

**REQUST FOR PROPOSALS** **CONSULTANCY FOR A STUDY AND DEVELOPMENT OF POLICY AND REGULATORY FRAMEWORKS ON OPTICAL FIBRE INFRASTRUCTURE**

 **for**

**Enhancement of Governance and Enabling Environment in the ICT sector (EGEE-ICT) Programme in the EA-SA-IO Region**




# INTRODUCTION

## Background of EGEE – ICT Programme

The ‘Enhancement of Governance and Enabling Environment in the ICT sector (EGEE-ICT) for the Eastern Africa, Southern Africa, and Indian Ocean (EA-SA-IO) Region’ is a programme that supports the development of the ICT sector and the deepening of regional integration in the EA-SA-IO Region (‘the Region’). The programme is funded by the European Union and implemented by the Regional Economic Communities of Common Market of Eastern and Southern Africa (COMESA), East African Community (EAC), Intergovernmental Authority for Development (IGAD), Indian Ocean Commission (IOC), and Southern African Development Community (SADC). In accordance with the programme’s Contribution Agreement, COMESA is the Lead REC with overall responsibility for the implementation of programme activities.

## Programme Objectives

The overall objective of the programme is to deepen regional integration and growth of the ICT sector in the Region; it has three specific objectives, namely: -

1. Regionally coordinated public and private sector ICT policy development - (Result Area 1);
2. Enhanced policy and regulatory environment for competitive markets and gender sensitive ICT markets – (Result Area 2); and
3. Improved infrastructure connectivity and access to ICT – (Result Area 3).

## Result Areas

Each of the programme’s three Result Areas will be implemented through the following sub result areas, and each sub-result area will produce a corresponding output, as follows:

1. Result 1: Regionally coordinated public and private sector ICT policy development
2. Sub Result 1.1: Mechanism for consensus building in policy development among public and private sectors development.
3. Sub Result 1.2: Capacity of existing regional ICT associations enhanced; and
4. Sub Result 1.3: Accountability systems in policy formulation and implementation strengthened between public and private ICT sector actors.
5. Result 2: Enhanced policy and regulatory environment for competitive markets and gender sensitive ICT markets
6. Sub result 2.1: Regional model policy and regulatory frameworks for e-commerce developed.
7. Sub result 2.2: Gender responsive rights-based policy and regulatory frameworks for universal access and licensing strengthened; and
8. Sub result 2.3: Policy and regulatory frameworks to harmonise mobile roaming and termination tariffs and transit internet charges developed.
9. Result 3: Improved Policies, infrastructure connectivity and access to ICT,
10. Sub result 3.1: Policies to promote private sector investment in ICT infrastructure developed; and
11. Sub result 3.2: Policies and regulatory frameworks for open access and infrastructure sharing developed.

## Assignment Background

Sub-Result 3.2 of the programme seeks to develop policies and regulatory frameworks on open access and infrastructure sharing. In this regard, four related activities are envisaged:

1. Activity 3.2.1 Carry out a study to identify the major technical, commercial and policy constraints regarding access to existing fibre optic infrastructure and recommend appropriate policy interventions to improve access and investments. The study should include the definition and description of alternative infrastructure in provision of fibre optic networks such as through the primary infrastructure (i.e. power grids, roads, railways, and oil and gas pipelines) in improving broadband connectivity and identification of the missing links;
2. Activity 3.2.2 Develop model policy and regulatory guidelines for use of alternative fibre infrastructure on an open access principle. These guidelines should aim at encouraging fair, non-discriminatory, reasonably priced and transparent access to the fibre infrastructure. The study to include assessment of existing regional and national policy and regulatory frameworks conducive to investment in fibre infrastructure.
3. Activity 3.2.3 Design strategic framework to foster regional cooperation on access to long haul and backbone networks as well as the undersea cables (the associated landing stations) and Internet Exchange Points (IXPs), and explore service models designed to ensure reliable service and maximize access and minimize cost for the region. The study will exclude the study on the last mile access; and
4. Activity 3.2.4 Support country level reforms to develop or strengthen policy and regulation that promotes open access principles in accessing existing and future long haul and backbone networks in ensuring that the policy and regulations were conducive to investment in the fibre infrastructure.

The Terms of Reference (ToR) apply to the assignment for Activities 3.2.1, 3.2.2 and 3.2.3. Activity 3.2.4 refers to national transposition of the outputs (i.e. regional frameworks) realized from the three preceding activities, and will therefore, be undertaken through a subsequent assignment.

# RATIONALE OF THE ASSIGNMENT

## Introduction

Information and Communications technologies (ICTs) which includes the internet, mobile phones, and all the other tools to collect, store, analyze, and share information digitally—have spread quickly. Many people in Africa countries own a mobile phone.

For some decades now, the world has witnessed remarkable and steady progress in ICT development. For example, between 2010 and 2020, mobile and broadband subscriptions, network coverage, and Internet bandwidth and use grew as shown in Tables[[1]](#footnote-1) 1, 2 and 3 below.

The Africa region in particular has recorded rapid increase in subscription for ICT services in the last two decades, thanks to market reforms and technological development. Liberalization of the ICT sector opened private sector investments required to expand ICT networks and services while the emergence of mobile telephony enabled an easier, rapid and cost-effective way of delivering ICT services across large geographical areas. Many countries in the Eastern and Southern African region have opened their ICT markets for Competition and have created regulatory institutions.

