Afghan Fiber Optic Network Analysis

Office of the Economic Advisor

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EXECUTIVE SUMMARY

Afghanistan's Fiber optical network is owned by government. Currently it is connected with 24 provinces and its active length is 4000/km. 101 million USD has been invested on this fiber optical network. In 2016 Afghan fiber optic revenue increased to USD$70 million from USD$0.4 million in 2008.
The remaining nine provinces will be contacted through the fiber optic in the future by building 1305 km link, to contact these remaining provinces Afghan telecom needs almost USD$33 million. The international routes of Afghan fiber optic currently connect with Pakistan, Iran, Tajikistan, Uzbekistan and Turkmenistan. In the future, it will connect with China, through a 480 KM connection from Faizabad City, Badakshan to the China Border.

Currently there is no private fiber optic network in Afghanistan or any private investment hasn't taken place in this regard. According to our regional case study, private sector is actively involve and invest in Fiber optic network in order to build their own backbone network; Pakistan, Mongolia, Kenya and Estonia are one of the example of those countries where private operators are having their own fiber optic in order to provide good quality broadband services to their customers.

Afghan fiber optic is controlled or managed by three government entities: Managed by Afghan Telecom, deployed by the Ministry of Communication & IT, and Regulated by ATRA (Afghanistan Telecommunication Regulatory. Recently, Afghanistan Telecommunication regulatory Authority (ATRA) drafted open access policy to provide a legal framework to private sector to invest in the fiber optical network.

Source: ATRA, Afghan telecom & Regional countries regulatory authorities

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Afghan Fiber Optic Network Map

The Afghan Fiber optic network connects 24 provinces across the country. The international routes of Afghan fiber optic connect with Pakistan, Iran, Tajikistan, Uzbekistan and Turkmenistan. In the future it will connect with China, and will have length of 480 KM connecting Faizabad City, Badakshan to the China Border.

Afghan Fiber Network Map

Note: From Akina (Faryab) to Torghondi (Herat) the fiber cable is not yet linked due to lack of roads. But it is connected by international routes.

Afghan Fiber Optic Network Overview

In 2007, the Optic fiber backbone network began to be constructed. The total active length of fiber optical backbone network is 4000 km across the county. Current Afghan fiber optic completed in three different phases. Out of 4000km fiber optic network, 1000km Fiber optic has built by World Bank. The overall cost of fiber project is USD 101 million.

Fiber Network Phases (completed)

1st Phase
3131 KM

- **Cost:** $ 52m
- **Deployment:** 2007-2008
- **14 Provinces**
- Kabul, Parwan, Kapisa, Baghlan, Kunduz, Samangan, Balkh, Fariyab, Jouzjan, Herat, Wardak, Nangarhar, Kunar and Laghman

2nd Phase
474 km

- **Cost:** $ 8.6m
- **Deployment:** 2011-2013
- **5 Provinces**
- Ghazni, Logar, Paktiya, Paktika and Khost

3rd Phase
530 Km

- **Cost:** $ 12.8m
- **Deployment:** 2012-2015
- **5 Provinces**
- Bamyan, Daikondi, Ghor ,Takhar and badkhshan

Source: Afghan Telecom

The key problems of Afghan fiber optic backbone

There are some key problems of Afghan fiber optic backbone: (1)uptime rate in lower, (2)investment and length is lower than regional countries, (3)quality is low: in some places the fiber was not placed deep enough underground, (4)fiber optic cables are damaged in 10 different locations which need to be repaired. Afghan telecom has allocated the budget in order to repair or relocate the damaged cables in 2017. The below table indicates the locations, km and estimated cost of damaged fiber optic cable.

Damaged locations			
	Locations	**KM**	**Estimated Cost($)**
Kabul	Karti now -1st mukriyan	4	$48,000
Kabul	Charaseyab - Logar	50	$750,000
Surobi	Pul e gozak – Bazar surobi	48	$720,000
Mazar	Heratan square – Ferdosi square	48	$720,000
Kandahar	Spin boldak square – Kandahar airport	20	$300,000
Kandahar	Gareskh - Maiwand	80	$1,200,000
Pule khumri	Inside city	8	$120,000
Pule khumri	Khitjan – Doshi	1	$15,000
Kapisa	Nasaji gulbahar – Al bairooni university	10	$150,000
Ghazni	Shash go - saidabad	58	$870,000
salangha	Palan e khair – pul e khaki	17	$340,000
Total	**--**	**344**	**$5.2m**

Note: The cable damages are due to road expansion and construction
Source: OFC transmission, Afghan telecom

MANAGEMENT & REGULATION

Below is the Afghan fiber optical network management circle where three government organizations are involved, Afghan Telecom, MCIT and ATAR.

Fiber Optic Management & Regulation

Afghan Telecom

Afghan Telecom Owned Fiber optic network across Afghanistan. The Optical fiber department of Afghan telecom communicates and coordinates where the operation and maintenance of fiber optic cables is handle by ZTE and Huawei.

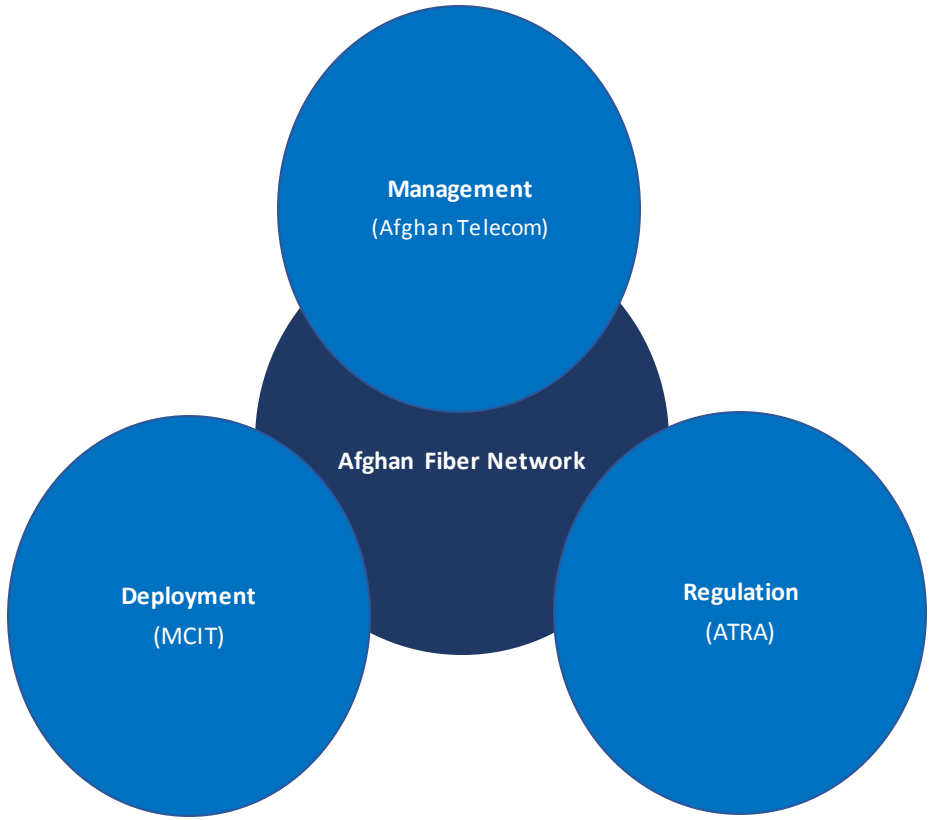
ATRA

ATRA regulate telecommunication services. draft regulations, policy and license to all telecom operators across country. On Oct, 2016 ATRA drafted Open access policy and approved BY HEC,

MCIT

The department of planning of MCIT deploys or implements the Fiber optic network across the country.

