement Campaign” to identify populated areas unconnected. This should be a joint effort with the mobile, FWA operators and other stakeholders, as deemed necessary;
- (ii) Initiate a consultation process to encompass “Deployment of New Infrastructure” targeting coverage and internet access to areas uncovered. It should include mobile FWA, and satellite broadband deployment.
- (iii) Work with the FWA operators to ascertain the issues surrounding extension of FWA connectivity in rural areas. Ensure plans including financial and business cases are submitted by FWA operators;
- (iv) Work with service providers to ascertain the issues surrounding deployment of satellite broadband in Malawi, in particular in rural areas;
- (v) Identify the role of the satellite broadband and associated regulatory issues that should be addressed to facilitate market entry for the to-be-service providers;
- (vi) Review spectrum related aspects:
 - Review the spectrum plan for mobile, FWA and satellite broadband so that more suitable spectrum is made available for wider area coverage, based on existing infrastructure and further coverage footprint for newly deployed infrastructure;
 - Re-farm spectrum below 1GHz, in particular 700/800 MHz and make them available to the market;
 - Offer incentive spectrum pricing for access and transport networks for rural areas;
 - Revise coverage obligations in licences.
- (vii) Ensure that relevant licenses are reviewed and issued to support the infrastructure expansion based on multi-technology deployment;
- (viii) Consider use of USF for deploying new infrastructure including satellite broadband;
- (ix) Devise a sustainable plan to monitor the progress of coverage extension based on mobile new infrastructure, FWA extension and deployment of satellite broadband.

b) Network operators should

- (i) Provide details of coverage not-spots for voice, basic internet access (GPRS/EDGE) and broadband access (3G/4G)” to identify populated areas unconnected;
- (ii) Devise an extension plan identifying technical, regulatory, commercial and financial issues/challenges;
- (iii) Share the plan with MACRA;
- (iv) Report to MACRA on a regular basis;
- (v) Provide KPIs highlighting the progress of expansion, e.g. population covered.
- (vi) Provide their existing coverage reach and types of customers served identify quality of service offered;
- (vii) FWA operators should devise an extension plan identifying technical, regulatory, commercial and financial issues;
- (viii) Share the plan with MACRA;
- (ix) Report to MACRA on a regular basis;
- (x) Provide KPIs highlighting the progress of expansion, e.g. population covered.

5.2.2 Release sub-1GHz Spectrum for Wider Coverage

Actions

a) MACRA should:

- (i) Review the existing sub-1GHz spectrum concerning the bands available and what else can be re-farmed for wireless broadband allocation, e.g. 700MHz band, in line with WRC and ITU regional allocations;
- (ii) Review and revise license conditions, if necessary;
- (iii) Ensure appropriate and relevant spectrum is available and offered through incentive spectrum pricing for rural areas;
- (iv) Monitor spectrum usage to ensure hoarding does not take place, especially with incentive.

b) Network operators should:

- (i) Provide evidence of efficient use of spectrum assigned to them and their needs for sub-1GHz spectrum based on sound commercial and financial analysis;
- (ii) Provide KPIs in alignment with the impact of using sub-1GHz spectrum both in terms of coverage and capacity.

5.2.3 Incentivize the use of Suitable Spectrum for Backhaul Connectivity

Actions

a) MACRA should:

- (i) Review the existing MW frequencies assignments and try to optimise their assignment roadmap;
- (ii) Ensure appropriate and relevant spectrum is available and assigned through an incentive pricing for rural areas;
- (iii) Monitor spectrum usage to ensure hoarding does not take place, especially with incentive.

- b) Network operators should** provide evidence of their needs based on financial quantification for MW frequencies falling into incentive based pricing and assignment.

5.2.4: Promote infrastructure and network sharing through regulatory Incentives

Actions

a) MACRA should

- (i) Develop (in cooperation with the overall competition regulator) SMP regulations, guidelines for SMP determinations and conduct the appropriate market studies to allow for the application of asymmetric obligations, including particularly for access to infrastructures and network elements; and
- (ii) provide for the expeditious drafting and implementation of infrastructure (site and/or network) sharing regulations under Articles 70 to 73 of the Act, including in its scope both passive (towers, ancillary inputs) and active (air interface) infrastructure sharing at cost-based rates, including providing for speedy and effective dispute resolution mechanisms in this context; and
- (iii) Consider developing and implementing a national roaming requirement either as a stand-alone regulation or as part of the impending relicensing of operators under the 2016 Act.
- (iv) MACRA should develop funding strategies and mechanisms that include the option of providing funding support to operators to locate infrastructure

in un- or under-served (rural) areas across the capex/opex elements of infrastructure deployment, while tying such support to enforceable and enduring additional obligations to share supported infrastructures with other operators (and excluding grounds for rejection permissible under the Act for non-USF-supported sites).

b) Telecommunications Operators, particularly the mobile operators, should, potentially under the auspices of MACRA's supervision:

- (i) Consider model codes and practices for infrastructure and/or network sharing solutions tailored to Malawi and the respective operator platforms and network designs. MACRA could seek to support such efforts by organizing and hosting periodic working groups to this end.
- (ii) Provide input and feedback to MACRA and the line ministries on national roaming regulation, as well as tower siting and planning issues and obstacles that may be amenable to regulatory/administrative improvements or solutions.

c) Government should:

- (i) review and evaluate siting and planning requirements for towers and associated base station infrastructures; and
- (ii) Provide incentives and legal/regulatory measures.

5.3 Strategic Priority Area 3: National Backbone Network capacity

The high cost and difficulties of constructing backbone network transmission infrastructure, e.g. primarily buried fibre in conduit, limit the incentives for network operators to extend the reach and capacity of their backbone networks to handle increases in traffic volumes resulting from broadband and the applications and services enabled by it. Duplicated investments are rarely worth undertaking, leading to a risk of monopolistic or oligopolistic control of essential facilities.

Moreover, as described above, duct construction in existing infrastructure is relatively less efficient than planning for and constructing ducting along with civil works construction or reconstruction in strategic locations and offering such ducting on cost-based rates to operators for deployment of their fibre lines. The government should take a leading role in putting up deliberate policies that would facilitate comprehensive planning, construction and

documentation of such duct infrastructure whether through public-private partnership arrangements or other models and the resulting duct network should be made available to operators. This would assist the rollout of broadband transport infrastructure, eliminating bottlenecks, as well as providing a source of revenues to the government as the road network owner-operator.

5.3.1: Policy for Telecoms Ducts to operators

Actions

Put up a policy that ensures new or constructed civil works include telecoms duct available to operators.

a) MACRA should:

- (i) Consult with industry stakeholders on the needs for, location priorities, and lease models and modalities for backbone conduit;
- (ii) Liaise with the Roads Authority and the relevant Ministries of ICT and Infrastructure to develop a high-level policy and plan to integrate duct construction as a routine component of road development/redevelopment and upgrading plans across the country;
- (iii) Coordinate and lead the development of cross-sectoral policies governing access to duct infrastructures to ensure cost-based leasing rates and non-discriminatory access, so in order to ensure coherence among duct owners across sectors (electricity and transport infrastructures primarily), and including also the Malawi Energy Regulatory Authority in this process.

a) Government should:

- (i) Support MACRA's initiative of institutionalization of a cross-sectoral policies.

b) The Roads Authority should;

- (i) work with MACRA and the relevant Ministries to develop national plans, standards and conduit access/leasing standards
- (ii) Set appropriate construction standards for such ducting in line with international standards and industry inputs.

c) The Energy Regulatory Authority should;

- (i) Work with MACRA and the Roads Authority to ensure that conduit access and leasing standards are uniform across industries, avoid anti-competitive effects, be cost based and return value for investment to the infrastructure (government) owners.

d) Telecommunications Operators should;

- (i) Provide input and suggestions to MACRA and the other concerned parties to ensure that policies, plans and standards developed with regard to conduit infrastructures are appropriate to Malawi and the needs of industry looking forward.

e) ESCOM should provide fibre corridors to other telecom operator

Using its existing rights of way for the electric grid.

5.3.2: Reference Wholesale Offers from Network Service Licensees

Actions: Require Reference Wholesale Offers from Network Service Licensees

a) MACRA should;

- (i) Develop and pass market assessment regulations and guidelines for such assessments;
- (ii) Prepare and publish regulations/guidelines for reference offers and related matters, including request, acceptance and dispute resolution procedures;
- (iii) Where dominance is identified for this sub-market, apply ex-ante controls to such dominant operators including specifically the requirement to develop reference offers for MACRA's review and approval;
- (iv) Encourage operators in this sub-market to publish reference offers even where they are not identified as dominant, but as a voluntary measure;
- (v) Ensure effective enforcement of the reference offer process, including particularly the timely resolution of inter-operator disputes with regard to these.

b) The Competition and Fair Trading Commission should cooperate with and support MACRA in the above-listed actions.

c) Network Operators should, upon implementation of the above regulatory requirements prepare reference offers and prices for the regulated services therein and, upon MACRA approval, enter into appropriate agreements with requesting operators.

5.3.3 Periodic reviews of wholesale tariffs based on cost models

Actions: Undertake periodic reviews of wholesale tariffs based on cost models

a) MACRA should;

- (i) in the process of developing appropriate implementing regulations called for under the Communications Act, 2016;
- (ii) Develop standardized cost-models and regulations governing their applications in cooperation with the overall competition regulator allowing for their periodic application to the market to identify inefficiencies and unjustified price levels in submarkets; and
- (iii) Develop and implement regulations for the imposition of price caps and their monitoring and enforcement under the authority of Art 78 of the Act.

b) Network Operators should upon implementation of the above regulatory requirements prepare revised tariffs complying with any price caps and glide path requirements in line with MACRA determinations.

5.4 Strategic Priority Area 4: International Network Capacity

High-capacity transport capacity within the country and for termination internationally and to the Internet is provided by a limited number of operators, over a limited range of links either via optical fibre as well as satellite. Due to other initiatives aim at increasing the broadband speed and internet/broadband penetration in Malawi, it is expected that traffic volume within the country and internationally will proportionally increase. To ensure the end-to-end quality of experience is achieved and also maintained at an acceptable level, it is essential to keep the international and national backbone capacity in harmony with the traffic growth. It is required that Malawi should ensure the local content which is specific to the needs of the people is developed and hosted locally to avoid the use of more costly international links to access content hosted in other countries.

5.4.1: Sufficient network availability

Action:

a) MACRA should:

- (i) Monitor traffic and network performance
- (ii) Consider licensing additional supplier if appropriate

b) The network providers should:

- (i) Analyze and review network requirements and obtain more capacity
- (ii) Provide the relevant KPIs concerning the traffic growth and performance.

5.4.2: Promote Local Hosting and Content

Action

a) Government should:

- (i) Ensure the implementation of ICT policies which will support the development of appropriate content in Malawi and its hosting locally.
- (ii)** Implement initiatives in the education and health sectors as well as throughout all government departments to ensure that internet content is available which will improve the outcomes for all citizens of Malawi.

b) MACRA should:

- (i) Cooperate with the Ministries to ensure the implementation of the ICT policy
- (ii) Supports the development of appropriate local content and its hosting within Malawi.
- (iii) Monitor the cost effectiveness of such initiatives including their impact on the overall demand for network resources.

- c) Network operators should work** in cooperation with local hosting companies to ensure resilient network access is provided and maintained to the hosting facilities.

c) Others institutions like;

- (i) Local bodies such as trade organizations, healthcare providers and banks should develop content which is appropriate to the needs of the people of Malawi and will bring benefit both to individuals and the economy of Malawi.
- (ii) The training institutions should promote use of local content through ICT skills training.

5.5 Strategic Priority Area 5: Availability of Broadband

Considering that currently broadband access penetration rate for the population is only 4.5% which is limited to urban areas, there is need to

provide ubiquitous quality broadband services to all citizens. Providing and extending a quality broadband network across the country will lead to improvement in the quality of life of citizens in the way they work, live and learn using broadband network.

5.5.1: Development of Government and tertiary education networks

Action

a) Government should:

- (i) Promote the initiatives detailed in the Digital Malawi project especially Connectivity for Public Institutions and Connectivity for Higher Education.
- (ii) Conclude financial and commercial arrangements with overseas providers to facilitate new network provision.

b) MACRA should

- (i) Issue all relevant licenses to support the development of the government and tertiary education networks.
- (ii) Make other required resources available including availability of appropriate spectrum.

c) Network operators should cooperate as appropriate to ensure timely deployment of networks.

d) New market entrants should work closely with established network operators to ensure the effective rollout of the networks.

5.5.2: Promote and fund Telecentres in rural areas

Action

a) Government should:

- (i) Promote the use of shared access locations such as schools community centres.
- (ii) Ensure that nomination and approval process of the USF Board members is expeditious.

b) MACRA, acting for the Universal Service Fund to be established should expeditiously to:

- (i) Ensure the USF is adequately staffed to commence operations;

- (ii) Develop an appropriate universal service strategy setting out specifically the subsidization of shared access models for segments of the population likely to remain un-served through individual access approaches (irrespective of expanded reach of networks or low-income user tariffs) and establishing subsidy strategies for shared access facilities (e.g. telecentres) on an ongoing basis and reflect this determination in appropriate budgetary allocations for telecentres;
- (iii) Set out the most appropriate support and selection mechanisms for providing the necessary subsidies in a cost-effective manner such as through reverse auction for the provision of service;
- (iv) Determine appropriate contribution levels and adjustment mechanisms to be set for the sector, including to strike the balance of industry viability to necessary subsidies for areas and populations unlikely to be economically viable and aligned with broader Malawi ICT policies and initiatives;
- (v) Create an appropriate monitoring mechanism to document telecentre demand/use, so to create an empirical basis for evaluating support needs of telecentres (connectivity, equipment, training);
- (vi) Provide training to telecentre staff, potentially in coordination with cross-sectoral ICT initiatives in e.g. education for example.

The Universal Service Fund, once fully established within MACRA, should continue these initiatives, including also periodic review mechanisms to best align available resources to demand as among un-served and excluded populations on a cost-efficient, shared access basis.

c) Operators should provide subsidised connectivity to rural telecentres as part of a Universal Service Obligation.

d) Other actors – supportive development of locally suitable and demanded applications to be available at telecentres.