**Table 1: Mobile and broadband subscriptions**

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**Table 2: Network Coverage**



**Table 3: Internet Consumption**



From the data in the tables above, it may be noted that: -

1. In Africa, and elsewhere in the world, both mobile and broadband subscriptions are growing rapidly. For example, between 2010 and 2020, broadband subscriptions in Africa grew by a factor of more than 2600% Mobile broadband subscriptions is far and away the dominant mode of broadband growth;
2. In 2020, network coverage by a generic mobile cellular network was approaching 100% in all regions (e.g. 82% in Africa.), However, considerable regional disparities exist with regard to coverage by LTE/WiMAX technologies, guaranteed to deliver quality broadband services. In Africa, only 17.9% of the rural population were covered by LTE/WiMAX networks;
3. Between 2015 and 2020, the international bandwidth in all regions more than doubled, indicating increasing demand for digital connectivity;
4. Whereas mobile broadband subscriptions are approaching saturation in the Americas and in Europe, the two regions record steady growths in international bandwidth and the proportion of individuals using the internet. This implies that there will be room for growth for cable technologies, including optical fibre technologies in supporting future growth in data traffic; and
5. Africa lags other regions with respect to access and consumption of ICT services. Given that the demand for ICT services is steadily increasing in Africa, the low ICT access suggests huge potential for investment in ICT infrastructure and services, including digital connectivity infrastructure.

Traffic has continued to grow in Africa. Two major factors are responsible for the rapid growth in international Internet capacity in sub-Saharan Africa. One, launch of submarine cable system on the east coast such as SEACOM, TEAMS, and EASSy and submarine cable systems Glo-1, Waksman ACE on the west coast, and two, Installation of new high-capacity terrestrial fibre links built in countries such as Zambia, Malawi, and Tanzania and many other countries. Combined, all the two factors have spurred Sub-Saharan Africa‘s rapid growth, increased market competition, and lowered prices.

The increased connectivity has had limited effect in reducing information inequality in Africa unless the majority can be connected to the internet. Africa has the smallest internet bandwidth in the world both within the continent and connections to the outside world. According to the ITU[[2]](#footnote-2) International bandwidth usage in 2021 reached a worldwide total of 932 Tbit/s, up from 719 Tbit/s in 2020. This is a 30 per cent increase, and it follows a similar increase to that of the previous year. The highest regional total for international bandwidth use is in the Asia-Pacific region at over 400 Tbit/s, twice as high as in Europe (204 Tbit/s) or the Americas (180 Tbit/s) Africa is lowest at less than (50 Tbits). On a per-user basis, it is Europe that leads, at 340 kbit/s per Internet user, followed by the Americas at 214 kbit/s and the Arab States at 174 kbit/s and Africa is lowest at 50 Kbit/s.

In terms of Affordability to connect to internet services, more than 75% of Sub Sahara African countries have affordability levels that exceed the 2% of GNI Broadband commission 2025 target.[[3]](#footnote-3)

Thus, despite the growth, digital benefits are not spreading rapidly enough in Africa, because many people are still offline and cannot fully participate in the digital economy. The digital divide persists across gender, geography, age, and income dimensions within each country. For example, women are less likely than men to use or own telephones. In 2019, it was estimated that globally 55 per cent of the male population was using the Internet, compared with 48 per cent of the female population.[[4]](#footnote-4)

In order to grow the African ICT sector there is a need to invest in Physical in infrastructure in the last mile, intermediate and backbones. 5G and $G networks are key technological development for the last mile connection to the end user. The Terrestrial and submarine cables and satellites for the long-distance connection (backbone) as major channels of data transmission. Internet exchange points (IXPs) for connecting networks and peering locally the Internet traffic, as well as of the cloud market and data centers for data storage are essential platforms in expanding digital presence[[5]](#footnote-5)

## Transmission Infrastructure

To support the growth in telecommunications traffic, there has been in recent times, massive deployment of telecommunications transmission infrastructure. The transmission infrastructure provides for connectivity to carry information in a network. The technical and economic characteristics of backbone networks place them at the heart of communications infrastructure and strongly affect the commercial viability of communications services, particularly broadband connectivity.

Transmission infrastructure is required to collect traffic from consumers at one end (i.e. uplink traffic), transport it across networks, and eventually distribute/deliver it to corresponding consumers at the other end of the end-to-end connectivity chain (i.e. downlink traffic). Both cable and wireless transmission technologies are deployed in networks, and this technology mix will certainly endure. For cable technologies, optical fibre cable (‘’OFC or ‘’fibre) is increasingly emerging to be the dominant technology, owing to the exceptional reliability and phenomenal traffic carrying capacity of fibre systems. It is estimated that about 99 per cent of international traffic goes through submarine cables (ITIF, 2019). Their advantage over other channels, such as satellites and wireless transmission, is that fibre cables can carry far more data at far less cost.[[6]](#footnote-6)

The process of supplying communications services can be thought of as a supply chain. At the top of the chain is the international connectivity that provides links to the rest of the world. At the second and third levels are the regional and domestic backbone networks that carry traffic from international communications infrastructure and within countries. The fourth level is the “intelligence” in the networks that route traffic. Below this are the access networks that link core networks to customers. Finally, there is a suite of retail services, including customer acquisition, billing, and customer care, that allows providers to function. The hierarchical nature of networks means that the volume of traffic carried by backbone networks is relatively high compared to the access.

Backbone networks have a major impact on the commercial viability of ICT services, particularly broadband. In a telecommunication network, the backbone network accounts for 10–15 percent of total network costs. The cost of backbone networks is much higher for operators providing broadband connectivity, particularly in small towns and rural areas. Backbone networks have high fixed costs and low variable costs, which means that the average cost of capacity falls as traffic volumes increase.[[7]](#footnote-7)

The projected growth in ICT will mean that a considerable amount of traffic will require a transport and transmission network with adequate capacity requirements to meet the expected demand. Additional new technologies such as 5G with enhanced data rates will require far more capacity. This makes OFC deployments key for enhancing connectivity.

## Fibre deployments in Africa

Fibre deployments have enormously increased in many countries, demonstrated by widespread deployments of last-mile fibre systems (Fibre-to-the-Premises and Fibre-to-the Home), fibre backhaul for 4G and 5G cellular networks, terrestrial backbone networks and submarine cable networks. The vast fibre investments belong to both public and private sector operators, such as governments, telecom operators, and utility operators (e.g., electric power and oil and gas utilities). The governments of countries such as Botswana, Burundi, Kenya, Rwanda, Tanzania, Malawi, Uganda, and Zambia have invested in countrywide optical fibre backbone networks. These government investments in backbone networks often supplement private sector investments by telecom operators and utility operators, particularly electric power utilities.

