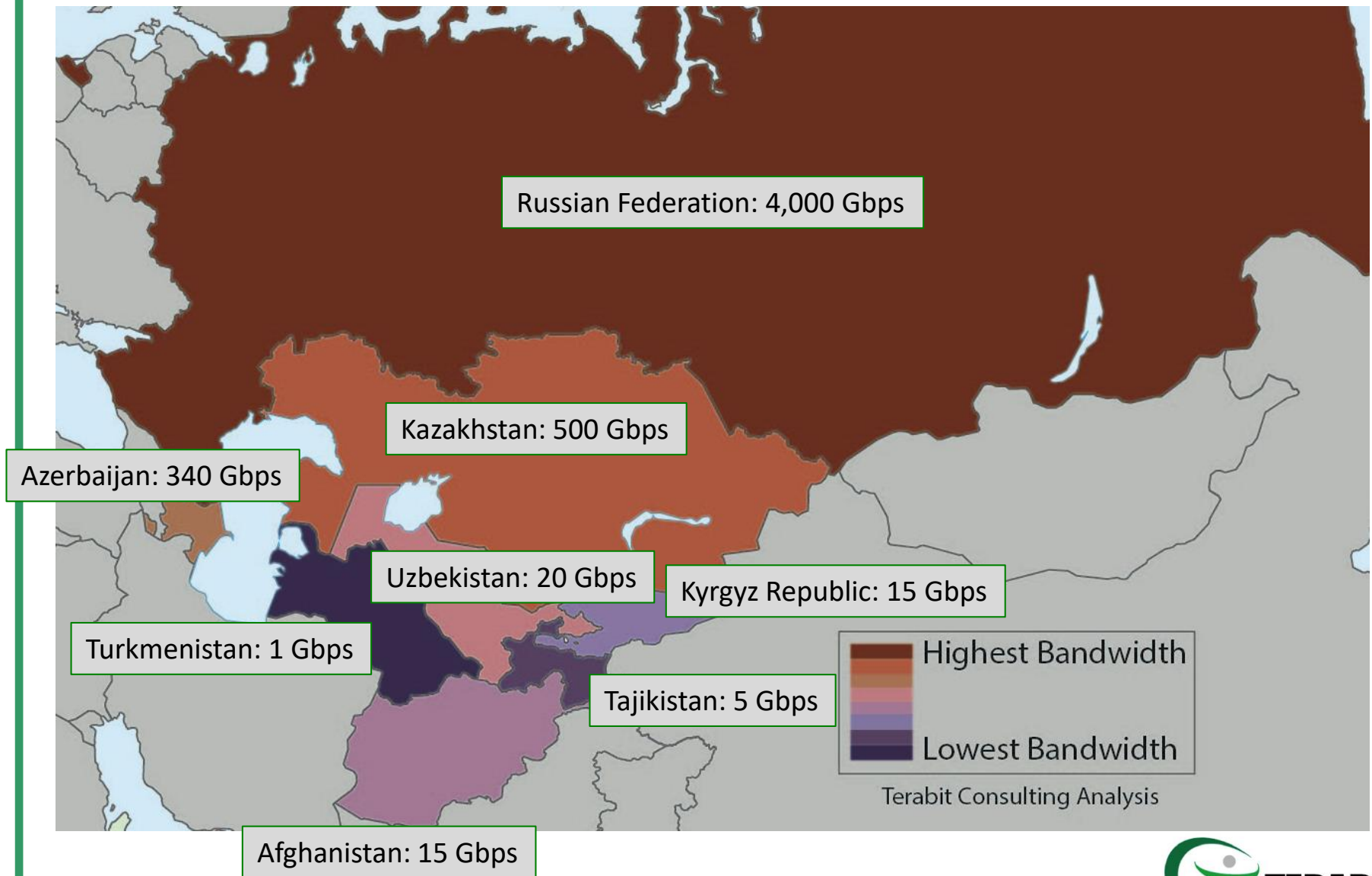


# **Improved Regional Fiber Connectivity via Digital CASA: The Opportunity for Central and South Asia**

**Michael Ruddy**  
**Director of International Research**  
**Terabit