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The State of TELECOMMUNICATIONS AND INTERNET IN AFGHANISTAN SIX YEARS LATER (2006-2012)

Assessment Report
March 2012

Javid Hamdard

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ACRONYMS

GENERAL	
$	Dollar (all amounts are in U.S. dollars unless mentioned otherwise)
3G	Third Generation (mobile communications)
APNIC	Asia Pacific Network Information Center
BTS	Base Transceiver Station
BWA	Broadband Wireless Access
ccSLD	Country Code Second Level Domain
ccTLD	Country Code Top Level Domain
CDMA	Code Division Multiple Access
CIO	Chief Information Officer
DSL	Digital Subscriber Line
EDGE	Enhanced Data rates for GSM Evolution (also known as "EGPRS")
e-Gov.	Electronic Government
EVDO	Evolution Data Optimized (a standard for wireless transmission using radio signals)
GDP	Gross Domestic Product
GIPI-AF	Global Internet Policy Initiative – Afghanistan
GPRS	General Packet Radio Service (mobile base data/Internet services)
GSM	Global System for Mobile Communications (2G mobile networks and services)
ICT	Information and Communication Technologies
ISM-band	Industrial Scientific and Medical
ISP	Internet Service Provider
IT	Information Technology
LMDS	Local Multipoint Distribution Service
Mbps	Megabits per second (data transfer speed/bandwidth measurement unit)
mGov	mobile Government (provision of Gov. services using mobile telephones)
MMDS	Multichannel Multipoint Distribution Service (also known as "Wireless Cable")
MMS	Multimedia Messaging Service
PCO	Public Call Office
PDSN	Packet Data Serving Node
SDH	Synchronous Digital Hierarchy
SIM	Subscriber Identification Module
SMS	Short Message Service
STM-1	Synchronous Transport Module - Level 1 (155.520 Mbps fiber based connection)
Tele-Density	The number of telephones per 100 or 1000 inhabitants
VoIP	Voice Over Internet Protocol (also known as "Internet Telephony")
VSAT	Very Small Aperture Terminal
WiMax	Worldwide Interoperability for Microwave Access

COUNTRY SPECIFIC	
ACSA	Afghan Computer Science Association
AECA	Afghanistan Electronic Certification Authority
AFCERT	Afghanistan Cyber Emergency Response Team
AFGNIC	Afghanistan Network Information Center
Afs	Afghanis (Afghan Currency, plural)
AISA	Afghanistan Investment Support Agency
ANDS	Afghanistan National Development Strategy
APO	Afghan Post Organization
APRA	Afghanistan Postal Regulatory Authority
ATOSA	Afghanistan Telecommunication Operators' Social Association
ATRA	Afghanistan Telecommunication Regulatory Authority
AWCC	Afghan Wireless Communication Company
DCN	District Communication Network
e-NID	electronic National Identification
GCN	Government Communication Network
GIRoA	Government of the Islamic Republic of Afghanistan
ICTi	Information and Communication Technology Institute
JCMB	Joint Coordination and Monitoring Board
LFSP	Local Fixed Service Provider
MCIT/MoCIT	Ministry of Communication and Information Technology
MoF	Ministry of Finance
MoI	Ministry of Interior
MoIC	Ministry of Information and Culture
NICTCA	National ICT Council of Afghanistan
NIRA	National Internet Registry of Afghanistan
NISPAA	National Internet Service Providers' Association of Afghanistan
NPP	National Priority Program
OFC	Optical Fiber Cable
PKI	Public Key Infrastructure
PMO	Project Management Office
SMP	Significant Market Power
TDF	Telecommunications Development Fund
TTC	Telecommunication Training Center
VCN	Village Communication Network

FOREWORD

This report presents a comprehensive and multidimensional overview of the Information and Communication Technologies (ICTs) sector in Afghanistan, covering developments and intersections across the areas of Internet and telecom infrastructure; policy, services, accessibility and affordability; key players and operators; and legal and regulatory governance frameworks. Serving as a reference for industry stakeholders and policymakers, the research presented is the most up-to-date collection of data on the dynamic and ever-developing telecommunications and Internet sector in Afghanistan. By drawing on sector developments over the past 6 years using the *GIPI-AF (2006) Report* as its comparative basis, the report aims to serve as an information bank and baseline for future research on ICTs in Afghanistan.[1]

Every effort has been made to ensure the accuracy and impartiality of the information, statistics and figures provided in this report. It should be noted that the culture of independent research and reporting – and of maintaining accurate records and data – is a relatively new practice in Afghanistan. Furthermore, much of the information contained within the report is of a commercial nature, and naturally the full disclosure of certain data cannot be provided due to the protection of private interests. Similarly, in the context of security, some key information was considered to be of a sensitive nature.

This report has been produced by the international media development agency, Internews, under the USAID-funded Afghanistan Media Development and Empowerment Project (AMDEP). Under AMDEP, USAID works to build the capacity of local independent media through technical support, equipment upgrades, hands-on training, business development, and strengthening media institutions, networks, and associations by increasing media professionalism and standards of practice. By expanding access to multimedia and communications tools, as well as offering technical advisory services to government ministries, Internews has further contributed to the development of the media and Information Communication Technology (ICT) sector in Afghanistan.

[1] GIPI-AF. "Assessment Report." 2006. State of Telecommunications and Internet in Afghansitan. Internews Europe. January 2012 <http://www.internews.eu/news/gipi-afghanistan>.

Javid Hamdard (the Author) has more than ten years of professional experience in senior technical and advisory capacities in the ICT sector in Afghanistan and has also co-authored the GIPI-2006 report on the State of Telecommunications and Internet in Afghanistan. He was commissioned because of his broad knowledge and experience in this field, as well as his independence, and ability to gather, synthesize and provide accurate and impartial data about the ICT sector in Afghanistan .If you have any comments, suggestions, or would like to propose any corrections to this report, please send your feedback to: jhamdard@internews.org or javidhamdard@gmail.com .

1. INTRODUCTION

Just ten years ago Afghanistan had a barely functional post-war infrastructure and literally no telecom services. Since the re-emergence of the telecom sector in April 2002, when the first private telecom company – Afghan Wireless Communications Company (AWCC) – was authorized to provide mobile (GSM) services, the telecom sector has witnessed unprecedented and phenomenal growth. Due to the rapid developments in infrastructure, services, policy, and the legal and regulatory framework, the telecom sector became one of the largest revenue generating sectors in Afghanistan with annual average revenue of $139.6 million – accounting for more than 12%[2] – of total government revenues.[3] Despite numerous challenges – such as the fluctuating security situation – the telecom sector has been able to attract over $1.8 billion in total investments as of 2012 compared to $600 million in 2006. Simultaneously, while unemployment is among the top 7 reasons for public pessimism regarding development trends in the country[4], the telecom sector has generated over 110,000 direct and indirect job opportunities throughout the country compared to 40,000 jobs in 2006. [5]

Currently there are six active telecom service providers and 44 licensed Internet Service Providers (ISPs) in Afghanistan, including the state-owned fixed-line operator Afghan Telecom; the Local Fixed Service Provider (LFSP) Wasel Telecom; and the four mobile (GSM) operators AWCC, Roshan, MTN and Etisalat. Spurred by the expansion of mobile services, with over 64% Tele-density[6] (64/100) and 85% population coverage, there are more than 17.41 million telephone subscribers (Mobile + CDMA + Fixed-line), including over 110,000 active landlines in the country compared to less than total 2 million subscribers in 2006.[7] The total number of Internet users in the country is estimated at more than 1 million[8] compared to only 200,000[9] in 2006. While Afghan citizens must be credited for the rapid demand-driven growth in the

[2] MCIT. "Summary Reports." Annual Achivements Summary 2006 - 2011 ed.
[3] Please refer to Annex-3 (Telecom Sector Annual Revenues 2002-2011); $139.6 million is the average annual revenue for the years 2006-2011.
[4] The Asia Foundation. "Afghansitan in 2011, A Survey of the Afghan People." 2011. pp.21. Reasons for Pessimism.
[5] GIPI-AF. "Assessment Report." 2006. State of Telecommunications and Internet in Afghansitan.
[6] The total number of telephones per 100 or 1000 inhabitants (in this case it is per 100 inhabitants).
[7] Telecom Operators. "Independent Research." January 2012. Telecom Operators Survey. Internews. ; MCIT. Website. February 2012. ; GIPI-AF. Assessment Report. 2006.
[8] H.E. Amirzai Sangin (Minister, MCIT). Presentation. American University of Afghanistan, 27 November 2011.
[9] GIPI-AF. "Assessment Report." 2006. State of Telecommunications and Internet in Afghansitan.

telecom sector as the end-users and buyers of these services, investors have played a major role in building the basic infrastructure. In addition, the Afghan Government and the Ministry of Communication and Information Technology (MCIT) in particular, have played a very positive role as a facilitator, policymaker, regulator and builder of infrastructure.

Key Comparative Indicators [10] (Table-1) [11]

Telecommunication (General)			
#	**Indicator**	**2006**	**2012**
1	Tele-Density per 100 inhabitants (Mobile + Fixed + CDMA)	7.19	64.49
2	Service Coverage by Population (Mobile + Fixed + CDMA)	9.03 %	85 %
3	Total Investment (Telecom Operators)	$748 million	$1829 million
4	Total Number of Telecom Base Stations	1,067	4,428
Telecommunication (Fixed & CDMA)			
2	Total Number of Fixed-line Subscribers	60,000	110,000
3	Total Number of CDMA-Wireless Subscribers	90,000	202,000
4	Fixed-line Penetration by Population (1/100)	0.55	1.16
5	Fixed-line Coverage by Land Area (per sq km)	0.23	0.48
Telecommunication (Mobile)			
1	Total Number of Mobile Subscribers	1.7 million	17.1 million
2	Mobile Penetration by Population (1/100)	6.27	63.33
3	Mobile Coverage by Land Area (per sq km)	2.61	26.22
Internet			
1	Total Number of Internet Users (estimated)	200,000	1.08 million
2	Internet Penetration by Population (1/100)	0.74	4
3	Total Number of Licensed ISPs	26	44
4	Total Number of Second Level (ccSLD) .af Domains	309	6525

[10] Due to the lack of credible official census information, the estimated total population figure used by MCIT is around 27 Million, whereas this figure is estimated by the UN and other entities to be higher, at over 32.3 million (as of July 2011), in which case the relevant indicators presented in this report would change accordingly.

[11] MCIT (ATRA; General Directorate of ICT; General Directorate of Planning & Policy; AFGNIC); Telecom Operators (Roshan; AWCC; Etisalat; MTN, Afghan Telecom, Wasel Telecom); ISPs (NISPAA members); E-Afghanistan; MCIT AUAF Presentation; GIPI-AF Assessment Report 2006; and Independent Research (Questionnaires and Surveys) by Internews.

2. TELECOMMUNICATION

A. Infrastructure

Building an adequate national telecom infrastructure has been the top priority for the sector since 2002. Telecom infrastructure has accounted for the majority of the overall total investment, and the private sector – namely the four mobile operators AWCC, Roshan, Etisalat and MTN – have been the largest investors in this area, followed by the Afghan Government with assistance from donor organizations such as the World Bank and USAID. While the four mobile operators and the state-owned, fixed-line carrier Afghan Telecom form the main building-blocks of the telecom infrastructure and services, the national microwave network and fiber optic backbone are two key infrastructure projects.

The establishment of the country-wide microwave network of more than 4,428 telecom base stations (BTS sites) serves as the main backbone for mobile services and wireless connectivity (mainly sponsored by the mobile operators). It is worth noting that in order to promote rural access to telecom services the MCIT/ATRA is funding the construction of 76 telecom base stations using the Telecommunications Development Fund (TDF) under the Universal Access Program (UAP). The construction projects are awarded to the mobile operators on a competitive basis and will be operated and maintained by these operators upon completion.