Today, submarine cable connectivity is the dominant mode for international digital connectivity. Consequently, there’s widespread deployment of submarine cable networks around the world. In the EA-SA-IO region, submarine cable networks with landing stations in the EA-SA-IO region include SEACOM, EASSy, SEAS, TEAMS and LION2 in the East Coast while the West Coast has SAT3/SAFE, SACS, WACS, and ACE[[8]](#footnote-8).

Besides submarine and terrestrial backbone networks, the Region has also recently witnessed an uptake in the deployment of last mile broadband networks, particularly wireless 4G networks. Currently, the deployment of last mile fibre networks is majorly confined to urban areas

## Challenges of the Regional fibre infrastructure

While the basic ICT infrastructure is already in place consisting of cross-border, intra-and inter-regional broadband infrastructure which mainly consist of broadband network transmission links and nodes. The transmission links consists of terrestrial underground and overhead and submarine fibre optic cables, microwave links and satellite links. However, the regional infrastructure has been implemented inefficiently due to lack of development in other sectors. The network connectivity is not well balanced between the inland connectivity and the submarine connectivity. Landlocked countries on the continent are the most affected with unreliable fibre connectivity.

While the submarine cables have been developed on both the western and eastern cost of Africa the in land connectivity remains fragmented with a lot of gaps in terms of physical connectivity, efficient traffic routing and with a lot of inefficient duplication of networks. Because of the deployment of networks is quite inefficient, mostly the services are of poor quality and expensive especially for inland countries with no direct connectivity to the sea.

The backbone infrastructure of incumbent operators has been expanded and upgraded steadily over time, often taking advantage of other infrastructure networks such as electricity, railway networks, and oil and gas pipelines. However, though, in many cases, these networks are available for use by other operators and service providers, but the latter are sometimes discouraged by high prices and/or low quality services. This situation has led mobile operators to build their own backbone networks thus duplicating infrastructure which is economically inefficient.

Though cross-border terrestrial networks are expanding rapidly in Africa Carriers still largely use intra-African capacity to interconnect with submarine cable stations for onward transit to Europe, rather than to facilitate the exchange of African traffic. This can mainly be attributed to lack of local content and competition. Most African ISPs continue to purchase international private lines to Europe, particularly London, where they then buy IP transit at major Internet exchanges. Most transactions remain at the STM-1 level and low capacity requirements correspond with high unit prices. Accordingly, Africa endures some of the most expensive transit prices in the world.

Thus, there is a need to create an efficient network connectivity which can increase network stability and usage with direct connectivity links between countries. In order to reduce the Internet traffic transit cost and improve service quality, the regional backbone network connectivity should be improved together with increased numbers of IXPs at national and regional level.

Whereas there are widespread fibre deployments in the Region, it’s increasingly apparent that the deployments are not optimal; invariably OFC concentration is exceedingly higher in urban areas than in rural areas, and disparities exist even among urban neighbourhoods. Additionally, fibre deployments along the Region’s economic corridors[[9]](#footnote-9) are unequitable: there may be multiple fibre deployments in one section of a corridor, yet no deployment in some other section (i.e., missing links). Again, some corridors have no fibre deployment altogether. As well as the interconnection between corridors is missing.

Besides suboptimal deployment, other challenges persist in the Region’s OFC infrastructure. Incidents of fibre connectivity outages raise questions on the quality of fibre networks, access to existing fibre infrastructure is ordinarily not governed by open access principles and realizing cross-border fibre interconnections and market access is exceedingly challenging.

Policy and regulatory frameworks are required to address the challenges. Specifically, the frameworks will:

1. Remove regulatory obstacles to investment and competition
2. Remove constraints on the market for backbone services
3. Reduce investment costs by facilitate access to passive infrastructure
4. Promote open access and infrastructure sharing to enhance utilization of existing fibre infrastructure
5. Reduce political and commercial risks
6. Support the adoption and enforcement of fibre and construction standards to foster quality of fibre network services;
7. Promote coordination among the ICT operators and other utilities to facilitate integrated infrastructure development; and
8. Facilitate regional cooperation for the planning, development and operation of broadband backbone networks.

# ASSIGNMENT OBJECTIVES

## Overall Objective of the assignment

The overall objective is to carry out a study to identify the major technical, commercial and policy constraints regarding access to existing fibre optic infrastructure and recommend and develop appropriate policy and regulatory interventions to improve access and investments.

The specific objectives, aligned to the activities of the Programme Action Document, and containing related sub-activities, are as follows:

1. Carry out a study to identify the major technical, commercial and policy constraints regarding existing and future fiber optic networks. The study should:-
2. Determine the existing fibre networks deployments and identify the major missing links in the Region.
3. Define the role of alternative infrastructure in provision of fibre optic networks through its primary infrastructure (i.e. power grids, roads, railways, oil and gas pipelines) in the provision of broadband Internet services;
4. Define an optimal ICT optic fibre network architecture including internet exchange points and data centers to realize full interconnectivity among region Member States and the rest of the world.
5. Undertake an analysis on policy and regulatory environment, the market, business and investment for fibre networks and make appropriate recommendations;
6. Develop model policy and regulatory framework on open access and infrastructure sharing to ease investments into regional communications infrastructure; and
7. Design strategic frameworks for regional cooperation on deployment and use of backbone fibre networks.

# DETAILED SCOPE OF WORK

## Activity 1: Carry out a study to identify the major technical, commercial and policy constraints regarding existing and future fiber optic networks.

The purpose of the survey is to obtain data, information and opinions on the existing status of the fibre infrastructure in the Region, covering the technical, commercial and policy aspects. The exercise, to be undertaken by desk study and field visits, comprise the tasks below.

The consultant will review previous and ongoing relevant assessments and studies including the Baseline Survey and Stakeholder Mapping undertaken under the Programme to obtain as much relevant data and information as may be available. The review will mainly be a literature review as well as possible interviews with other development partners supporting ongoing related initiatives.

