AfricaConnect Extension Project

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European Union

Astec Global ICT Consortium
Implemented by Linpico
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NREN in Africa

- 55 Countries
- 1.02 billion people
- 12 million NREN users
- Estimated 4.5 (1.5 ESA+ 3.0 NA)million connected
- How much it costs to connect 7.5 million NREN user?

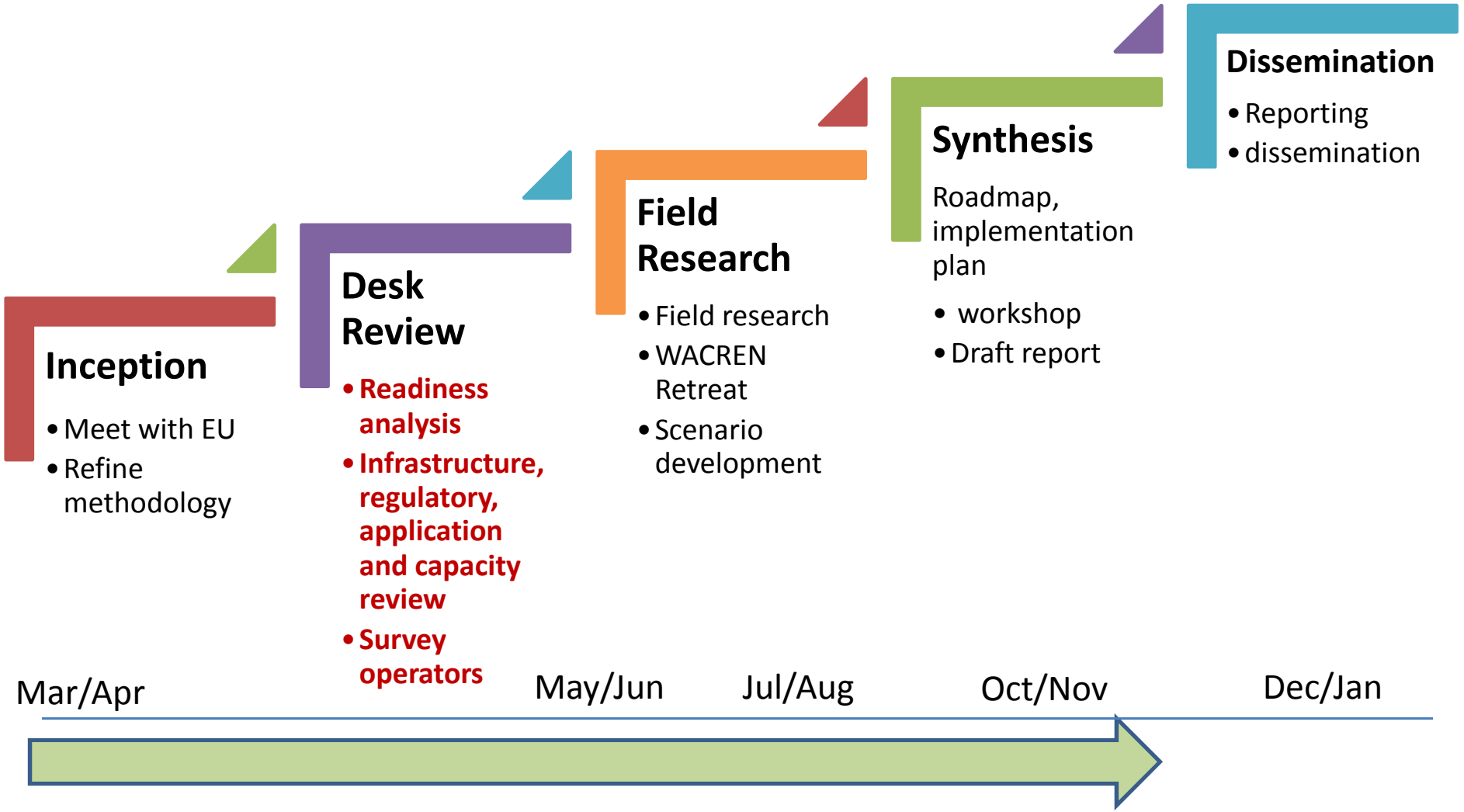
- Launched in November 2012
- Total budget of €14.75m, with 80% (€ 11.8 m) of the funding provided by the EDF building on a roadmap by FEAST
- Lasts for four years to 2015..
  - **the first of which was devoted to plan and procure the network**
  - **an operational phase**

Country	Students	Faculty	Researchers and others	Total NREN population	% of tertiary Student	Population in million
Kenya	259,080	9600	960	269,640	0.6	43.18
Malawi	47,730	2130	213	50,073	0.3	15.91
Mozambique	128,520	4500	450	133,470	0.51	25.2
Rwanda	81,366	2790	279	84,435	0.71	11.46
South Africa	819,040	48,000	4800	871,840	1.6	51.19
Sudan (not covered)	148,800	5600	560	154,960	0.4	37.2
Tanzania	176,786	5800	580	183,166	0.37	47.78
Uganda	327,150	12100	1210	340,460	0.9	36.35
Zambia	98,560	3500	350	102,410	0.7	14.08
Total	2,087,032	94,020	9,402	2,190,454		282.35