- Survey, design and planning fiber optic projects
- Monitoring and control of Fiber Optic Projects
- Evaluation of Fiber Optic Network Projects
- Estimation and future planning for Fiber Optic Cables.

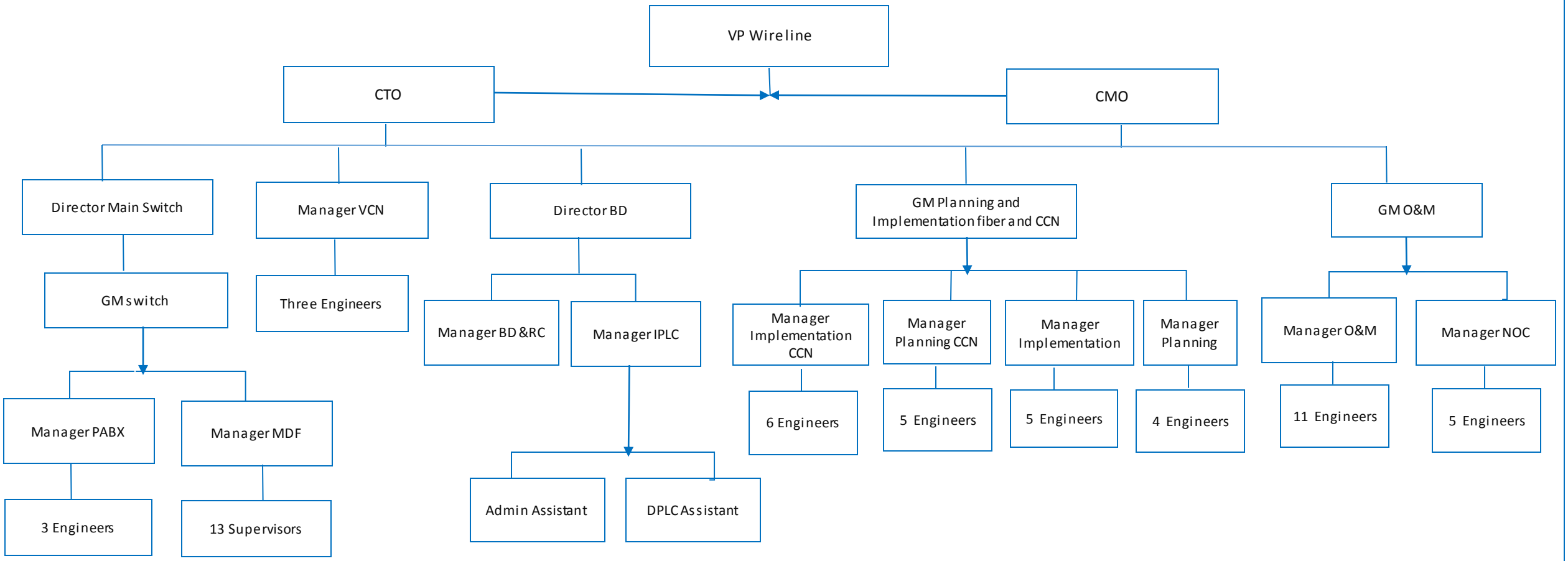


Source: MoCIT, Afghan Telecom & ATRA

Organizational Structure

Three Afghan Government organizations manage the Afghan Fiber optical network: (1)it is managed by Afghan Telecom, (2)deployed by department of planning and project, Ministry of communication & IT, and (3)regulated by ATRA (Afghanistan Telecommunication Regulatory Authority).

Organizational Structure of Wire line Division (Fiber)



Source: HR Department, Afghan Telecom

Open access policy

The below pattern indicates the open access objectives, The HEC minutes of meeting for key players, the steps which has taken so for and the other important steps to be taken by key player in order to forward the process.

Current scenario

Open access policy

On Oct, 2016 ATRA drafted an Open access policy and approved by HEC, the Open access policy provide a legal framework to private sector to invest in Fiber optic and broadband services in Afghanistan.

Objectives

- Facilitate investment & growth in telecom sector
- Encourage delivery of broadband services to uncovered areas.
- Provide or encourage free and fair competition in the fiber optic and telecom sector
- Create an ICT sector free of monopoly and cartel.
- Provide affordable and reliable access to the entire Afghan population

HEC Minutes

- The conditions for telecom companies to acquire optic fiber permits should be made open, so that a chance is given to the existing companies to participate in the competition.
- Also, the committee is assigned to provide specific recommendation about making Afghanistan a connecting point, and the government and private sector role is made explicit in it.
- ATRA is obliged to increase their supervision capacity and seek financial aids from international donors such as USAID.

Steps Taken

- Open access policy drafted and approved.
- Initial license draft is prepared by ATRA.
- Operators and USAID have shared their initial opinion on the license draft.

Steps to be Taken

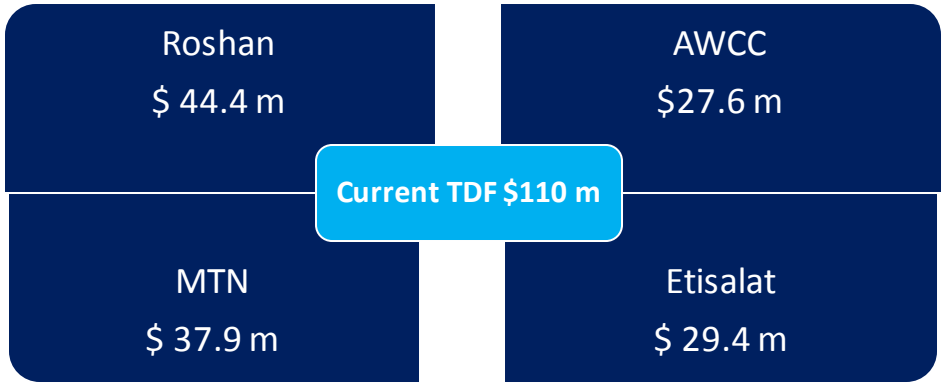
- A public consultation to be conducted by ATRA and finalize the License template
- License fee should be decided by MoF after the final draft of license
- In order to increase supervision capacity; ATRA to seek Financial Aid from international donors such as USAID

Note: When license draft finalized by ATRA then PRF (Proposal for request) is issued to operators , The operators response to PRF and bedding begins

Telecommunications Development Fund (TDF)

The Telecommunications Development Fund (TDF) was established in 2006 in order to extend telecommunication services in remote areas. It now has USD$110 million available. Each telecom operator has to contribute 2.5% in TDF of their gross revenue, the total USD$139.2 million has been contributed by operators from 2006 to 2016. Two types of projects are done by TDF: (1)ICT Lab project and (2)BTS (Base Tower Station) projects. ICT projects includes OFC connection, Internet Bandwidth, computers to universities, schools and hospitals. BTSs Projects include constructed BTS for mobile network and installed PCOs.