The national fiber optic backbone, which is currently being implemented in three phases[12], is an estimated $130 million project (funded by the World Bank and Afghan Government) that will lay 4810km of fiber optic cable connecting 23 provincial capitals and several principal cities (including Kabul, Herat, Jalalabad, Kandahar and Mazar-e-Sharif). Upon completion, the project will also connect Afghanistan to its five neighboring countries; Iran, Pakistan, Tajikistan, Turkmenistan and Uzbekistan. More than 2678km of the total 3300km of the first-phase, a national fiber optic ring alongside the country's main road system has been completed, and more than 50% of the ring – including connectivity with neighboring Iran, Pakistan, Tajikistan and Uzbekistan – is operational. The construction of the 450km second-phase connecting 4 southeastern provinces (Logar, Paktya, Paktika and Khost) is also in progress and more than

[12] Please refer to Annex-1 (national Fiber Optic Backbone map).

25km has been completed. Funded under the World Bank's *ICT Sector Development Project*, the construction of the 1060km third-phase, connecting 3 central and 2 northeastern provinces (Bamyan, Daikundi, Chaghcharan, Takhar and Faizaabad) is also due to begin soon. In addition to the main national backbone, the project also includes building small intercity loops and "last mile" connectivity legs in Kabul and other major cities. MCIT has contracted this project to international private companies ZTE Corporation of China (first phase) and Shahid Ghandi Communication Cable of Iran (second phase).

B. Service Carriers

i. Overview

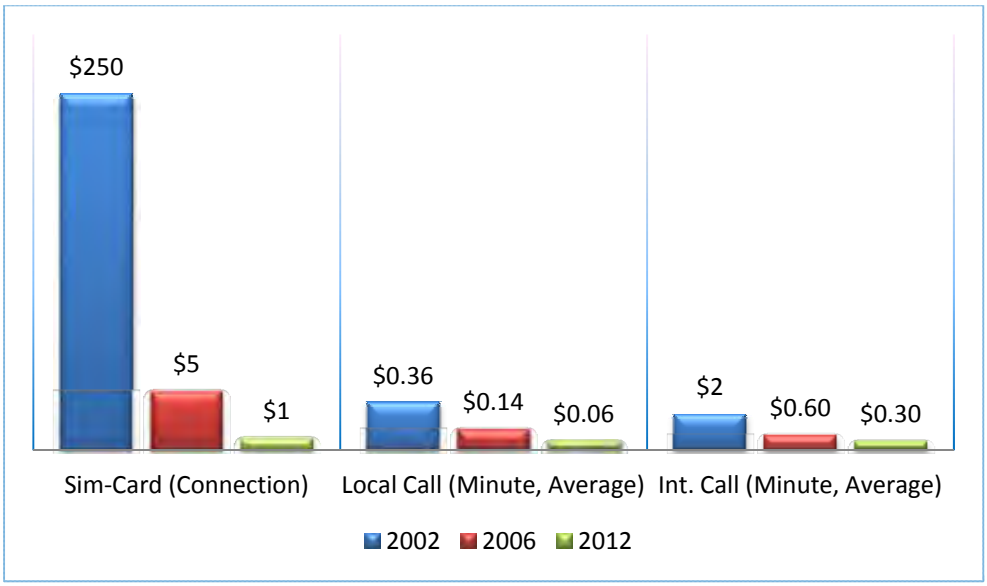
As of 2012 the country's telecom market consists of six active service carriers; the four mobile operators (AWCC, Roshan, Etisalat, and MTN) and the two fixed-line carriers Afghan Telecom and Wasel Telecom.[13] With over $1.5 billion in total investment and a combined subscribership of 17.1 million, the four mobile operators are the dominant players in the market. Roshan leads with 5.6 million subscribers, followed by MTN with 4.5 million subscribers. Wasel Telecom is the only private fixed-line operator with a relatively smaller operation, which provides wireless CDMA (2000 1X) services in the northern provinces of Balkh, Baghlan, Jawzjan and Kunduz. The state-owned Afghan Telecom is the only *national* fixed-line operator with the largest physical infrastructure and service presence in all 34 provincial capitals (mostly wireless CDMA) and most principal cities, including Kabul, Herat, Jalalabad, Kandahar and Mazar-e-Sharif.

The growing competition in the telecom market for providing cheaper and improved quality of services has caused a continuous decline in the price of telecom services. While SIM cards sold for more than $250 in 2002, SIM cards are now readily available from operators for less than a dollar. The local costs for using a mobile telephone has already fallen more than 500% from 18 Afs ($0.36) per minute in 2003 to 3 Afs ($0.06) in 2012. The international calling tariff has also reduced from 100 Afs ($2) per minute in 2003 to an average of 15 Afs ($0.30) in 2012.[14] These

[13] Please refer to Annex-4 for a detailed scope of service by each operator.
[14] Mobile Operators. "Independent Research." January 2012. Telecom Operators Survey. Internews.

prices are even lower when using the fixed-line and CDMA services provided by Afghan Telecom and Wasel Telecom. [15]

Periodic Cost Comparison, Mobile Telephony (Figure-1) [16]



ii. Profiles

1. Afghan Telecom [17]

Based upon the findings of the *Telecom and Internet Policy of 2003,* the MCIT recommendations led to the establishment of Afghan Telecom in September 2005 through a presidential decree. Established with an initial capital of $2 million from the Government budget, Afghan Telecom commenced services in April 2006. As a public corporation (despite some attempts for its partial privatization in 2008), Afghan Telecom still remains a 100% Afghan Government/MCIT owned. According to its bylaws, Afghan Telecom is authorized to provide unified telecom services throughout the country and cross-border transit telecom services outside Afghanistan[18]. Registered as a business entity with the Afghanistan Investment Support Agency (AISA), Afghan Telecom is expected to operate based on open-market principles and subject to the same rules and regulations as other telecom operators.

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[15] Fixed-line Operators. "Independent Research." January 2012. Telecom Operators Survey. Internews.
[16] Mobile Operators. "Independent Research." January 2012. Telecom Operators Survey. Internews.
[17] Afghan Telecom. "Independent Research." January 2012. Telecom Operators Survey. Internews.
[18] GIRoA, Afghan Telecom. "Bylaws of Afghan Telecom Corporation." n.d. Chapter 1, Article 2; Chapter 2, Article 5 (1, 2, 4); Chapter 3, Article 6.

As the only national fixed-line carrier, Afghan-Telecom is quickly emerging as a major telecom service provider for both voice and data services. It has the unique competitive advantage of inheriting and operating all state-owned telecom infrastructure and services, including key infrastructure projects like the Government Communication Network (GCN), District Communication Network (DCN), Village Communication Network (VCN), and the only nation-wide fiber optic backbone in the country. With over $250 million in total investment and more than 260,000 total subscribership (150,000 CDMA and 110,000 fixed-line), Afghan Telecom offers voice and data services, such as digital fixed-line, wireless digital fixed-line (CDMA-2000 1X), FWP/T, CDMA cellular mobile, public pay phones, and retail and wholesale ISP services. Afghan Telecom provides Fixed-line services in Kabul, Herat, Jalalabad, Kandahar, Mazar-e-Sharif and Kunduz and wireless CDMA-1X services in all 34 provincial capitals and principal cities. Through its satellite-based VCN, Afghan Telecom also provides call-center and tele-kiosk services in more than 700 districts and villages across the country. In addition to voice telephony Afghan Telecom also provides various kinds of Internet/data services including high speed and whole-sale Internet to most government agencies, banks, universities, as well as some NGOs and ISPs.

2. Afghan Wireless Communication Company [19]

Afghan Wireless Communications Company (AWCC) was the first private telecom company in the country, and began providing mobile services in April 2002 based on an interim service authorization from the Government and a $1.2 million license fee. After the later establishment of the licensing regime, AWCC was awarded the first GSM license in July 2003 for a 15 year period and a total license fee of $5 million. Originally founded by Ehsanullah Bayat, an Afghan American entrepreneur, AWCC is a joint venture with MCIT having 20% ownership and the US-based Telephone Systems International (TSI) maintaining 80% ownership.

Operating at 900-1800 band, AWCC offers mobile (GSM) voice, SMS, IVR, and GPRS/EDGE services through prepaid, postpaid, corporate, value-added, and international/roaming tariffs. Moreover, AWCC was awarded a national ISP license in March 2006 which also allows the

[19] AWCC. "Independent Research." January 2012. Telecom Operators Survey. Internews.

company to provide Internet services. AWCC has grown from 20,000 subscribers in 2002 to 700,000 in 2006, and as of 2012 the telecom service provider has a subscribership of more than 3.5 million and a total investment of $355 million. Through its 708 telecom base stations, AWCC has service presence in all 34 provincial capitals including 600 towns and villages and most of the principal cities.

In addition to mandatory interconnection agreements with all national telecom operators as mandated under the *Telecom Law (2005)*, AWCC also has interconnection agreements with 12 regional and international carriers (PTCL, Wateen, Tajiktel, Compass Global, Verizon, Thuraya, Telenor Global Services, Telenor PK, TATA Communications, Airtel, Global Voice Communications Inc., and Exclusive Group). AWCC also provides international prepaid and postpaid voice, SMS and data (GPRS) roaming in more than 118 countries and across 417 networks.

3. Roshan [20]

The Telecommunication Development Company of Afghanistan (TDCA), which operates under the brand name of Roshan (meaning 'Light'), was awarded the second GSM license in January 2003 for a period of 15 years and a license fee of $5 million. Roshan is owned by an international consortium of three major shareholders: Agha Khan Fund for Economic Development (51%), Monaco Telecom International (36.75%), and Telia-Sonera Telecommunication Company (12.25%). After commencing services in Afghanistan in July 2003, Roshan grew to 1 million subscribers in less than three years. With over $500 million in total investment and more than 5.6 million subscribers as of 2012, Roshan has emerged as the largest telecom service provider in the country. Roshan directly employs more than 1,200 people, most of whom are Afghans, and provides indirect employment to more than 30,000 people (resellers, vendors, partners, etc.) across the country.

Operating at 900-1800 GSM band, Roshan has service presence in all 34 provincial capitals, 230 districts, and offers services in most of the major cities, including Kabul, Herat, Jalalabad, Kandahar and Mazar-e-Sharif. Roshan offers mobile (GSM) voice, Black-Berry, SMS, MMS,

[20] Roshan. "Independent Research." January 2012. Telecom Operators Survey. Internews.

GPRS/EDGE and IVR services through prepaid, postpaid, corporate, value-added, and international/roaming tariffs under four packages; Aali (*The Best*), Yaraan (*Friends*), Enaam (*Prize*) and Saadat (*Happiness*).

Roshan provides international voice and data roaming through prepaid, postpaid and corporate tariffs in 146 countries and in cooperation with 360 roaming partners, as well as has interconnectivity with all national telecom operators (AWCC, Etisalat and MTN and the two fixed-line carriers). Roshan also launched M-Paisa, a mobile-based money transfer system, which enables Roshan subscribers to use SMS for person-to-person transfers, merchant payments, airtime purchases, disbursement and payments of microfinance loans and receipt and disbursement of salaries.

4. MTN [21]

According to a three year duopoly agreement between the MCIT and mobile operators AWCC and Roshan, no mobile operator could enter the Afghan telecom market until July 2006. The third GSM license was awarded to Areeba in September 2005 for a period of 15 years, and a total license fee of $40.1 million. Areeba was a subsidiary of the Lebanon-based firm Investcom in consortium with Alokozai-FZE. After commencing services in July 2006, Areeba had an estimated subscribership of 200,000 by the end of that year. Areeba was later acquired by the South African-based Mobile Telephone Network (MTN) in mid-2007 as part of a $5.53 billion global merger between the two companies.

MTN-Afghanistan is a subsidiary of the South African-based MTN Group, a multinational telecommunications company operating across the Middle East and Africa. MTN is the majority (90%) shareholder, while International Finance Corporation (IFC) at 9% is also a debt and equity shareholder of MTN-Afghanistan. MTN operates at 900-1800 MHZ GSM band, and as of 2012 has 4.5 million subscribers and service coverage in most major cities, 464 districts, and all 34 provincial capitals. With over $400 million in total investment, MTN offers mobile voice, SMS, MMS, SRS, GPRS, fax, voicemail and PCO services through prepaid, postpaid and corporate tariffs.