AfricaConnect Extension Project Objective

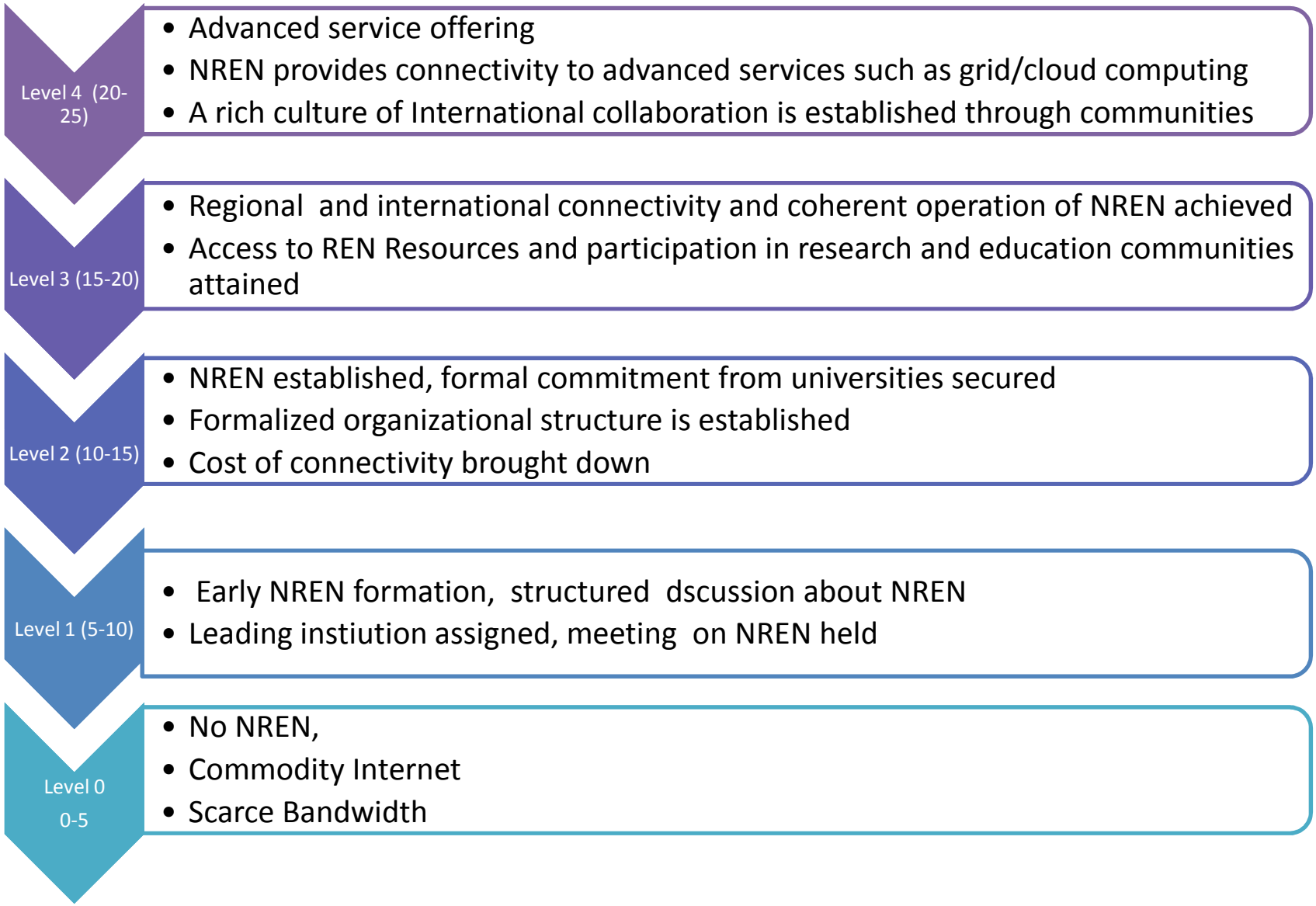
- Carryout feasibility study for extending the AfricaConnect project to West and Central Africa and beyond
- Goal: build the backbone and capacities of *existing* NRENs to enable them to link to each other and to their peers in other continents via GEANT.
- Covers 7.5 million users

Five Phases


Inception
• Meet with EU
• Refine methodology
Desk Review
• Readiness analysis
• Infrastructure, regulatory, application and capacity review
• Survey operators
Field Research
• Field research
• WACREN Retreat
• Scenario development
Synthesis
Roadmap, implementation plan
• workshop
• Draft report
Dissemination
• Reporting
• dissemination
Mar/Apr
May/Jun
Jul/Aug
Oct/Nov
Dec/Jan

Dimensions	National
Commitment	Government understanding of benefits, financial commitment, policy and regulatory endorsement
Coordination	Membership, sustainable governance, and management framework - institutions, champions, strategies Relevant national strategies in support of RENs
Connectivity	Commercial condition, regulatory endorsement and options for NREN backbone Steady equipment supply
Capability	Human resources and skills availability, certification and standards, training in internetworking and business development
Content and services	Sharable national resources, collaboration in OER, libraries, apps, national innovation systems
Cash (financial resources)	Public funds, donor fund, universal access funds for NREN backbone