* + 1. ***Sub-activity 1: Determine the existing fiber networks deployments and identify the major missing links in region.***

**Task 1**: Identify the major economic corridors traversing and serving the EA-SA-IO Region and obtain the current and planned backbone fibre network nodes and links therein.

**Task 2:** Identify the submarine cable networks on the Eastern and Western coasts of the Region and for each network identify the landing stations, capacity, utilization, and international transit points.

**Task 3**: For selected countries within the EA-SA-IO Region, obtain the information as in Table 4 below.

**Table 4: Technical and Commercial information**

|  |
| --- |
| **Table of Required Information**  |
| **Supply of fibre infrastructure**1. Total number of access fibre lines.
2. Number of active-network fibre lines
3. Number of passive-network fibre lines
4. Average number of fibre cores in access fibre cable
5. Proportions of underground and aerial access fibre cables
6. Total lengths of duct for access fibre, metro fibre, and backbone fibre
7. Duct occupancies for access fibre, metro fibre, an backbone fibre
8. Total number of add/drop multiplexors for metro and cellular fibre backhaul
9. Total number of cellular radio base stations with fibre backhaul
10. Percentage of cellular radio base stations with fibre backhaul
11. Average number of fibre cores in metro fibre cable
12. Proportion of underground and aerial metro fibre
13. Total length of backbone fibre in each economic corridor
14. Total length of missing fibre links in each economic corridor
15. Installed capacity of submarine cable networks
16. Number of cross-border fibre interconnection stations
17. Number of international borders without cross-border fibre interconnections
18. Average number of fibre cores in backbone fibre cable
19. proportions of underground and aerial backbone fibre cables
20. Number of submarine fibre cable landing stations
21. installed capacity of each submarine cable network
22. Average number of fibre cores in a submarine fibre cable)
23. Number of IXPs
24. Number of data centres.

**Demand of fibre infrastructure:** 1. Total broadband subscriptions
2. Broadband fibre subscriptions
3. Broadband fixed wireless subscriptions
4. Mobile broadband subscriptions
5. Proportion of business broadband subscriptions
6. Proportion of residential broadband subscriptions
7. Utilization of metro fibre network
8. Proportion of access fibre lines on leased dark fibre
9. Proportion of metro fibre connections on leased dark fibre
10. Maximum utilization of backbone fibre on each economic corridor
11. Proportion of backbone fibre connections on leased dark fibre
12. utilization of submarine cable networks
13. Domestic voice traffic
14. Domestic data traffic
15. International voice traffic
16. international data traffic
17. Utilization of international gateways
18. International mobile roaming traffic
19. Utilization of cross-border broadband interconnection stations

**Financing**1. Major funding sources for fibre investments (i.e., private, institutional, government, domestic, foreign)
2. Proportion of domestic v foreign investment funds
3. Proportion of private v institutional v government investment funds)
 |  **Costs**1. Civil works and fibre costs per meter for dense urban: with ducts, direct burial, and aerial
2. Civil works and fibre costs per meter for suburban: with ducts, direct burial, and aerial
3. Civil works and fibre costs per meter for rural soft ground: with ducts, direct burial, and aerial
4. Civil works and fibre costs per meter for rural rocky ground: with ducts, direct burial, and aerial
5. PON: Cost of final drop fibre per meter
6. PON: cost of final drop fibre installation per meter
7. PON: cost of fibre splitter
8. unit cost of duct access charges
9. AON: unit cost of optical line terminating equipment
10. AON: unit cost of customer premises equipment
11. AON: unit cost of rack and power supply
12. Access charges: unit cost of duct access for passive optical network
13. Access charges: unit cost of network connectivity for active optical network
14. Any other CAPEX cost that may be involved (transportation, taxation, project management etc)
15. Cost of access to land for fibre infrastructure development
16. OPEX Network operation costs

**Fibre tariffs**1. Monthly cost of access broadband fibre line/Mbps
2. Annual cost of metro fibre connection/Mbps
3. Annual cost of backbone fibre connection/Mbps
4. Annual cost of submarine cable connection/Mbps
5. Fibre tariff regulation, taxes and levies
6. Fibre provider pricing principles and models for both wholesale and retail services
7. International Termination Rates (ITRs) on fibre connectivity

**Standards**1. Adoption and enforcement of standards for all categories of fibre cable (e.g. multimode, single mode, armored, aerial, ducted, direct buried, tight buffered)
2. Fibre construction standards for various installation environments (e.g. soft/rocky ground, concrete pavement, bitumen pavement, road crossings, valley crossings)

**Miscellaneous**1. Access to land and rights of way (Wayleaves and zoning requirements)
2. Challenges faced in fibre infrastructure development and the measures taken to overcome the challenges

**KEY**:AON: Active Optical NetworkPON: Passive Optical Network |

### Sub-activity 2: Undertake an analysis on the policy and regulatory environment, market, and business and investment

**Task 4**: Determine ICT sector structure (i.e., presence of a separate ICT regulator; number of fixed network operators; list of mobile network operators (MNOs); list of fibre providers for each of access, metro, backbone, and submarine market segments

**Task 5**: Assess the following policy and regulatory elements and make recommendations aimed at promoting sustainable investment and operation of fibre networks:

1. Open access and infrastructure sharing;
2. Procedures for land acquisition, access to rights of way, and construction permits; and
3. Adoption and enforcement of standards for optical fibre cable and codes of practice for fibre cable installation.
4. Broadband strategies

**Task 6**: Study the licensing framework for fibre providers and define alternative fibre providers. Discuss the following fibre licensing options and propose selection criteria for the licensing options:

1. Liberal licensing framework permitting any provider to invest in access, metro and backbone fibre networks;
2. Restricted licensing framework permitting only telecom network operators to invest in metro and backbone fibre networks;
3. Stringent licensing framework permitting only incumbent fixed line operator to invest in backbone fibre networks; and
4. Other option for the licensing framework (Please specify the option)

**Task 7:** Assess the feasibility of granting a fibre operator the responsibility and the means to provide universal access for broadband fibre.