[21] MTN. "Independent Research." January 2012. Telecom Operators Survey. Internews.

MTN has interconnection agreements with all national telecom operators and provides international voice and SMS roaming in 121 countries and across 227 operators through prepaid and postpaid roaming tariffs. MTN also has a national ISP license which the company received in November 2008. MTN was the first company to introduce the popular per-second billing system in the country (also known as "pay as you talk") allowing its subscribers to transparently track their talk-time and receive billing summaries via SMS. The scheme was so popular that other GSM companies quickly adopted this method.

5. Etisalat [22]

The fourth GSM license was awarded to Etisalat in May 2006 for a total license fee of $40.1 million. Etisalat Afghanistan is a 100% owned subsidiary of the UAE-based Etisalat Telecommunications Corporation, a multinational telecom company operating in the Middle East, Africa and Asia. Etisalat Afghanistan commenced commercial services in August 2007, and within a span of only five years has emerged as a major telecom operator in the country attracting over 3.5 million subscribers. With over 1,100 telecom base stations, Etisalat has a presence in all major cities, 30 provincial capitals, and 182 districts.

Operating at 900-1800 MHZ band, Etisalat offers mobile voice, SMS, MMS, GPRS/EDGE (Internet/Data) and voicemail services through prepaid, postpaid and corporate tariffs. Under its national ISP license – received in October 2009 – the company is also authorized to provide Internet services. Etisalat has over 1200 retail outlets across the country, interconnection agreements with all national telecom operators, and offers international roaming in over 80 countries through 120 operators. In line with the MCIT's strategy for the expansion of telecom services in rural areas, Etisalat has signed an agreement with ATRA for the establishment of 23 telecom base stations in 9 provinces and 17 rural districts. On March 18, 2012 Etisalat was the first company to be awarded a 3G license, marking a new milestone in the development of Afghanistan's telecom sector.

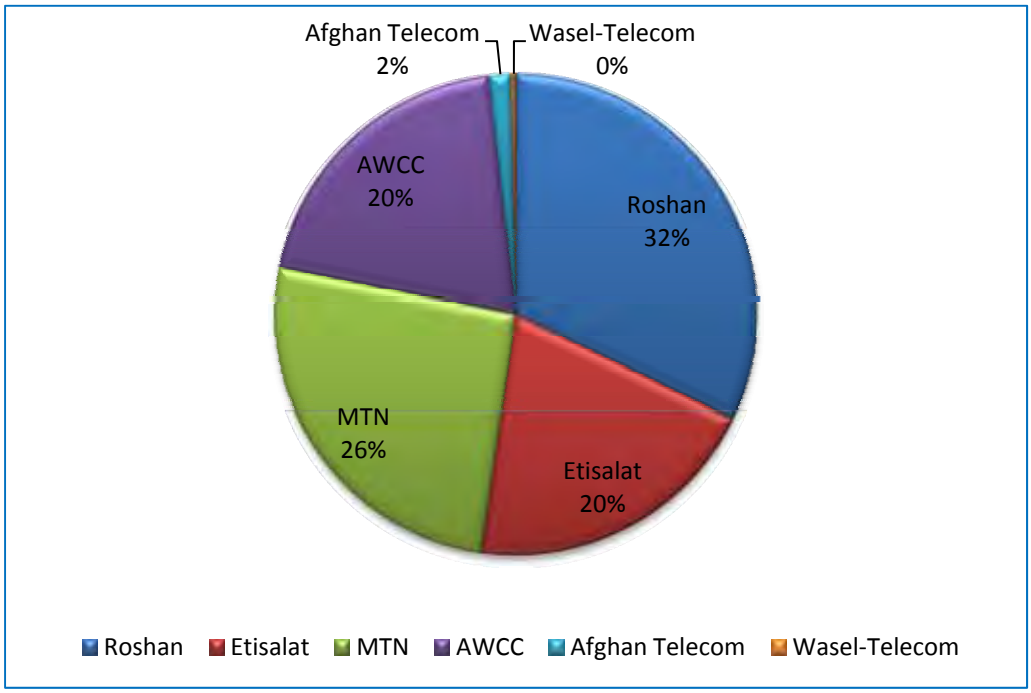
[22] Etisalat. "Independent Research." January 2012. Telecom Operators Survey. Internews.

6. Wasel Telecom [23]

After a long and repetitive bidding process, the first Local Fixed Service Provider (LFSP) license was awarded to Wasel Telecom in May 2006. In accordance with the *Telecom and Internet Policy* (2003), LFSP licenses are awarded on a case-by-case basis to private telecom companies interested in providing fixed-line and/or wireless CDMA services in underserved rural areas. Therefore, no license fee was charged in the case of Wasel Telecom.

Wasel Telecom, which commenced services in May 2008, is a joint venture between the UAE-based AG Telecom LLC (the majority shareholder), UAE-based Modern Technology International, and two Afghan and Korean entrepreneurs. With over $24 million in total investment, Wasel Telecom has more than 52,000 subscribers and offers CDMA (2000 1X) based voice (WLL digital and mobile) and data (GPRS, Dialup and USB Dongles) service in the northern provincial capitals of Balkh, Baghlan, Kunduz and Jawzjan and 22 districts within these provinces. In addition to the LFSP license, Wasel Telecom also holds a national ISP license which was awarded in July 2009.

Market Share by Subscribership (Figure-2) [24]



[23] ATRA. "Telecom Operators, LFSPs." Wasel Telecom Profile. <http://www.atra.gov.af/file.php?id=19>. ; Wasel Telecom Website February 2012.

[24] Telecom Operators. "Independent Research." January 2012. Telecom Operators Survey. Internews.

C. Afghanistan Telecom Operators' Social Association

Established in April 2010 by Afghan Telecom, AWCC, Etisalat, MTN and Roshan, the Afghanistan Telecom Operators' Social Association (ATOSA) is a trade association representing telecom operators. ATOSA is registered with the Ministry of Justice as a legal entity, and represents the collective interests of telecom operators with the Government, consumers and other relevant entities. It also resolves inter-operator disputes and disagreements when necessary. With no official organizational structure or permanent office to date, ATOSA's monthly meetings are chaired and hosted on a rotational basis by the member companies.[25]

[25] ATOSA. "Independent Research." January 2012. ATOSA Questionnaire. Internews.

3. INTERNET

A. Overview

The growth of the Internet and data services in general has been relatively low compared to mobile telephone services. Despite the slow pace, Internet penetration is growing, especially among the urban-educated populace. Spurred by the low cost DSL and dialup services provided by Afghan Telecom (available only in some major cities), home and personal Internet connectivity is increasing and most government ministries and offices have some form of basic ICT platform, including websites and Internet access. In 2006 there were an estimate 200,000 Internet users and 23 ISPs, today there are more than 1 million (estimated) Internet users and 44 ISPs[26].

The major ISPs, which provide Internet services in most principal cities, include Neda-Telecom, Insta-Telecom, Rana Technologies, IO Global, Ceretechs, New Dunia, Multinet, Netzone, Asix and Afghan Cyber. Services provided by these ISPs, include satellite-based VSAT solutions, Microwave (Point to Point), Wi-Fi, and dial-up and some of them also provide WiMax. It is worth noting that due to the lack of a reliable and open physical infrastructure, the majority of the private ISPs are relying on expensive satellite-based backbone connectivity. In addition to the aforementioned ISPs, the four mobile operators (AWCC, Etisalat, MTN, and Roshan) also provide mobile based (GPRS/EDGE) Internet services throughout their coverage area.

Afghan Telecom's access to state-owned Internet infrastructure including the fiber optic backbone has enabled the company to quickly emerge as the largest ISP in the country, providing both wholesale and retail Internet services to most government ministries and departments, banks, academic institutions, as well as some ISPs and end-users. Services provided by Afghan Telecom range from high speed fiber-based (STM-1 and SDH) connections to wireless microwave, WiMax, Wi-Fi, PDSN/CDMA Dongles, and its most popular low-priced dialup and DSL Internet services provided through its reseller Insta-Telecom.

The consistent decline of Internet prices, especially wholesale service, is due to market-based competition in the Internet sector and the government subsidized Afghan Telecom with the

[26] ATRA. "ISP Companies List." February 2012. <http://www.atra.gov.af/file.php?id=280>.

capacity to provide cheap Internet services by importing international Internet traffic through its national fiber optic backbone. Nevertheless, the lack of reliable infrastructure and the fact that the majority of ISPs' rely on expensive satellite communications has forced prices for high speed Internet connectivity to remain steep. The prohibitive cost of connectivity, along with other factors such as poor literacy levels, lack of computer and network access, and limited production of local content, keeps Internet services out of reach for the majority of Afghans.

B. Internet Service Providers

The first ISP license was awarded to Neda-Telecom in November 2004. Today there are 44 licensed ISPs in the country, including the four mobile operators (AWCC, Etisalat, MTN, and Roshan) and the fixed-line carriers Afghan Telecom and Wasel Telecom. Most of these ISPs are based in Kabul and provide services (mostly satellite-based) to the other provinces. Thirty-nine of the 44 are national license holders, who are authorized to provide Internet services throughout the country; whereas 5 are local ISPs authorized to only provide local inter-Provincial/Regional services. As of writing this report only 33 of the total 44 licensed ISPs, are operational and providing Internet services, while the remaining 11 are in the process or simply holding their licenses.

National ISPs (Table-3) [27]

#	ISP-Name	License Issuance -Date	License Type	Remarks
1	Neda Telecom	Sep - 2004	National	Based in Kabul
2	KBI	Sep - 2004	National	Based in Kabul
3	Ceretechs	Oct - 2004	National	Based in Kabul
4	New Dunia	Oct - 2004	National	Based in Kabul
5	Insta Telecom	Nov - 2004	National	Based in Kabul
6	IO Global	Jan - 2005	National	Based in Kabul
7	Rana Technologies	Jun - 2005	National	Based in Kabul
8	Multi-Net	Aug - 2005	National	Based in Kabul
9	Liwal	Jan - 2006	National	Based in Kabul
10	AWCC	Mar - 2006	National	Based in Kabul
11	Atlas Telecom	Mar - 2006	National	Based in UAE
12	Aryana Network Service	May - 2007	National	Based in Kabul
13	Pactec	July - 2007	National	Based in Kabul
14	AFSAT (AKA, Faiz Satellite)	Aug - 2007	National	Based in Kabul
15	Asix	Sep - 2008	National	Based in Kabul
16	Afghan ICT Solutions	Sep - 2008	National	Based in Kabul
17	MTN	Nov - 2008	National	Based in Kabul
18	Net Zone	Nov - 2008	National	Based in Kabul
19	Stream Link	Feb - 2009	National	Based in Kabul
20	Universal Telecom Services	Apr – 2009	National	Based in Kabul
21	Asia Consultancy Group	Sep - 2009	National	Based in USA
22	Nashita	Sep - 2009	National	Based in Kabul
23	Etisalat	Oct - 2009	National	Based in Kabul
24	Melat Networks	Nov - 2009	National	Based in Kabul

[27] ATRA. "ISP Companies List." February 2012. <http://www.atra.gov.af/file.php?id=280>.