5.5.3: Support development of ‘Smart Hubs’

Action

a) MACRA should establish three types of hub

- (i) **A student/technology businesses incubator** – establish an initial scheme, as a pilot and test-bed within the Campus of one of Malawi’s main universities; then based on lessons learnt, establish one to two additional schemes in Malawi’s other universities

- (ii) **General telecentres**, - seek to establish 5-7 general telecentres in a variety of locations through:-
- revitalising two to three existing urban telecentres
 - locating one within an operator’s offices and
 - creating a new telecentre opportunistically utilising existing available office space in one of Malawi’s urban centres
- (iii) **More informal internet cafes/internet shops** – promote this as part of the voucher scheme with the aim of encouraging a significant number of entrepreneurs to purchase connectivity and set up internet cafes
- b) Operators should:**
- (i) Roll out infrastructure
 - (ii) Support training of staff
 - (iii) Subsidize access initially
- c) Other Actors should:**
- (i) Develop applications relevant to “Smart Hubs”
 - (ii) Encourage the use of “Smart Hubs” by SMEs.

5.6 Strategic Focus Area 6: Affordability of Broadband

There are some challenges associated with accessibility and affordability of broadband services especially with respect to the terminal devices such as computers, smart-phones, set-up boxes amongst others. Affordability is one of the key obstacles to broaden access to broadband-enabled services and applications in Malawi. In order to mitigate this, the Strategy identifies the high upfront of handsets/terminals as a substantial barrier to access to broadband in Malawi. Some actions to reduce the price of terminals through regulatory action have already been taken, including tariff free imports (*Customs and Exercise (Tariffs) Order 2017, items 84.17 (handsets) and 84.71 (computers)*).

Further, measures to improve affordability to purchasers might therefore include creating micro-finance/cooperative purchase mechanisms for such terminals (public-private initiative), Incentivizing operators to offer lower-cost handsets, and potentially subsidies, at least for shared access/ public users (e.g. telecentres, educational and other institutions).

The establishment of the Universal Service Fund opens new possibilities to provide shared access to segments of the population who would not otherwise be able to access broadband in Malawi. The mandates for the Universal Service Fund calls for identification of underserved and unserved areas and communities and provide the authority to subsidize services that might otherwise not be economically viable. Shared access venues like telecentres are necessary to permit digital inclusion of these population from time to time.

5.6.1: Improve affordability of terminals/connection devices

Actions:

- a) MACRA** should facilitate the provision of information on low-cost handsets and terminals and options (above) for lowering/spreading the cost of these.
- b) Operators** should be incentivized to import and offer to their customer's low-cost handsets.
- c) SME and cooperatives** should consider offering micro-lending/financing of such purchases to small businesses and entrepreneurs.

5.6.2: Introducing further levels of competition in the market

Actions:

- a) MACRA**, in coordination with the appropriate line ministries should:
 - (i) Enable implementation of the 2016 Act, including particularly with respect to cost models, annual market assessments, reference offers, facilities and network sharing and corresponding regulatory monitoring and enforcement/timely dispute resolution standards (see the corresponding separate initiatives);
 - (ii) Encouraging, in the context of these pro-competitive measures, the rollout of the third mobile operator, as well as other present or potential entrants across sub-markets, including in terms of a speedy and low-barrier licensing process;
 - (iii) Consider creating a market for resale services through MVNO licensing and access obligations on existing facilities-service operators;
 - (iv) Consider the introduction of number portability as a recognised way in which barriers to competition can be reduced by offering customers of existing networks to move to newly licensed operators without the need to change their telephone number;

(v) Allocating scarce resources, particularly to new market entrants to enable facilities-based competition (see corresponding specific initiative).

b) Operators should:

- (i) Enter into commercially appropriate MVNO agreements;
- (ii) Cooperate in the introduction of number portability;
- (iii) Reduce prices in response to increased competition.

c) Others, including potential investors should seek opportunities to enter the BB supply market in Malawi either through MVNO arrangements or deploying new networks.

5.6.3: Introduce targeted subsidies - Voucher schemes for businesses/SME users

Actions:

- a) **Government** should encourage the uptake of ICTs through government initiatives and make money available to support SMEs
- b) **MACRA should;**
- (i) With the use of the USF and in cooperation with SMEs, establish a national voucher scheme for a period of three years which subsidises up to 100% of connection costs (up to an agreed limit) and 50-75% of the annual tariff for the first year. Aim to target 1,000 connections, with a specific focus on aggregators:
- entrepreneurs that purchase a connection and resell to a group of users, for example via an internet café, and
 - a number of customers clustered together e.g. a business park, join forces to aggregate their vouchers which will enable subsidy of a large connection cost

5.6.4: Closely Monitor and where necessary Regulate Retail Prices

Actions:

- a) **MACRA** should;
- (i) in the process of developing appropriate implementing regulations called for under the Communications Act, 2016:
- Develop standardized cost-models and regulations governing their application in cooperation with the overall competition regulator allowing for periodic application to the market to identify inefficiencies and unjustified price levels in submarkets; and
 - Develop and implement regulations for the imposition of price caps and their monitoring and enforcement under the authority of Art 78 of the Act, including with respect to data services specifically.
- b) **The Competition and Fair-Trading Commission** should cooperate with and support MACRA in the above-listed actions.

- c) Operators should** implementation of the above regulatory requirements prepare revised tariffs complying with any price caps and glide path requirements in line with MACRA determinations.

5.6.5: Review impact of taxation levels on broadband services on the industry and user take-up

Actions:

a) Government (MoF and the revenue authorities) should:

- (i) Consider the impact of import duties on communications network equipment for both existing as well as new entrant operators against the expectation of an increase in the availability of broadband services in existing locations and currently unserved areas and a desire to see additional competition and more affordable prices in the market;
- (ii) Conduct studies in cooperation with MACRA to consider the impact of taxation of broadband services on price and take-up levels as among both, consumers and businesses; and
- (iii) Consider the effect of elimination, reduction or restructured taxation of broadband services in terms of both government revenue and projected changes in affordability/take-up of such services. Scenarios should include recapture of operator profits at the corporate income tax level.

b) MACRA should provide data and expert analysis to the Ministry of Finance in this context and in light of its knowledge of the Malawi industry; and

c) Operators should provide revenue and related data and feedback to this inquiry and analysis.

5.7 Strategic Focus Area 7: Promote Demand

Promoting demand for broadband services is vital to increase usage, socio-economic benefits, and sufficient revenue for operators and government to continue investment in infrastructure roll-out. Focusing on supply side and broadband infrastructure deployment alone will not drive broadband to scale up. There are a number of issues which include relatively low levels of digital awareness and skills, limited numbers of IT teachers, in schools/ colleges and limited IT user skills which need to be improved at all levels, but particularly starting with the young, at school and

college. In order to stimulate broadband demand, this Strategy considers some actions to be undertaken by different stakeholders which include government, network operators as well as NGOs. Capacity building and awareness is therefore a strategic issue that will be addressed to accelerate broadband uptake and utilization.

5.7.1: Develop IT skills for teachers, technical professionals and IT Users

Actions:

- a) Government** should Increase the number of IT/digital technology teachers in schools and colleges, and establish a schools' digital connectivity network
- b) Operators** should be required to provide training to teachers (on how to connect to the internet, or how to use it once on)
- c) ICT suppliers should** provide training/guidance on hardware and software
- d) Education bodies and NGOs should;** promote use of relevant applications and training in schools, colleges, telecentres and "Smart Hubs".

5.7.2: Promote Government Usage

Actions:

a) Government should;

- (i) establish a Government/ public service network
- (ii) Improve digital technology awareness and skills of Government/ public service employees
- (iii) Procure sufficient IT devices, software and services for staff to use
- (iv) Establish and e-Government strategy, delivery plan and processes

5.7.3: Encourage businesses and SMEs to work together

Actions

- a) **MACRA should** establish a business networking and collaboration online portal/ website, initially targeting uses of the Smart Hubs, Telecentres and Internet Cafes, but targeting a wide SME audience

6.0 SWOT ANALYSIS

The Strategy includes a SWOT (Strengths, Weaknesses, Opportunities, and Threats) analysis of the current situation in the telecommunications sector in Malawi with direct relevance to Broadband services in the country. The SWOT analysis has been used to identify the key areas where actions are required and include both network and service provision as well as user support and demand stimulation. Further, the SWOT analysis has been used to develop the Initiatives and Actions grouped under the seven Key Areas that make up the National Broadband Strategy for Malawi. The outcomes of the SWOT analysis are presented below.

SWOT ANALYSIS

Strength, Weaknesses, Opportunities and Threats Analysis

STRATEGIC FOCUS AREA	STRENGTHS	WEAKNESSES	OPPORTUNITIES	THREATS
1. Increase access speeds and capacity of existing network infrastructure	<ul style="list-style-type: none"> ICT Policy has been developed along with ICT Masterplan and Wireless Broadband Access Masterplan Licensing regime and functioning NRA are in place Cost modelling study has recently been completed and wholesale prices will move to be more in line with costs Regulatory Review and market assessment is being undertaken, conclusion of which should enable MACRA to put in place pro-competitive asymmetric regulations on dominant entities Radio spectrum plan is in place Incentive pricing of spectrum for access including microwave links e.g. in rural areas 	<ul style="list-style-type: none"> Transition towards implementing the new Communications Act and associated implementing regulations takes time and focus from MACRA High taxation levels Inadequate infrastructure backbone and access <ul style="list-style-type: none"> Poor business opportunity for Fixed Wireless Access operators (FWA) Spectrum release roadmap to further broadband is not yet available 	<ul style="list-style-type: none"> Mandate infrastructure sharing especially towers in rural areas and new ducts Widespread deployment of connectivity specifically aimed at providing Broadband to “shared access” centres /locations 	<ul style="list-style-type: none"> Failure of widespread deployment of technologies e.g. fixed wireless access Obsolescence of technology –network and terminal Difficulty in management of and lack of cooperation between stakeholders
2. Increase access network coverage into underserved (unserved) areas	<ul style="list-style-type: none"> Regulatory Review and market assessment is being undertaken, conclusion of which should enable MACRA to put in place pro-competitive asymmetric regulations on dominant entities Incentive pricing of spectrum for access including microwave links e.g. in rural areas 	<ul style="list-style-type: none"> Low GDP and low penetration Lack of electricity and low dependability of power grid where there is access Lack of local content Shortage of ICT 	<ul style="list-style-type: none"> Increase power availability in rural areas including using renewable energy Develop strategic plan for USF including prioritization of highest increase in access connectivity at least cost 	<ul style="list-style-type: none"> Telecoms is seen as a major source of tax revenue by the Government Difficulty in serving the rural population due to high cost of service access to low-density, poor populations No clear prospect for GDP growth

		<p>skills and training</p> <ul style="list-style-type: none"> • Low literacy rates • Telecentres in rural areas are not cost effective or self-supporting 	<ul style="list-style-type: none"> • Increase power availability in rural areas including using renewable energy • Change license fee structures to make market entry attractive and lower risk • Development of higher education network to give more POPs for telecentres and community access points and ongoing education 	<p>supporting significant investment</p> <ul style="list-style-type: none"> • Impact of wider digital divide
3. National Backbone Network capacity	<ul style="list-style-type: none"> • Entrance of the third backbone operator has introduced competition and is driving prices down 	<ul style="list-style-type: none"> • Lack of BB satellite usage • High cost of capital • Lack of sufficient investment • Quality of Service by network operators • High cost of capital 	<ul style="list-style-type: none"> • Mandate infrastructure sharing especially towers in rural areas and new ducts • Development of partnerships to grow networks (including VSAT providers) • Change license fee structures to make market entry attractive and lower risk 	<ul style="list-style-type: none"> • Difficulty in management of and lack of cooperation between stakeholders • Economic and political change/instabilities
4 International Network capacity	<ul style="list-style-type: none"> • High capacity international connectivity in place 	<ul style="list-style-type: none"> • High cost of bandwidth – international and national-landlocked country despite introduction of third fibre backbone provider • High cost of capital 	<ul style="list-style-type: none"> • Cooperation with international organization e.g. Google, Facebook, Microsoft etc. to develop applications and network infrastructure 	<ul style="list-style-type: none"> • Economic and political change/instabilities • Malawi is competing in a global market for investment • Unstable exchange rates and lack of access to investment finance • Obsolescence of technology –network and terminal

				<ul style="list-style-type: none"> • Malawi is competing in a global market for investment • Operators not investing, in both current and new technologies or not meeting their investment promises
5. Availability of broadband	<ul style="list-style-type: none"> • Licensing regime and functioning NRA are in place 	<ul style="list-style-type: none"> • Lack of competition- only 2 mobile operators • High taxation levels • Lack of sufficient investment • Lack of electricity and low dependability of power grid where there is access • Quality of Service by network operators 	<ul style="list-style-type: none"> • Incentivize use of Broadband services through tax changes • Increase power availability in rural areas including using renewable energy 	<ul style="list-style-type: none"> • Difficulty in serving the rural population due to high cost of service access to low-density, poor populations • No clear prospect for GDP growth supporting significant investment
6. Affordability of broadband	<ul style="list-style-type: none"> • Incentive pricing of spectrum for access including microwave links e.g. in rural areas • There is a desire to develop and learn from others • Cost modelling study has recently been completed and wholesale prices will move to be more in line with costs 	<ul style="list-style-type: none"> • High cost of capital • High taxation levels • Low GDP and low penetration 	<ul style="list-style-type: none"> • Incentivize use of Broadband services through tax changes • Stronger cooperation amongst operators and vendors to provide cheaper devices/terminals 	<ul style="list-style-type: none"> • Economic and political change/instabilities • Unstable exchange rates and lack of access to investment finance • Obsolescence of technology –network and terminal • Ongoing dominance of the 2 mobile operators
7. Promote demand	<ul style="list-style-type: none"> • Cost modelling study has recently been completed and wholesale prices will move to be more in line with costs 	<ul style="list-style-type: none"> • Lack of local content • Shortage of ICT skills and 	<ul style="list-style-type: none"> • Stronger cooperation amongst operators and vendors to provide cheaper 	<ul style="list-style-type: none"> • Impact of wider digital divide

		<p>training</p> <ul style="list-style-type: none">• High taxation levels• Low literacy rates	<p>devices/terminals</p> <ul style="list-style-type: none">• Incentivize use of Broadband services through tax changes	
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7.0 INSTITUTIONAL FRAMEWORK

The implementation of the National Broadband Strategy for Malawi will be key to the ongoing successes in the broadband development in Malawi. Responsibility for the individual strategic focus area has been identified. However the coordination of the initiatives and the stakeholders involved in each initiative will need to be carried out over the five year period of the plan and beyond. It is therefore recommended that a Broadband Coordination Function is set up as part of the Universal Service Department within MACRA. This department will work with all relevant parties to ensure that the various initiatives are undertaken within the identified time periods. It will also identify specific KPIs for each initiative and monitor progress.