**Task 8:** Describe the dispute settlement mechanism related to infrastructure sharing and ascertain the main disputes settled by the regulator or competition authorities, if applicable.

**Task 9**: Review international best practices for the resale or lease of fibre by alternative fibre optic networks. The review should include:

1. A brief presentation on alternative optical fiber utility operators, and their fibre optic networks;
2. A description of the regulatory framework and obligations (in particular open and non-discriminatory access) necessary for the resale of excess capacity on their fiber optic networks;
3. Examples of business models, profitability and financial structure (e.g., revenue sharing);
4. A description of the reference offer established;
5. A description of the arrangements made by utility-type companies for the resale of excess capacity on their fibre optic networks.
6. The number of client operators and nature of the services used; and
7. Possible PPP models defining the ownership and management of the infrastructure

**Task 10**: Examine the availability of geographic information systems (GIS) for optical fibre development and recommend strategies for the development and maintenance of such systems

### Sub-activity 4: Undertake a Techno- Economic analysis of Optical Fibre Networks

Besides the policy and regulatory environment, the other factors that influence decisions to invest on fibre infrastructure includes the existing fibre market condition, namely the prevailing supply and demand of fibre infrastructure and services. Therefore, undertaking an analysis of the actual and potential supply and demand of fibre infrastructure is valuable in promoting fibre investments.

Further, various business models exist for an investor contemplating entering the market for fibre network services. These models include building a new fibre infrastructure with attendant civil works (New Build); renting duct space to install new fibre and subsequently build own network (Duct Access); leasing dark fibre to build own network (Passive Network Access); and connectivity to an existing optical network (Active Network Access). The attendant costs for each of these models vary, as do the overall competition cost for the industry.

Using scenario mapping or any relevant methodology the consultant should perform the following:

**Task 11:** Propose scenarios based on services to be offered, customer preferences, technology evolution and obsolescence, market structure (level of competition), including licensing and universal Service impacts. The definitions should be in the access, metro, backbone, and submarine segments.

**Task 12:** Carry a detailed marketing analysis taking into consideration the various market attributes which includes but not limited to market segmentation, service types penetration of services, willingness to pay (per service per segment), tariffs (annual fees, usage fees, connection fees), operator market shares and churn rates. From the Market analysis determine the following:

1. Annual penetration and market share per service and market segment for assumed study period;
2. Annual generated traffic for each service per market segment; and
3. Annual revenues per service and market segment.

**Task 13:** Based on the results of the market analysis. Task 11. For each scenario determine the Reference Network Architecture. The reference network architecture should include;

1. The description of relevant technologies, systems and architectures to provide the services for each scenario in the access, metro, backbone, and submarine segments
2. A list of number of each network element needed in order to satisfy the capacity and quality of service demands related to the services and their attributes.
3. Grouping of cost elements into various classes e.g., to network level, functionality or type of technology

**Task 14:** from the results of task 12: Determine the cost evolution of network components and operations for each network segment in the access, metro, backbone, and submarine segments. These should include:

1. Annual investment for each network components;
2. Annual maintenance cost for each network component; and
3. Annual amount for each type of operation and administration costs.

**Task 15:** Based on the selected scenario’s, market analysis, reference and architecture and costing done determine the following:

1. Financial analysis: earnings before interest, taxes, depreciation, and amortization (EBITDA), net present value (NPV), cash flows, return on investment (ROI), etc;
2. Uncertainty quantification in techno-economic models (sensitivity analysis, Monte Carlo, etc.); and
3. Business models and risk assessments.

### Sub-activity 4: Make appropriate Recommendations

**Task 16:** Based on the findings of Task 1- 14 make recommendations on best practise on:

Network architecture, Business Models, Legal and regulatory requirements etc

### Sub-activity 5: Prepare Draft Final Report of the Study

Upon completing the sub-activities above, prepare a Draft Final Report of the Study comprising (i) baseline data on optical fibre infrastructures, (ii) policy and regulatory analysis, (iii) techno-economic analysis, and (iv) Recommendations. The Draft Final Report shall be subjected to stakeholder validation, and subsequently revised to accommodate the outcome of the stakeholder validation

**Task 17**: Prepare a Draft Final Report of the Study, including but not limited to

1. Introduction and methodology
2. Baseline data on optical fibre infrastructure
3. Analysis on policy and regulatory environment, market, business, and investment
4. Techno-economic analysis of optical fibre networks
5. Recommendations

**Task 18:** Undertake stakeholder validation of the Draft Final Report of the Study. COMESA Secretariat will be responsible for the logistical aspects of the stakeholder validation exercise, while the consultant will prepare and deliver all the technical materials for the validation.

**Task 19:** Revise the Draft Final Report to accommodate the outcome of the stakeholder validation and produce a Final Report.

## Activity 2: Develop harmonized policy and regulatory frameworks for open access and infrastructure sharing (Activity 3.2.2 in Action Description).

Upon undertaking the study and preparing relevant output documents, the next logical step would be to draft appropriate policy and regulatory frameworks for open access and infrastructure sharing for optical fibre infrastructures. And in keeping with standard practice, a draft policy and regulatory framework is accompanied by an Explanatory Note or Memorandum, presenting the rationale for developing the framework.

### Sub-activity 4.2.1: Prepare an explanatory note for open access and infrastructure sharing for fibre networks.

Broadly speaking, the Explanatory Note will seek to provide brief answers to the following questions (i) Why should there be a regional policy and regulatory framework for open access and infrastructure sharing for fibre networks (ii) What are the broad policy issues that the policy and regulatory framework will seek to address? (iii) How will the regional policy and regulatory frameworks be anchored in the treaties establishing each of COMESA, EAC, SADC, IGAD, and IOC; (iv) In essence, what are the principles, content and procedures for regional policy and regulatory framework for open access and infrastructure sharing.

In developing the Explanatory Note, references may be made to the baseline assessment and best practices from other jurisdictions and international institutions.

**Task 20**: Prepare an Explanatory Note for regional policy and regulatory framework for open access and infrastructure sharing for optical fibre networks.