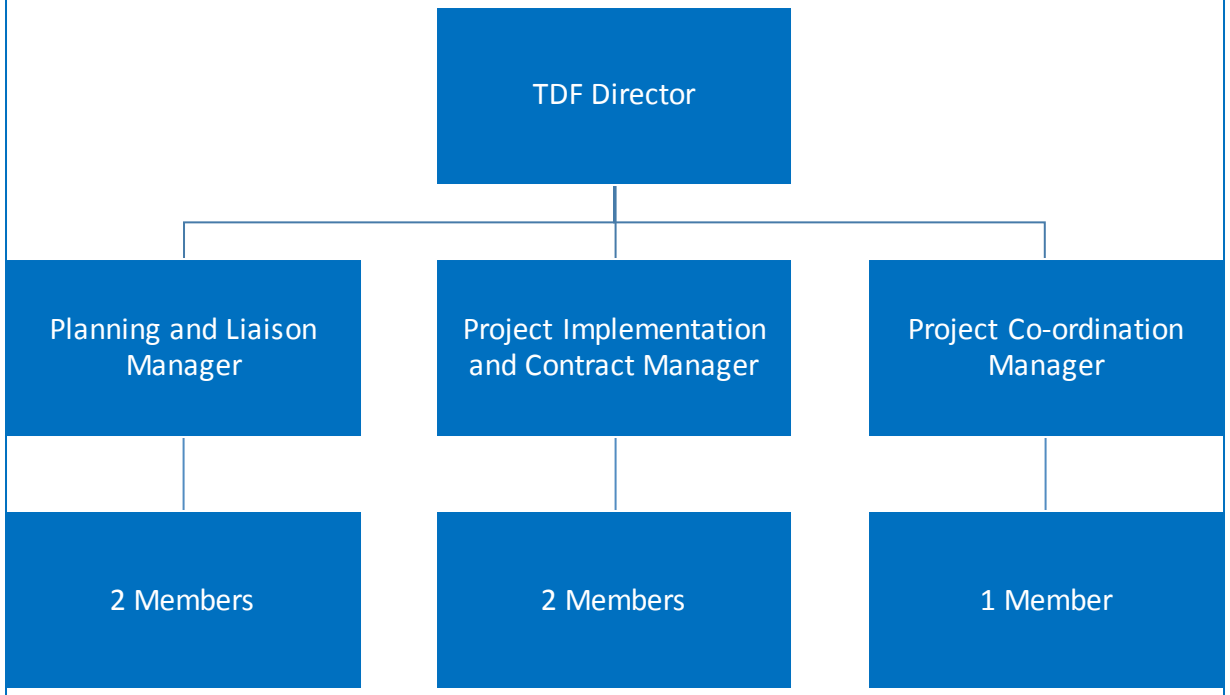
TDF contributions & Projects



Completed Projects				
	2009	**2010**	**2011**	**2012**
Towers/BTS	67	17	76	220
On aired sites	41	4	34	179
Total	**134**	**34**	**152**	**440**

On going Projects		
	2013	**2014**
Towers/BTS	240	289
On aired sites	*143*	193
Total	**383**	**482**

TDF Department Structure



Source: TDF & Finance Department, ATRA
Note: In on going projects, Total 106 BTS sites are still under construction: in total, 35 sites are from 2013 and 71 sites are from 2014 . From 2009 to 2014, 987 BTS sites have been cancelled due to security reasons.

Completed Sites - TDF

From 2009 to 2014, Total 258 BTS sites have on aired across country from telecom development fund which cost USD$33 million where Afghan telecom has built or on aired 164 BTS sites which makes value of USD$20.3 million and followed by AWCC.

2009 - 2012		
Operator	**On aired Sites**	**Cost($m)**
AWCC	50	6,504,128
ETISALT	5	124,950
ROSHAN	4	387,486
MTN	3	338,000
Aftel	2	312,000
Total	**64**	**8**

2011 - 2013		
Operator	**On aired Sites**	**Cost($m)**
AWCC	5	535,780
ETISALT	8	832,850
ROSHAN	3	185,000
MTN	18	1,597,000
Total	**34**	**3**

2012 - 2014		
Operator	**On aired Sites**	**Cost($m)**
Aftel	162	20,000,000
AWCC	6	746,015
MTN	11	1,158,493
Total	**179**	**21.9**

Note: Total 380 BTS sites have contracted to be build but only 258 BTS sites have on aired and 122 BTS sites have been cancelled due to security reasons.
Source: TDF Department, ATRA

Future projects - TDF

TDF department has planned to deliver five different projects in 2017 and allocated the budget for these projects which is USD$51.5 million. The projects have categorized as programs. The below table indicates the details

Projects detail				
First program (Cost: $ 32m)	**Second program (Cost: $ 2.6m)**	**Third program (Cost: $ 12.9m)**	**Fourth program (Cost: $ 3.5m)**	**Fifth program (Cost: $ 0.5m)**
▪ Communication services sites 250 sites. ▪ Payment of sixth, seventh, and eighth general access completed projects. ▪ Procurement of required equipment of ATRA's Monitoring and Control Department. ▪ Installation of PCO 34 provinces. ▪ Supervision expenses of the implemented and under implementation TDF projects and miscellaneous expenditures	▪ Telemedicine project and establishment of 8 centers for hospitals	▪ Equipment of 120 schools (with PCs and ICT LAB related facilities) and money required for connecting fiber optic cables to 15 schools. ▪ Purchase of 1000 laptop computers for first position holders of 9th grade, across the country. ▪ D3 video project for schools (contract is signed with Arif Azim and Genesis Company and is payable in 1396)	▪ Equipment of 15 universities with IT facilities, connection to fiber optic cables and facilitation of internet (ICT- Lab)	▪ Facilitation of communication services to fight against calamities. Supporting ICTI institute. ▪ Cooperation in establishing ICT-LAB in public libraries of MoIC