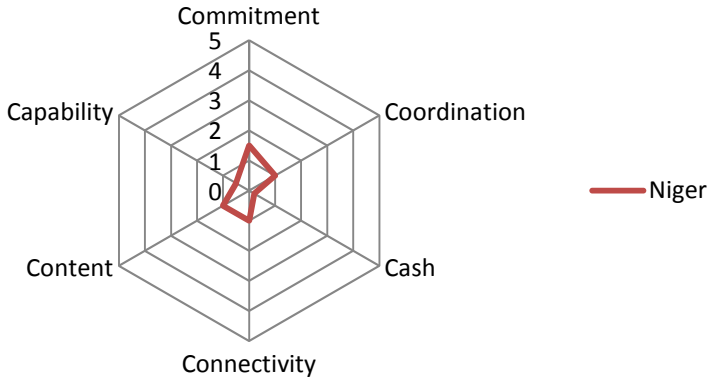
NREN CMM



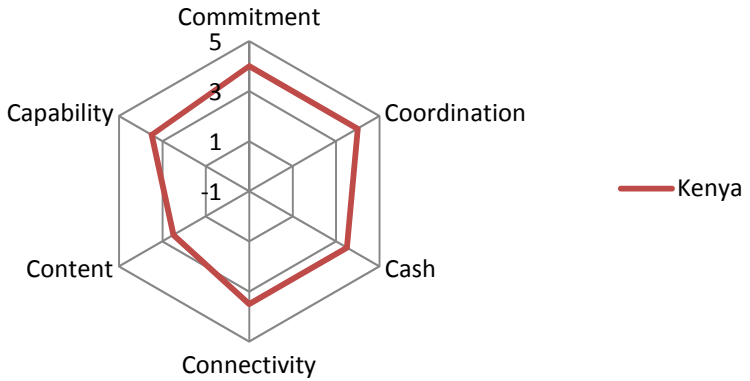
Source: Greeves

NREN Ecology in Selected Countries

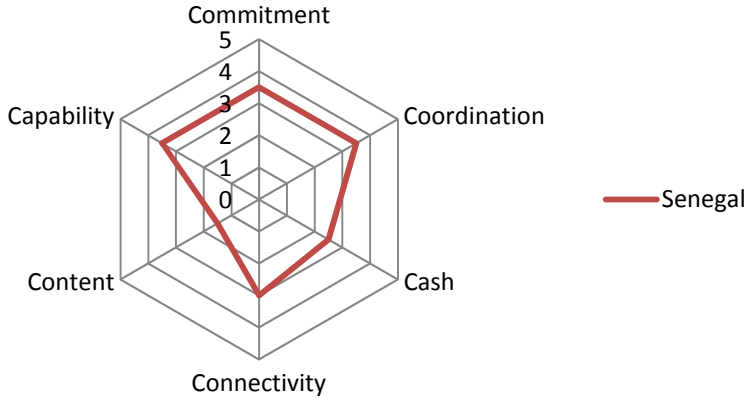
Niger



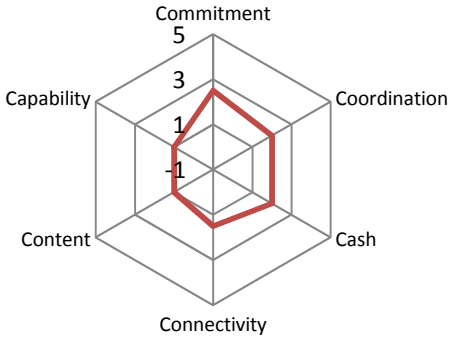
Kenya



Senegal



Uganda



1. Commitments - endorsement and resources matter
2. Champions and institutions nurture the relationship

2. Interaction and Consensus …

- Champions (director of corporate IT services from the largest university in a country),
- CTOs of the other universities that are expected to work closely with the champion,
- Leaders of tertiary education institutions (college deans, university presidents/vice chancellors, etc.),
- National university councils that accredit tertiary level institutions,
- Ministries responsible for higher education (e.g. Ministry of Education, Ministry of Science and Technology),
- Ministries responsible for communication (e.g. Ministry of Transport and Communication, Ministry of Communication and Information Technology)
- Communications sector regulator,
- Government IT agency,
- Ministry responsible for finance and economy (e.g. Ministry of Finance)
- Lead researchers or practitioners that are often regarded as national icons (e.g. lead surgeon, lead educator, etc.)

International Bandwidth

Current =18 Tbps

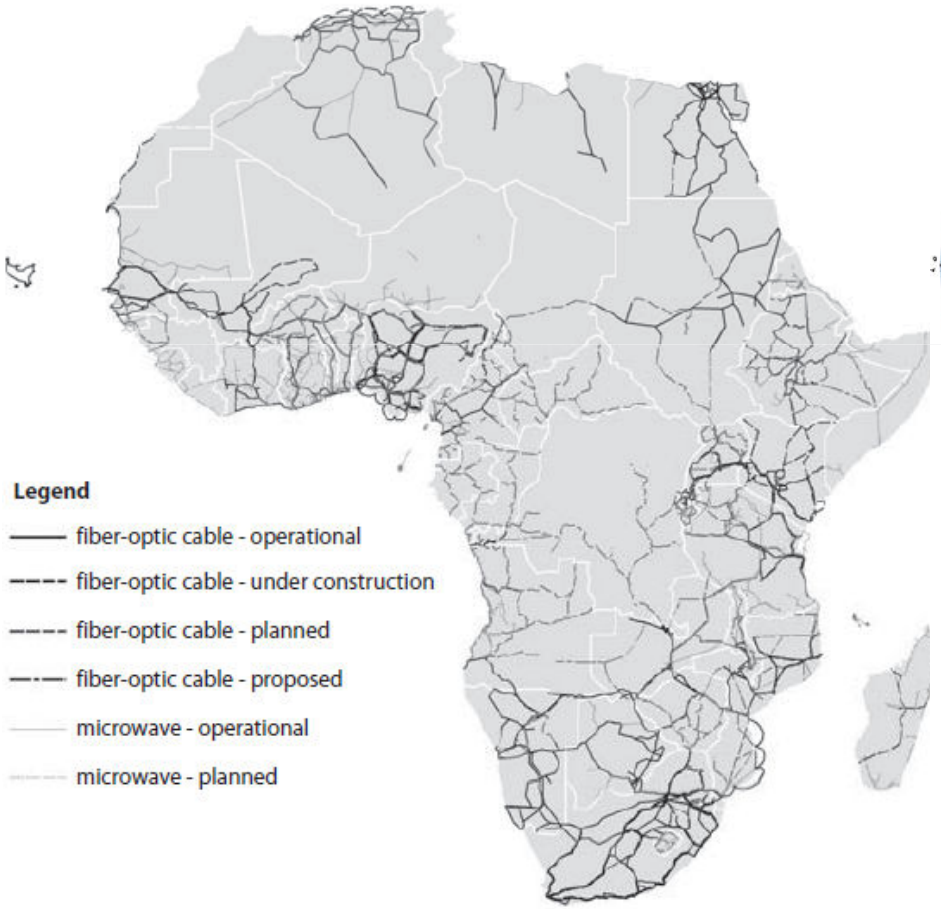
Future = 120 Tbps

1 -2 Tbps (less than 10% use)