### Sub-activity 4.2.2: Develop model policy and regulatory framework for open access and infrastructure sharing of fibre networks

The draft Framework will be developed taking into consideration the Report of the baseline assessment and the Explanatory Note.

**Task 21** Prepare draft Policy and Regulatory Framework for open access and infrastructure sharing on optical fibre networks.

The draft Framework will be based on the following outline, among others:

1. Part I: Preliminaries
2. Part II: Policy framework and procedures for open access and infrastructure sharing for fibre networks
3. Part III: Technical and operational terms for open access and infrastructure sharing for fibre networks
4. Part IV: Commercial terms for open access and infrastructure sharing for fibre networks
5. Part V: Enforcement mechanisms
6. Part VI: Miscellaneous provisions
7. Part VII: Schedules and Appendices

### Sub-activity 4.2.3: Develop Reference Offer (i.e. Model Infrastructure Sharing Agreement)

The availability of a Reference Offer (RO) may considerably facilitate the negotiation and conclusion of standardized infrastructure sharing agreements between incumbent fibre operators and investors intending to invest on fibre network services. Parties to the agreement may customize the RO to suit their unique requirements.

 **Task 22**: Develop a Reference Offer for sharing optical fibre infrastructures.

**Task 23:** Prepare a draft Final Report for policy and regulatory framework for open access and infrastructure sharing, consisting of

1. Explanatory Note for policy and regulatory framework for open access and infrastructure sharing for fibre networks
2. Model policy and regulatory framework for open access and infrastructure sharing for fibre networks

### Sub-activity 4.2.4: Prepare Draft Final Report for policy and regulatory framework for open access and infrastructure sharing

The Draft Final Report for policy and regulatory framework for open access and infrastructure sharing, shall comprise (i) an explanatory note, (ii) draft policy and regulatory framework, and (iii) draft reference offer.

**Task 24:** Prepare Draft Final Report for policy and regulatory framework for open access and infrastructure sharing containing:

1. Explanatory note for policy and regulatory framework for open access and infrastructure sharing.
2. Draft policy and regulatory framework for open access and infrastructure sharing; and
3. Reference Offer for open access and infrastructure sharing

## Activity 3: Design strategic frameworks for regional cooperation on backbone fibre networks (Activity 3.2.3 in Action Description).

Facilitating investment and utilization of regional broadband backbone networks requires regional cooperation and partnerships whose strategic objective is enhanced coordination in the planning, development and operation of broadband backbone infrastructures and the digital applications and services thereon.

### Sub-activity 4.3.1: Defining the regional backbone network and developing draft strategic framework for regional cooperation on backbone network.

Firstly, it is necessary to establish a common understanding of what regional backbone networks are. Thereafter, a framework for regional cooperation on long haul backbone networks may be developed and adopted.

**Task 25**: With reference to the development corridors as well as existing and planned backbone nodes and links, propose a dual-layer structure for a regional long haul backbone network comprising a comprehensive network and a basic network. The comprehensive network shall consist of all existing and planned nodes and links in all the corridors. The basic network shall be a subset of the comprehensive network, containing nodes and links with high strategic importance for national development and regional integration[[10]](#footnote-10).

**Task 26**: Prepare a map and list of nodes and links of the Comprehensive and the Basic Networks.

**Task 27**: Propose a list of key digital applications and services required for trade facilitation and regional integration (e.g. electronic single windows, digital payment systems). Assess the feasibility of requiring such applications and services to be anchor services on the broadband backbone networks.

**Task 28**: In line with the REC treaties and national policies and laws, draft an explanatory memorandum justifying a strategic framework for regional cooperation in the planning, development, and operation of regional backbone networks.

**Task 29**: With reference to the baseline data, the explanatory memorandum, and international best practice, develop Draft Framework for Regional Cooperation on Backbone Networks (Framework for Backbone Networks). The draft framework may incorporate the following outline:

1. Part I: Preamble
2. Part II: General principles and undertakings with respect to policy of OFC on, common standards, maintenance of networks, common tariffs, interconnection, security of networks, future expansions
3. Part III: The Comprehensive Network
4. Part IV: The Basic Network
5. Part V: Digital Applications and Services for Regional Integration
6. Part V: Corridors and Corridor Coordination
7. Part VI: Miscellaneous Provisions
8. Part VII: Annexes
9. Maps of the Comprehensive Network and the Basic Network
10. Lists of Nodes in the Comprehensive Network and the Basic Networks

### Sub-activity 4.3.2: Prepare Draft Final Report for Strategic framework on regional cooperation for backbone networks

The consultant shall prepare a Draft Final Report for strategic framework for regional cooperation on backbone networks, comprising (i) an explanatory memorandum, and (ii) draft strategic framework for cooperation.

**Task 30:** Prepare Draft Final Report for strategic framework for cooperation containing:

1. Explanatory memorandum for strategic framework for regional cooperation
2. Draft strategic framework for regional cooperation on backbone networks

### Sub-activity 4.3.3: Stakeholder validation for Draft Final Reports for frameworks

**Task 31:** Undertake stakeholder validation of the (i) Draft Final Report for Policy and Regulatory Frameworks for Open Access and Infrastructure Sharing and (ii) Draft Final Report for Strategic Framework for Regional Cooperation on Backbone Networks. COMESA Secretariat will be responsible for the logistical aspects of the stakeholder validation exercise, while the consultant will prepare and present all the technical materials for validation.

### Sub-activity 4.3.3: Final Reports of frameworks

**Task 32:** Upon finalization of the stakeholder validation process, revise the documents of the two Draft Final Reports (i.e. Draft Final Report on policy and regulatory framework for open access and infrastructure sharing and Draft Final Report on strategic framework for regional cooperation) into two separate Final Reports for subsequent submission to the REC Council for consideration and approval.