25	Stan Telecom	Nov - 2009	National	Based in Kabul
26	Aria Sat Ltd.	Nov - 2009	National	Based in Kabul
27	Quality Net	July - 2010	National	Based in Kabul
28	Wasel Telecom	July - 2010	National	Based in Kabul
29	Afghan Cyber	Aug - 2010	National	Based in Kabul
30	Global Entourage	Aug - 2010	National	Based in Kabul
31	Connect Telecom	Sep - 2010	National	Based in Kabul
32	Afghanyar Technologies	Dec - 2010	National	Based in Kabul
33	Cast Globe	Dec - 2010	National	Based in Kabul
34	Giga-Nor	Jan - 2011	National	Based in Kabul
35	Kahinat Technologies	Jan - 2011	National	Based in Kabul
36	IDIL	Apr - 2011	National	Based in Turkey
37	Aryan Technology	Apr - 2011	National	Based in Kabul
38	Vital Telecommunication	Jul - 2011	National	Based in Kabul
39	Aryan Afghan Networks	Oct - 2011	National	Based in Kabul

Regional/Provincial ISPs (Table-4) [28]

#	ISP-Name	License Issuance -Date	License Type	Remarks
1	Sarfaraz Bahador	Oct - 2004	Regional	Based in Herat
2	Alpha Waves	Oct - 2009	Regional	Based in Khost
3	AfNet	Jan - 2010	Regional	Based in Kandahar
4	Asia Global	Sep - 2010	Regional	Based in Jalalabad
5	Aziz Helmand	Feb - 2011	Regional	Based in Helmand (cancelling license)

C. National ISP Association of Afghanistan

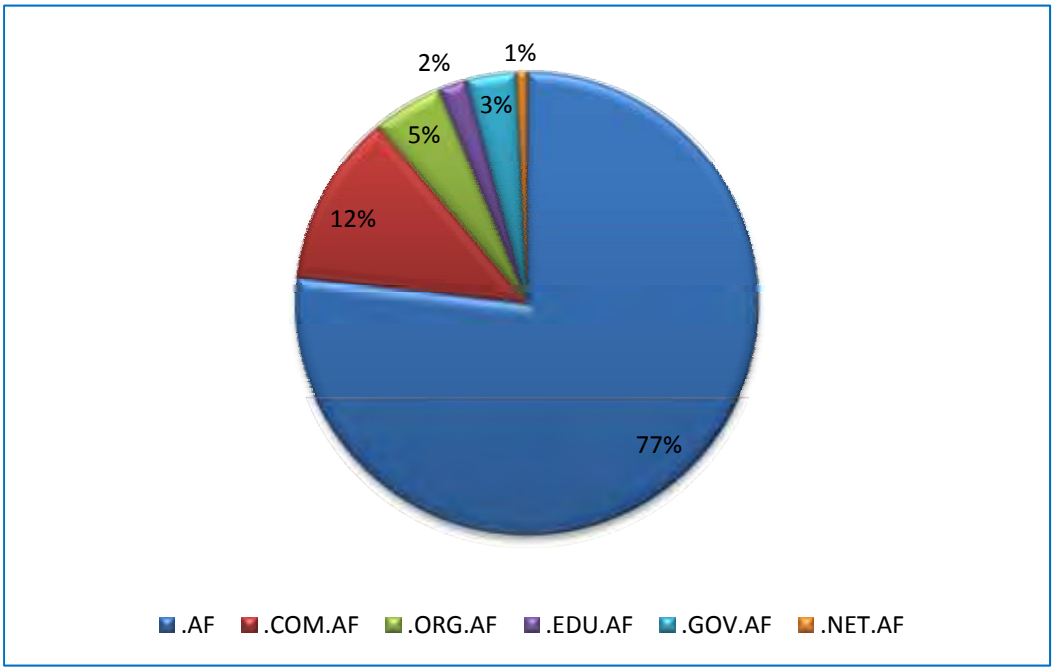
NISPAA is a non-profit social association of Internet service providers in Afghanistan, which aims to coordinate and protect the rights of the ISPs, as well as act as a mediating body for

[28] ATRA. "ISP Companies List." February 2012. <http://www.atra.gov.af/file.php?id=280>.

resolving disputes among the ISPs. NISPAA, which was originally established in March 2006 through a series of meetings and negotiations coordinated by GIPI-Afghanistan,[29] was not officially registered as a legal entity until December 2010 with founding members New-Dunia, Afghan-Cyber, RANA, NEDA, Net Zone, Afghan Telecom, AFSAT, Pactec, IO-Global, and Multi-Net.

NISPAA's organizational structure consists of an elected chairman,[30] a semi-annually elected vice-chairman and a rotating executive committee of 6 members. The association holds bi-monthly meetings and is governed by a comprehensive bylaw. As of 2012, NISPAA has a membership of 21 major ISPs,[31] which pay a mandatory $200 monthly membership fee.

Registered Dot-Af ccSLDs Ratio (Figure-3) [32]



[29] Predominantly financed by the European Commission, GIPI-Afghanistan was a joint initiative of Internews Europe, the Institute for Information Law (University of Amsterdam, Netherlands), Political Intelligence (Brussels, Belgium), and the Afghan Computer Science Association (Kabul, Afghanistan).
[30] The vice-chairman is automatically promoted to succeed chairmanship at the end of each semi-annual term.
[31] NISPAA members include: New-Dunia, Afghan-Cyber, RANA, NEDA, Net-Zone, Insta-Telecom, Afghan Telecom, AFSAT, Pactec, Nashita, Melat, Afghan-ICT-solutions, KBI-Afghanistan, ARIA-SAT, GIGA-NOR, Liwal, Asix, Multi-Net, IO-Global, ATLAS/net Links, and STAN-Telecom.
[32] AFGNIC. "Independent Research.". AFGNIC Questionnaire. January 2012. Internews.

4. LEGAL AND REGULATORY FRAMEWORK

A. Background

The signing of Decree 4517 by President Karzai in July 2002 heralded in a new era in the legal and regulatory landscape of Afghanistan's telecom sector. The Decree granted the MCIT statutory authority to issue licenses and spectrum frequency permits to private investors, as well as the power to adopt new policies, laws, regulations and procedures necessary for establishing a modern and competitive telecom sector. By July 2003, a new *Telecom and Internet Policy* had been approved by the Council of Ministers; in line with this Policy the MCIT took immediate steps to establish the Telecom Regulatory Board (TRB), an interim body responsible for issuing, monitoring and enforcing licenses and spectrum permits.

Commencing operations in May 2004, the TRB drafted a *National Numbering Plan (NNP)* and a *National Frequency Table,* as well as sought to replace the Taliban-era (2000) legislation by composing a new *Telecom Law*, which was enacted in December 2005. As per the provisions of the 2005 *Telecom Law* (Chapter 2, Article 4), the Afghanistan Telecom Regulatory Authority (ATRA) was established as a permanent and independent regulatory body, replacing the interim TRB. Since its establishment in 2006, ATRA has set up an inclusive licensing regime (license categories, ISP licensing, GSM licensing, licensing procedures, etc.), and implemented several regulations, procedures and normative-acts, including ATRA's Internal Code of Practice, a National Numbering Plan (NNP), Regulation on Radio and Wireless Frequency Usage, Procedure on Radio Frequency Assignment, and a Universal Access Policy.

The key building blocks of the legal and regulatory framework for the telecom and Internet sectors are the *Telecom Law (2005)* and the *Telecommunications and Internet Policy (2003)*. Except for a slight amendment to the *Telecom Law* in 2011 by the Afghan Parliament, there has been no significant transformation of the legal and regulatory framework. It is also worth noting that a new *ICT Law* is being redrafted following a review by the legislative department [Taqnin] of the Ministry of Justice. Furthermore, the MCIT has also begun an initial process for drafting a new and more inclusive ICT policy which is expected to be finalized by mid-2012.

B. Telecommunications

i. Legal Framework

The *Telecom Law* (2005)[33] sets out the general legal framework for the telecom sector in Afghanistan. The *Law* contains a detailed institutional framework for the creation of the Afghanistan Telecommunications Regulatory Authority (ATRA), licensing regime and procedures, competition policy, interconnection, co-location, scarce resources management, universal access, tariffs, regulations, penalties, sanctions, and dispute resolution. Reflecting international best practices and keeping in line with the Government's general policy of promoting private investment and market economy, the *Telecom Law* is decisively pro-private sector and in compliance with the World Trade Organization's (WTO) principles. The following is a brief analysis of the main elements of the *Telecom Law* (hereafter Law):

GENERAL PROVISIONS

The Purpose of the Law as stated in Chapter 1, Article 2:

1. *To provide further access to Telecom Services to the public throughout the country;*
2. *To promote non-discriminatory entry of Service Providers and Operators to the market;*
3. *To strengthen telecommunications market in the country in order to promote the quantity and quality of telecom services in the country;*
4. *To encourage technology that meets the needs of users and competitors and to prevent abuse of Significant Market Power by Telecom Service Providers and Operators.*

While Article 2 makes no reference to the protection of consumer interests, these provisions are briefly outlined in Chapter 1, Article 3. Further clarification regarding the terms defined in Article 3 are necessary to ensure the protection of consumers. For example, the law should make a clear distinction between a "Permit" and "License". It is assumed that this was an attempt to introduce an authorization regime that consists of "Licenses" as a strict regime, and "Permits" or registrations as a lighter regime for other services. However, the rest of the Law seems to require that all providers have licenses, further conflating the two terms.

[33] In the translated English version the Law is also referred to as the "Act".

In modern telecom laws, a distinction between the type of users (for instance subscriber and customer) as well as between the operators of public and private networks or services has proven to be useful. In this respect, the scope of the Law might need some clarification to distinguish between the two kinds of operators; for instance, in Chapter-9 ("Access to Property") it might be an unwelcome consequence to grant providers of private networks the same rights as providers of public networks.

AFGHANISTAN TELECOMMUNICATIONS REGULATORY AUTHORITY (ATRA)

The establishment and operations of a national regulatory authority is one of the major aspects of the *Telecom Law*. Chapter 2 describes the organizational structure[34] and the tasks of the Afghanistan Telecom Regulatory Authority (ATRA). The Law states that ATRA should be led by the Board of Regulation of Telecom Services, and outlines the power and responsibilities that the five-member board maintains.[35] While the composition of the Board is detailed in ATRA's *Code of Practice* (Article 2)[36], the Law itself does not provide any further guidelines regarding the composition of the Board.

The "Duties and Authorities" of ATRA are outlined in Article 6, and Chapter 3 (Decisions of ATRA) grants the body the authority for settling disputes between "Service Providers, Users and Interested Parties." Any person aggrieved by a decision of ATRA has the right of appeal to the Commission for settling financial disputes, as established in the Central-Bank *Law*. There is, however, no specific procedure available for consumer disputes.

COMPETITION AND ACCESS

Provisions regarding competition and access are important elements in the *Telecom Law*. These provisions are covered in Chapter 6 (Tariffs), Chapter 7 (Competition), and Chapter 8 (Network Interconnection and Access). In Article 3 (18) *"Definition of Expressions"* of the Law, Significant Market Power (SMP) has been defined as: "A Service Provider who earns 40% or more of the

[34] Please refer to Annex-5 "ATRA's organizational structure".

[35] The Board of ATRA, as per the provisions of the law, has the following responsibilities and powers: Regulating and directing activities of ATRA, Arranging and Formulating Laws, Rules, Regulations and Procedures necessary for regulating activities of the Afghanistan Telecommunications Regulatory Authority (ATRA) and the telecom market.

[36] ATRA. July 2008. ATRA's Code of Practice (Article 2). December 2012 <http://www.atra.gov.af/en/atra_code_practice.html>.

gross revenues in a specific telecommunications market, as defined by ATRA, as a specific service category or as a geographic service scope." Though this definition may provide clarity, the 40% share may cause some market players with substantial market power to fall outside the scope of the regulation. It is important that ATRA will have enough discretionary power to choose and impose remedies to issues arising.

AUTHORIZATIONS

One main element of the authorization-regime in the *Telecom Law* is a general license requirement for providers of telecommunication services (Chapter 5, Licensing). According to Article 13(2) an exception to this rule is made only for the private use of telecommunication devices. Furthermore, specific authorizations are required for the use of property (Chapter 9, Access to Property), "numbers" (Chapter 10, Numbering Plan) and frequencies (Chapter 11, Frequency Spectrum Plan). The latter approach is comparable to provisions in modern telecom laws in other countries. However that is not the case for the general license approach from Chapter 5.

Chapter 9 grants any operator or service provider the right to use "any highway or public property" for the construction and operation of infrastructure. An issue that is missing in this chapter is a provision to clarify ownership of the constructed infrastructure. Chapter 10 specifies the authorization to use "numbers" as "assignment." Only licensed operators or service providers (according to Chapter 5) are entitled to be assignees of "numbers." According to Chapter 11 (Frequency Spectrum Resources) a license or "exemption document" is required to use any radio frequency or any frequency-emitting device, Article 37(1). However, the Law does not further explain the eligibility and/or criteria for obtaining an "exemption document" (see earlier remarks on the license/exemption-document issue).