Responsibility for the successful ongoing development of broadband services in Malawi rests with a range of organizations including Government, MACRA, existing and new network operators and service providers, international organizations and users. The structure of such a Broadband Coordination Function could be as shown below:

7.1 Roles and Responsibilities

The section below describes the roles and responsibilities of key actors involved in the implementation of the strategy:

7.1.1 Ministry of Information

The Ministry of Information will be responsible for creating a conducive legal and regulatory environment for the broadband deployment, adoption and smooth functioning of the ICT sector of Malawi.

7.1.2 Malawi Communications Regulatory Authority (MACRA)

Under MACRA, Universal Service Department will play a critical role in the implementation of this National Broadband Strategy.

7.1.3 The Academia

The Academia in Malawi will play a key role in the nation's efforts in developing capacity and expertise in promoting digital literacy which is relevant for broadband adoption and usage.

7.1.4 Civil Society

The Civil Society will work with other stakeholders to promote effective engagement, promote transparency and accountability of the public and private sector institutions, and strengthen knowledge and awareness of cyber security related issues across Malawi.

7.1.5 Private Sector

The Private Sector will be responsible for deployment of broadband technologies and all other infrastructure required for the population to access broadband services.

7.1.6 Citizens

The citizens will be expected to take appropriate steps in order to ensure that they embrace the opportunities brought by the advances in technology which includes broadband services.

8.0 SCHEDULE 1

8.1 NATIONAL BROADBAND STRATEGY IMPLEMENTATION COST (BUDGET)

Implementation Costs

Building on the SWOT analysis and the demand forecast, user and technology mapping and so forth described above, a series of Initiatives has been developed which set out the proposed strategies comprising the National Broadband Plan for Malawi. These are grouped under seven high level descriptors and deal with the supply of services by network operators and service providers, as well as the demand for services and the activities of users at small-institutional, SME and individual level. The total cost for implementing the Broadband Strategy arises from the implementation of the 25 initiative whose total cost is MWK558 billion spread over a period of five yea

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1 INCREASE ACCESS SPEEDS AND CAPACITY OF EXISTING NETWORK INFRASTRUCTURE

	Initiative	Responsible Party	Activity	Programs, projects and /or actions to be undertaken	Cost to be incurred MWK(000,000)	Implementation KPI
1.1	<p>Roll out 3G and 4G to all existing towers (based on plans of network operators)</p> <p>Duration 1-5 years (3G) Duration 1-5 years (4G)</p>	MACRA	<ul style="list-style-type: none"> Review and revise license conditions as necessary. 	<ul style="list-style-type: none"> Internal consultations – review of the licence conditions Meetings/negotiations with Telcos on licence review Submit the reviewed licences to DOX Submit the reviewed licences to the Board for approval Gazetting Implementation 	30	<ul style="list-style-type: none"> Operator plans developed and shared Number of base station sites upgraded BB speed increases experienced by customers
<ul style="list-style-type: none"> Ensure appropriate and relevant spectrum is available. 			<ul style="list-style-type: none"> Re-farming the spectrum Stakeholders’ consultation meetings Submit to DOX Submit to Board 	10		
<ul style="list-style-type: none"> Offer incentive spectrum pricing for rural areas 			<ul style="list-style-type: none"> Review current spectrum pricing Stakeholders’ consultations meetings Submit to DOX Submit to Board 	40		
<ul style="list-style-type: none"> Consider use of USF for hard to reach areas. 			<ul style="list-style-type: none"> Conduct Gap analysis study Identify potential operators to roll out services in the underserved areas Advertise Evaluate Contract negotiation Award Contract/License Offer the US fund to the winning bidder Implement M&E 	500,000		
<ul style="list-style-type: none"> Ensure operators’ plans are submitted. 			<ul style="list-style-type: none"> Write operators to submit information Follow up to ensure submission is done 	5		
<ul style="list-style-type: none"> Monitor performance of operators. 			<ul style="list-style-type: none"> Carry out technical audits (GSM audit) 	10		
Operators			<ul style="list-style-type: none"> Ensure appropriate plan is in place. 	<ul style="list-style-type: none"> Ensure licence conditions include submission of appropriate plans Enforce licence conditions 	10	

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1.2	Migrate FWA from WiMAX to LTE Duration 1-3 years	MACRA	<ul style="list-style-type: none"> • MACRA to encourage the migration. • Review and revise license conditions as necessary - 	Engage the operators Issue roll out targets for LTE	20,000	<ul style="list-style-type: none"> • Number of operators migrating to new technologies • BB speed increases experienced by customers
			<ul style="list-style-type: none"> • Ensure appropriate and relevant spectrum is available. 	As above	10	
			<ul style="list-style-type: none"> • Offer incentive spectrum pricing 	As above	40	
			<ul style="list-style-type: none"> • Consider use of USF for hard to reach areas 	As above	30,000	
			<ul style="list-style-type: none"> • Ensure plans are submitted. 	As above	5	
			<ul style="list-style-type: none"> • Monitor performance of operators. 	As above	30	
		Operators	<ul style="list-style-type: none"> • FWA operators may need to upgrade technology 	Engage operators	900	
			<ul style="list-style-type: none"> • Market driven actions 	Encourage competition – license more operators	20	
1.3	Release more spectrum Duration 1-3 years	MACRA	<ul style="list-style-type: none"> • Ensure sufficient relevant spectrum is available. • Publish plan to show when new spectrum will be available. 	<ul style="list-style-type: none"> • Re-farm the spectrum as above As above 	20	<ul style="list-style-type: none"> • Spectrum review completed • Revised licenses issued • New spectrum pricing implemented
			<ul style="list-style-type: none"> • Develop incentive based pricing strategy especially for rural areas. 	<ul style="list-style-type: none"> • Review licensing framework to target rural areas pricing • Engage operators • Submit to DOX • Submit to Board • Gazette 	20	

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				<ul style="list-style-type: none"> • Implement • M&E 		
			<ul style="list-style-type: none"> • Ensure roll out obligations are included in licenses, especially “use it or lose it requirements”. 	M&E exercise	20	
			<ul style="list-style-type: none"> • Monitor spectrum use to ensure hoarding does not take place, especially with incentive priced spectrum. 	M&E	10	
		Operators	<ul style="list-style-type: none"> • Prepare realistic spectrum plans. • Follow license obligations 	Enforcement	10	
1.4	Promote use of renewable energy sources	Government/MoI	<ul style="list-style-type: none"> • Develop policies to promote rollout and use of renewable energy sources. 	<ul style="list-style-type: none"> • Review ICT policy to include renewable energy aspects • Stakeholders’ consultations • Final Policy 	40	<ul style="list-style-type: none"> • Number of existing sites upgraded to renewable energy sources • Number of new sites deployed using renewable energy sources
			<ul style="list-style-type: none"> • Consider subsidies and incentives, including reduced import duties, for such equipment. 	<ul style="list-style-type: none"> • Engage Parliamentary committee on communications • Lobby government 	30	
		MACRA	<ul style="list-style-type: none"> • Conduct cost benefit analysis of using renewable power sources 	<ul style="list-style-type: none"> • Conduct the analysis to establish the cost of investment for several scenarios • Engage operators • Publish report and recommendations 	40	

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			<ul style="list-style-type: none"> Consider use of USF to promote use of renewable energy sources 	<ul style="list-style-type: none"> Include as a condition in the bidding document to ensure winning bidder adopts renewable energy 	200	
		Operators	<ul style="list-style-type: none"> Deploy renewable energy sources for RAN where possible. 	Implement	300	
		Energy Utility companies	<ul style="list-style-type: none"> Energy companies to invest in infrastructure and rollout and develop range of pricing models based on Govt policy 	<ul style="list-style-type: none"> Govt to lobby with energy utility companies Govt introduce incentives to invest in infrastructure and rollout and develop range of pricing models based on Govt policy 	200	
1.5	Increase Network Reliability, Redundancy and Diversity	Government/Mol	<ul style="list-style-type: none"> Identify appropriate policies to support MACRA in this initiative 	<ul style="list-style-type: none"> Develop applicable policies Consult key stakeholders Adopt Policies 	30	<ul style="list-style-type: none"> NRRD plans developed and submitted to MACRA
		MACRA	<ul style="list-style-type: none"> Develop ICT network Redundancy, Reliability and Diversity (NRRD) Framework 	<ul style="list-style-type: none"> Develop the Framework Consult stakeholders Submission to DOX/Board for approval Implement Enforce 		
			<ul style="list-style-type: none"> Conduct cost-benefit analysis input to government policy initiatives 	<ul style="list-style-type: none"> Conduct the analysis Engage stakeholders Implement 		
			<ul style="list-style-type: none"> Consider use of USF to support initiatives 	<ul style="list-style-type: none"> To include in the USF Operational Manual – to encourage network redundancy 		
		Operators	<ul style="list-style-type: none"> Develop individual NRRD plans 	<ul style="list-style-type: none"> Include in the license condition for operators 		
			<ul style="list-style-type: none"> Provide appropriate performance metrics to 	<ul style="list-style-type: none"> MACRA to develop metrics for operators Include the metrics in the license 		

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			MACRA	condition for operators	
			<ul style="list-style-type: none"> Review NRRD on an ongoing basis and update as required 	<ul style="list-style-type: none"> MACRA to amend licenses to include NRRD review on an ongoing basis Include the requirement in the license condition for operators 	10
TOTAL COST FOR STRATEGIC PRIORITY AREA 1					552,040
AVERAGE ANNUAL COST FOR STRATEGIC PRIORITY AREA 1					110,408

2 INCREASE ACCESS NETWORK COVERAGE INTO UNSERVED AREAS

	Initiative	Responsible Party	Activity	Programs, projects and /or actions to be undertaken	Cost to be incurred (MWK 000 000)	KPI
2.1	Deploy new infrastructure – Mobile, FWA and use of broadband satellite Duration 1-5 years	MACRA	<ul style="list-style-type: none"> Ensure sufficient relevant spectrum is available 	As above	100	<ul style="list-style-type: none"> Operator plans developed and shared Number of new base station sites deployed Amount of additional coverage provided (number of additional customer subscriptions)
			<ul style="list-style-type: none"> Revise coverage obligations in licenses. 	<ul style="list-style-type: none"> Review operators licenses Engage operators Include the obligations in the reviewed licenses 	15	
			<ul style="list-style-type: none"> Offer targeted prices for spectrum. 	As above – Review pricing structure	30	
			<ul style="list-style-type: none"> facilitate use of appropriate technologies such as satellite through licensing processes 	<ul style="list-style-type: none"> Carryout cost benefit analysis of satellite versus other technologies Engage the operators Implement 	30	
			<ul style="list-style-type: none"> consider use of USF to support deployment 	As above	200	
			<ul style="list-style-type: none"> Monitor progress of network deployment 	As above	25	
		Operators	<ul style="list-style-type: none"> Meet new license coverage obligations. 	<ul style="list-style-type: none"> MACRA to include new license coverage obligations in the licenses Engage operators Enforce 	5	
			<ul style="list-style-type: none"> Invest in new network infrastructure 	<ul style="list-style-type: none"> MACRA to include coverage obligations in the license Engage Enforce 	5	
		Others	<ul style="list-style-type: none"> Bring new technologies into the market e.g. satellite 	Engage and encourage such stakeholders during international forums	30	
		2.2	Release more spectrum for wider coverage Duration 1-3 years	MACRA	<ul style="list-style-type: none"> Ensure sufficient relevant spectrum is available. 	
<ul style="list-style-type: none"> Develop incentive based pricing strategy especially for rural areas. 	<ul style="list-style-type: none"> Review spectrum pricing structure Engage Implement 				15	

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			Release sub-1GHz spectrum for wider coverage	<ul style="list-style-type: none"> Finalize channelization of sub 1GH spectrum Publish plan to show when new spectrum will be available Implement 	30	
			<ul style="list-style-type: none"> Ensure roll out obligations are included in licenses, especially “use it or lose it requirements”. 	As above	5	
			<ul style="list-style-type: none"> Monitor spectrum use to ensure hoarding does not take place, especially with incentive priced spectrum. 	As above	20	
		Operators	<ul style="list-style-type: none"> Prepare realistic spectrum plans 	As above	20	
			<ul style="list-style-type: none"> Follow license obligations 	As above	20	
2.3	Incentivizes the use of suitable spectrum for backhaul connectivity Duration 1-3 years	MACRA	<ul style="list-style-type: none"> Ensure sufficient relevant spectrum licensed at an appropriately low price (even at an admin cost level) for new links. 	<ul style="list-style-type: none"> <i>As above Review pricing structure</i> 	10	
			<ul style="list-style-type: none"> Maintain existing pricing for existing links, even when upgraded 	<ul style="list-style-type: none"> <i>- offer as an incentive</i> 	5	
		Operators	<ul style="list-style-type: none"> Deploy new high speed links to new sites 	<ul style="list-style-type: none"> <i>MACRA to encourage operators to deploy high speed links.</i> 	150	
2.4	Promote infrastructure and network sharing through regulatory	Govt/Mol.	<ul style="list-style-type: none"> Ensure legislation in place to enable new towers to be built easily 	<ul style="list-style-type: none"> Lobby Govt for new legislation to be developed Engage relevant stakeholders 	30	<ul style="list-style-type: none"> National roaming requirement implemented Number of agreements to share infrastructures/ network (sites)