# DELIVERABLES

There shall be seven (7) deliverables for this Assignment, namely: -

1. Inception Report
2. Draft Final Report of the Study
3. Final Report of the Study
4. Draft Final Report for Policy and Regulatory Framework for Open Access and Infrastructure Sharing
5. Draft Final Report for Strategic Framework for Regional Cooperation on long haul Backbone fibre Networks,
6. Final Report for Policy and Regulatory Framework for Open Access and Infrastructure Sharing; and
7. Final Report for Strategic Framework for Regional Cooperation on Backbone Networks

# TIMELINES

## Commencement Date and Period of Implementation

The assignment is estimated to be completed within a period of Two Hundred and Ten (210) calendar days, commencing from the date of contract signature.

## Table of Deliverables

The timing of the deliverables for the assignment are as indicated in the table below. The Inception, draft final reports and final report shall be submitted electronically.

**Table 3: Deliverables**

|  |  |
| --- | --- |
| **Deliverables** | **Timeline** |
| Contract Signature – T0 | T0 |
| Inception Report including Detailed Work Plan – T1 | T0 + 30 calendar days  |
| Draft Final Report of Study – T2 | T1 + 60 calendar days |
| Final Report of Study – T3 | T2 + 45 days |
| Draft Final Reports for (i) Policy and Regulatory Framework for Open Access and Infrastructure Sharing and (ii) Strategic Framework for Cooperation – T4 | T3 + 30 calendar days |
|  Final Reports for (i) Policy and Regulatory Framework for Open Access and Infrastructure Sharing and (ii) Strategic Framework for Cooperation – T5 | T4 + 45 calendar days |

# QUALIFICATION AND EXPERIENCE OF EXPERTS

COMESA is seeking applications from firms and/or consortiums of consultants comprising at least a telecommunications engineer, an economist, and a lawyer. The lead consultant and support consultant should have a minimum of the following qualifications and experience:

## Lead Consultant/Telecommunications Engineer

### Qualifications

1. A minimum of a master’s degree in telecommunications engineering or computer science

### Professional experience

1. At least 15 years’ experience in telecommunications engineering, particularly carrier networking. Experience with optical fibre networks is an advantage
2. Postgraduation experience in policy, regulatory and/or legislative oriented work in telecommunications industries.
3. Regional experience in EA-SA-IO Region and work experience in Sub-Saharan Africa
4. Leadership/management experience.
5. Excellent communication and report writing skills in at least one of the official languages of COMESA

## Economist

### Qualifications

1. A minimum of a master’s degree in economics, finance, mathematics, or statistics

### Professional experience

1. At least 10 years’ post-graduation experience in policy, regulatory and/or legislative oriented work in network industries.
2. Demonstrable knowledge and skills in market analysis and econometric modelling including costing models
3. Leadership/management experience.
4. Regional experience in EA-SA-IO region and work experience in Sub-Saharan Africa.
5. Excellent communication and report writing skills in at least one of the official languages of COMESA.

## Legal consultant

1. A minimum of a master’s degree in law

### Professional experience

1. At least 10 years’ experience in administrative law, policy and regulatory environment
2. Demonstrable knowledge and experience on legislative drafting
3. Leadership/management experience.
4. Regional experience in EA-SA-IO region and work experience in Sub-Saharan Africa.
5. Excellent communication and report writing skills in at least one of the official languages of COMESA.

# PLACE OF ASSIGNMENT

Flexible, provided that online calls and a video conference are possible with at least two travel missions to Lusaka, Zambia and at least one visit to EAC, IGAD, IOC and SADC (interviews presentation of draft, validation workshop, etc.). Missions to selected Member/Partner States and other locations of interest to the development of regional backbone networks. Mission to at least two cross border interconnection points and at least two submarine landing sites and at least five IXPs

# SUPERVISION AND REPORTING

It is expected that the consultant will work in very close coordination with the COMESA Secretariat, providing regular, unsolicited updates, and responding promptly and flexibly to the needs and demands of COMESA and the corresponding timelines. Overall reporting will be to Director of Infrastructure and Logistics. All reports shall be in electronic format in MS Word, Excel or PowerPoint as the case may be.

# DURATION

The tasks will be carried out over 210 calendar days within a seven months’ period from contract signature

# INSTRUCTIONS TO BIDDERS

1. **Eligibility to Tender**

This tender is open to all competent companies that have demonstrated and has the capacity, competence in the subject matter, . Company should have at least 5 years of proven experience performing in similar capacity upon inception.

1. **Cost of Tender**

The Bidder shall bear all costs associated with the preparation and submission of the bid. COMESA will, in no case, be responsible or liable for those costs, regardless of the conduct and outcome of the tender.

1. **Bid Currencies/Bid Prices**

All prices shall be quoted in United States Dollar.

1. **Tender Prices**

The tenderer shall indicate on the appropriate price schedule the unit prices and total tender price of the services it proposes to provide under the contract.

Prices indicated on the price schedule shall be the cost of the services quoted exclusive of all taxes in Zambia.

1. **Price Variation**

Prices quoted by the tenderer shall be fixed during the term of the contract. Quoted rates should include all overheads and profits. The rate should be firm for the entire contract period. There will be no price variation after signing of contract. Currency exchange fluctuations will be a non-factor.

1. **Period of validity of Bids**

The Bids shall remain valid for ninety (90) days after the closing date of tender submission.

In exceptional circumstances and prior to the expiry of the original tender validity period, the contracting authority may solicit the tenderers’ consent to an extension of the period of validity.

1. The request and the responses thereto shall be made in writing.
2. **Amendments of Bid documents**

At any time prior to the deadline for submission of Bids, COMESA, for any reason, whether at its own initiative or in response to a clarification requested by a prospective Bidder, may modify the Bidding Documents by issuing an addendum.

All addenda shall be posted on the COMESA website <http://www.comesa.int>. All bidders wishing to be notified of any addenda should provide to COMESA the bidders name and email address.

In order to afford prospective Bidders reasonable time in which to take the amendments into account in preparing their offers, COMESA may, at its discretion, extend the deadline for the submission of bids.

1. **Format and Sealing of Bids**

The Bidder shall prepare copies of the Technical bid and Financial bid in two separate emails, clearly marking one as “Technical Proposal " and the other as "Financial Proposal” with a password for the financial proposal, we shall only request for the password to the financial Proposal if the bidders technical proposal scores 70 and above.

