Connectivity in Afghanistan and Kyrgyzstan: Leveraging International Bandwidth

Michael Ruddy
Director of International Research
Terabit Consulting
www.terabitconsulting.com
Weak Regional Infrastructure Constrains Afghanistan & Kyrgyzstan

- Afghanistan and Kyrgyzstan have made great advancements in the development of their own domestic & international fiber connectivity, including Afghanistan’s OFC ring and more than 12,000 route km of fiber in Kyrgyzstan.
- However, as landlocked countries they are reliant on the region’s overall fiber infrastructure, which is low-capacity, high-cost, and unreliable.
- There are no coherent, purpose-built, cost-effective pan-regional fiber optic networks: international connectivity consists only of bilateral, point-to-point, closed-access trans-border links.
- Afghanistan and Kyrgyzstan’s investment in new infrastructure will require stronger regional infrastructure in order to be effective.
Low International Bandwidth & Weak Intl. Infrastructure Has a High Cost Across the Economy

• At the macro level: a major obstacle to economic and human development
  – Detachment from digital economy
  – Continued economic inefficiencies and restrained growth
  – Lack of access to critical social development tools including telemedicine, distance learning, scientific/research networks

• More specifically within the telecom environment: higher wholesale and consumer prices, and lower broadband adoption rates
An Option for Improved Regional Connectivity: Digital CASA

- Terabit Consulting’s *Pre-Feasibility Assessment (2016)* proposed three phases of deployment:
  - Phase I: Proposed Digital CASA segments via CASA-1000 (OPGW)
  - Phase II: Proposed Digital CASA segments via existing telecom fiber
  - Phase III: Proposed Digital CASA segments requiring new construction
Improved Regional Fiber Connectivity: Immediate Benefits & Opportunities for Afghan & Kyrgyz Operators

1. Would bring lower-cost, higher-volume bandwidth
   • Via improved regional access to Russia, Europe, and China

2. Would increase reliability of int’l. connectivity
   • Additional fiber connectivity decreases the likelihood of network outages

3. Would increase value of Afghan & Kyrgyz fiber optic networks
   • Aftel revenue from the optical fiber network grew from USD$25 million in 2009 to USD$100 million in 2014; improved regional fiber connectivity would greatly increase the utility and value of domestic networks

4. Would present a stronger opportunity for the sale of transit capacity to neighbors & share of Europe-Asia
   • Improved regional connectivity would allow countries to export to their neighboring markets, and also to capture a share of the lucrative Europe-to-Asia transit market (currently in excess of 15 Tbps)
Business Models for Network Development

Strategy for the Improvement of Central and Southern Asian Terrestrial Fiber Optic Connectivity

Construction of a Coherent Regional Terrestrial Fiber Network

Continued Use of Fractured, Bilateral Terrestrial Fiber Infrastructure

Intervention by World Bank Group / Government to Facilitate Implementation

Marketplace Left to Implement Its Own Coherent Solution

Government Ownership and Project Management

Choice of Project Design and Engineering, Supplier, Maintenance Authority, Operational Plan

Special Purpose Vehicle (SPV) with Govt./WB Shareholding (Investment)

Public-Private Partnership (PPP) / Private Sector Project Management

Special Purpose Vehicle (SPV) with Govt./WB Contribution (Subsidy)

Build-Operate-Transfer (BOT)

Project Management Contract
Strategies to Ensure Successful Network Development

1. Functioning and monitored as single, uniform network
   – Existing multi-national terrestrial networks cannot offer uniform quality-of-service guarantees between endpoints (as good as “weakest link” or “weakest operator”).

2. Leveraging existing infrastructure
   – Right-of-way procurement and uniform construction techniques would be enabled through the use of linear infrastructure such as the highways, railways, or energy transport and transmission infrastructure.

3. Fully integrated and coherent
   – Redundant ring or mesh architecture would allow for in-network healing in the event of physical cable outages or instability affecting connectivity in specific countries.
4. **Cost-effective**
   - With suitable transmission capacity and fiber count, a pan-regional terrestrial fiber network could compete effectively with submarine cable on both a regional and intercontinental basis.

5. **Open access and non-discriminatory pricing**
   - In order to achieve development and policy goals, as well as to serve the region’s consumers, all purchasers of capacity must be able to access the network on an equal, non-discriminatory basis.

6. **Developed and managed by a Special Purpose Vehicle (SPV)**
   - SPV shareholding would ensure the neutrality and efficiency of the network
   - Allows participation by all stakeholders while still maintaining arm’s-length terms over all capacity sales and leases.
Possible Obstacles to Fully Leveraging Afghanistan & Kyrgyzstan’s International Connectivity

- Limitations in International Gateway Competition and Access
- Limitations in Domestic, Inter-city Connectivity
- Restricted local access & Expensive Consumer Broadband Services
- Lack of ICT Equipment, Lack of Electricity
Downstream Policy Initiatives to Ensure Bandwidth Success

✓ Truly independent and transparent regulatory environment
✓ A strong commitment to competition and open-access, non-discriminatory tariff frameworks throughout the entire telecommunications ecosystem
  ✓ International gateway, international bandwidth, and IP transit
  ✓ Backhaul, interconnection, domestic transport, and access networks
✓ Local-loop unbundling, as well as antenna and tower site sharing, to ensure competitive service offerings to end-users
✓ Promotion of public Internet exchanges to more efficiently interconnect domestic operators and prevent “hairpinning” of domestic and/or regional traffic via international transit paths.
  ✓ By encouraging private-sector IXP participation as well as requiring government entities (and possibly educational and research networks) to participate in IXPs.