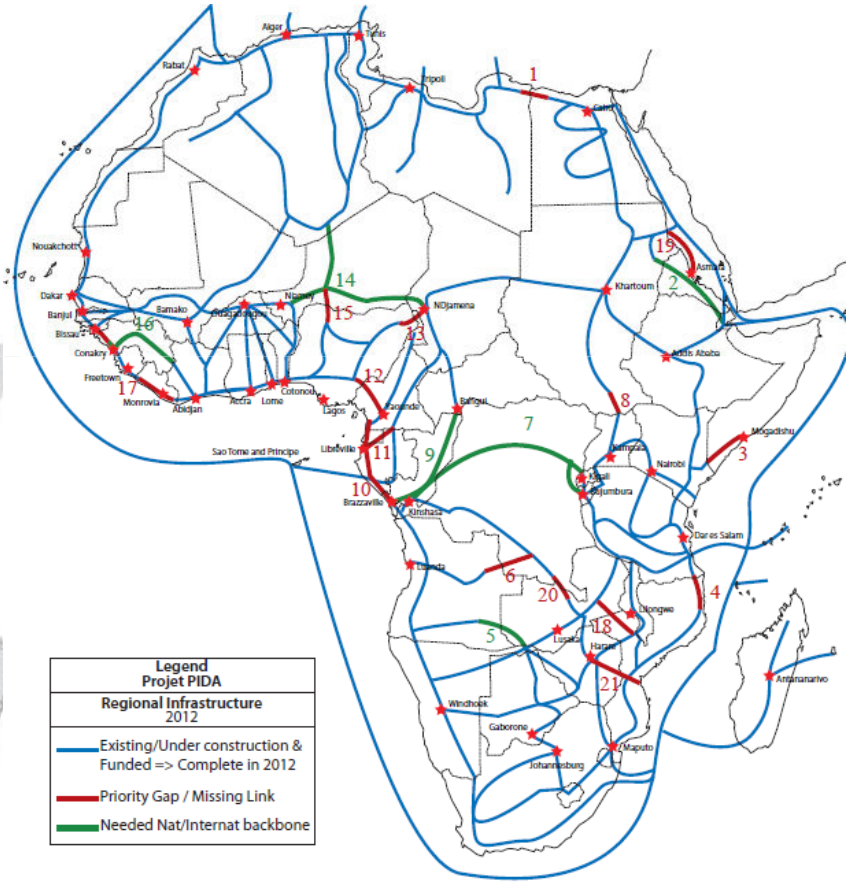
Current = 7 Tbps

Future = 25 Tbps

Regional and International Infrastructure

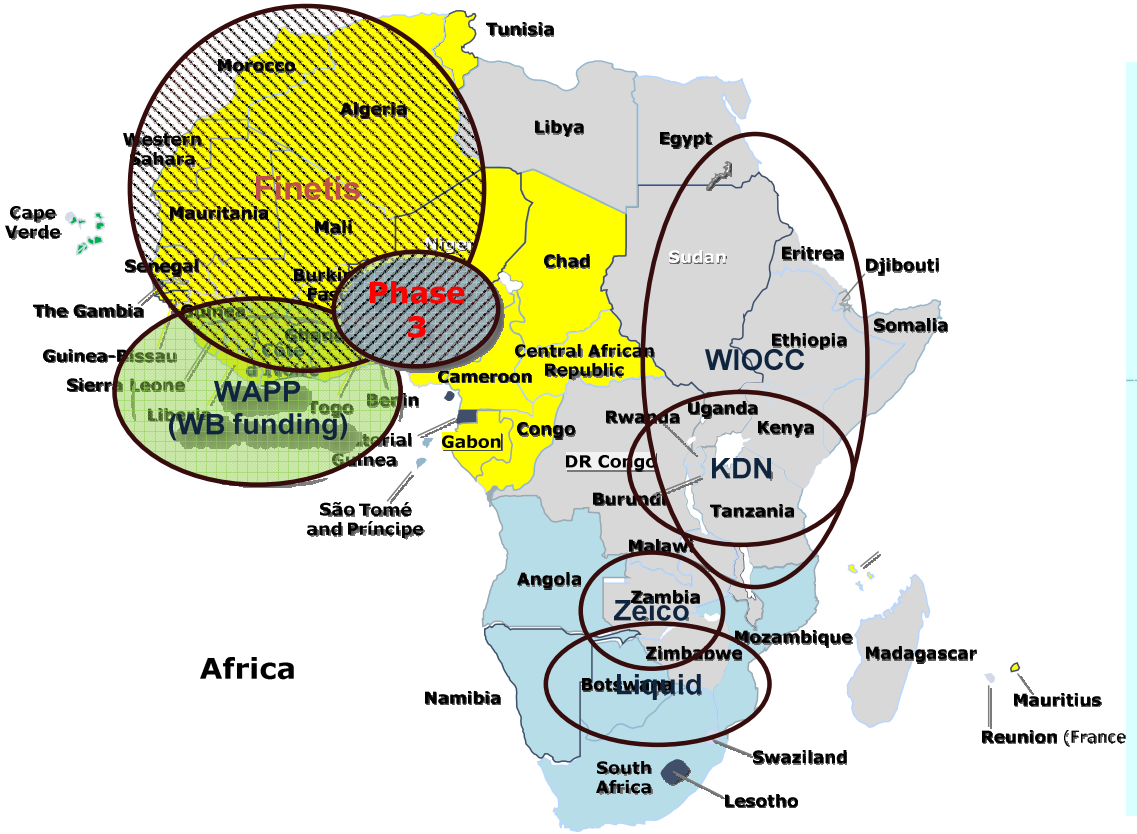


Source: World Bank



Source: PIDA

Carrier of carriers



Few carrier of carriers
No competition

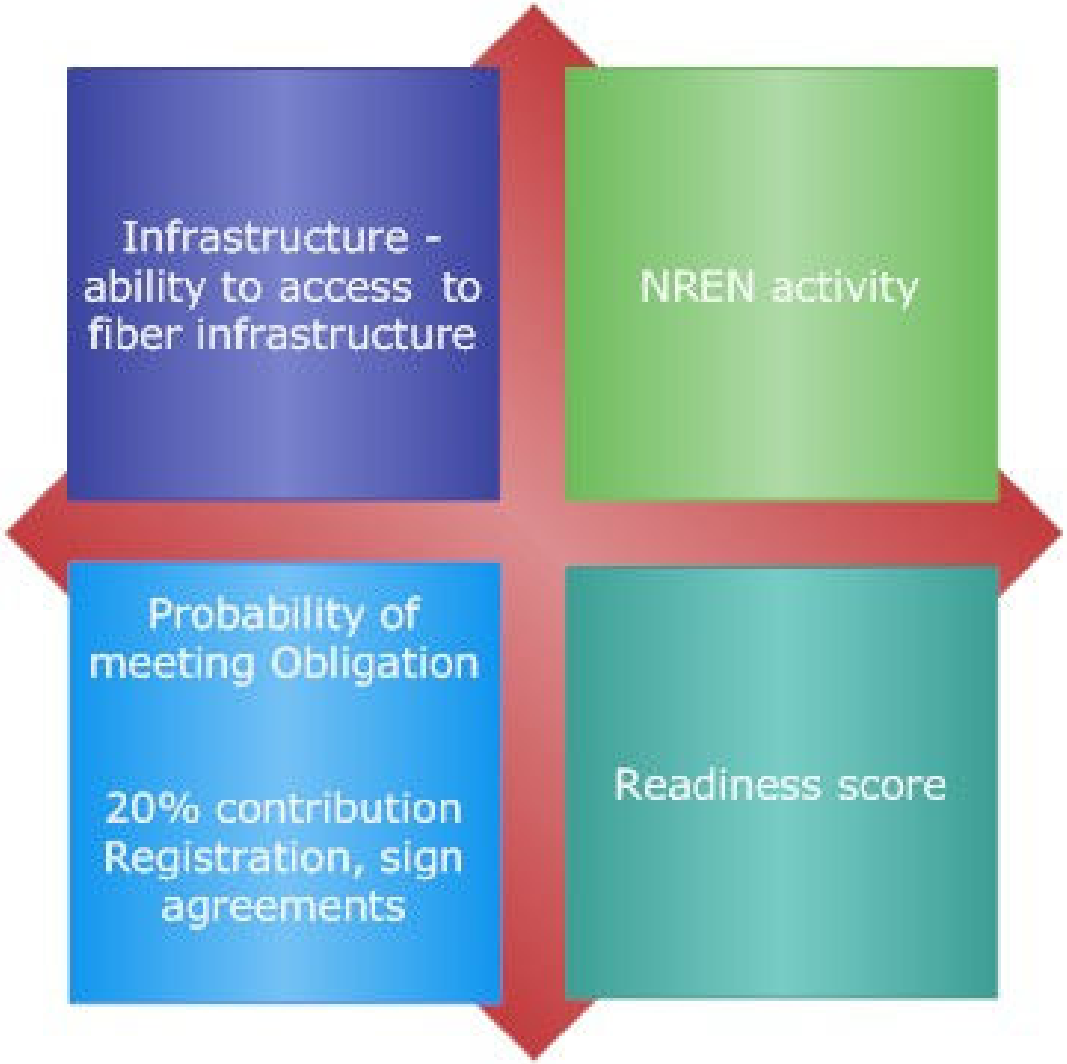