The tenders should be emailed to Procurement@comesa.int not later than **28th  July 2022** at 15.00 hrs Lusaka time and should be marked “**CONSULTANCY FOR A STUDY AND DEVELOPMENT OF POLICY AND REGULATORY FRAMEWORKS ON OPTICAL FIBRE INFRASTRUCTURE”** DO NOT OPEN BEFORE **28th July 2022** at 15.00 hrs Lusaka time.

1. **Methodology**

The methodology, schedule and design should be stated and presented clearly

Each Proposal shall be evaluated by a selection committee utilizing a number of criteria, as specified in the table below:

|  |  |
| --- | --- |
| Understanding of the TORs | 10% |
| Specific experience of firm in relation to the assignment | 30% |
| Approach, Methodology and work plan | 30% |
| Proposed Team for the assignment | 30% |

However, this will be subject to the bidder attaining a pass score 70% of the obtainable score of 100 points in the evaluation of the technical proposals.

The weighting of quality and price will be applied as follows:

Score for Proposal ***=*** ({Lowest price } x20)+ ({Total quality score of Proposal} x80%)

 Price of Tender 100

The bidder who will have the highest ranked combined proposal will be selected.

1. **Technical Queries**

For any technical queries related to the terms of reference, kindly contact or send written enquiries to the following email address: procurement@comesa.int and copied to tenders@comesa.int

Note that the deadline for submitting questions is 25th October 2019 at 12hrs Lusaka Time.

1. **Ownership of Tenders**

COMESA retains ownership of all tenders received under this invitation to tender.

1. **Negotiation and Finalization**

After the selection of the best bid and notificatoin to the selected company, COMESA will commence negotiations with the company for purposes of concluding an agreement for the provision of the services.

1. **Award of Contract**

Prior to expiration of the period of bid validity, the Procurement Committee will award the contract to the qualified Bidder whose Bid has been evaluated to be the most responsive to the needs of the organization and activity concerned.

COMESA reserves the right to wholly or partially reject or award these contracts to any bidder and has no obligation to award this tender to the highest ranked bidder.

COMESA also reserves the right to annul the Bid process and reject all Bids at any time prior to award of contract, without thereby incurring any liability to the affected Bidder(s).

1. **Cancellation of the Tender**

In the event of cancellation of the tender, bidders will be notified in writing of the cancellation by the contracting Authority and informed of the reasons for cancellation.

If the tender is cancelled before the outer envelope of any bid has been opened, the unopened and sealed envelopes will be returned to the bidders.

1. **Signing of the Contract**

Within 14 days of receipt of the contract the successful Bidder shall sign and date the contract and return it to the COMESA Secretariat.

1. **Period of execution**

The period of execution of the contract starts from the date of the signing of the contract and will be for duration of Two hundred and tendays (210) days.

1. **Ethical conduct**

COMESA requires that Tenderers observe the highest standard of ethics during the selection and execution of such contracts. For this provision, the Purchaser defines the terms set forth below as follows:

1. “Corrupt practice” means the offering, giving, receiving, or soliciting of anything of value to influence the action of an officer of the Purchaser in the tendering process; and
2. “Fraudulent practice” means a misrepresentation of facts to influence the tendering process to the detriment of the Purchaser.

COMESA will reject a proposal for award if it determines that a Tenderer has engaged in corrupt or fraudulent activities in competing for the contract in question.

1. **Confidentiality**

Information relating to evaluation of bids and recommendations concerning awards, shall NOT be disclosed to the Bidders who submitted the bids or to other persons not officially concerned with the process, until the winning firm has been notified that it has been awarded the contract.

1. **Corrupt or Fraudulent Practices**

COMESA requires that Bidders/Suppliers/Firms observe the highest standard of ethics during the procurement and executions of such contracts.

For the purposes of this provision, COMESA defines the terms set forth below as follows:

1. "Corrupt practice" means the offering, giving, receiving or soliciting of anything of

 value to influence the action of a public official in the procurement process or in

 contract execution: and

 (b) "fraudulent practice" means a misrepresentation of facts in order to influence a procurement process or the execution of a contract to the detriment of the COMESA and includes collusive practice among Bidders (prior to or after bid submission) designed to establish bid prices at artificial non-competitive levels and to deprive COMESA of the benefits of free and open competition.

1. ITU Regional Key ICT Indicators, 2021 [↑](#footnote-ref-1)
2. ITU Key Facts 2021 [↑](#footnote-ref-2)
3. Broadband Commission for sustainable developed joint initiative by ITU and UNICEF formed in 2010 [↑](#footnote-ref-3)
4. <https://www.itu.int/en/mediacentre/Pages/2019-PR19.aspx> [↑](#footnote-ref-4)
5. UNCTAD Information Economy Report 2021 [Digital Economy Report 2021 (unctad.org)](https://unctad.org/system/files/official-document/der2021_en.pdf) [↑](#footnote-ref-5)
6. See Submarine Cable FAQs, available at www2.telegeography.com/submarine-cable-faqs-frequently-asked-questions. [↑](#footnote-ref-6)
7. [untitled (worldbank.org)](https://thedocs.worldbank.org/en/doc/761731434649062983-0190022009/original/IC4D2009Chapter4.pdf) Advancing the Development of Backbone Networks in Sub-Saharan Africa [↑](#footnote-ref-7)
8. <https://www.submarinenetworks.com/en/africa> [↑](#footnote-ref-8)
9. An economic corridor is a network of integrated infrastructure such as roads, railways, ports, backbone broadband, and electricity; linking towns, cities and countries; and designed to stimulate economic development (https://en.wikipedia.org/wiki/Economic\_corridor) [↑](#footnote-ref-9)
10. An example definition for the Basic Network may be ‘those parts of the Comprehensive Network that guarantees each country (i) access to at least one submarine cable network and (ii) at least one çross-border interconnection with each of its neighbours [↑](#footnote-ref-10)