Source: TDF Department, ATRA

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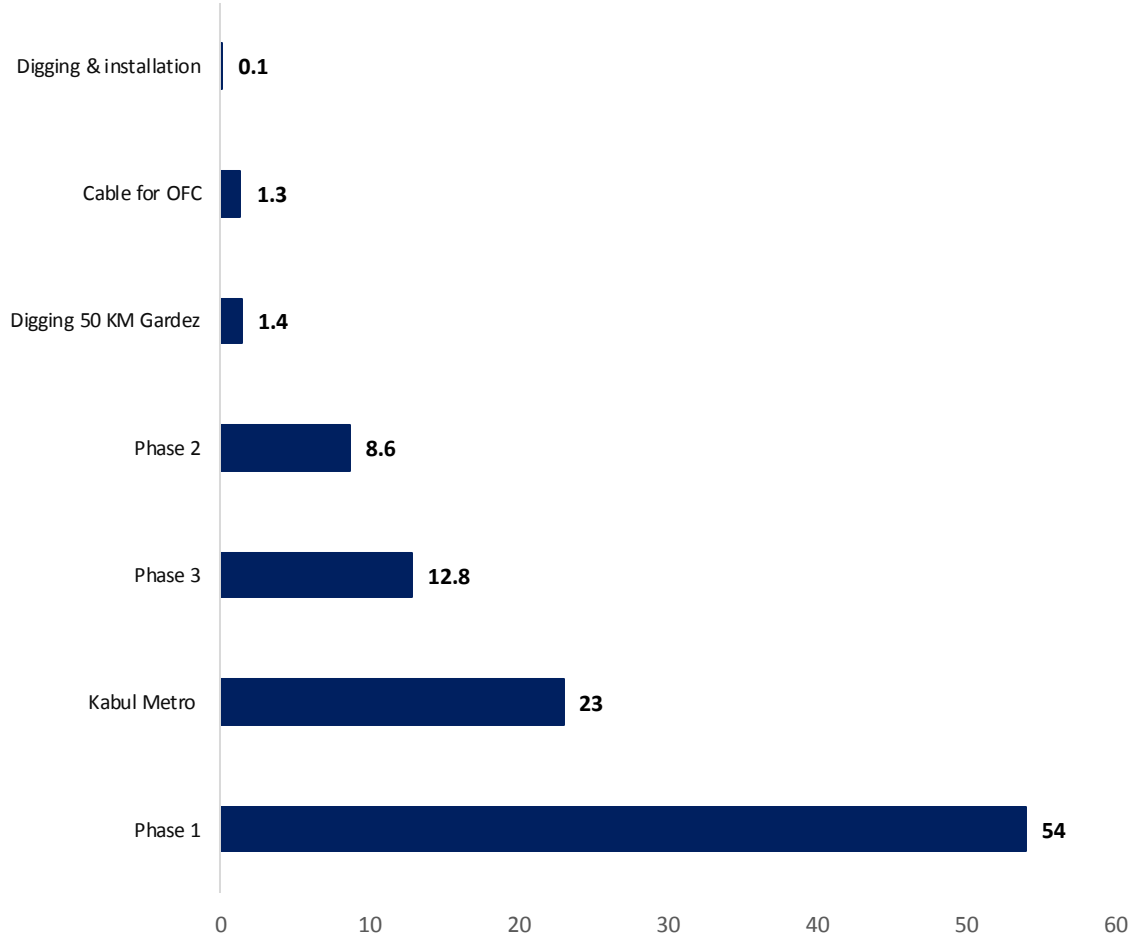
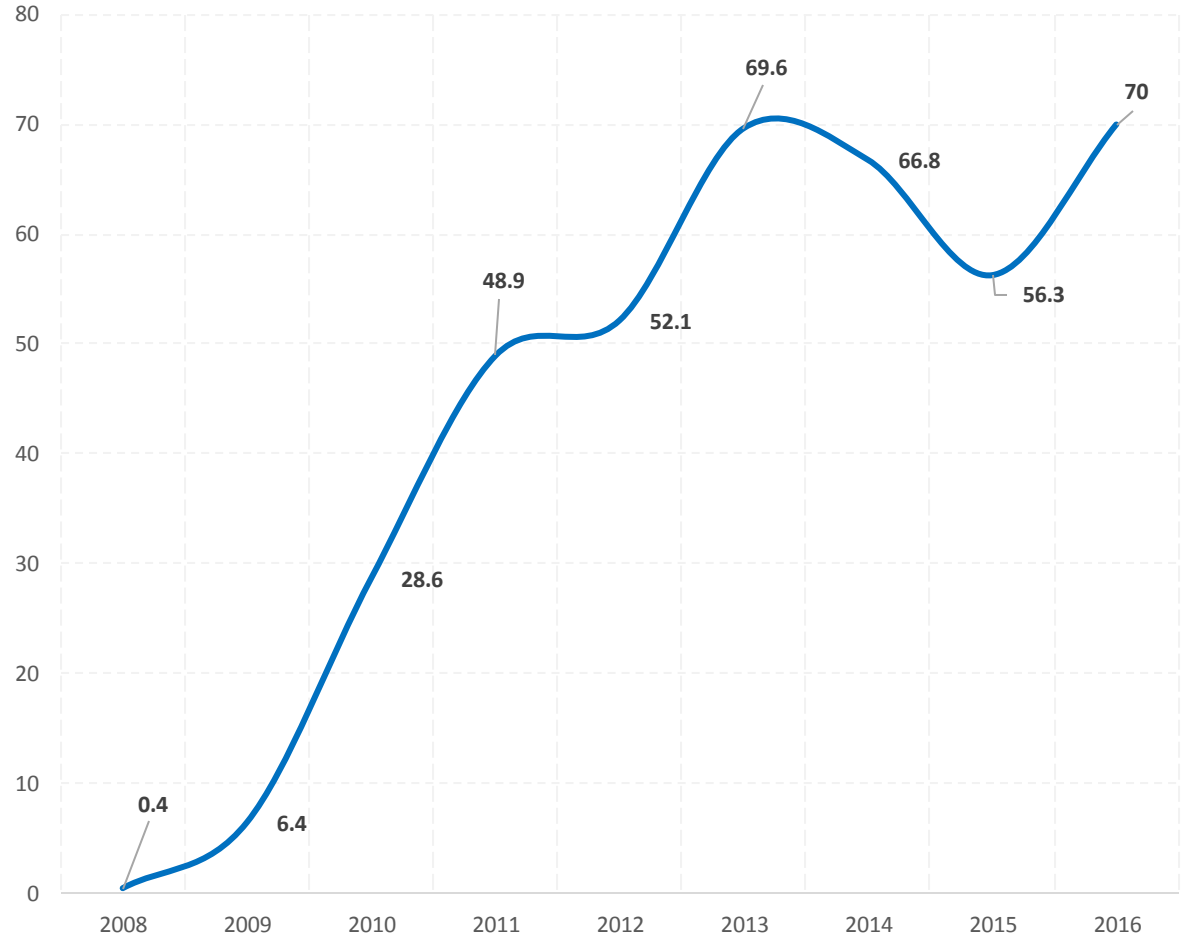
Afghan Fiber optic - Investment and Revenue

Around USD$101 million has invested in current Afghan Fiber optic network. In 2016 Afghan fiber optic revenue increased to USD$70 million from 2008 revenues of USD$0.4 million.