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Incentives Duration 1-5 years	<ul style="list-style-type: none"> • MACRA 	<ul style="list-style-type: none"> • Apply obligations to SMP operators • Define guidelines for Infrastructure Sharing • Consider use USF to build new towers that are then shared • Encourage networks sharing or mandate national roaming on new tower infrastructure built in rural areas 	<ul style="list-style-type: none"> • Implement • Include in license for operators • Develop the Guidelines • Engage the stakeholders • Implement the US Fund Rules on IS • Implement license conditions on national Roaming 	35	<ul style="list-style-type: none"> • USF-supported shared tower sites deployed • Policy review of planning/siting requirements completed including recommendations
	Operators	<ul style="list-style-type: none"> • Enter into infrastructure sharing agreements with each other 	<ul style="list-style-type: none"> • Submit to the Authority IS Agreements 	15	
		<ul style="list-style-type: none"> • Undertake national roaming agreements with other network parties 	<ul style="list-style-type: none"> • Submit to the Authority the National roaming Agreements 	5	
TOTAL COST FOR STRATEGIC PRIORITY AREA 2					817
AVERAGE ANNUAL COST FOR STRATEGIC PRIORITY AREA 2					164

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3 NATIONAL BACKBONE NETWORK CAPACITY

	Initiative	Responsible Party	Activity	Programs, projects and /or actions to be undertaken	Cost to be incurred	KPI
3.1	Policy to ensure new or reconstructed civil works include telecoms duct available to operators Duration 1-5 years	Govt/MoI	<ul style="list-style-type: none"> Inter departmental as well as local /regional/national cooperation needed to develop and implement policy. 	<ul style="list-style-type: none"> MACRA to lobby Govt to develop applicable policy Stakeholders consultation Adopt Policy Implement 	10	<ul style="list-style-type: none"> Development of a national policy and plan to integrate ducting into the road construction/reconstruction undertakings, construction standards and so Forth. Development of a cross-sectorial leasing and access policy for ducting across transport and electric (and other) Rights-of-way owner/operators. Location/length of conduit actually deployed in the rights of way Conduits successfully leased to operators in which active fibre is deployed and utilized
		MACRA	<ul style="list-style-type: none"> Managing agency to be set up either within MACRA or independently. 	<ul style="list-style-type: none"> Policy to include Councils as managing agency Maintaining records and allocating capacity to be done by operators 	20	
		Operators	<ul style="list-style-type: none"> Willingness to make use of shared infrastructure 	Encourage operators to make use of the ducts through IS	10	
		Others	<ul style="list-style-type: none"> Collaboration with other bodies required with MACRA 	<ul style="list-style-type: none"> Develop Agreements with relevant stakeholders Engage Implement 	10	
3.2	Require Reference Wholesale Offers from Network Service Licensees Duration 1-3 years	MACRA	<ul style="list-style-type: none"> Use SMP Determinations to set obligations on dominant suppliers. 	<ul style="list-style-type: none"> Develop Competition Rules and Guidelines for determining dominant market player Assessing markets Enforce 	20	<ul style="list-style-type: none"> Dominant carrier regulatory framework promulgated/effective Annual market analyses and dominance determinations carried out Reference offers approved Take-up of reference offer terms by other operators
		MACRA	<ul style="list-style-type: none"> Identify other regulatory remedies to mandate RIOs 	<ul style="list-style-type: none"> Benchmark on best practices Enforce 	15	
				<ul style="list-style-type: none"> Approve Reference Offers. 		
				<ul style="list-style-type: none"> Encourage non SMP operators to publish RIOs to ensure consistency across the sector. 	5	
				<ul style="list-style-type: none"> Resolve disputes in a timely manner if they arise. 	5	
				<ul style="list-style-type: none"> Prepare Reference Offers 	5	
				<ul style="list-style-type: none"> Determine prices for regulated services 	5	
<ul style="list-style-type: none"> Enter into interconnect agreements 	5					

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3.3	Undertake periodic review of wholesale tariffs based on cost models to ensure prices are cost-based Duration 1-2 years	MACRA	<ul style="list-style-type: none"> Undertake tariff and determine regulated tariffs. 	<ul style="list-style-type: none"> MACRA to do market analysis 	15	<ul style="list-style-type: none"> Completion of regulations for cost modelling and market analyses, application of price caps Annual market analyses and dominance determinations carried out; Periodic updating of cost models and review of findings Application of price caps/glide paths to wholesale products Declines in tariffed prices for wholesale products
				<ul style="list-style-type: none"> Implement in a timely manner Enforce 	15	
		Operators	Cooperate fully to provide data for costing activities	MACRA to enforce license conditions and Regulations	15	
TOTAL COST FOR STRATEGIC PRIORITY AREA 3						155
AVERAGE ANNUAL COST FOR STRATEGIC PRIORITY AREA 3						31

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4 INTERNATIONAL NETWORK CAPACITY						
	Initiative	Responsible Party	Activity	Programs, projects and /or actions to be undertaken	Cost to be incurred (MWK 000,000)	KPI
4.1	Ensure sufficient network availability for needs Duration 1-5 years	MACRA	<ul style="list-style-type: none"> Monitor traffic and network performance 	<ul style="list-style-type: none"> Monitor traffic and network performance Enforce license conditions and Regulations 	50	<ul style="list-style-type: none"> Amount of additional international bandwidth installed/equipped Amount of additional international bandwidth used
			<ul style="list-style-type: none"> Consider licensing additional suppliers if appropriate 	<ul style="list-style-type: none"> License additional international bandwidth operators 	30	
		Operators	<ul style="list-style-type: none"> Analyse and review network requirements and obtain more capacity when necessary 	<ul style="list-style-type: none"> Meetings with telcos 	50	
4.2	Promote local content and hosting to minimize costs Duration 1-5 years	Govt/MoI	<ul style="list-style-type: none"> Implementation of ICT policies through coordination between bodies. 	<ul style="list-style-type: none"> Lobby Govt to develop policies to encourage local content development and hosting Stakeholders engagement Adopt policies Implement 	30	<ul style="list-style-type: none"> Number of local applications developed Number and capacity of local hosting sites
			<ul style="list-style-type: none"> Implement initiatives across education, health and agriculture sectors and develop information sites 	<ul style="list-style-type: none"> Lobby Govt to engage education and health and agriculture sectors to develop local content 	150	
		• MACRA	<ul style="list-style-type: none"> Cooperation with Ministries to ensure implementation of ICT policy. 	Meetings with relevant Ministries	30	
			<ul style="list-style-type: none"> Monitor cost effectiveness of local applications 	<ul style="list-style-type: none"> Do a cost benefit analysis Publish results Implement 	35	
		Others	<ul style="list-style-type: none"> Local bodies (trades, health organisations, banks) to develop local content and e-commerce sites. 	<ul style="list-style-type: none"> MACRA to collaborate with relevant stakeholders 	100	
			<ul style="list-style-type: none"> Education of users to promote use of local content. 	<ul style="list-style-type: none"> Hold awareness meetings and sensitization meetings 	90	
TOTAL COST FOR STRATEGIC PRIORITY AREA 4					565	
AVERAGE ANNUAL COST FOR STRATEGIC PRIORITY AREA 4					113	

5 AVAILABILITY OF BROADBAND						
	Initiative	Responsible Party	Activity	Programs, projects and /or actions to be undertaken	Cost to be incurred	KPIs
5.1	Development of government and education networks Duration 1-5 years	Government	<ul style="list-style-type: none"> Promote initiatives through Digital Malawi program. Conclude financial and commercial arrangements with overseas providers to facilitate new network provision. 	<ul style="list-style-type: none"> MACRA to lobby Govt to implement Digital Malawi Projects Encourage investors to provide new network 	100	Number of connected sites per year Speed of connections Rate of growth in user numbers
		MACRA	<ul style="list-style-type: none"> Issue necessary licenses. Make other required resources available including spectrum 	<ul style="list-style-type: none"> Evaluation Negotiate Issue licenses Gazette As above	20	
		Operators	<ul style="list-style-type: none"> Cooperate as appropriate to ensure timely deployment of networks. 	MACRA to conduct roll out audit	20	
		Others	<ul style="list-style-type: none"> Market entrants such as ESCOM should work with established network operators. 	<ul style="list-style-type: none"> MACRA to facilitate new entrants to work with established network operators 	20	
5.2	Promote and fund Telecentres in rural areas Duration 1-5 years	Government	<ul style="list-style-type: none"> Promote use of telecentres across sectors in rural areas including education and health. 	<ul style="list-style-type: none"> MACRA to lobby Govt to provide the list of targeted sites 	400	<ul style="list-style-type: none"> USF fully established, board in place and institutional staffing accomplished Universal Service policy appropriately prioritizing support to telecentres/shared access Sufficient funds are raised through an appropriate level of industry contributions and allocated to telecentre support Number of telecentres supported and monitored to ensure uninterrupted connectivity is provided, user demand in the location is given/developed.
		MACRA	<ul style="list-style-type: none"> Fund Telecentres through USF – include in USF planning and 	<ul style="list-style-type: none"> Implement US Fund Action Plan Awareness on telecentre use Identify training needs 	200	

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			<ul style="list-style-type: none"> budgeting. Monitor activities at telecentres to encourage increasing activities. Provide training to telecentre staff. 	<ul style="list-style-type: none"> Identify training institute Conduct training 		
		Operators	<ul style="list-style-type: none"> Provide subsidised connectivity to rural telecentres as part of a USO. 	<ul style="list-style-type: none"> Encourage operators to provide subsidized connectivity to rural telecentres 	100	
		Others	<ul style="list-style-type: none"> Develop applications and provide training on use of IT and telecentres. 	<ul style="list-style-type: none"> Hold meetings with relevant stakeholders to develop applications and provide training on use of IT and telecentres 	400	
5.3	<p>Support development of “Smart Hubs”</p> <p>Duration 1-3 years</p>	MACRA	<ul style="list-style-type: none"> Encourage creation of “Smart Hubs” in urban areas. 	<ul style="list-style-type: none"> Lobby Govt to create conducive environment for Smart hubs Meetings with relevant stakeholders to create smart hubs Implement Digital Malawi Project Identify suitable places to become “Smart Hubs”. Provide funding for equipment and training from USF. Consider usage of voucher scheme. Monitor usage 		<ul style="list-style-type: none"> Number of centres of each type established per year Rate of growth in user numbers
		Operators	<ul style="list-style-type: none"> Rollout infrastructure Support training of staff Subsidise access initially 	<ul style="list-style-type: none"> MACRA to encourage operators to support the initiative 	200	
		Others	<ul style="list-style-type: none"> Develop applications relevant to “Smart Hubs” Encourage the use of “Smart Hubs” by SMEs 	<ul style="list-style-type: none"> Implement Innovation Awards Conduct awareness on Smart Hubs 	300	
TOTAL COST FOR STRATEGIC PRIORITY AREA 5						1760
AVERAGE ANNUAL COST FOR STRATEGIC PRIORITY AREA 5						352

6 AFFORDABILITY OF BROADBAND						
	Initiative	Responsible Party	Activity	Programs, projects and /or actions to be undertaken	Cost to be incurred	KPIs
6.1	Improve Affordability of terminals/connection devices Duration 1-3 years	Government	<ul style="list-style-type: none"> Introduce lower (or remove) tariffs on imported devices. Consider promotion of subsidised computers through schools. Consider promotion of subsidised computers to SMEs positive 	<ul style="list-style-type: none"> Lobby Ministry of Information to liaise with Ministry of finance to remove or lower import tariffs Lobby Ministry of Information to liaise with Ministry of finance to remove or lower import tariffs Lobby Ministry of Information to liaise with Ministry of finance to remove or lower import tariffs 	50	<ul style="list-style-type: none"> Broadened tax exemptions/investment rules lower the price of ownership of smartphone and analogous devices Micro-finance including or focusing on acquisitions of smartphone and devices are operating in Malawi Telecentres are provided with USF-supported terminals for shared access Smartphone/terminal ownership increases, particularly in lower-income populations
		MACRA	Facilitate the provision of information on making cost effective choices for consumers on website or other material	<ul style="list-style-type: none"> Encourage operators to publish tariffs on website and print media but also distributing leaflets on tariffs Awareness meetings/campaign with consumers 	30	
		Operators	Continue to offer a range of handsets at different price ranges, including low cost smartphones	<ul style="list-style-type: none"> MACRA to encourage operators to enter into agreements with manufacturers so that they can offer handsets at affordable prices 	150	
		Others	SME groups consider pooling access to computers, potentially through "Smart Hubs"	MACRA to encourage and support SMEs to pool resources through smart hubs	100	
6.2	Introduce further levels of competition in the market Duration 1-5 years	Government	Facilitate deployment of new networks through the Digital Malawi project, government networks, education networks and energy networks.	<ul style="list-style-type: none"> MACRA to lobby Govt to create conducive environment for investors to invest in new networks 	50	<ul style="list-style-type: none"> Public sector spending on ICT initiatives, including infrastructure and services like training, awareness etc. having a positive effect on domestic demand for broadband service

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						<ul style="list-style-type: none"> • Implementation and enforcement of competition-relevant regulatory standards and imposition of effective remedies • Streamlining of licensing process and resale-based licensing options • Implementation of number portability • Entry and operational status of new/previously inactive operators • Take-up of reference offer terms by other operators
		MACRA	<ul style="list-style-type: none"> • Effective application of existing and new regulations to encourage 3rd operator to roll out services (regulated prices, infrastructure sharing, open access) • Consider MVNO access obligations on existing operators (though the MVNO market is currently more likely to focus on voice rather than BB). • Review the need for the introduction of number portability. 	<ul style="list-style-type: none"> • Review CLF • Review spectrum pricing • Incentivise new entrants in the market • Operationalize Regulations on Infrastructure Sharing • Encourage existing operators to apply for MVNO licence • Operationalize Numbering Regulations 	55	
		Operators	<ul style="list-style-type: none"> • Enter into commercially appropriate MVNO agreements. • Reduce prices in response to competition. 	MACRA to encourage operators to enter into commercial MVNO agreements and to offer competitive pricing	20	
		Others	Seek opportunities to enter the BB supply market either through MVNO arrangements or deploying new networks	MACRA to encourage vendors to partner with potential investors	20	
6.3	Introduce targeted subsidies - Voucher schemes for businesses/SME users	Government	<ul style="list-style-type: none"> • Encourage uptake of ICTs through government initiatives. • Make money available from national government to support businesses/SMEs • Identify suitable body to draw up rules and administer scheme 	<ul style="list-style-type: none"> • Lobby Govt to create an environment that will increase ICT uptake • Lobby Govt/MoI to set aside some budget allocation to support businesses/SMES 	50	<ul style="list-style-type: none"> • Public launch of voucher • Number of vouchers issued