The Law also contains some provisions about universal services (Chapter 13), which states that "necessary funds are provided by ATRA from the Telecom Development Fund (TDF)."[37] The

[37] See Article 47 (2): "In order to provide universal access to telecommunication services, and finance its expenses, ATRA shall ensure the provision and use of necessary funds from the TDF, in accordance with the provisions of law." According to Article48 (2) all operators and service providers are required to make a contribution, as determined by the ATRA, to the fund.

provisions in this chapter could lead to a broad definition of universal services which may have consequences for the operators who have to make the contributions to the fund.

USER PROTECTION

Chapter 14 (User Protection, Privacy and Directory Information) contains specific provisions regarding the protection of users and/or consumers. Most of the provisions in the chapter apply to the broader expression "user". Nevertheless the regulation with respect to end user aspects is rather limited. The regulation of the Terms of Service addressed in Article 50, enumerates the standards based on which the actual terms will be prescribed by ATRA in separate procedures. It is worth noting that ATRA has considerable discretionary power in this matter. Additionally, this chapter contains regulations pertaining to the confidentiality of communications, the protection of user information, and the monitoring of traffic. The Law states that providers have to comply with monitoring requests from bodies of competent jurisdiction in criminal and national security cases. Based on experience in other countries it should be noted that additional regulation may be required regarding the compensation of the cost incurred by providers for monitoring.

The Law concludes with Chapter 17, which contains provisions for transitions, enactment and enforcement. In other countries where traditional telecom laws were replaced by a new framework focusing on competition, additional provisions were needed to limit the duration of the licenses of incumbents and other existing providers. Also the chosen system of individual licenses is rather strict and could gradually be replaced by a general/unified licensing regime. While some provisions may need further consideration and amendments will be required as the sector further evolves, in general the *Telecom Law* provides an open and modern framework.

ii. Regulatory Framework

The regulatory framework for the telecom sector is mainly governed by the *Telecommunications and Internet Policy* (drafted and approved in 2003), which was enacted in the context of a nascent telecom sector. Due to the phenomenal and unexpected growth of the sector since 2003, this policy has failed to keep pace with the development of the sector. The

following is a brief, descriptive-analysis of the regulatory framework based on the *Telecommunications and Internet Policy* (20030.

The MCIT has defined the following five principles to guide the development and transformation of the telecom sector in Afghanistan:

1. *Create a legal and regulatory environment that nurtures and accelerates industry growth.*
2. *Engage private investment to the greatest extent possible.*
3. *Establish a level playing field for competition.*
4. *Introduce market liberalization.*
5. *Encourage the usage of Internet and information and communications technologies (ICTs).*

The principles in the *Telecommunications and Internet Policy* (hereafter Policy) puts greater emphasis on encouraging users and the promotion of benefits for consumers compared to the provisions outline in the Article 2 "Purpose" of the *Telecom Law*. In the Policy, the MCIT is appointed as the responsible body for providing overall direction for the telecom sector's development, including a promotional role regarding investments and competition. While the Policy enumerates a number of duties of the regulator (ATRA), including consumer protection, this responsibility seems absent in the *Telecom Law*.

Another provision of the Policy is that the government will encourage the transformation of Afghan Telecom to become a "market-oriented and commercial enterprise". However for the transfer of shares approval of the Council of Ministers will be required (Article 8 of the "Procedure for the Institution of Afghan Telecom"). Article 36 of the By-laws of Afghan Telecom Corporation[38] establishes further procedures regarding the transfer of shares, and paragraph (4) addresses protecting the interest of existing share-holders in the event that a share-holder wishes to transfer its shares to a third party. For a limited time-period the company will be exempt from taxation (Articles 23-24 of the Procedure). However regarding the transfer of licenses to the new company, no limited time-period is imposed (Article 20).

[38] GIRoA, Afghan Telecom. n.d. Bylaws of Afghan Telecom Corporation.

The Licensing regime forms a major element in sector reform. The following licenses are distinguished in the Policy:

1. Mobile Services Provider Licenses (MSP)
2. Fixed Services Provider Licenses [39] (FSP)
3. Local Fixed Service Provider (LFSP) Licenses.
4. International Gateway Services (IGS) Licenses.
5. Very Small Aperture Terminal (VSAT) Registrations.
6. Digital Trunk Radio Services (DTRS) Spectrum Licenses.
7. Radio Paging Services (RSPS) Licenses.
8. Value-added Network Services (VAS), General-License.
9. Global Mobile Satellite Services Provider (GMSSPs) Licenses and Satellite Phone User Licenses for end users.
10. Cable Television Services Licenses (to be issued by the Ministry of Information and Culture).

This appears to be a very broad scheme of licenses. License-holders are also confronted with different kinds of license fees that they are required to pay. Spectrum usage fees are specified in the license agreement. A fee for a (general) license is based on a percentage of revenues share, which also has to be contributed to the Telecom Development Fund (TDF). Special attention should be paid by the MCIT to prevent this license policy from turning into a licensing jungle with a huge administrative burden.

The policy regarding private networks can be questioned. Private-networks for internal use by public and private companies are allowed, and are subject to the ATRA licensing. However as stated above, the *Telecom Law* seems to lack provisions to distinguish between operators of private and public networks and services.

[39] In the Policy a limited number of national FSP licenses are defined (a license for Afghan Telecom and two additional ones). It is common practice in the process of sector liberalization to limit the number of fixed services provider only in a relatively short transitional period of time. In this case the licenses are granted for 15 years with an option for renewal. It should be examined what exactly the competition implications are for additional nationwide FSP Licenses issued on a later date.

THE NATIONAL NUMBERING PLAN

The *Telecom Law* also assigned ATRA the task of preparing a National Numbering Plan. This scheme provides for the assignment of "geographical" numbers throughout the country for various kinds of services including premium rate services. The prefix code (7) is reserved for mobile communications in Afghanistan; short 3 digit codes (generally used for these kinds of services) are reserved and assigned for emergency (Police, Fire, and Ambulance); and the prefixes 8 and 9 are available and listed as spare codes. It is assumed that these codes spare will be assigned for information services at a later point in time. A more specified description of usage and allocation methods of these ranges may be added to the numbering plan.

In liberalized telecom sectors, numbering policies that enable the allocation (of certain numbers) to persons, instead of providers is an issue of importance. Detailed provisions on number portability (enabling the migration of users between providers) are considered to be important for competition in the telecom sector.

C. Internet

i. Legal Framework

As of writing this report, there is no specific legal framework available for Internet, however this is about to change. A comprehensive *ICT Law* oriented around content, and e-Commerce has been redrafted and is expected to be enacted soon. While the draft *ICT Law* will be discussed in the forthcoming sections, there are a number of provisions in the *Telecom Law* that also apply to the Internet. These provisions and additional regulations regarding Internet are discussed below.

INTERNET SERVICE PROVIDERS (ISPs)

Some of the regulations in the *Telecom Law* also apply to ISPs as providers of access to "end user or other persons"[40] such as user protection and regulations regarding the confidentiality of traffic (*Telecom Law*, Chapter 14). The ISP licensing process has been regulated under a

The *Telecom Law* (2005), Article 3 (17).

separate *Procedure* established by ATRA.[41] According to this *Procedure* applicants are expected to fulfill certain requirements including the submission of a detailed business plan and a $4,000 (200,000 Afs) refundable bank guarantee prior to being awarded a license. However the relationship between this procedure and the general licensing regime discussed in the *Telecom Law* (Chapter 5) is unclear.

DOMAIN NAMES

There is uncertainty in the *Telecom Law* regarding whether the definition of "numbers" might also include domain names. The .af ccTLD and all sub-category domain-names are regulated under the *Afghanistan Country Code Top level Domain Policy*[42]. Consisting of 14 main articles, the most critical provisions are listed under Article 2 (Acceptable Domain Names) Article-6 (Agreement between Licensee and Registrar), Article 7 (Privacy Policy), Article 10 (Dispute Resolution Policy), Article 11 (Rules for the Domain Name Use) and Article 12 (Required Documents). The ccTLD and all sub-domain names are technically managed and administered by AFGNIC.[43]

It should be noted that the *Draft ICT Law/Amendment* extensively covers the issue of regulation, overall management and administration of domain names, as well as proposes the establishment of a *Domain Name Authority,* which would have the authorization to draft and enact relevant regulations and procedures. The draft law does not elaborate, however, on whether the proposed Domain Name Authority will be established as a new entity parallel to the existing AFGNIC or lead to a restructuring and expansion of the roles and responsibilities of the AFGNIC to include the proposed Domain Name Authority.

[41] ATRA. "Procedure for the allotment of ISP licenses (amended, May 7, 2009)." <http://www.atra.gov.af/file.php?id=54 >.
[42] AFGNIC. "Afghanistan Country Code Top level Domain Policy." u.d. <http://www.nic.af/domainpolicy.htm >.
[43] Administering the .af ccTLD since 2003, AFGNIC was established as a separate entity in 2009 within the general framework of the MCIT under the general directorate of ICT.

ii. Regulatory Framework

Defined under the *Telecommunications and Internet Policy* (2003), the key element in the regulatory framework of the Internet is the ISP licensing regime. The Policy establishes a two-class ISP licensing regime:

- International Transit Licenses
- National Licenses [44]

This two class ISP licensing regime seems a rather strict regime. National ISP license holders are allowed to offer connection to end-users, but are prohibited from providing international connectivity. The government's rational for implementing this system is to achieve "robust competition at all levels of the market".[45] In order to encourage the development of Internet use, the licensing mechanism for (national) ISPs should be an inexpensive procedure. According to the government, the number of international transit licenses should be limited to "promote both a competitive and a stable investment climate"[34]. However the regime is not as strict as it seems, since providers are allowed to have both national licenses and international transit licenses. In practice it is not easy to distinguish between the two types of licenses. This is partly due to the fact that the ISP licensing procedure[46] introduced by ATRA only discusses the process for the allotment of national ISPs and its subcategories, and does not provide any details on the licensing procedure for international transit licenses.

WIRELESS REGULATION

As outlined in the *Telecom Law*, another main element of Internet regulation is the regulation of wireless frequency spectrum covered under the boarder category of radio spectrum. The allocation and assignment of radio spectrum is covered in Chapter 11 of the *Telecom Law*. While Article 37 states that a license or "exemption document" is required to use a frequency or transmitting equipment, most of the articles in this Chapter refer only to "License" as a

[44] As a practice by ATRA "in order to develop rural Internet access and services," national ISP licenses are further sub-categorized into two additional zonal and provincial categories. These license holders are allowed to provide zonal and/or provincial services only.

[45] MCIT. "Telecommunications and Internet Policy." November 2003. pp. 12. Article 10.0 (Internet Services Licenses).

[46] *"Procedure for the allotment of ISP licenses (amended, May 7, 2009)".*

requirement. Thus, the criterion for the term "exemption document" is poorly defined. Moreover, it is unclear whether the holder of an "exemption document" is exempt from paying the license fee as well as the frequency use fees.

The application and granting of a license is predominantly covered in Article 38, but clauses pertaining to mobile services and the number of licenses are included in Article 13 (7). According to Section 3, a license will be granted unless:

1. *The applicant's request is not technically feasible;*
2. *The contents of the request contravene the provisions of this Law;*
3. *Approval of the request would be inconsistent with the efficient use of the radio frequency spectrum;*
4. *Approval of the request would result in unacceptable interference to others;*
5. *The applicant or proposed transferee is not eligible pursuant to the provisions of this Law.*

Article 13 (7) lists the following application to have a limited number of licenses:

1. Mobile services or new and modern technologies.
2. Supportive services through the Telecom Development Fund.
3. Such other services that ATRA may deem necessary.

The latter option puts a significant discretionary power in the hands of the ATRA, as the Law does not describe any guidelines, like scarcity reasons. On the other hand, regarding the issue of allocation methods, the Law has a very restricted approach, limiting the options to a bidding process only. Hence other (comparative) methods, for example a "beauty contest", seem to be ruled out.