Investment ($ million)– Afghan Fiber optic (2007-2016)



Revenue ($ million)– Afghan Fiber optic

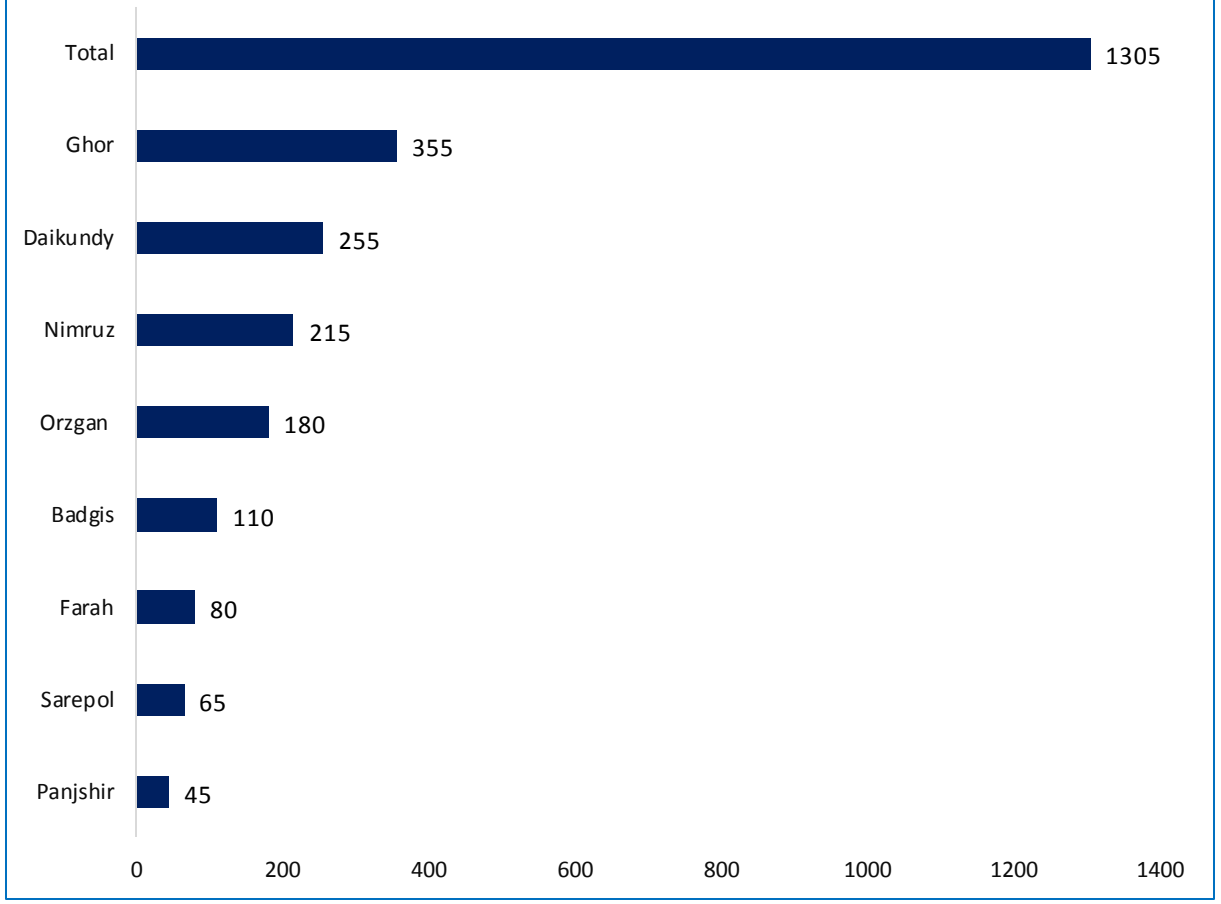


Source: CFO, Afghan telecom

Afghan fiber optic - Future projects and Cost

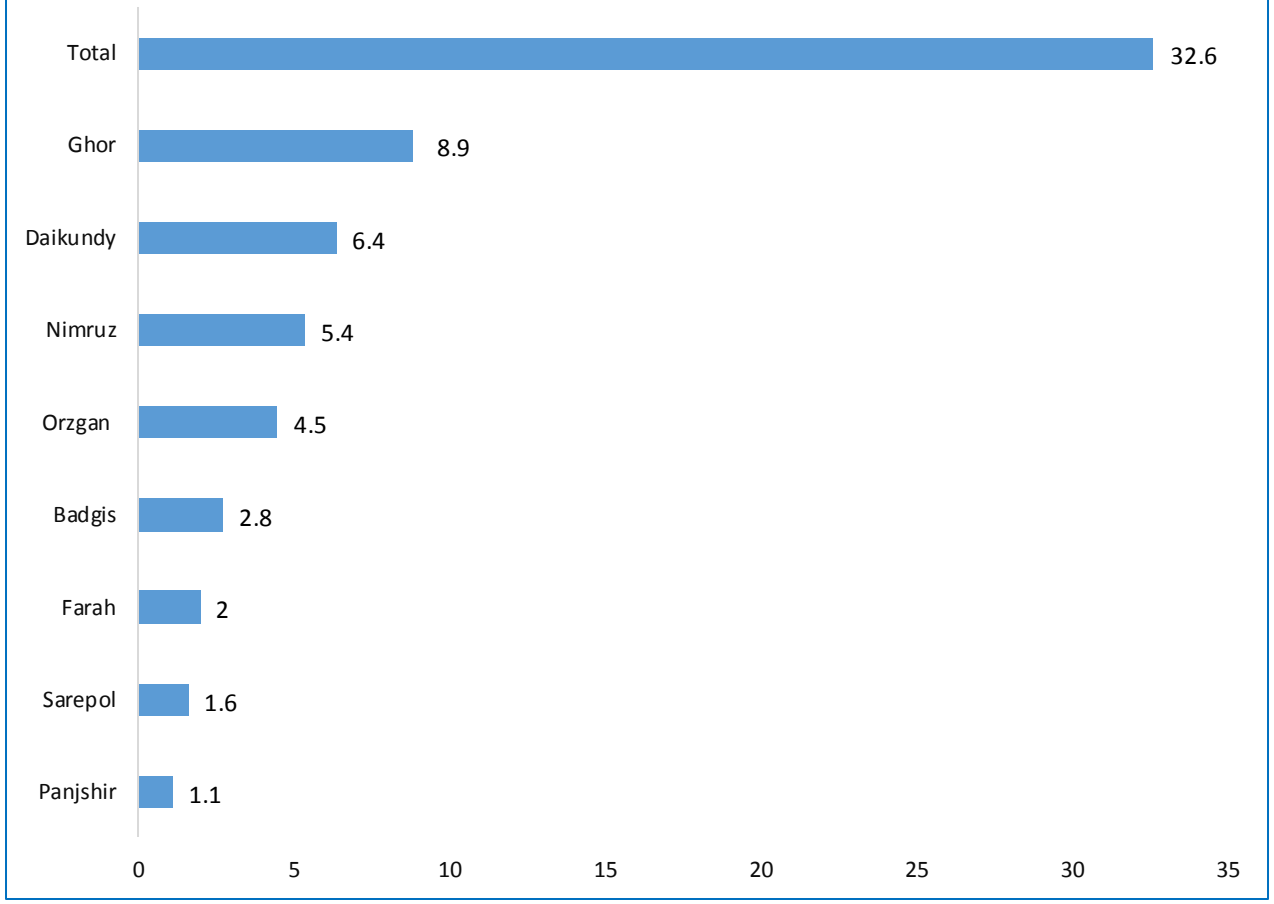
To connect remaining 8 provinces and build 1305 KM Fiber optic network , Afghan Telecom would need USD$32.6 million in additi onal funds. Future projects details are also available below.