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	Duration 1-3 years			<ul style="list-style-type: none"> MoI to hold meetings with relevant stakeholders 		
		MACRA	<ul style="list-style-type: none"> Publicise and administer Voucher Scheme (if required by government) Assess impact of scheme after 1, 2 and 3 years. 	<ul style="list-style-type: none"> Carry out awareness campaign on voucher scheme and implement the voucher scheme Carry out a baseline study of the voucher scheme Conduct Periodic monitoring of the voucher scheme Carry out an evaluation study 	30	
		Operators	Accept vouchers as payment for services	MACRA to encourage operators to accept voucher payments	20	
		Others	Publicise availability of Vouchers Scheme through SME groups	<ul style="list-style-type: none"> Make awareness to SME groups on the availability of voucher schemes 	20	
6.4	Closely Monitor and where necessary Regulate Retail Prices	MACRA	<ul style="list-style-type: none"> Ensure that all actions taken are in line with the powers granted under the Act. Ensure market definitions are appropriate for market analysis. 	<ul style="list-style-type: none"> Enforce the Act and Tariff Regulations Conduct market assessment 	20	<ul style="list-style-type: none"> Completion of regulations for cost modelling and market analyses, application of price caps Annual market analyses and dominance determinations carried out; Periodic updating of cost models and review of findings Application of price caps/glide paths to retail products Declines in tariffed prices for retail products
		Operators	Follow Tariff Regulations adopted	MACRA to enforce Tariff Regulations	20	
	Review impact of	Government	<ul style="list-style-type: none"> Cooperation with MACRA to 	Lobby Govt for	30	<ul style="list-style-type: none"> Broadband taxation study

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7 PROMOTE DEMAND						
	Initiative	Responsible Party	Activity	Programs, projects and /or actions to be undertaken	Costs to be incurred (MWK 000,000)	KPIs
7.1	Develop IT skills for teachers, technical professionals and IT users Duration 1-5 years	Government	<ul style="list-style-type: none"> Effective Implementation of ICT policies. Implement ICT education into the education curriculum. Support training in ICT as part of life-long learning opportunities. Implement computer and internet access penetration into schools and telecentres (following ICT policies) 	<ul style="list-style-type: none"> MoI to put up procedures of to support ICT education in the curriculum NACIT to develop a curriculum for all relevant sectors 	70	<ul style="list-style-type: none"> Number of teachers trained per year Number of IT professionals trained per year
		MACRA	<ul style="list-style-type: none"> Inter-governmental cooperation to implement ICT policies Facilitate deployment of education networks. 	<ul style="list-style-type: none"> MACRA to implement policies related with digital literacy Consider issuing licence fee exempt to education networks Issue applicable licences Make scares resources available as required. 	200	
		Operators	Cooperate with MACRA and education networks to provide capacity	MACRA to enforce	25	
		Others	<ul style="list-style-type: none"> Education bodies and NGOs assist with the use of relevant applications and training in schools, colleges, telecentres and “Smart Hubs” to provide training, including training of trainers. Consider opportunities for alternative service providers e.g. satellite BB 	MACRA to facilitate the development of application for training by other stakeholders – meeting such stakeholders	150	
7.2	Promote government usage Duration 1-5 years	Government	<ul style="list-style-type: none"> Promote use of broadband in Government offices, and train staff on using computers and the internet 	<ul style="list-style-type: none"> E-Govt to facilitate deployment of networks in Govt offices and train Govt employees annually 	200	<ul style="list-style-type: none"> Number of sites connected per year Number of new network users added per year
		MACRA	<ul style="list-style-type: none"> Facilitate deployment of government networks. 	<ul style="list-style-type: none"> Issue licenses as required. Make scares resources available 	200	

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		Operators	Provide network infrastructure to Government buildings	as required. Collaborate with Govt to provide infrastructure	500	
		Others	Consider opportunities for alternative service providers	Supply equipment or consultancy services	300	
7.3	Encourage businesses and SMEs to work together Duration 1-3 years	Operators	<ul style="list-style-type: none"> Provide connectivity to "Smart Hubs". 	MACRA to facilitate provision of connectivity to Smart Hubs	150	<ul style="list-style-type: none"> Number of connected SMEs Increase in value of business resulting from on-line activities
		Others	<ul style="list-style-type: none"> Businesses and SMEs develop "internet user groups" to lobby and review network rollout progress Support and use "Smart Hubs" 	To manage/ establish Smart Hubs	400	
	7.4 Improve Affordability of terminals/connection devices		<ul style="list-style-type: none"> Introduce lower (or remove) duty on smart terminal devices. 	<ul style="list-style-type: none"> Lobby Ministry of Information to liaise with Ministry of finance to remove or lower import duty on terminal devices 	70	
TOTAL COST FOR STRATEGIC PRIORITY AREA 7						2265
AVERAGE ANNUAL COST FOR STRATEGIC PRIORITY AREA 7						453

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Implementation Road Map

Many of the initiatives will be ongoing over the five year period of the National Broadband Strategy. The timing of some of them though is important in the short term in order to provide the necessary network infrastructure as well as skills which will be imperative in promoting the demand for Broadband services in the years ahead. The road map for the initiatives is shown in the chart below:

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ID	Task Name	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
1	1 Increase access speeds and capacity of existing network infrastructure	[Bar spanning all years]					
2	1.1 Roll out 3G and 4G to all existing towers	[Bar spanning all years]					
3	3G roll out	[Bar spanning all years]					
4	4G roll out	[Bar spanning all years]					
5	1.2 Migrate FWA from WMAX to LTE	[Bar spanning all years]					
6	1.3 Release more spectrum	[Bar spanning all years]					
7	1.4 Promote use of renewable energy sources	[Bar spanning all years]					
8	1.5 Network Reliability, Redundancy and Diversity (NRRD)	[Bar spanning all years]					
9	2 Increase access network coverage into underserved (unserved) areas	[Bar spanning all years]					
10	2.1 Deploy new infrastructure – Mobile, FWA and use of broadband satellite	[Bar spanning all years]					
11	2.2 Release sub-1GHz spectrum for wider coverage	[Bar spanning all years]					
12	2.3 Incentivise the use of suitable spectrum for backhaul connections	[Bar spanning all years]					
13	2.4 Promote infrastructure and/or network sharing through regulatory incentives	[Bar spanning all years]					
14	3 National backbone network capacity	[Bar spanning all years]					
15	3.1 Policy to ensure new or reconstructed civil works include telecoms duct available to operators	[Bar spanning all years]					
16	3.2 Require Reference Wholesale Offers from Network Service Licensees	[Bar spanning all years]					
17	3.3 Undertake periodic reviews of wholesale tariffs based on cost models to ensure prices are cost-based	[Bar spanning all years]					
18	4 International network capacity	[Bar spanning all years]					
19	4.1 Ensure sufficient network availability for needs	[Bar spanning all years]					
20	4.2 Promote local content and hosting to minimise costs	[Bar spanning all years]					
21	5 Availability of broadband	[Bar spanning all years]					
22	5.1 Development of government and education networks	[Bar spanning all years]					
23	5.2 Promote and fund Telecentres in rural areas	[Bar spanning all years]					
24	5.3 Support development of "Smart Hubs"	[Bar spanning all years]					
25	6 Affordability of Broadband	[Bar spanning all years]					
26	6.1 Improve affordability of terminals/connection devices	[Bar spanning all years]					
27	6.2 Introduce further levels of competition in the market	[Bar spanning all years]					
28	6.3 Introduce targeted subsidies - Voucher schemes for businesses/SME users	[Bar spanning all years]					
29	6.4 Closely monitor and where necessary regulate retail prices	[Bar spanning all years]					
30	6.5 Review impact of taxation levels on broadband services on the industry and user take-up	[Bar spanning all years]					
31	7 Promote demand	[Bar spanning all years]					
32	7.1 Develop IT skills for teachers, technical professionals and IT	[Bar spanning all years]					
33	7.2 Promote government usage	[Bar spanning all years]					
34	7.3 Encourage businesses and SMEs to work together	[Bar spanning all years]					

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Each of the initiatives has been assessed against three further criteria. These represent impact, ease of implementation and broad costs. The assessments are shown graphically in the following Gant charts. The following key is used:

Colour	Impact	Ease of Implementation	Broad Cost
Green	High	Easy	Low
Orange	Medium	Medium	Medium
Red	Low	Difficult	High

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8.1.1 Impact

ID	Task Name	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
1	1 Increase access speeds and capacity of existing network infrastructure	[Progress bar]					
2	1.1 Roll out 3G and 4G to all existing towers	[Progress bar]					
3	3G roll out	[Progress bar]					
4	4G roll out	[Progress bar]					
5	1.2 Migrate FWA from WiMAX to LTE	[Progress bar]					
6	1.3 Release more spectrum	[Progress bar]					
7	1.4 Promote use of renewable energy sources	[Progress bar]					
8	1.5 Network Reliability, Redundancy and Diversity (NRRD)	[Progress bar]					
9	2 Increase access network coverage into underserved (unserved) areas	[Progress bar]					
10	2.1 Deploy new infrastructure – Mobile, FWA and use of broadband satellite	[Progress bar]					
11	2.2 Release sub-1GHz spectrum for wider coverage	[Progress bar]					
12	2.3 Incentivise the use of suitable spectrum for backhaul connections	[Progress bar]					
13	2.4 Promote infrastructure and/or network sharing through regulatory incentives	[Progress bar]					
14	3 National backbone network capacity	[Progress bar]					
15	3.1 Policy to ensure new or reconstructed civil works include telecoms duct available to operators	[Progress bar]					
16	3.2 Require Reference Wholesale Offers from Network Service Licensees	[Progress bar]					
17	3.3 Undertake periodic reviews of wholesale tariffs based on cost models to ensure prices are cost-based	[Progress bar]					
18	4 International network capacity	[Progress bar]					
19	4.1 Ensure sufficient network availability for needs	[Progress bar]					
20	4.2 Promote local content and hosting to minimise costs	[Progress bar]					
21	5 Availability of broadband	[Progress bar]					
22	5.1 Development of government and education networks	[Progress bar]					
23	5.2 Promote and fund Telecentres in rural areas	[Progress bar]					
24	5.3 Support development of "Smart Hubs"	[Progress bar]					
25	6 Affordability of Broadband	[Progress bar]					
26	6.1 Improve affordability of terminals/connection devices	[Progress bar]					
27	6.2 Introduce further levels of competition in the market	[Progress bar]					
28	6.3 Introduce targeted subsidies - Voucher schemes for businesses/SME users	[Progress bar]					
29	6.4 Closely monitor and where necessary regulate retail prices	[Progress bar]					
30	6.5 Review impact of taxation levels on broadband services on the industry and user take-up	[Progress bar]					
31	7 Promote demand	[Progress bar]					
32	7.1 Develop IT skills for teachers, technical professionals and IT	[Progress bar]					
33	7.2 Promote government usage	[Progress bar]					
34	7.3 Encourage businesses and SMEs to work together	[Progress bar]					

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8.1.2 Ease of Implementation

ID	Task Name	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
1	1 Increase access speeds and capacity of existing network infrastructure	[Progress bar from Year 1 to Year 6]					
2	1.1 Roll out 3G and 4G to all existing towers	[Progress bar from Year 1 to Year 6]					
3	3G roll out	[Progress bar from Year 1 to Year 3]					
4	4G roll out	[Progress bar from Year 1 to Year 6]					
5	1.2 Migrate FWA from WiMAX to LTE	[Progress bar from Year 1 to Year 4]					
6	1.3 Release more spectrum	[Progress bar from Year 1 to Year 4]					
7	1.4 Promote use of renewable energy sources	[Progress bar from Year 1 to Year 6]					
8	1.5 Network Reliability, Redundancy and Diversity (NRRD)	[Progress bar from Year 1 to Year 6]					
9	2 Increase access network coverage into underserved (unserved) areas	[Progress bar from Year 1 to Year 6]					
10	2.1 Deploy new infrastructure – Mobile, FWA and use of broadband satellite	[Progress bar from Year 1 to Year 6]					
11	2.2 Release sub-1GHz spectrum for wider coverage	[Progress bar from Year 1 to Year 4]					
12	2.3 Incentivise the use of suitable spectrum for backhaul connections	[Progress bar from Year 1 to Year 4]					
13	2.4 Promote infrastructure and/or network sharing through regulatory incentives	[Progress bar from Year 1 to Year 6]					
14	3 National backbone network capacity	[Progress bar from Year 1 to Year 6]					
15	3.1 Policy to ensure new or reconstructed civil works include telecoms duct available to operators	[Progress bar from Year 1 to Year 6]					
16	3.2 Require Reference Wholesale Offers from Network Service Licensees	[Progress bar from Year 1 to Year 4]					
17	3.3 Undertake periodic reviews of wholesale tariffs based on cost models to ensure prices are cost-based	[Progress bar from Year 1 to Year 3]					
18	4 International network capacity	[Progress bar from Year 1 to Year 6]					
19	4.1 Ensure sufficient network availability for needs	[Progress bar from Year 1 to Year 6]					
20	4.2 Promote local content and hosting to minimise costs	[Progress bar from Year 1 to Year 6]					
21	5 Availability of broadband	[Progress bar from Year 1 to Year 6]					
22	5.1 Development of government and education networks	[Progress bar from Year 1 to Year 6]					
23	5.2 Promote and fund Telecentres in rural areas	[Progress bar from Year 1 to Year 4]					
24	5.3 Support development of "Smart Hubs"	[Progress bar from Year 1 to Year 4]					
25	6 Affordability of Broadband	[Progress bar from Year 1 to Year 6]					
26	6.1 Improve affordability of terminals/connection devices	[Progress bar from Year 1 to Year 4]					
27	6.2 Introduce further levels of competition in the market	[Progress bar from Year 1 to Year 6]					
28	6.3 Introduce targeted subsidies - Voucher schemes for businesses/SME users	[Progress bar from Year 1 to Year 4]					
29	6.4 Closely monitor and where necessary regulate retail prices	[Progress bar from Year 1 to Year 3]					
30	6.5 Review impact of taxation levels on broadband services on the industry and user take-up	[Progress bar from Year 1 to Year 6]					
31	7 Promote demand	[Progress bar from Year 1 to Year 6]					
32	7.1 Develop IT skills for teachers, technical professionals and IT	[Progress bar from Year 1 to Year 6]					
33	7.2 Promote government usage	[Progress bar from Year 1 to Year 6]					
34	7.3 Encourage businesses and SMEs to work together	[Progress bar from Year 1 to Year 4]					