Two other important issues covered under Article 37 are:

- A list of transmitting devices and services without license requirements shall be established by the regulator. The extent of the discretionary power of the regulator in this matter is not stated in this Article. However, Article 36 states that the national frequency allocation table shall conform to international and regional standards.

License free-use of frequencies for telecom service is however still not possible, because Article 13 of the Law seems to imply that a license is required for any kind of telecommunication service. Therefore, for example it is difficult to assess the regulatory environment of access-technologies like Wi-Fi and other applications of the ISM-bands.

- The transfer or allocation of a license to another person is not allowed without the written prior consent of the regulator.

In addition to the provisions of the *Telecom Law*, radio frequencies and wireless communication devices are also governed by the *Regulation on the Use of Radio Frequencies and Wireless Communication Devices,*[47] which was enacted by ATRA in 2003.

[47] ATRA. 2003. Regulation on the Use of Radio Frequencies and Wireless Communication Devices. January 2012 <http://www.atra.gov.af/en/Radio_Frequencies_and_Radio_Communication_Regulati.html>.

5. ROADMAP FOR THE FUTURE

A. Development Framework

i. Background

In line with the Afghan Government's general policy for practicing sovereign authority through good governance and better service provision, during the *London Conference* in January 2010 the Afghan Government in coordination with the international community introduced the *Kabul Process*.[48] This is a general transition policy for gradually transferring both civilian and military responsibilities and leadership from the international community to the Afghan Government in the lead up to 2014. Endorsed by the international community, donor countries pledged at the July 2010 Kabul Conference, to realign their financial assistance mechanisms by spending at least 50% of their pledges through the Afghan Government's budget.

In a follow-up conference held in Kabul in July 2010, the Afghan Government presented the international community with the *Afghanistan National Development Strategy (ANDS)*[49] *Prioritization and Implementation Plan.* The three year ANDS-based strategic plan promotes peace, security, governance and socio-economic development during the transition period to 2014, and is comprised of 22 National Priority Programs (NPPs) grouped under six major clusters (peace, human resource development, infrastructure development, private sector development, agriculture and rural development, and governance).

i. E-Afghanistan National Priority Program

Serving as a roadmap for the ICT sector, the *E-Afghanistan National Priority Program* was presented at the *Kabul Conference* as one of the 22 NPPs. E-Afghanistan was later endorsed by the Joint Coordination and Monitoring Board (JCMB)[50] in October 2011, and will serve as the national development framework for the ICT sector for the next 3 to 5 years. The following

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[48] Government of the Islamic Republic of Afghanistan. "Kabul Process." 2010. Kabul Process. February 2012 <http://www.thekabulprocess.gov.af/>.

[49] Approved by president Karzai in April 2008, the *Afghanistan National Development Strategy* (ANDS) is a 5 years (2008-2013) national development master plan for Security, Governance, Socio Economic Growth and Poverty Reduction in line with the UN's Millennium Development Goals (MDGs).

[50] Established in 2006 and consisted of representatives from the Afghan Government, UN, and international community (donor countries) the Joint Coordination and Monitoring Board (JCMB) oversee and provide coordination and strategic guidance on the implementation and progress of the ANDS and the Kabul Process.

provides a brief analytical description of the *E-Afghanistan National Priority Program* (hereafter, *Program)*:

GENERAL ANALYSIS

The *Program* presents a broad and detailed[51] development framework for the ICT sector in Afghanistan, and provides a useful roadmap for the future. Additionally the *Program* proposes valuable policy recommendations and solutions to existing problems, which could prove beneficial for the improvement and development of the ICT sector. However the *Program* is heavily oriented towards government/MCIT activities with particular focus on the development and implementation of e-Government services and applications. It also places special emphasis on strengthening the MCIT's technical, policy-making and regulatory roles and capacity. It is also worth noting that due to external factors like the fluctuating security situation, donor funding, implementing partners' (ministries) capacity, and inter-ministerial coordination and cooperation, some of the *Program*'s components and objectives might prove too ambitious.

IMPLEMENTATION, DURATION, BUDGET AND FINANCING

The *Program* is expected to be implemented over a period of three years with the option to extend for another two years. The *Program* will be implemented by MCIT as the main implementing body in coordination with other relevant government ministries and entities, as well as donor agencies. The MCIT has already established two dedicated Project Management Offices (PMOs) to oversee and coordinate the implementation of these projects.

The *Program* was originally estimated by MCIT at $215.96 million for a period of three years, but was later revised and endorsed by the Joint Coordination and Monitoring Board (JCMB) at $194 million. The *Program's* five years budget is estimated at $267 million. While some of the *Program's* components have already been funded and/or implemented through alternative sources, over 80% of the *Program*'s budget is expected to be provided by international donor countries and organizations through direct funding and/or funding provided through the

[51] The *Program* document provides a detailed (70 Pages) framework explaining the background, requirements and benefits of each component and sub-components.

government's budget. The remaining 20% will be funded from the government/MCIT's development budget.

GOALS AND OBJECTIVES

"To make affordable communication services available in every district and village of Afghanistan through enabling market economy, so that all Afghans, men and women alike, can use ICT to expeditiously improve Government, social services, foster the rebuilding process, increase employment, create a vibrant private sector, reduce poverty and support underprivileged groups."

The *Program's* main goal and objectives are:

"To create a modern and efficient Information and Telecommunications sector and e-Government to enhance the effectiveness, efficiency and transparency of the public sector, provide for social services, develop a vibrant private sector, and create a connected and productive society."

1. Bridge the existing communication Gap.
2. Improve telecom services (phone and Internet) and access in rural and urban areas.
3. Lower local cost of mobile and fixed line telephony.
4. Generate jobs in telecom industry.
5. Increase government revenues from the telecom industry.
6. E-Government and e-NID adoption and completion.
7. Using ICT as an enabler for socio-economic growth and prosperity.

COMPONENTS

Based on a seven-layered development model the *Program's* main and sub-components are:

(COMPONENT-1) STRENGTHENING OF LEGAL, REGULATORY, POLICY AND INSTITUTIONAL FRAMEWORKS:

1. LEGAL FRAMEWORK:
   - *ICT Law* (After the review of the first draft by the legislative department [Taqnin] of the Ministry of Justice, the redrafting of the law has commenced).

- Postal Law (the *Law* has already been drafted and sent to the legislative department [Taqnin] of the Ministry of Justice for review and approval).

2. REGULATORY FRAMEWORK:
   - Cyber Security Regulations.
   - Broadband Regulations.
   - E-Governance Regulations.
   - Digital Signatures Regulations.
   - E-Government Interoperability (Software) Framework (This framework including over 100 standards has already been developed by MCIT; the project was separately funded by the World Bank).
   - Information Technology Audits.
   - Electronic Certification Regulations.
   - Quality of Service Regulations.
3. INSTITUTIONAL FRAMEWORK:
   - National ICT Council of Afghanistan (elaborates the duties, objectives and the scope of work for the existing National ICT Council of Afghanistan [NICTCA]).
   - Afghanistan Telecom Regulatory Authority (elaborates the duties, objectives and the scope of work for the existing ATRA).
   - Afghanistan Postal Regulatory Authority (APRA has already been formed including a 4 member commission appointed by the MCIT minister which will later appoint the fifth member also the Post Commissioner).
   - Electronic Certification Authority (discusses the establishment, authority and key objectives of a proposed new entity called Electronic Certification Authority or ECA).
4. POLICY FRAMEWORK:
   - Broadband Policy.
   - Revision of ICT Policy (the 2003 *ICT Policy* will be revised under the World Bank-funded ICT sector development project).

(COMPONENT-2) EXPANDING TELECOMMUNICATION NETWORK:

1. Building Telephone Lines Network (30,000 new copper telephone lines in 10 provincial capitals).
2. Building Internet Exchange Point (discusses the establishment of a National Internet Exchange, its benefits and characteristics).
3. Fiber Optic Network (discusses the implementation of the ongoing fiber optic backbone project and connecting all 34 provinces to this backbone in a phase by phase manner).

(COMPONENT-3) e-GOVERNMENT:

1. National ID Cards (the $122 million Afghan government funded e-NID project has completed the preliminary bidding, contracting and procurement steps and is expected to begin in mid-2012).
2. E-Government Resource Center.
3. Website for Service Delivery and Interoperability.
4. Automated National Registries (including land ownership, ID cards, passports, etc.).
5. Establishing an ICT Village/Park (the initial assessment and feasibility study for the project has already been initiated by MCIT).
6. Developing e-Government Applications.
7. Improving ICT Training and Digital Literacy.

(COMPONENT-4) Mobile GOVERNMENT:

1. Enabling Mobile Government (mGov).
2. Innovation Grants Program (this program will be funded under the Word Bank $50 million grant for the ICT sector development and implemented by MCIT. A total of $5 million has been allocated for this program).

(COMPONENT-5) POSTAL SECTOR MODERNIZATION:

1. Reconstruction and modernization of Afghan Post Organization (APO).
    - Development of Services.
    - The Development of Afghan Post.
    - Enhancing Mail Services.
    - Capacity Building.

- Reconstruction and Rehabilitation of the Infrastructure and modernization of the APO Post Offices.

2. Postal Law (the law has been drafted).
3. Establishing an Independent Afghan Postal Regulatory Authority (APRA has been formed).

(COMPONENT-6) STRENGTHENING THE MINISTRY:

1. Restructuring of the Ministry (This component is not discussed in the *Program*, however under the E-Resource Center [E-Gov. Component] an organizational chart suggests that a new ICT deputy-ministerial position will be created and the existing E-Gov. and AFGNIC departments will be promoted to Directorates and placed under this entity including the existing ICT directorate).
2. Cyber Security Center (proposes the creation of AFCERT, at the moment AFGNIC assumes the functions and duties of AFCERT).
3. Capacity Building in MCIT.
4. Chief Information Officer (CIO) Cadre across the Government.
5. Creation of e-Government Resource Center (same as under e.Gov Component).
6. Information and Communication Training Center (ICTi exists, and the *Program* discussed the benefits of the existing center and proposes that the center should offer a two year Master's degree program, as well as fellowship and 'training of trainers' programs).

(COMPONENT-7) STRENGTHENING THE SECTOR:

1. National Internet Register of Afghanistan (at the moment AFGNIC assumes the functions and duties of NIRA).
2. Incubator Program and Skills Development (this component is planned and funded under the World Bank $50 million grant for the ICT sector development).
3. Skills Development Program for Universities and Private Institutions.

B. Legal and Regulatory Framework

i. ICT Law

The MCIT's dominant policy objective for the next 5 years is to protect consumers, foster the growth of a domestic content-creation industry, and implement an electronic commerce system. To achieve this objective, MCIT started drafting a comprehensive *ICT Law* in 2008 to reflect international best practices and standards, and to address the development of "new media" and Internet-oriented issues such as "web hosting" and "domain names." Two chapters of the Law are simply adaptations of the United Nations' "model laws" on electronic commerce and digital signatures, and another chapter is an adaptation of the Council of Europe's legal framework on cybercrime and security. While the draft *ICT Law* is not contentious, it is highly technical and consists of a vast number of IT services and issues that are unfamiliar to the majority of Afghans.

The draft *ICT Law* was presented to the legislative department (Taqnin) of the Ministry of Justice in early 2010, and subsequently added to the legislative calendar for review. In early 2012, the Taqnin informed the MCIT that the *ICT Law* was too long (around 70 pages) and too technical, as well as contained elements that should be divided into a section on normative acts and a section on sub-regulations. Consequently, the MCIT has commenced redrafting the *ICT Law* to result in either a shorter version or perhaps, a brief content-oriented technical amendment to the existing *Telecom Law* (2005).

The primary outcome of the *ICT Law/Amendment* is to give ATRA additional powers, as well as responsibilities in the ICT realm, especially with respect to the data communications content being offered by the telecom service licensees. However, as a matter of Constitutional Law, the Ministry of Information and Culture (MoIC) is responsible for the regulation of content. Therefore, ATRA will not have authority over broadcasters beyond allocating spectrum assignments once a broadcast license has been issued by the MoIC. The *ICT Law/Amendment* is also expected to instruct ATRA to promulgate rules, regulations and procedures pertaining to each of the chapters of the full-length *ICT Law/Amendment*, and this will be done pursuant to ATRA's existing *Rules of Procedure*, which includes full transparency, public consultations and the same terms and conditions applicable to all licensees.