Future Projects Location(KM) – Afghan Fiber optic



Source: OFC transmission, Afghan telecom

Future Projects Cost ($m) – Afghan Fiber optic



Note: Cost is estimated, per KM fiber optic estimated cost is 25000 USD according to Afghan Telecom. Afghan telecom currently has no budget for remaining 9 provinces in order to rollout fiber optic

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AFGHAN TELECOM

The following slides will indicate the Afghan telecom details in terms of company profile, management and financials.

AFTEL BRIEF PROFILE	
Operation Started	September, 2005
Group Operation	None
Sister Company	Salaam Telecom
Ownership	Government
Total Investment	$370.7 m
Total Revenue	$582.4 m
Total lost	-$ 44.5 m
Total Tax to Government	$ 37 m
Equity	$ 2 bn
Assist	$ 1.5 bn
Services	Fixed line
Subscribers	100k
Employees	1350
Fiber optic network	4000 km
Fiber optic connection	24 provinces

- Afghan Telecom corporation is fixed-line operator. Afghan Telecom started its operation in 24 September 2005 to provide unified telecommunication and various services throughout Afghanistan which includes but not limited to Mobile cellular services, Landline Telephone Network, Internet Services, Media Connectivity, Video conference, and Wholesale Internet transit through latest available technologies such as DSL, WIMAX, OFC and MICROWAVE.

Management Team

CEO

Gul Ahmad Rastman :
Rastman has 14th grade degree from ICT institute, Kabul with 30 years of experience and has been working for Aftel for 7 years

Vice President (Wireless Network)

Ali Mohammad Ateequi: Has Bachelor degree in Electrical Engineering from USA with 20 years of experience and has been working for Aftel for two months

Vice President of (Wire Line Network)

Said Harres Mir: Has Bachelor degree in computer Science from USA with 20 years of experience and has been working for Aftel for two months

Board of Directors

Chairman of BOD
Sayed Ahmad Shah Sadat (Acting Minister of MCIT)

Board Members

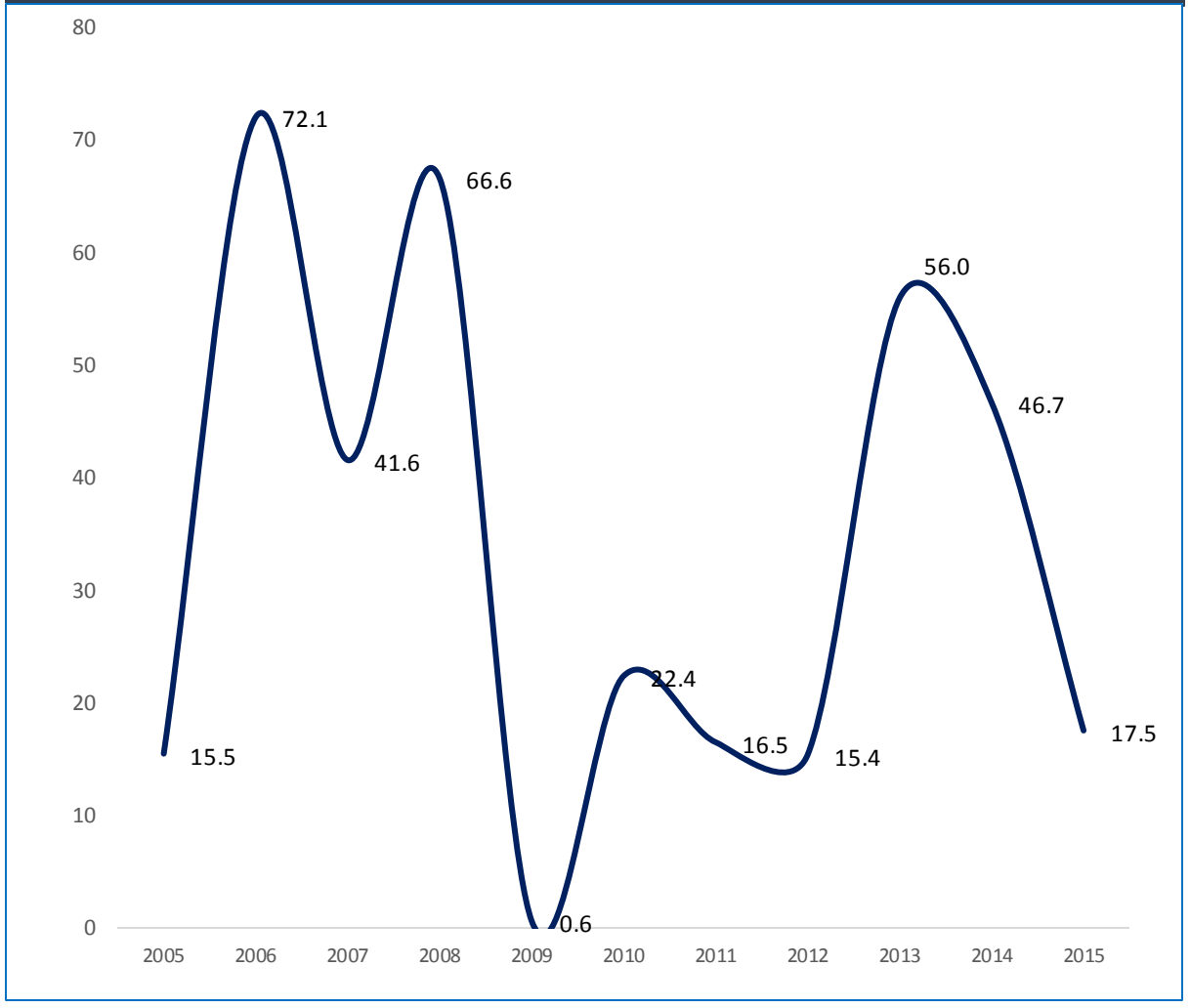
Hadi Hedayati
(Deputy Minister of Admin & Finance, MCIT)
Ahmad Shafiq Qarizada
(Deputy Minister of Custom & Revenue, Minister of Finance)
Najibullah Wardak
(Director of CBR, Minister of Finance)