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8.1.3 Broad Costs

ID	Task Name	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
1	1 Increase access speeds and capacity of existing network infrastructure	[Progress bar from Year 1 to Year 6]					
2	1.1 Roll out 3G and 4G to all existing towers	[Progress bar from Year 1 to Year 6]					
3	3G roll out	[Progress bar from Year 1 to Year 3]					
4	4G roll out	[Progress bar from Year 1 to Year 6]					
5	1.2 Migrate FWA from WiMAX to LTE	[Progress bar from Year 1 to Year 4]					
6	1.3 Release more spectrum	[Progress bar from Year 1 to Year 4]					
7	1.4 Promote use of renewable energy sources	[Progress bar from Year 1 to Year 6]					
8	1.5 Network Reliability, Redundancy and Diversity (NRRD)	[Progress bar from Year 1 to Year 6]					
9	2 Increase access network coverage into underserved (unserved) areas	[Progress bar from Year 1 to Year 6]					
10	2.1 Deploy new infrastructure – Mobile, FWA and use of broadband satellite	[Progress bar from Year 1 to Year 6]					
11	2.2 Release sub-1GHz spectrum for wider coverage	[Progress bar from Year 1 to Year 4]					
12	2.3 Incentivise the use of suitable spectrum for backhaul connections	[Progress bar from Year 1 to Year 4]					
13	2.4 Promote infrastructure and/or network sharing through regulatory incentives	[Progress bar from Year 1 to Year 6]					
14	3 National backbone network capacity	[Progress bar from Year 1 to Year 6]					
15	3.1 Policy to ensure new or reconstructed civil works include telecoms duct available to operators	[Progress bar from Year 1 to Year 6]					
16	3.2 Require Reference Wholesale Offers from Network Service Licensees	[Progress bar from Year 1 to Year 4]					
17	3.3 Undertake periodic reviews of wholesale tariffs based on cost models to ensure prices are cost-based	[Progress bar from Year 1 to Year 3]					
18	4 International network capacity	[Progress bar from Year 1 to Year 6]					
19	4.1 Ensure sufficient network availability for needs	[Progress bar from Year 1 to Year 6]					
20	4.2 Promote local content and hosting to minimise costs	[Progress bar from Year 1 to Year 6]					
21	5 Availability of broadband	[Progress bar from Year 1 to Year 6]					
22	5.1 Development of government and education networks	[Progress bar from Year 1 to Year 6]					
23	5.2 Promote and fund Telecentres in rural areas	[Progress bar from Year 1 to Year 4]					
24	5.3 Support development of "Smart Hubs"	[Progress bar from Year 1 to Year 4]					
25	6 Affordability of Broadband	[Progress bar from Year 1 to Year 6]					
26	6.1 Improve affordability of terminals/connection devices	[Progress bar from Year 1 to Year 4]					
27	6.2 Introduce further levels of competition in the market	[Progress bar from Year 1 to Year 6]					
28	6.3 Introduce targeted subsidies - Voucher schemes for businesses/SME users	[Progress bar from Year 1 to Year 4]					
29	6.4 Closely monitor and where necessary regulate retail prices	[Progress bar from Year 1 to Year 3]					
30	6.5 Review impact of taxation levels on broadband services on the industry and user take-up	[Progress bar from Year 1 to Year 6]					
31	7 Promote demand	[Progress bar from Year 1 to Year 6]					
32	7.1 Develop IT skills for teachers, technical professionals and IT	[Progress bar from Year 1 to Year 6]					
33	7.2 Promote government usage	[Progress bar from Year 1 to Year 6]					
34	7.3 Encourage businesses and SMEs to work together	[Progress bar from Year 1 to Year 4]					

9.0 SCHEDULE 2:

9.1 MONITORING AND EVALUATION FRAMEWORK

MONITORING AND EVALUATION FRAMEWORK FOR THE NATIONAL BROADBAND STRATEGY (NBS)

The National Broadband Strategy (NBS) Monitoring and Evaluation Framework provides a detailed layout for the assessment of progress during the implementation of the strategy, as well as the assessment of the long-term impact and outcomes of the strategy based on periodic reviews. The Monitoring and Evaluation Framework aims to provide mechanisms or tools for data collection, analysis and reporting, and further information on the roles and responsibilities of stakeholders as well as frequency of reports.

The successful implementation of the NBS will require a Monitoring and Evaluation Framework that aim to:

- Support the attainment of the NBS Vision and Strategic Goals; and
- Enable accurate reporting on progress and identification of lessons learned and challenges encountered for informed decision making and effective planning in subsequent years.

This can be used to elaborate new measures as well as amend and tailor existing initiatives under the strategy. This section of the Strategy details the proposed systematic approach to monitoring and evaluating progress as an integral part in implementing

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the NBS in Malawi. The monitoring is scheduled to be periodic in order to track the progress of implementation of the NBS. The monitoring will, therefore, focus on periodic and objective assessment of progress towards the attainment of the set objectives.

The key objectives of the monitoring and evaluation approach are:

- Establishment of performance targets for various governmental institutions and other key relevant stakeholders responsible for implementing specific activities of the NBS.
- Development of performance plans to establish a shared understanding of the expected end results, the approach to achieving these end results and identify the resources necessary to ensure a successful implementation of the strategy. The plans will be based on the KPIs, Performance Targets and Deadlines provided in the Implementation Logical Framework
- Monitoring and reporting performance as well as progress in achieving expected end results by identifying and promptly reporting observed or likely deviations.
- Periodically evaluating key stakeholders' or individual institution performance against established performance targets.

9.1.1 Monitoring

Implementation of this Strategy will be through annual work plans and budgets. The tasks detailed in the NBS implementation plan will form the basis for preparing annual work plans and budgets. In this regard, the Ministry of Information (MoI) and MACRA together with all relevant stakeholders will ensure that annual work plans and budgets are prepared within the framework of the Strategy.

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Activities of this strategy will be continuously monitored and monthly performance reports will be prepared by all implementing agencies and submitted to the Principal Secretary of MoI through the Director General of MACRA. The Ministry will in turn submit to the National Steering Committee quarterly performance reports highlighting the progress made towards the achievement of key performance indicators (KPIs) in general and quarterly targets. Furthermore, quarterly monitoring exercises will be conducted. Lastly, a comprehensive annual progress report will be produced highlighting the progress made towards achievement of the KPIs in general and annual targets. The purpose of periodic reporting is to account for the resources utilized and output/results.

9.1.2 Joint Annual Reviews

The MoI in conjunction with MACRA and all key stakeholders identified in the Strategy shall set the Terms of Reference for the Joint Annual Reviews (JARs). The JARs will start at organizational level, sector and national level in order to allow for wider participation and analysis of implementation bottlenecks. Participation at national level will include representatives from all key stakeholders in the promotion of broadband in the country, who will discuss developments, interventions and policy recommendations as well as the achievement of Annual Implementation Plan milestones. Emphasis will be placed on challenges being experienced in the achievement of the targets and how these can best be addressed.

9.1.3 Evaluation

Performance evaluation is very important as it helps in objective comparison of actual against expected results and the resultant impact. In a changing environment, some of the key assumptions in the strategy may dramatically change and affect implementation of the set outcome targets. It is in the course of evaluation that the effects of such changes will be determined, and appropriate corrective action taken. The evaluations, therefore, will assess the relevance of the strategic goals and objectives, efficiency and effectiveness of the strategies, assumptions, the strengths and weaknesses in the implementation of the NBS.

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A mid-term and full review will be conducted. As such, an independent stakeholder will be commissioned to undertake the mid-term and long-term reviews of the strategy to determine the short, medium and long-term impact and outcomes of the strategy based on annual reviews, and if necessary, effect remedial actions following the mid-term review to keep implementation on track. The mid-term review will be undertaken from the end of third quarter of Year 3 of the Strategy and the long-term review at the end of the fifth year.

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Monitoring and Evaluation framework for the implementation of the National Broadband Strategy

Strategic goals	Strategies/Actions	Key Performance Indicators	Baseline (2019)	Target/Outputs (2024)	Means of verification	Time Frame /Frequency	Data Collection Instrument/ Strategy	Lead Implementing Agency and Support
Strategic Priority Area – 1: Increase access speeds and capacity of existing network infrastructure								
Strategic goal – 1.1: Roll out 3G and 4G to all existing towers (based on plans of network operators)	Review and revise license conditions	Number/proportion of 3G sites rolled out (Bts)	0	20	Roll reports out	Annually (1-2 years)	Administrative	MACRA
	Increase access speeds and capacity for existing networks	Number/proportion of 4G sites rolled out (Bts)	0	20	Roll reports out	Annually (1-3 years)	Administrative	Operators
	Offer incentive spectrum pricing	Number of FWA operators migrating from WIMAX to LTE	2	4	License evaluation reports	Annually (1-5 years)	Administrative	MACRA
	Ensure spectrum availability	Proportion of spectrum blocks released	0	100% of the demanded blocks	Spectrum management reports	Annually (1-5 years)	Administrative	MACRA
	Using USF to reach hard to get areas	Proportion of projects in hard to reach areas	0	100	Rural Projects rollout reports	Annually (1-5 years)	Administrative	MACRA
	Ensure operators plans are submitted	Number of plans submitted	0	2	Commercial plans	Annually (1-2 years)	Administrative	MACRA
	Monitor performance of operators	Number of projects implemented	0	20	Performance assessment report	Annually (1-2 years)	Field visits, meetings.	MACRA
	Devise a robust plan containing commercial and financial planning	Number of plans submitted	0	2	Commercial plans	Annually (1-2 years)	Operators' business plan reviews	Operators
	Share the plan with MACRA	Number of Plans shared with MACRA	0	2	Published plan	Annually (1-2 years)	Administrative	Operators
	Report to MACRA on a regular basis	Progress report schedule	0	4	Progress Report	Annually (1-5 years)	Report writing sessions	Operator
Provide KPIs in	KPIS targets	0	1	KPIs	Annually (1-	Working	MACRA	

	alignment with broadband targets	with broadband targets			framework developed	5 years)	session on the KPIs targets	
Strategic goal 1.2: Migrate to Newer Technologies (3GPP Based)	Ensure that all relevant licenses are issued to support the migration plan	Number of licenses issued	0	4	License evaluation/Board reports	Annually (1-5 years)	Administrative	MACRA
	Review and revise license conditions to support the migration plan	Reviewed license conditions	0	1	Reviewed license report	Annually (1-5 years)	Administrative	MACRA
	Ensure migration plans are submitted	Number of migration plans	0	4	Migration plan reports	Annually (1-5 years)	Administrative	MACRA
	Ensure the availability of appropriate spectrum bands for access	Proportion of spectrum blocks released	0	100% of the demanded blocks	Spectrum management reports	Annually (1-5 years)	Administrative	MACRA
	Offer incentive pricing for spectrum for access and transport network	Administrative Incentive Pricing (AIP) reviewed	1	1			Administrative	
	Monitor the progress of the migration plan by establishing mutually agreed KPIs	Established KPIs on Migration plan	0	4	Reports available of migration plan	Annually (1-5 years)	Administrative	Network operators MACRA
	Upgrading technology FWA operators	Number of operators migrating to new technologies	0	2	Technical reports	Annually (1-5 years)	Operators technical quarterly reports	Network operators

Strategic goal 1.3: Release more spectrum	Ensure sufficient relevant spectrum is available	Proportion of spectrum blocks released	0	100% of the demanded blocks	Spectrum management reports	Annually (1-5 years)	Administrative	MACRA
	Publish plan to show when new spectrum will be available	Number of published spectrum plan	0	1	Published spectrum plan	Annually (1-3 years)	Administrative	MACRA
	Develop incentive-based pricing strategy especially for rural areas	Administrative Incentive Pricing (AIP) reviewed	1	1	AIP review report	Annually (1 year)	Administrative	MACRA
	Ensure roll out obligations are included in licenses, especially “use it or lose it requirements”	Number of licenses reviewed with regards to rollout obligations	0	4	CLF annual reports	Annually (1years)	Administrative	MACRA
	Monitor spectrum use to ensure hoarding does not take place, especially with incentive priced spectrum	Number of Spectrum availability reports	0	5	Spectrum availability reports	Annually (1-5 years)	Administrative	MACRA
	Prepare realistic spectrum plan	Number of spectrum requirement plans	0	1	Spectrum requirement plans	Annually (1-5 years)	Operators technical annually reports	Network operators
Strategic goal 1.4: Promote use of renewable energy sources	Develop policy to promote rollout and use of renewable energy sources	Number of policies developed	0	1	Policy developed	Annual (by 3 rd year)	Meeting and working sessions	GoM MoICT & MoE&EA