Source: PIDA

Fientis expected

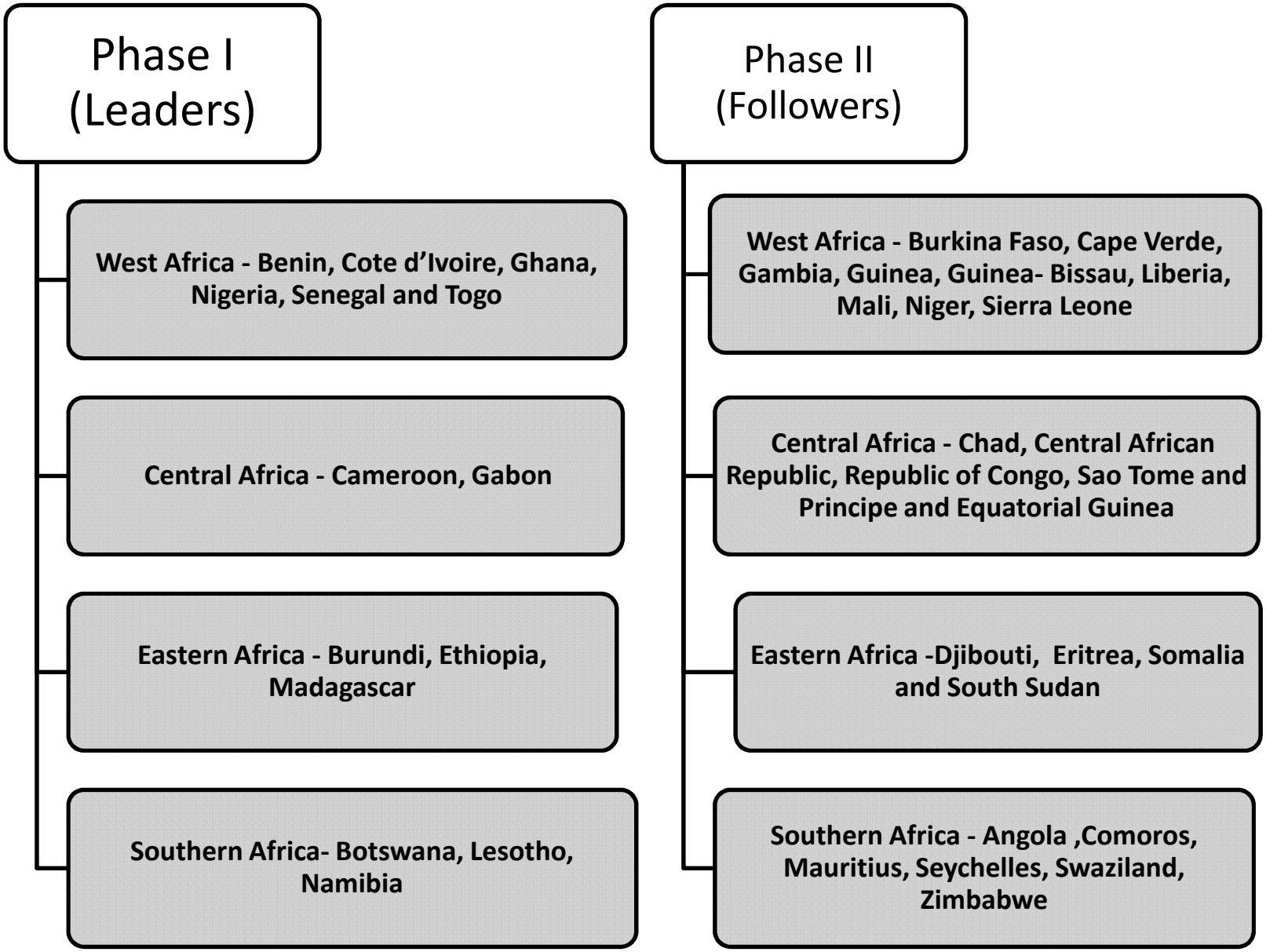
Regulatory and Policy Endorsement

Broadband	Fiber network (Eritrea and Guinea Bissau), exception Cape Verde, Mauritius, Senegal and South Africa well developed fiber 400,00 Km fiber
Pricing	High prices in landlocked countries - Benin $2000 Mbps/month to Senegal $80 Mbps/month
Licensing	Legal instruments designed before the advent of NREN No clear guide on CUG
Ownership	Network ownership is generally not allowed
Universal access	Financing through universal access is not always straightforward - some initiative (e.g. Nigeria)