Source: Afghan telecom

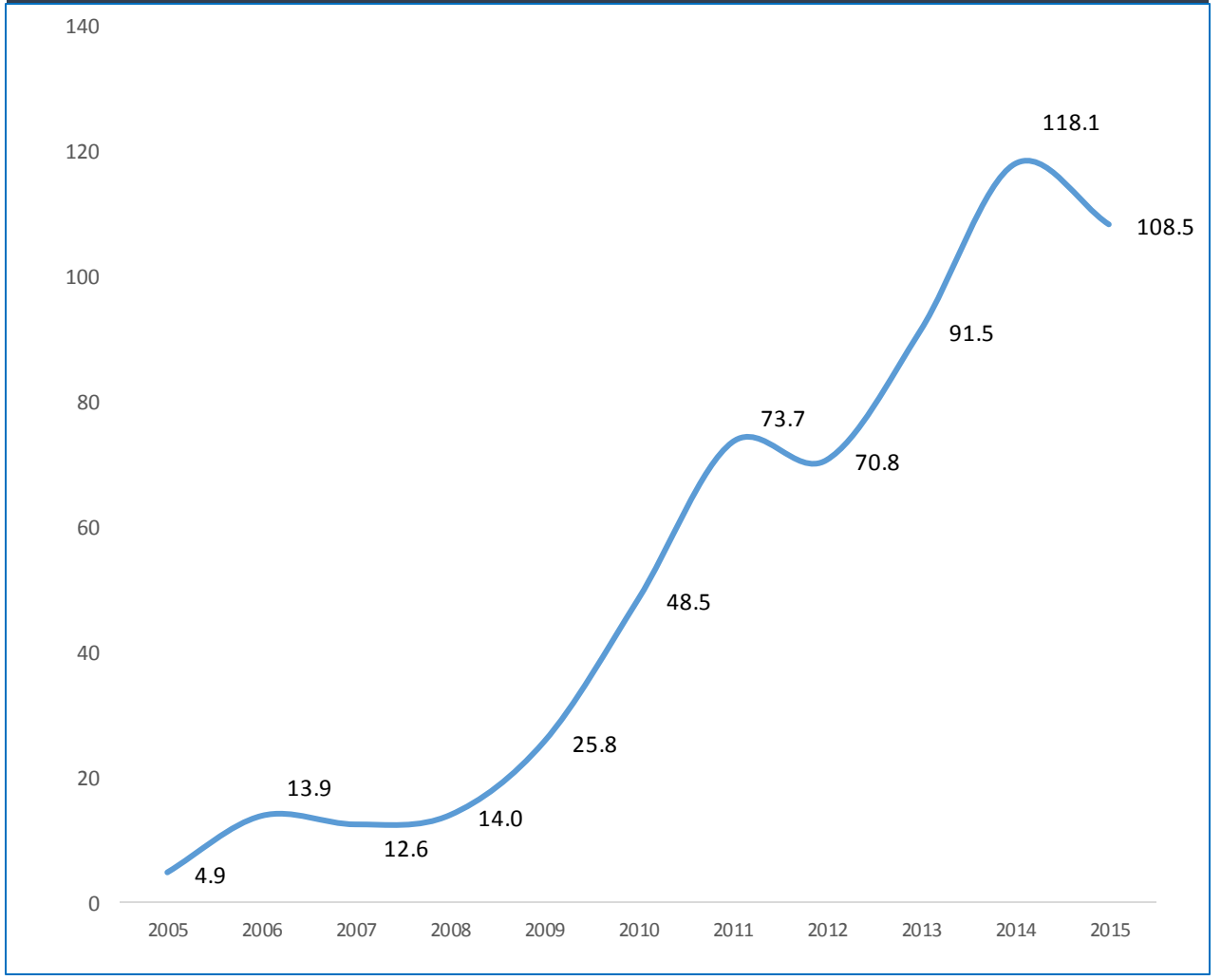
AFTEL - Investment and Revenue

Afghan telecom invested USD$370.7 million and its aggregate revenue since inception is USD$582.4 million. In 2015 the investment was USD$17.5 million & higher investment took place in 2006 which was USD$72.1 million. In terms of revenue, Aftel's revenue was USD$108.5 million in 2015.