	Develop a strategy on subsidies and incentives, including reduced import duties, for such equipment	Number of strategies developed	0	1	Strategy developed	Annual (by 3 rd year)	Meeting and working sessions	MACRA
	Conduct cost benefit analysis of using renewable power sources	CBA study	0	1	CBA study report	Annual (by 2 nd year)	Meetings Analysis and report writing sessions	MACRA
	Consider use of USF to promote use of renewable energy sources	Proportion of sites using renewable energy sources	0	20%	Annual reports	Annually (1-5 years)	Administrative	MACRA Operators
	Deploy renewable energy sources for RAN where possible	Proportion of sites with renewable energy sources	0	20%	Annual reports	Annually (1-5 years)	Administrative	Others renewable energy companies
	Facilitate investment by energy companies in infrastructure and rollout and develop range of pricing models based on government policy	Proportion of energy companies rolling out	0	20%	Annual reports	Annually (1-5 years)	Administrative	Others renewable energy companies
Strategic goal 5: Increase Network Reliability, Redundancy and Diversity	Identification of appropriate policies to support MACRA in this initiative	Number of policies identified to the support initiative	0	1	ICT Policy Review Report	Annually (1 year)	Working sessions and meetings	GoM MoICECT
	Develop ICT network Redundancy,	Number of NRRD	0	1	NRRD framework	Annually (by 3 rd year)	Working sessions and	MACRA

	Reliability and Diversity (NRRD) Framework	framework					meetings	
	Conduct cost-benefit analysis	CBA study	0	1	CBA study report	Annual (by 2 nd year)	Meetings Analysis and report writing sessions	MACRA
	Develop individual NRRD plans	Number of operators' NRRD plans	0	4	Operators' NRRD plan	Annually (by 3 rd year)	Working sessions and meetings	Network Operators
	Provide appropriate performance metrics to MACRA	Schedule of performance metrics agreed	0	1	Agreed schedule of KPIs	Annual (by 3 rd year)	Working sessions and meetings	Network Operators
	Review NRRD on an ongoing basis and update as required	Number of operators' NRRD plans reviewed	0	4	Operators' NRRD plan review reports	Annually (from 4 th year)	Working sessions and meetings	Network operators
Strategic Priority Area – 2: Increase access network coverage into underserved (unserved) areas								
Strategic goal 2.1: Deploy new infrastructure – Mobile, FWA and use of broadband satellite	Ensure sufficient relevant spectrum is available	Proportion of spectrum blocks released	0	100% of the demanded blocks	Spectrum management reports	Annually (1-5 years)	Administrative	MACRA
	Revise coverage obligations in licenses	Number of revised licenses	0	4	Revised license templates	Annually (1-5 years)	Administrative	MACRA
	Offer targeted prices for spectrum	Number of offers for targeted price for spectrum	0	4	Revised spectrum prices	Annually (1-5 years)	Administrative	MACRA
	Facilitate use of appropriate technologies such as	Number of reviewed licenses	0	4	Reviewed license documents	Annually (1-5 years)	Administrative	MACRA

	satellite through licensing processes							
	Consider use of USF to support deployment	Number of project support for deployment using USF	0	4	Financial and Projects reports	Annually (1-5 years)	Administrative	MACRA Network operator
	Monitor progress of network deployment	Number of monitoring exercises	0	20	Monitoring reports	Quarterly (for each year)	Field visits, surveys and meetings	MACRA, Network operators
	Implement new license coverage obligations	Number of revised licenses	0	4	Revised license templates	Annually (1-5 years)	Administrative meetings with MACRA & operators	Network operators
	Ensure adoption of new technologies into the market e.g. satellite	Number of adopted new technologies into the market	0	1	Progress Reports on new technologies adopted	Annually (1-5 years)	Working sessions, meetings, field visits, awareness meetings on new technologies	Others
Strategic goal 2.2: Release sub-1GHz spectrum for wider coverage	Ensure sufficient relevant spectrum is available	Proportion of spectrum blocks released	0	100% of the demanded blocks	Spectrum management reports	Annually (1-5 years)	Administrative	MACRA
	Publish plan on new spectrum availability	Number of spectrum availability plan	0	1	Spectrum availability plan	Annually (1-5 years)	Administrative	MACRA
	Develop incentive-based pricing strategy especially	Administrative Incentive Pricing (AIP) reviewed	1	1	AIP review report	Annually (1 year)	Administrative	MACRA Operators

	for rural areas							
	Ensure roll out obligations are included in licenses, especially “use it or lose it requirements”	Number of licenses reviewed with regards to rollout obligations	0	4	CLF annual reports	Annually (1 year)	Administrative	MACRA Network Operators
	Monitor spectrum use to ensure hoarding does not take place especially with incentive priced spectrum	Number of spectrum monitoring reports	0	5	Spectrum monitoring reports	Quarterly (for each year 1-5)	Administrative	MCARA
	Prepare realistic spectrum plans	Number of spectrum requirement plans	0	1	Spectrum requirement plans	Annually (1-5 years)	Operators technical annually reports	Operators
	Follow license obligations	Number of monitoring reports on license obligation	0	4	Monitoring reports	Quarterly (for each year 1-5)	Administrative	Network operators
Strategic goal 2.3: Release sub-1GHz spectrum for wider coverage	Ensure sufficient relevant spectrum licensed at an appropriately price for new links	Proportion of spectrum blocks released	0	100% of the demanded blocks	Spectrum management reports	Annually (1-5 years)	Administrative	MACRA
	Maintain existing pricing for existing links even when upgraded through	Administrative Incentive Pricing (AIP) reviewed	1	1	AIP review report	Annually (1 year)	Administrative	Operators

	AIP							
Strategic goal 2.4: Promote infrastructure and network sharing through regulatory Incentives	Ensure legislation in place to enable new towers to be built easily	New proposed policy/strategy infrastructure development	0	1	Infrastructure development policy/strategy	Annual (by 3 rd year)	Working sessions and meetings	GoM MoICECT
	Apply obligations to SMP operators	SMP determination guidelines developed	0	1	SMP determination guidelines	Annual (1 st year)	Working sessions and meetings	MACRA
	Define guidelines for Infrastructure Sharing	Infrastructure sharing regulations developed	0	1	Infrastructure sharing regulations	Annual (1 st year)	Working sessions and meetings	MACRA
	Consider use USF to build new towers that are then shared	Number of new towers built that are shared	0	5	Infrastructure sharing reports	Annually (3 rd year to 5 th year)	MOU agreements, Implementation meetings, monitoring visits, Commissioning.	GoM MoICECT Operators MACRA
	Encourage networks sharing or mandate national roaming on new tower infrastructure built in rural areas	Number of infrastructure agreements/ mandated national roaming	0	5	Infrastructure agreements/ mandated national roaming copies	Annually (1-5 years)	Administrative	MACRA Operators
	Enter into infrastructure sharing agreements with each other, or	Number of infrastructure agreements	0	5	Infrastructure agreements copies	Annually (1-5 years)	Administrative	MACRA Network operators

	third parties (tower owners)							
	Undertake national roaming agreements with other network parties	Number of national roaming agreements	0	1	National roaming agreements copies	Annually (1-5 years)	Administrative	MACRA Network operators
	Potential opportunity for third party companies to build new infrastructure and lease it to network operators (tower companies)	Number of new tower companies licensed	1	3	Infrastructure license	Annual	Administrative	Other companies
Strategic Priority Area – 3: National Backbone Network capacity								
Strategic goal 3.1: Policy to ensure new or reconstructed civil works include telecoms duct available to operators	Inter departmental as well as local /regional/national cooperation needed to develop and implement policy	Number of collaborative meetings	0	10	Meeting reports	Annually (from year 1-5)	Working sessions and meetings	GoM – MoICECT & MoLGRD
	Managing agency to be set up either within MACRA or independently	Unit established under MACRA	0	1	Operation structure reviewed	Annual (by 3 rd year)	Working sessions and meetings	MACRA
	Cooperation with other bodies required	Number of MOUs signed	0	10	Signed MOUs	Annually (from year 1-5)	Working sessions and meetings	Other institutions/MA CRA
	Maintaining records and allocating capacity to operators	Number of records submitted	0	4	Operator record submission	Annually (from year 1-5)	Administrative	MACRA
	Willingness to make use of shared	Quarterly performance	0	4	Infrastructure sharing	Quarterly (from year 1-	Administrative	Network operators

	infrastructure	reports in shared infrastructure			performance reports	5)		
	Cooperation of other bodies required with MACRA	Number of MOUs signed	0	10	Signed MOUs	Annually (from year 1-5)	Working sessions and meetings	Other institutions/MACRA
	Set up new conduit/dark fiber seller/provider	New conduit for dark fiber set	0	1	Licensed fiber operator	Annual (once off by 3 rd year)	License application, evaluation, board approval and negotiation reports	MACRA/new operator
Strategic goal 3.2: Require Reference Wholesale Offers from Network Service Licensees	Use SMP Determinations to set obligations on dominant suppliers	SMP determination guidelines developed	0	1	SMP determination guidelines	Annual (1 st year)	Working sessions and meetings	MACRA
	Identify other regulatory remedies to mandate RIOs	Number of remedies identified to mandate RIOs	0	1	Signed MOUs	Annually (from year 1-5)	Working sessions and meetings	Other institutions/MACRA
	Prepare and publish Guidelines for Reference Interconnection Offers	Guidelines for RIO prepared and published	0	1	Published guidelines for RIOs	Annual (by 3 rd year)	Working sessions and meetings	MACRA
	Approve Reference Offers	Number of RIOs submitted/year	0	4	RIOs prepared	Annually (from 1-5 years)	Administrative	Network operators
	Encourage non SMP	Number of	0	4	RIOs	Annually	Administrative	Network

	operators to publish RIOs to ensure consistency across the sector	published RIOs			prepared	(from 1-5 years)		operators
	Resolve disputes in a timely manner	Proportion of disputes resolved	0%	100%	Dispute resolutions report	Quarterly (from year 1-5)	Administrative	
	Prepare Reference Interconnect Offers	Number of RIOs submitted/year	0	4	RIOs prepared	Annually (from 1-5 years)	Administrative	Network operators
	Encourage operator to enter into RIO agreements	Number of RIO agreements per year	0	1	RIO agreements	Annually (from 1-5 years)	Administrative	MACRA
Strategic goal 3.3: Undertake periodic review of wholesale tariffs based on cost models to ensure prices are cost-based	Undertake tariff review and determine regulated tariffs	Number of tariff structure reviewed per year	0	1	Wholesale tariff structure	Annually (from 1-5 years)	Technical meetings and administrative	MACRA
	Implement in a timely manner	Number of licensees under tariff review	0	4	Progress Reports	(from 1-5 years)	Quarterly meetings to determine progress	MACRA
	Provision of data for costing activities	Request for information (RFI) template	0	1	Performance analysis reports	Quarterly (from year 1-5)	Administrative	Network operator
	Publish and Implement regulated tariffs	Number of tariff reports/year	0	4	Tariff analysis reports	Quarterly (from year 1-5)	Administrative	Network operator

Strategic Priority Area – 4: International Network capacity

Strategic goal 4.1: Ensure sufficient network availability for needs	Monitor traffic and network performance	Request for information (RFI) template	0	1	Performance analysis reports	Quarterly (from year 1-5)	Administrative	MACRA
	Consider licensing additional suppliers if appropriate	Number of additional suppliers licensed	0	2	License evaluation reports	Annually (1-5 years)	Administrative	MACRA
	Analyze and review network requirements and obtain more capacity when necessary	Business plan submissions/year	0	1	Business plans evaluation reports	Annually (from 1-5 years)	Technical meetings and administrative	Network operators
Strategic goal 4.2: Promote local content and hosting to minimize costs	Implementation of ICT policies through coordination between bodies	Reviewed national ICT policy	0	1	ICT policy review report	Annual (by 3 rd year)	Working sessions and meetings	MoICECT
	Implement initiatives across education and health sectors and develop information sites	Number of initiatives (education & health) and information sites developed	0	2	Reports on establishment of information sites	Annually (from 2-5 years)	Field visits, working sessions and meetings	MACRA and Other institutions
	Cooperation with Ministries to ensure implementation of ICT policy	ICT policy Implementation plan	0	1	Approved implementation plan document	Annually (by 2 nd year)	Field visits, working sessions and meetings	MACRA
	Cooperation with local hosting companies	Number of cooperation agreements	0	4	Cooperation agreements documents	Annually (1-5 years)	Administrative	Network operators
	Local bodies (trades, health organizations,	Number of local content & e-			Local content and e-	Annually (1-5 years)	Working sessions and	Others

	banks) to develop local content and e-commerce sites	commerce sites			commerce site development		meetings	
	Enhance capacity building for users to promote use of local content	Number of training initiatives	0	20	Training reports	Annually (1-5 years)	Training sessions and meetings	Other institutions/MA CRA
Strategic Priority Area – 5: Availability of broadband								
Strategic goal 5.1: Development of government and education networks	Promote initiatives through Digital Malawi program	Number of initiatives implemented under Digital Malawi	0	1	Digital Malawi annual progress report	Annually (1-5 years)	Administrative	GoM – MoICECT
	Conclude financial and commercial arrangements with overseas providers to facilitate new network provision	Financial and commercial agreements with overseas providers	0	3	Signed MOUs	Annually (from year 1-5)	Working sessions and meetings	Other institutions/MA CRA
	Issue necessary licenses	Number of licenses issued	0	3	License evaluation reports	Annually (1-5 years)	Administrative	MACRA
	Make other required resources available including spectrum	Proportion of spectrum blocks released	0	100% of the demanded blocks	Spectrum management reports	Annually (1-5 years)	Administrative	MACRA
	Cooperate as appropriate to ensure timely deployment of networks	Number of operator agreements signed	0	5	Agreement documents	Annually (1-5 years)	Administrative	Network operators

Strategic goal 5.2: Promote and fund Telecentres in rural areas	Promote use of Public Internet Access Centers across sectors in rural areas including education and health	Deliberate strategy on telecentre use developed	0	1	Deliberate strategy on telecentre usage document	Annually (from 2 nd year)	Working sessions and meetings	MoICECT MACRA MOEST
	Fund Public Internet Access Centers through USF – include in USF planning and budgeting	Number of Public Internet Access Centers established (continuous)	0	200	Establishment reports (construction, setting up & operational)	Annually (1-5 years)	Site visits, local committee meetings, contractor reports	MACRA
	Monitor activities at Public Internet Access Centers to encourage increasing activities	Number of monitoring visits to the Public Internet Access Centers	0	5	Field Reports	Quarterly (from year 3-5)	Field visits	MACRA
	Provide training to Public Internet Access Centers staff	Number of staff trained	0	28	Training reports	Annually (from year 1-5)	Training and practical sessions	Training institutions MACRA
	Provide subsidized connectivity to rural telecentres as part of a USO	Number of Public Internet Access Centers that are subsidized	0	200	Wi-Fi connectivity reports	Quarterly (from year 1-5)	Technical and administrative	Network operators
	Develop applications and provide training on use of IT in Public Internet Access Centers	Develop Application content manual	0	1	Application developers' reports	Annually (from year 1-5)	Technical and administrative	Others
Strategic goal 5.3: Support development of	Encourage creation of “Smart Hubs” in urban areas	Deliberate strategy on “Smart Hubs”	0	1	Deliberate strategy document	Annual (by 3 rd year)	Working sessions and meetings	MoICECT