Criteria for selection



Readiness results

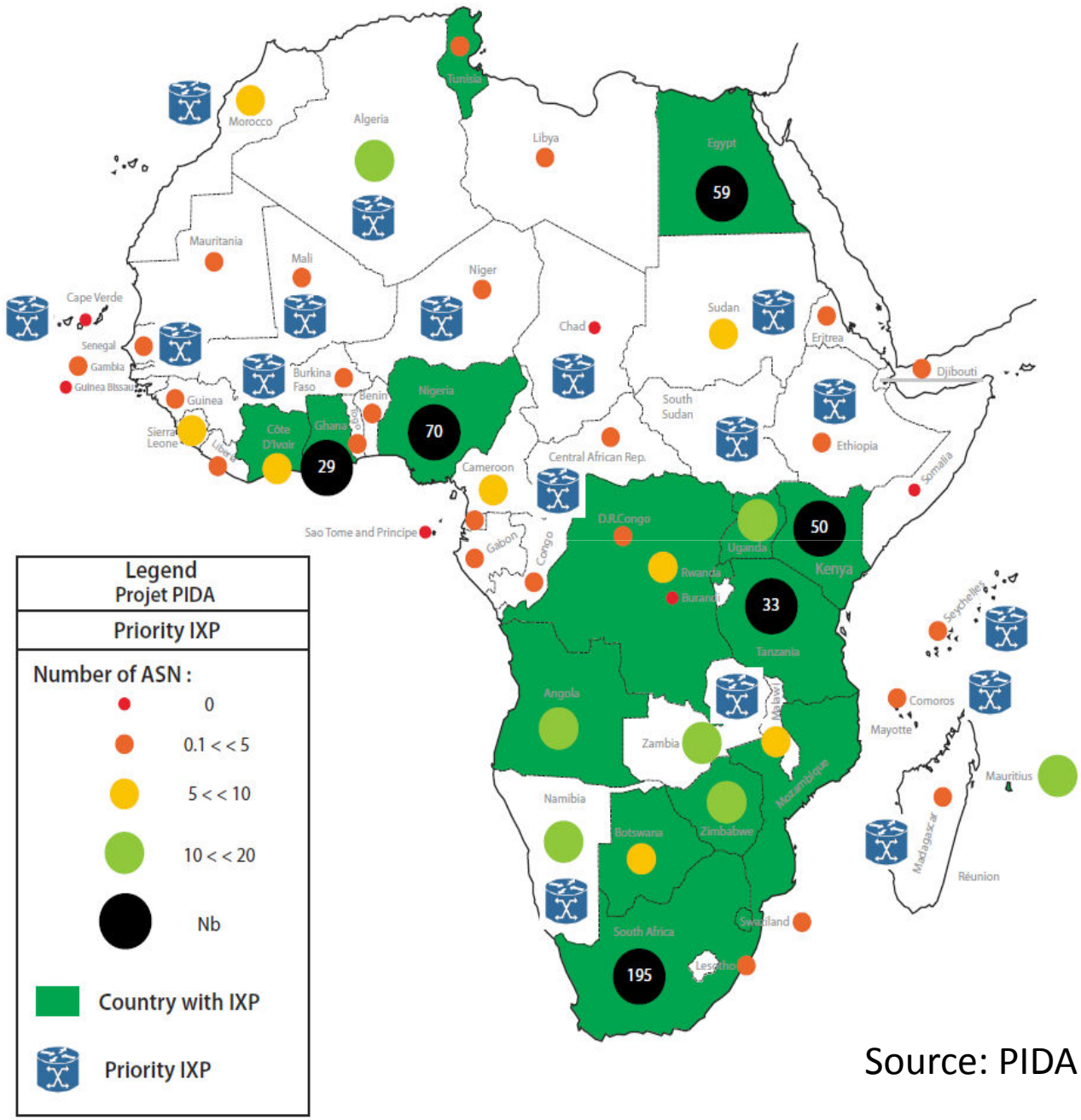


Extension countries – Phase 2

NREN population

Country	Students	Faculty	Researchers and others	Total	% of Student	Population
Benin	100,000	4170	417	104,587	0.995	10.05
Botswana	25,000	900	90	25,990	1.1	2.04
Burundi	35,000	1800	180	36,980	0.36	9.85
Cameroon	275,590	4500	450	280,540	1.27	21.7
Cote d'Ivoire	160,902	6,000	600	167,502	0.811	19.84
Ethiopia	706,321	19,600	1960	727,881	0.77	91.73
Gabon	14,697	800	80	15,577	0.9	1.633
Ghana	279,070	10,000	1000	290,070	1.1	25.37
Lesotho	12,300	650	65	13,015	0.6	2.05
Madagascar	93,618	4,600	460	98,678	0.42	22.29
Namibia	24,849	1200	120	26,169	1.1	2.259
Nigeria	2,194,400	60,000	6000	2,260,400	1.3	168.8
Senegal	109,840	2600	260	112,700	0.8	13.73
Togo	73,040	2,000	200	75,240	1.1	6.64
Total	4,104,627	118820	11882	4,235,329		397.982

Country	Legally established NREN	Connection between institutions	Resources flow
Benin	RerBenin	Yes	Yes
Botswana	No	No	No
Burundi	No	No	Expected
Cameroon	RIC	Yes	Yes
Cote d'Ivoire	RITER	Yes	Yes
Ethiopia	EtheRNet	Yes	Yes
Gabon	No	Yes	Yes
Ghana	GHARNET	Yes	Yes
Lesotho	No	No	No
Madagascar	Irelana	yes	Yes
Namibia	Xnet	Yes	Yes
Nigeria	ngREN	Yes	Yes
Senegal	SenRER	Yes	Yes
Togo	RENRT	Yes	Yes


Legend
Projet PIDA
Priority IXP
Number of ASN :
0
0.1 < < 5
5 < < 10
10 < < 20
Nb
Country with IXP
Priority IXP
Tunisia
Morocco
Algeria
Libya
Egypt
59
Mauritania
Mali
Niger
Cape Verde
Senegal
Gambia
Guinea Bissau
Guinea
Sierra Leone
Liberia
Côte D'Ivoir
29
Ghana
Togo
Burkina Faso
Benin
Nigeria
70
Chad
Sudan
Eritrea
Djibouti
South Sudan
Ethiopia
Somalia
Central African Rep.
Cameroon
Sao Tome and Principe
Gabon
Congo
D.R.Congo
Uganda
50
Kenya
Rwanda
Burundi
33
Tanzania
Seychelles
Comoros
Mayotte
Malawi
Angola
Zambia
Mozambique
Mauritius
Namibia
Botswana
Zimbabwe
Madagascar
Réunion
South Africa
Swaziland
Lesotho
195