Investment ($ million)– AFTEL



Revenue ($ million)– AFTEL

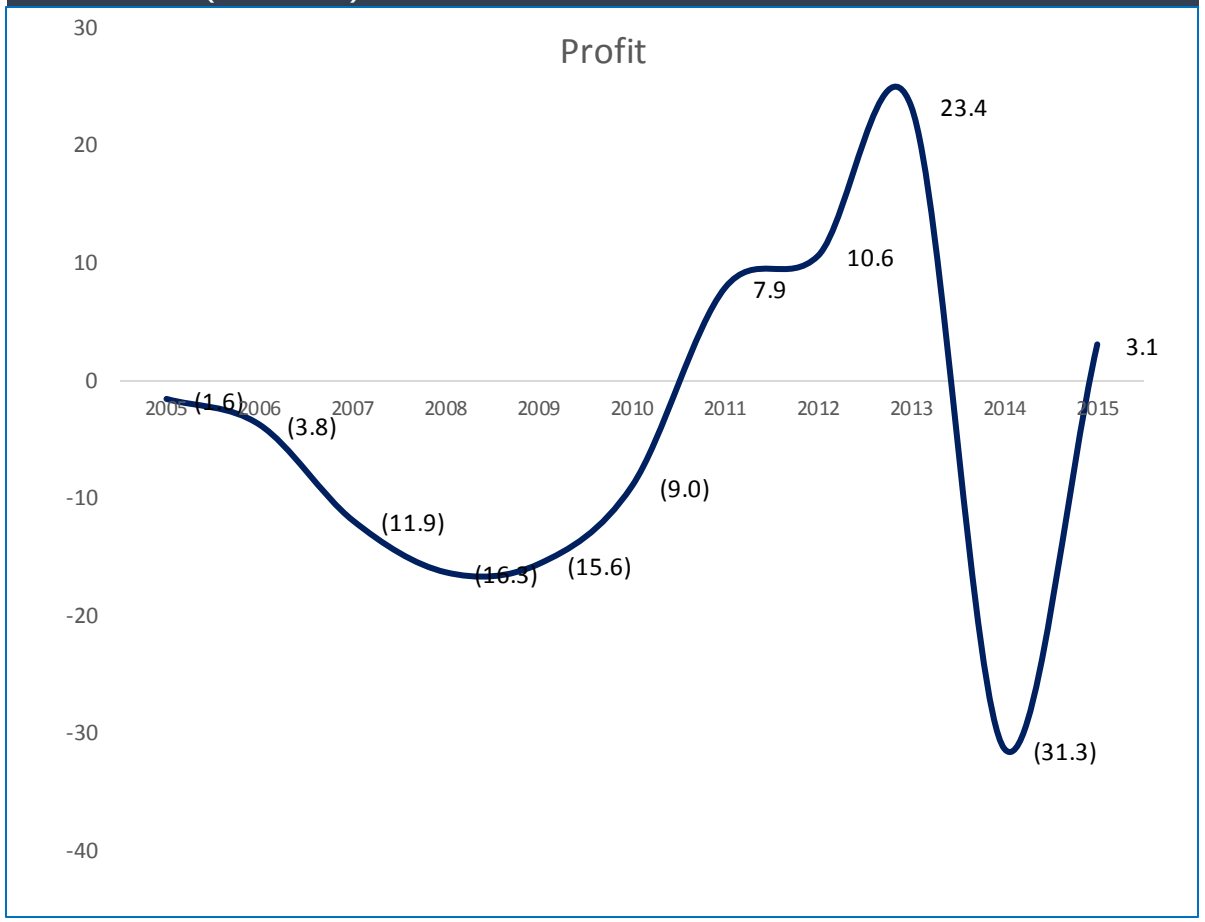


Source: CFO, Afghan telecom

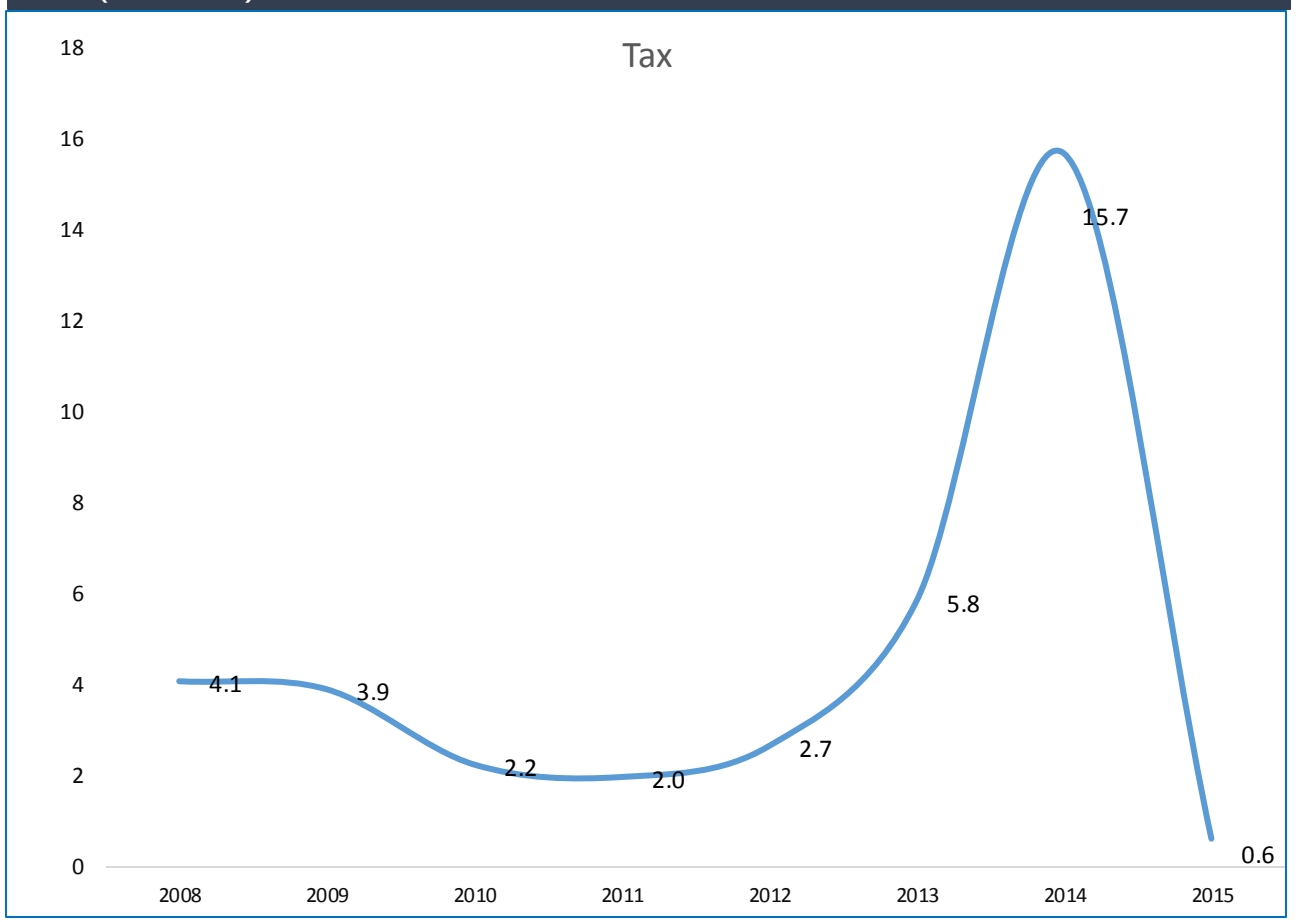
AFTEL - Profit/loss and Tax

There is fluctuation in Aftel financials which shows lost at the beginning of operation. The current profit of Aftel is USD 3.1 million but in 2014, Aftel shows lost of USD 31.3 million. In terms of tax, Aftel paid USD$ 37 million total tax to government and higher tax was paid in 2014 which was USD 15.7 million

Profit/loss ($ million)– AFTEL



Tax ($ million)– AFTEL



Note: In 2013, MoF assigned Audit team in order to audit Afghan Telecom tax payment from 2008-2013. Auditors charged Afghan Telecom with 5% additional Tax from 2008 till 2013, which makes total 1.7 billion Afghani (USD$ 29.8 million). While AFTEL payed only 5% from OFC Contracts, which are signed with Department of Defense of USA. Afghan claimed that they have tax exemption if contract with USD , department of defense

Source: CFO, Afghan telecom

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REGIONAL CASE STUDY

In regional case study five countries are included for study, in this study we analyzed their fiber optic current status , private sector share and other related telecom facts & figures. The purpose of this to identify the countries where private companies are holding private fiber optic network and government has issued license & developed funds for fiber network development and expansion.

Criteria	Afghanistan	Pakistan	Mongolia	Kenya	Estonia
Government Fiber Optic (KM)	4,000	10,400	17,091	4,300	12,000
Private Fiber optic	No	Yes	Yes	Yes	Yes
Private fiber optic License	No	Yes	Yes	Yes	Yes
Fiber development Fund	No	Yes	Yes	Yes	Yes
Telecom Investment	$ 2361.3 m	$ 718 m	$ 322m	$ 507 m	EUR 13 m
Revenue	$ 885.4 m	$ 4265 m	$ 91 m	$ 2087 M	EUR 730 m
Fixed Operators	1	7	6	5	3
Mobile Operators	5	6	4	3	3
Mobile Subs	27m	137m	5.6m	38.3	36m
Fixed Subs	120k	2.8m	255K	85k	150k
ISPs	50	50	66	146	26
Internet users	8.3%	18%	21%	45.6%	88.4%

Note: Afghanistan telecom sector is total while other countries investment of current year. Afghanistan telecom sector revenue from 5 MNOs & Afghan telecom while countries revenue of current year.
Source: Afghan telecom, ATRA and other countries regulatory authority & telecom updates

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International Overview

Fiber optic network started in 1970s but now 2 billion km fiber optic network has been deployed across world. Below is the fiber optic network shares by various regions in kilometers. The largest increase has been seen in ASEAN countries.

Fiber optic network- world 2013