“Smart Hubs”		developed						
	Identify suitable places to become “Smart Hubs”	“Smart Hub” locations identity schedule	0	5	“Smart Hub” locations schedule/document	Annually (from year 1-5)	Planning/work ing sessions and meetings	MACRA
	Provide funding for equipment and training from USF	Number of budgets for equipment and training	0	5	Budget documents	Annually (from year 1-5)	Planning/work ing sessions and meetings	MACRA Smarts Hubs
	Consider usage of voucher scheme	Proportion of usage voucher scheme	0	50%	Voucher scheme usage analysis reports	Annually (from year 1-5)	Administrative	MACRA Network operators
	Monitor usage	Request for information	0	1	Usage report	Annually (Quarterly 1-5years)	Administrative	MACRA Network operation
	Rollout infrastructure for Smart Hubs	Number of rollout plans by operators	0	5	Operators’ rollout plans submissions	Annually (from year 1-5)	Operator applications	Network operators
	Support training of staff of Smart Hubs	Number of staff trained	0	25	Training reports	Annually (from year 1-5)	Training and practical sessions	MACRA Smart Hubs
	Subsidize the initial access for “Smart Hubs”	Number of subsidized initial access Smart hubs	0	5	Subsidized Smart hubs reports	Annually (from 3 rd year)	Technical and administrative	MACRA
	Develop applications relevant to “Smart Hubs”	Develop Application for “Smart Hub” manual	0	1	“Smart Hub” Application developers’ reports	Annually (from year 1-5)	Technical and administrative	Others

	Encourage the use of “Smart Hubs” by SMEs	Number of programs to encourage “Smart Hubs”	0	5	“Smart Hubs” applications and approved made	Annually (from the 3 rd year)	Sensitization meetings TV and Radios Documentaries, brochures, newspaper adverts.	MACRA Smart Hubs
Strategic Priority Area – 6: Affordability of broadband								
Strategic goal 6.1: Improve Affordability of terminals/connection devices	Introduce lower (or remove) tariffs on imported devices	Number of meetings	0	4	Meeting reports	Quarterly	Meetings with Ministry of Finance (Revenue Directorate)	GoM MoICECT –
	Promoting subsidized schools’ laptop initiative	Number of schools provided with laptops	0	30	Procurement, Implementation/ delivery reports	Annually (from 2 nd year)	Needs assessments, procurement processes	MACRA MoEST
	Promoting subsidized laptops to SMEs	Number of SMEs provided with laptops	0	60	Procurement, Implementation/ delivery reports	Annually (2-5 year)	Needs assessments, procurement processes	MACRA SMEs
	Facilitate the provision of information on making cost effective choices for consumers on website or other material	Number of programs for consumer awareness on cost effective choices	0	5	Website with information on cost effective choices for consumers	Annually (2-5 year)	Sensitization meetings TV and Radios Documentaries, brochures, newspaper adverts, website.	MACRA Network operators
	Enhance provision of low-cost smartphones handsets	Number of low-cost smart phones/year	0	120	Procurement report/ delivery report	Annually (2-5 year)	Meetings, Needs assessments, procurement	MACRA/ Network operators

							processes	
	Encourage SME groups to be pooling access to computers through “Smart Hubs”	Number of SMEs that are pooling access to computers through “Smart Hubs”	0	60	“Smart Hubs” registry	Annually (1-5 years)	Submissions of “Smart Hubs” concepts, meetings	MACRA Smart Hubs SMEs
Strategic goal 6.2: Introduce further levels of competition in the market	Facilitate deployment of new networks through the Digital Malawi project, government, education and energy networks	Percentage completion of Digital Malawi initiatives	0	100	Digital Malawi project progress reports	Annual (1-5 years)	Meetings, mission reports, Administrative	MoICECT
	Effective application of existing and new regulations to encourage 3rd operator to roll out services	New regulations developed for 3rd operator to roll out services	0	1	Regulations	Annual (from 2nd year)	Stakeholder consultations, MoJCA promulgation	MACRA MoJCA
	Provide MVNO access obligations on existing operators	Infrastructure sharing, interconnection regulations	0	3	Regulations	Annual (from 2nd year)	Stakeholder consultations, MoJCA promulgation	MACRA MoJCA
	Provide necessary new licenses	New licenses issued	0	3	Licensed operator	Annual (once off by 3rd year)	License application, evaluation, board approval and negotiation reports	MACRA
	Make scarce	Availability of	0	100% of	Resource	Quarterly (1-	Data collection	MACRA

	resources available to new market entrants	scarce resources to new market entrants		the demanded blocks	availability Reports	5 years)		
	Conduct needs assessment for introduction of number portability	Number of needs assessment report	0	1	Needs assessment report	Annual (by 3 rd year)	Data collection, analysis	MACRA
	Resolve disputes in a timely manner	Percentage of disputes resolved/year	0	100%	Dispute resolution report	Quarterly (1-5 years)	Dispute submission management tool	MACRA
	Enter into commercially appropriate MVNO agreements	Number of commercial MVNO agreements	0	5	Commercial MVNO agreements	Annual (1-5 years)	Contract negotiation reports	Network operators
	Reduce prices in response to competition	Percentage reduction in average prices	0	5%	Tariff review reports	Annual (1-5 years)	Data collection, tariff analysis	MACRA
	Enhance BB supply market either through MVNO arrangements or deploying new networks	Number of MVNO operators providing BB	0	5	MVNO licenses issued	Annual (from 3 rd year)	License negotiations, report submission	Others
Strategic goal 6.3: Introduce targeted subsidies - Voucher schemes for businesses/SME users	Encourage take up through government initiatives	Proportion of Government initiatives	0	1	Subsidized voucher schemes for businesses/SME users	Annual (from 2 nd year)	Negotiations meeting on subsidized voucher schemes	MoICECT
	Facilitate Government resource	Percentage allocation of	0%	0.1%	Public Sector Investment	Annual (from 2 nd year)	Budget discussion	MoICECT MACRA

	mobilization towards support businesses/SMEs	resources in national budget through Public Sector Investment Program (PSIP)			Program (PSIP)		with Treasury	
	Identify suitable body to draw up rules and administer scheme	Number of Body set up	0	1	Institutional set up of the Body	Annual (from 3 rd year)	Functional reviews	MoICECT MACRA
	Publicize and administer Voucher Scheme (if required by government)	Number of public adverts	0	1	Request for proposals (RFPs) developed	Annual (from 3 rd year)	Terms of references for RFPs	MACRA
	Assess impact of scheme after 1, 2 and 3 years	Number of evaluation exercises	0	3	Evaluation/assessments reports	Annual (1, 2 and 3 years)	Data collection, evaluations	MACRA, operators
	Accept vouchers as payment for services	Voucher payment system in place	0	1	Voucher payment system report	Annual (from 3 rd year)	Terms of reference for Voucher Payment system	Operators
	Publicize availability of Vouchers Scheme through SME groups	Voucher payment system in place	0	1	Voucher payment system report	Annual (from 3 rd year)	Awareness campaigns, meetings, brochures, TV and Radio, documentaries	Others
	Use to support “Smart Hubs”	Number of “Smart Hubs” developed/year	0	1	“Smart Hubs” approved and supported	Annually (from the 3 rd year)	Stakeholder meetings	MACRA Other
Strategic goal 6.4:	Ensure that all	Compliance to	0	100%	Laid down	Annual (by	Data analysis	MACRA

Closely Monitor and where necessary Regulate Retail Prices	actions taken are in line with the powers granted under the Communications Act.	Communications Act.		Fully compliant	procedure for compliance	3 rd year)		
	Ensure market definitions are appropriate for market analysis	Number of market analysis done	0	1	Market analysis report	Annual (by 3 rd year)	Data analysis, report writing	GoM MoICECT/ MACRA
	Follow tariff regulations imposed	Number of tariff remedies imposed (Compliance to tariff regulations)	0	100% Fully compliant	Market analyses reports	Annual (after every 3 years)	Tariff registry	Operators
Strategic goal 5: Review impact of taxation levels on broadband services, on the industry and user take-up	Coordinate with MACRA to determine impact of taxation of broadband network operators' operations	Number of impact analysis done	0	1	Impact of taxation on telecoms sector report	Annual (by 3 rd year)	Data analysis, report writing	GoM MoICECT/ MACRA
	Consideration of impact of lower levels of taxation on total government revenues	Percentage of lower levels of taxation on total government revenues	0	High level	Impact of lower levels of taxation on government revenues	Annual (by 3 rd year)	Data analysis, report writing	MACRA
	Work with Treasury reduction of import duties on communications network equipment	Number of impact analysis done	0	1	Impact of taxation on telecoms sector report	Annual (by 3 rd year)	Data analysis, report writing	MACRA, Treasury
	Work with Treasury to determine impact	Number of Impact analysis	0	1	Report on impact	Annual (by 3 rd year)	Working sessions	MACRA, Treasury

	of taxation				taxation			
	Provide data to support analysis of revenues within the sector	Number of support analysis of revenues within the sector	0	1	Analysis of revenues report	Annual (by 3 rd year)	Data analysis, report writing	MACRA, Treasury
Strategic Priority Area – 7: Promote demand								
Strategic goal 1: Develop IT skills for teachers, technical professionals and IT users	Effective Implementation of ICT policies	Number of policies implemented	0	1	ICT policies implemented reports or Activity Reports	Annual (by 3 rd year)	Meetings, working sessions, field visits	MoICECT
	Implement ICT education into the education curriculum	Reviewed education curriculum	0	1	Curriculum with incorporated ICT courses	Annual (by 3 rd year)	Working sessions and meetings	MoICECT and MoEST
	Support training in ICT for life-long learning opportunities	Number of ICT training initiatives to the youth/year	0	100	Training reports	Annual (from 2 nd year)	Telecentre/ rural trainings	Other training institutions MoICECT and MoEST
	Implement computer and internet access lessons in schools and telecentres (following ICT policies)	Reviewed education curriculum with computer and internet lessons	0	1	Curriculum with incorporated ICT courses	Annual (by 3 rd year)	Working sessions and meetings	MoICECT and MoEST
	Inter-governmental cooperation to implement ICT policies	Number of MDAs involved in Inter-Governmental Cooperation	0	2	State of ICT policies in MDAs report	Annual (from 3 rd year)	Meetings, working sessions	MACRA
	Facilitate deployment	Number of	0	10	MAREN	Annual (1-5	Meetings,	MAREN

	of education networks	institutions on MAREN			annual reports	years)	Administrative	
	Issue licenses as required	Number of licenses issued	0	3	License evaluation reports	Annually (1-5 years)	Administrative	MACRA
	Make scarce resources available as required	Availability of scarce resources as required	0	100% of the demanded blocks	Resource availability Reports	Quarterly (1-5 years)	Data collection	MACRA
	Providing deliberate training to teachers and users (businesses and SMEs) by operators	Number of trainees trained	0	56	Training reports	Annually (from year 1-5)	Training and practical sessions	Network operators/ MACRA
	Operators could be required to provide training to users, especially businesses and SMEs	Number of trainings conducted	0	100	Training reports	Annually (from year 1-5)	Training sessions	Operators
	Provide network infrastructure to schools	Number of schools connected	0	30	Technical roll out reports	Annually (from year 1-5)	Technical and physical roll out installations	Operators ISPs MACRA
	Enhance use of relevant applications and training in schools, colleges, telecentres and “Smart Hubs” to provide training (including TOTs) by education bodies and NGOs	Number of trainers trained	0	56	Training reports	Annually (from year 1-5)	Training sessions, materials	Others training institutions

	Enhance opportunities for alternative service providers e.g. satellite BB	Number of service providers	0	3	Progress reports	Annually (1-5 years)	Administrative , funding proposals	Operators MACRA
Strategic goal 2: Promote government usage	Promote use of broadband in Government offices, and train staff on using computers and the internet	Number of Government offices with broadband internet	0	200	Status reports from e-Govt Dept.	Annually (1-5 years)	Administrative	MoICECT / e-Govt Dept.
	Roll out connectivity to government offices throughout the country	Number of government offices connected	0	200	Status reports from e-Govt Dept.	Annually (1-5 years)	Administrative	MACRA ISPs Operators
	Issue licenses as required	Number of licenses issued	0	3	License evaluation reports	Annually (1-5 years)	Administrative	MACRA
	Make scarce resources available as required	Availability of scarce resources as required	0	100% of the demanded blocks	Resource availability Reports	Quarterly (1-5 years)	Data collection	MACRA
	Provide network infrastructure to Government buildings	Number of Government offices with Network infrastructure	0	200	Status report from e-Govt. Dept.	Annual (from 3 rd year)	Meetings, working sessions, installation of infrastructure	Network operators
	Facilitate opportunities for alternative service providers	Number of service providers	0	5	Progress reports	Annually (1-5 years)	Administrative , funding proposals	Others

Strategic goal 3: Encourage businesses and SMEs to work together	Provide connectivity to "Smart Hubs"	Number of "Smart Hubs" instituted	0	5	"Smart Hubs" registry	Annually (1- 5 years)	Submissions of "Smart Hubs" concepts, meetings	Operators
	Businesses and SMEs develop "internet user groups" to lobby and review network rollout progress	Number of Internet User Groups developed	0	28	SMEs and Business Internet User Groups registry	Annually (1- 5 years)	Meetings, working sessions	Others
	Support and use "Smart Hubs"	Number of "Smart Hubs" instituted	0	5	"Smart Hubs" registry	Annually (1- 5 years)	Submissions of "Smart Hubs" concepts, meetings	Others MACRA