C. 3G and Wireless Broadband

As a major step toward improving the quality of voice services and fostering broadband mobile Internet and facilitating other mobile-based value-added services and applications, in line with MCIT's general policy focus for the next 3 years[52]. The MCIT has decided to issue the country's first 3G and Wireless Broadband licenses. In August 2011 MCIT/ATRA initiated the bidding process for issuing a new national license for the provision of 3G mobile services over the allotted 20/100 MHZ spectrum on the 2100 MHZ band.

Following a three month international bidding process, apparently none of the three applicants (Sahar 3G, Toseye Eatemad Mobin, and Shezai Tel USA) could fulfill the technical requirements for the tender and their bids were rejected by ATRA's Technical Evaluation Committee.[53] As per the approval of the Minister's Committee for the Telecom Sector and in line with the tender's conditions, MCIT/ATRA subsequently decided to offer licenses to the four incumbent mobile operators (AWCC, Etisalat, MTN, Roshan) to also include 3G services over the allotted spectrum. The 3G licenses will be issued against the reserve tender price of $25 million per operator. On March 18, 2012 Etisalat was the first to be awarded a 3G license, marking a new milestone in Afghanistan's telecom sector. It is also worth noting that in addition to the four mobile operators, Afghan Telecom is automatically entitled to provide 3G services as per its unified service authorization.

As per the coverage and timing *schedule*, all 3G licensees will be required to meet the following service coverage and timing schedule in addition to keeping their existing (GSM) services at its current optimal level:

TIMETABLE	AREA	COVERAGE
Within 6 Months of Service Commencement.	Kabul City.	At Least 50% Coverage.
Within 12 Months of Service Commencement.	Kabul, Mazar-e-Sharif, Jalalabad, Herat, Kandahar, and Kunduz Cities.	At least 80% Coverage (within the 15 km radius of the city centers).
Within 2 Years of Service Commencement.	Provincial Capital Centers and One Major National Highway.	At Least 80% Coverage.

[52] H.E. Amirzai Sangin (Minister, MCIT). Presentation. American University of Afghanistan, 27 November 2011.
[53] ATRA Website. "News and Events Section." December 2012. Result of 3G Bidding Process. February 2012 <http://www.atra.gov.af/en/old_files.html>.

The *schedule* also suggests that if any of the licensees do not meet the above-mentioned coverage and timing requirements, they will be fined an amount of $10,000 (500,000 Afs) for each month's delay.

Following the 3G licensing process, the MCIT intends to initiate the public consultation and tendering process for issuing Broadband Wireless Access (BWA) licenses and spectrum (5/100 MHZ spectrum over 3.5 GHZ band) for the provision of broadband wireless services such as WiMax and MMDS/LMDS. Both 3G and Broadband wireless services (WiMax and MMDS/LMDS) are expected to be available through multiple operators/providers by mid 2012.

D. Other Major Projects

i. ICT Sector Development Project

As one of the largest donors of the telecom sector, the World Bank in April 2011 approved a $50 million 'International Development Association emergency'[54] grant awarded to the Afghan Government/MCIT for the development of the ICT sector in Afghanistan. Aiming at expanding connectivity, mainstreaming the use of mobile based services and applications, and supporting the development of the local IT industry in Afghanistan, the project will be implemented by the MCIT in close coordination with the World Bank over a 3-4 year period until 2016.

The project will support and finance the following main and sub-components: (1) Expanding Connectivity: Supporting Policy and Regulatory Reforms ($2 million), Backbone Connectivity[55]($27 million) and Capacity Building ($1 million); (2) Mainstreaming m-Government: m-Gov. Strategy ($0.6 million), m-Gov. Service Delivery Platform ($3.1 million), and Innovation Support Program ($5.6 million); (3) IT Industry Development: IT Industry Dev. Strategy ($0.4 million), IT Skills Dev. Program ($2 million), ICT Village ($0.8 million), and ICT Incubator Setup and Support ($1 million), Project Management and Support ($4.2 million). The grant will be provided to the MCIT through MoF in five installments over the project implementation period.

[54] International Development Association (IDA) is a part of the World Bank, and supports anti-poverty programs in the poorest developing countries with long-term, no interest loans and/or grants.
[55] This is construction of the third-phase of the fiber optic backbone.

It is worth noting that in addition to this several other major projects – namely the initiation of the electronic National ID (e-NID), establishment of the National Internet Exchange of Afghanistan (NIXA), The licensing and leasing of the Afghan Orbital Satellite Slot (50 degrees East) – and more are in various planning and implementation stages. If the country's general security and political situation allow, it is expected that Afghanistan's ICT sector will witness some exciting developments in the coming 3 to 5 years.

6. CONCLUSION AND POLICY RECOMMENDATIONS

The exploding growth of the telecom sector over the past decade not only surpassed the expectations of the public sector and industry, but serves as a practical model for the larger development of infrastructure and services in Afghanistan. However this growth and progress remains fragile due to the ever-changing security and political environment in the country. While the fluctuating security situation and the ongoing insurgency are the biggest hurdles to the development, growth and expansion of the telecom sector: the lack of sustainable electrification; the lack of universal access and poor quality of service; inadequate local content and applications; insufficient qualified local human resources; the lack of a comprehensive consumer-oriented legal and regulatory framework; and the lack of coordinated and timely sector-based research and information are constraints that still remain fundamental obstacles to the development of the telecom sector in Afghanistan.

Nevertheless, given the growth of both the legal enabling environment and industry practice, Afghanistan has built a modern telecom sector that has increased access to information, economic opportunities, and the overall standard of living for ordinary citizens. The pace of policy and regulatory development and the construction of national infrastructure systems combined with the wide adoption of these technologies by its citizenry over the past decade, generate an optimistic outlook for the ICT sector in Afghanistan. Looking ahead the cooperation between the public and private sector to transition to e-Governance systems, digitalization, Broadband, 3G, and a fully-operational fiber optic backbone, will present new and exciting possibilities for Afghanistan as a democratic country seeking membership in the global information society.

- ***ICT Sector Prioritization:*** While continuing to work on the development and progress of the existing sector, there is enormous economic and social potential for converting the telecom and Internet sectors into a fully-fledged ICT industry. The viability of this vision is exhibited against the backdrop of the phenomenal growth of the telecom sector in the past decade as well as Afghanistan's largely literate, young population (57.5% below

19 years)[56] who are enthusiastically inclined towards new technology trends. While continuing to transform Afghanistan into a well-established information society, the construction of the national fiber optic backbone, the introduction of 3G and Broadband services, the amendments in the legal and regulatory framework especially the drafting of the new *ICT Law/Amendment*, and the licensing and leasing of Afghanistan's orbital satellite slot are practical steps towards the vision of integrating Afghanistan into the 'Digital Silk Route.'

- ***Level Playing Field:*** The private sector is a key implementing partner in the growth and sustainability of the telecom industry. Ensuring a level playing field that reduces the powers of the state-owned Afghan Telecom will lessen the contention among telecom and Internet service providers (ISPs). As per the recommendations of the *Telecommunication and Internet Policy (2003)* – "Through the creation, 'corporatization' and rapid privatization of Afghan Telecom, the government will relinquish its role as an operator of public telecommunications services"[57] - practical steps toward the partial or full-privatization of Afghan Telecom should be considered. Additionally, allowing ISPs to purchase and import international data through balanced and open access to national telecom infrastructure, especially the fiber optic backbone will contribute to a level playing field.[58]

- ***Capacity Building and Human Resource Development:*** Further empowering the education sector to respond to real-world developments via accredited certifications and degree programs that are compliant with industry standards will complement the transition of the existing telecom sector into a fully-fledged ICT industry. The inclusion of ICT and computer learning as mandatory subjects in the national curriculum of Afghan schools, colleges and universities; the introduction of ICT Master's degree

[56] United Nations. "World Population Prospects (The 2010 Revision)." June 2011. Total population (both sexes combined) by Five-Year Age Group. February 2012 <http://esa.un.org/wpp/Excel-Data/population.htm>.
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[58] NISPAA. "Presentation by NISPAA Representative." ICT Collaboration Conference. Kabul, 11-12 December 2011. Slide -10.

programs at the MCIT's ICT Institute (ICTi); and regular reviews of regulation and policy to build sector-oriented technical capacity, will enable the legal environment to keep pace of industry developments. Alongside these recommendations, investing in ICT human resources at all levels will ensure a long-term profit and return.

- ***Policies, Laws and Regulations:*** The legal enabling environment works to both regulate and promote industry realities and opportunities. Undergoing a regular review of the policies, laws and regulations that govern the telecom sector is important as the sector matures. Moreover, laws and regulations that are amended in consultation with all stakeholders and emphasize the protection of the consumer or end-user as a top priority, will promote a long-term sustainable model.

- ***Quality of Service:*** While there has been enormous growth in the number of ICT services available to ordinary citizens, businesses and government, the quality of services available are still low according to international consumer standards. This is especially true of mobile services, which are often poor due to environmental and security factors that continue to inhibit the roll out of supporting infrastructure, such as continuous power supply or the installation of repeater towers. In addition, service providers are not readily using available technologies to provide a diverse range of consumer products, such as high-end mobile services. Due to the absence of consumer interest reports, companies will often deliver the lowest costing level of service at the highest price that the market is willing to pay. If telecom companies had market data indicating that consumers were willing to pay for better service delivery, the ICT environment would undergo a further improvement in the quality of service on par with international consumer standards as well as enhanced infrastructure.

- ***Awareness Raising:*** Public information campaigns that seek to raise awareness and dispel misnomers about ICT among all facets of society will reduce the resistance toward change and replacing traditional systems and procedures. Explaining ICT in an accessible and more simplified manner and conveying the benefit of ICT beyond the realm of communications will contribute to changing both public opinion and practice.

- ***Local Content and Applications:*** Through the support of public information campaigns to demonstrate the practical nature of ICT, these educational initiatives will contribute to the wider penetration of ICT in rural and remote areas of Afghanistan. To support the use of ICT tools and applications, young technology enthusiasts and experts should be encouraged and facilitated to promote the development of content and applications, particularly in local languages, in order to increase the relevancy for all Afghans.

- ***Sector Information and Market Research:*** Regularly published sector-oriented information, trends and developments are important research and marketing tools for the wider coordination and overall growth of the sector. The accessibility and availability of these research and marketing indicators are important and must be ensured by all stakeholders; government, industry, and consumers.