Source: PIDA

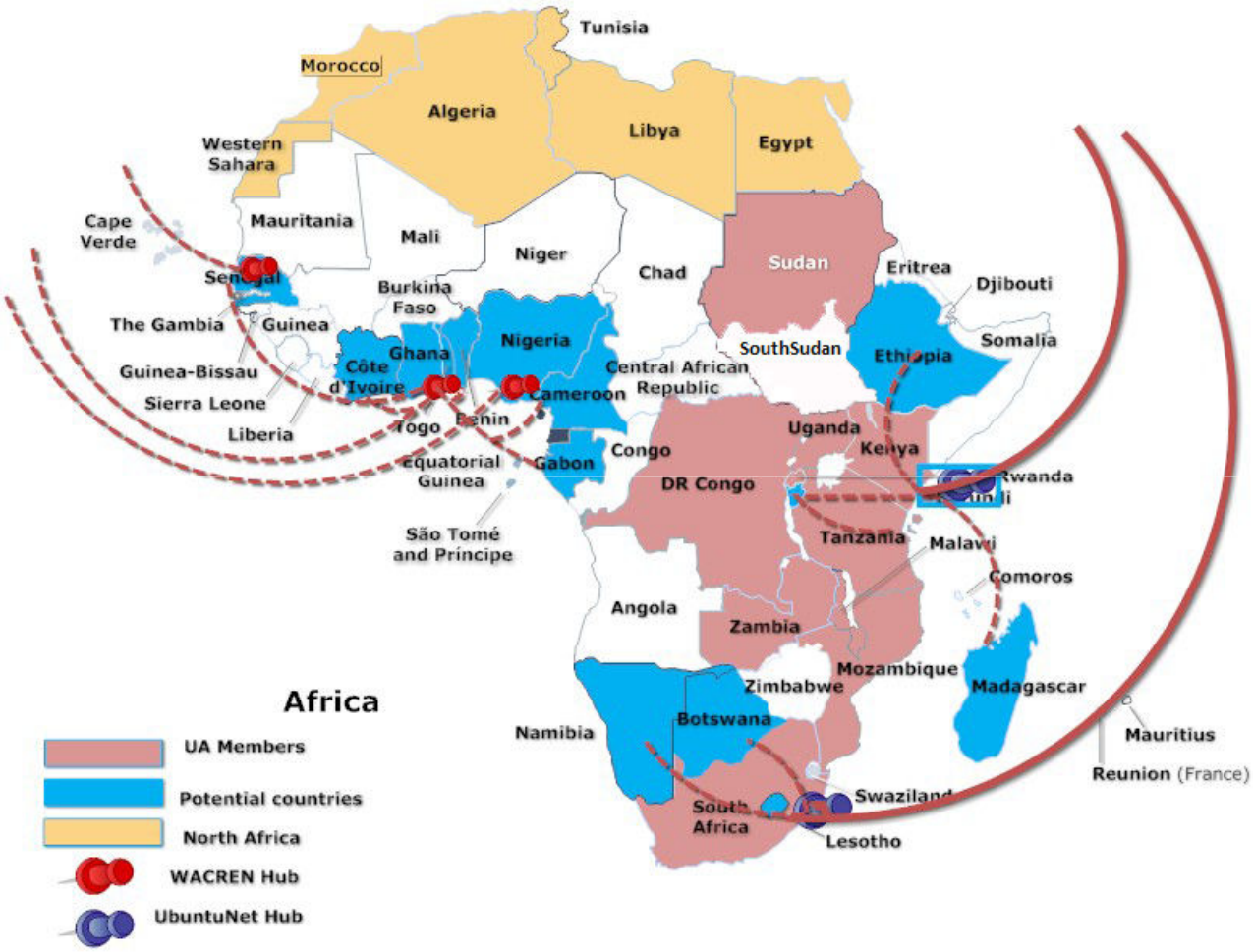
Desired applications

- Internet
- Content Services - repository, Open educational resources including national Learning Management Systems
- High speed networks and computing power, grids, labs and scientific equipment in support of research in health, climate change, environment, agriculture, natural products

Connectivity and Cost

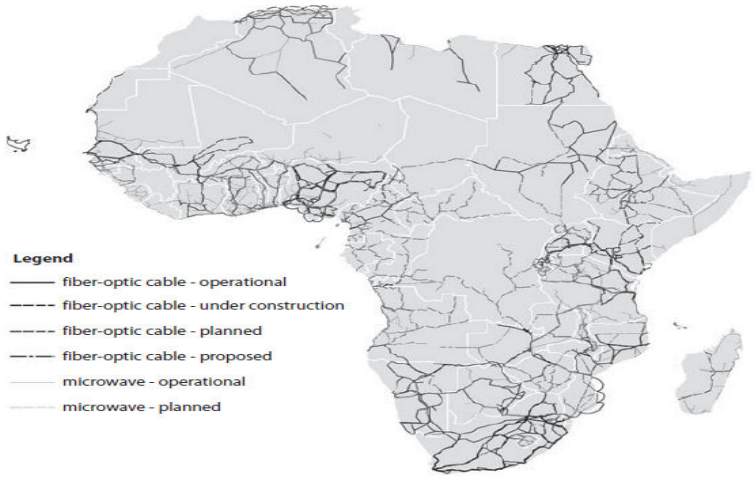
- RFI soliciting information on cost and possibility was sent
- Follow up in Ghana, Nigeria, Senegal
  - Poor RFI result, but two major companies provided data
- Equipment providers were also engaged
  - Good response based on the experience in eastern and southern Africa
  - Logistics (tax, understanding the implication)
- Flexibility in procurement process for negotiation with service providers
- An exception to rules of origin for the equipment

Possible connection



Choice of countries and current links

Discussion with Orange/Sonatel for STM1 link to Paris /RENATER
Multi-country connection – Gambia, Guinea Guinea Bissau, Mali, Cote d'Ivoire, Burkina Faso Mauritania
WACREN NOC
Training and development hub



High concentration of fibre in ng
Discussion to link U-hub to Lagos
ngREN to establish link to London
Not much difference between Accra/London, Lagos/London
Political, linguistic consideration

Source: World Banj

RISKs and Issues

- Unpredictable NREN development - takes long for countries to participate… some countries might move fast, other
- Inability of NRENs to raise resources…
- Limited progress with competition for cross-border networks – landlocked countries will continue to suffer
- How, when, to connect the rest of landlocked countries
- Lack of governance and institutional framework
- Strong WACREN…
  - Initial funding
  - Business model based on the UA approach towards sustainability

Implementation Issues

- Engaging identified NRENs
  - WACREN should raise awareness on requirements to pay
  - Raise resources elsewhere
  - UA to press on countries on the remaining countries
  - Policy makers should know the importance of payment for NREN development?
- Engage with connectivity providers
  - More data for cross-border connection opportunities and costs (IRU or rentals of managed services –
  - Engage with equipment suppliers for delivery, donation, warehousing, SLAs
- WACREN NOC functions, NEG functions, Fault handling, operational and business models
  - WACREN needs to develop NOC functional guidelines, NEG functional guidelines based on UA experience
  - NREN need guidance from AUP to how to handle and report faults
  - NEG support for WACREN
- Capacity building
  - Basic, intermediate and advanced training
  - Peering with other NRENs
  - ToT and different level of training

Thank you