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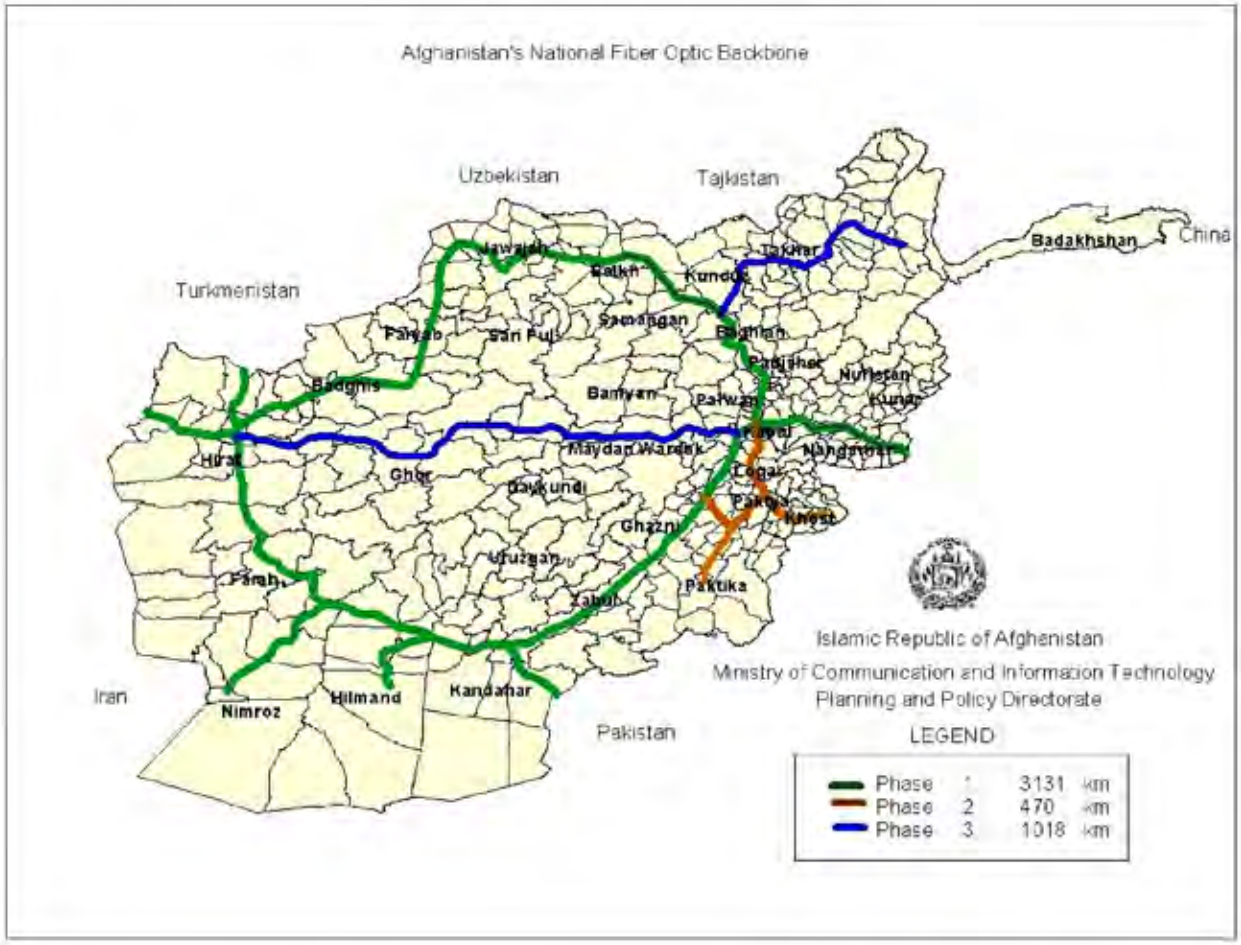
Javid Hamdard

1. **National Fiber Optic Backbone Map (Annex-1)** [59]



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2. **MCIT's Vision for 2014 (Annex-2)** [60]

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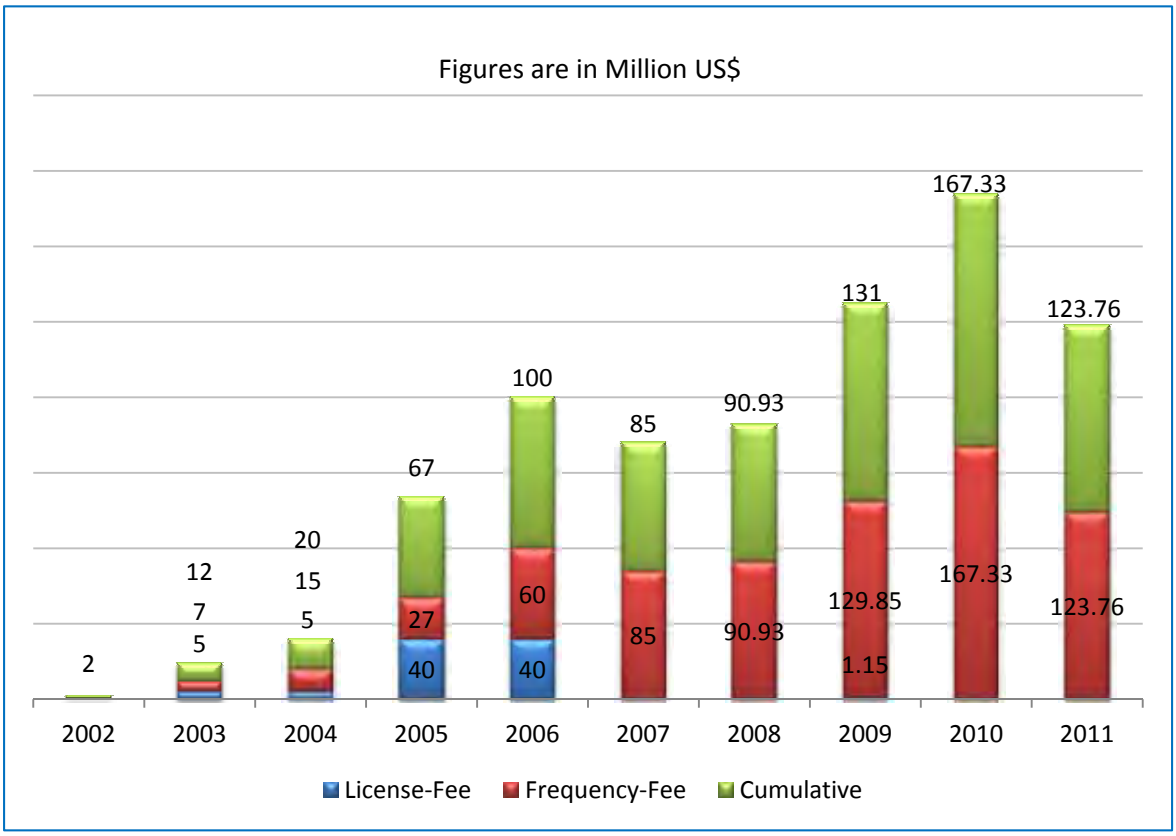


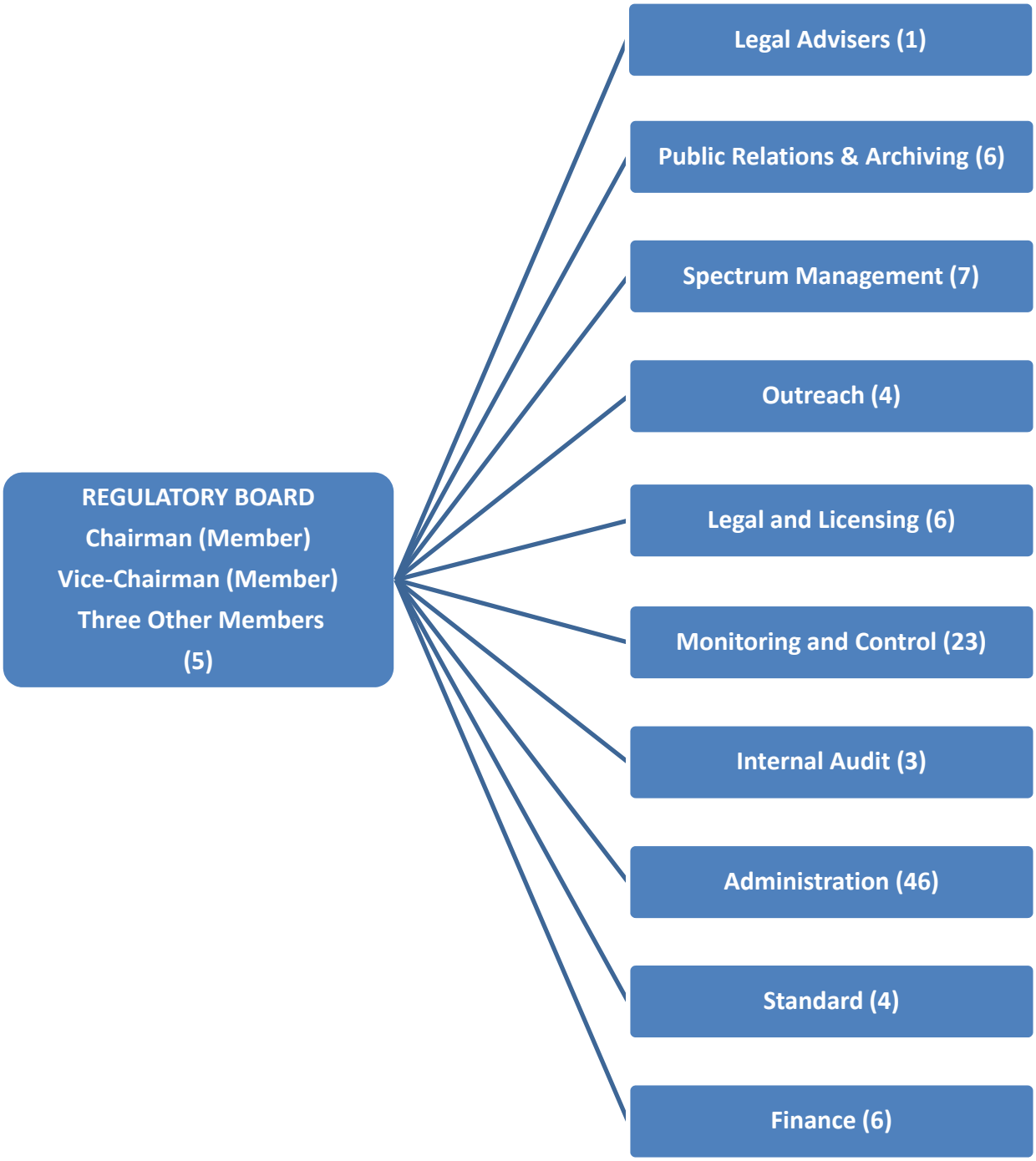
[61] MCIT. "Annual Achivements Summary." Summary Reports 2006 - 2011 eds.

4. Service Scope by Operators (Annex-4) [62]

#	OPERATOR	SERVICE START	SERVICES	COVERAGE	SUBSCRIBERS
1	AWCC	Apr-2002	Mobile (GSM) Voice and Data (including SMS, MMS, IVR, GPRS/EDG,), Int. roaming, and ISP.	All 34 provincial capitals and principal cities (incl. Kabul, Herat, Jalalabad, Kandahar and Mazar), 600 towns and villages, and major highways.	3.5 million
2	Roshan	Jul -2003	Mobile (GSM) Voice and Data, (including SMS, MMS, Black-Berry, GPRS/EDGE, IVR, and M-Paisa), Int. Roaming and ISP.	All 34 provincial capitals and major cities (incl. Kabul, Herat, Jalalabad, Kandahar and Mazar), 230 districts, and major highways.	5.6 million
3	Afghan Telecom	Apr-2006	Fixed-line (Digital) Voice and Data, CDMA-2000-1X Voice and Data, FWP/T, cellular mobile, Public Pay Phones and ISP (retail and wholesale).	Fixed-line voice and data in Kabul, Herat, Jalalabad, Kandahar, Mazar and Kunduz. CDMA (1X) voice and data in all 34 provincial capitals and satellite based call-center and tele-kiosk services in more than 700 districts and villages.	260,000 (150,000 CDMA & 110,000 Fixed-line)
4	MTN	Jul -2006	Mobile (GMS) Voice and Data (including SMS, MMS, blackberry, GPRS/EDGE, and Voice-mail), Int. Roaming and ISP.	All 34 provincial capitals and major cities (incl. Kabul, Herat, Jalalabad, Kandahar and Mazar), 464 districts, and major highways.	4.5 million
5	Etisalat	Aug-2007	Mobile (GSM) Voice and Data (including SMS, MMS, Blackberry, GPRS/EDGE, and Voice-mail), Int. Roaming and ISP.	All major cities (including Kabul, Herat, Jalalabad, Kandahar and Mazar), 30 provincial capitals, over 182 districts, and major highways.	3.5 million
6	Wasel	May-2008	Wireless CDMA-2000 & 1X Voice and Data (including WLL, cellular, GPRS, dialup and USB Dongles) and ISP.	In 3 northern provincial capitals of Balkh, Baghlan, Kunduz and Jawzjan and 22 districts in these provinces.	52,000

[62] Internews. "Independent Research." Telecom Operators Survey. ; Wasel Telecom Website Feb 2012.

5. ATRA's Organizational Structure (Annex-5)[63]



[63] ATRA. "ATRA's Organizational Structure." ATRA's Organizational Structure for Year 2011. February 2012 <http://www.atra.gov.af/en/Organization_Structure.html>.

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