Consulting**

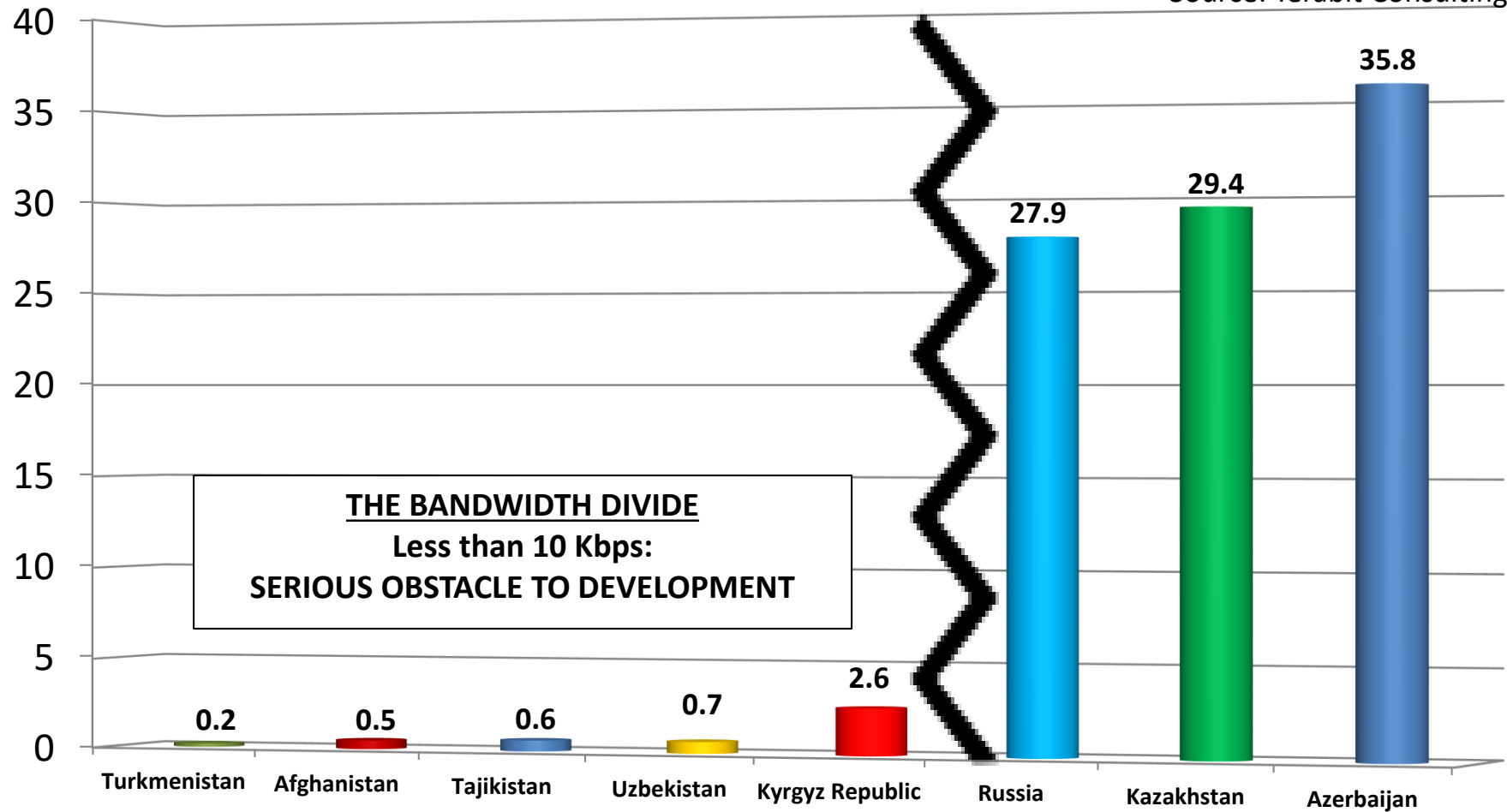
# **PART I: THE BANDWIDTH DIVIDE**

# International Internet Bandwidth, YE14



# Int'l. Internet Bandwidth per Capita (Kbps)

Source: Terabit Consulting

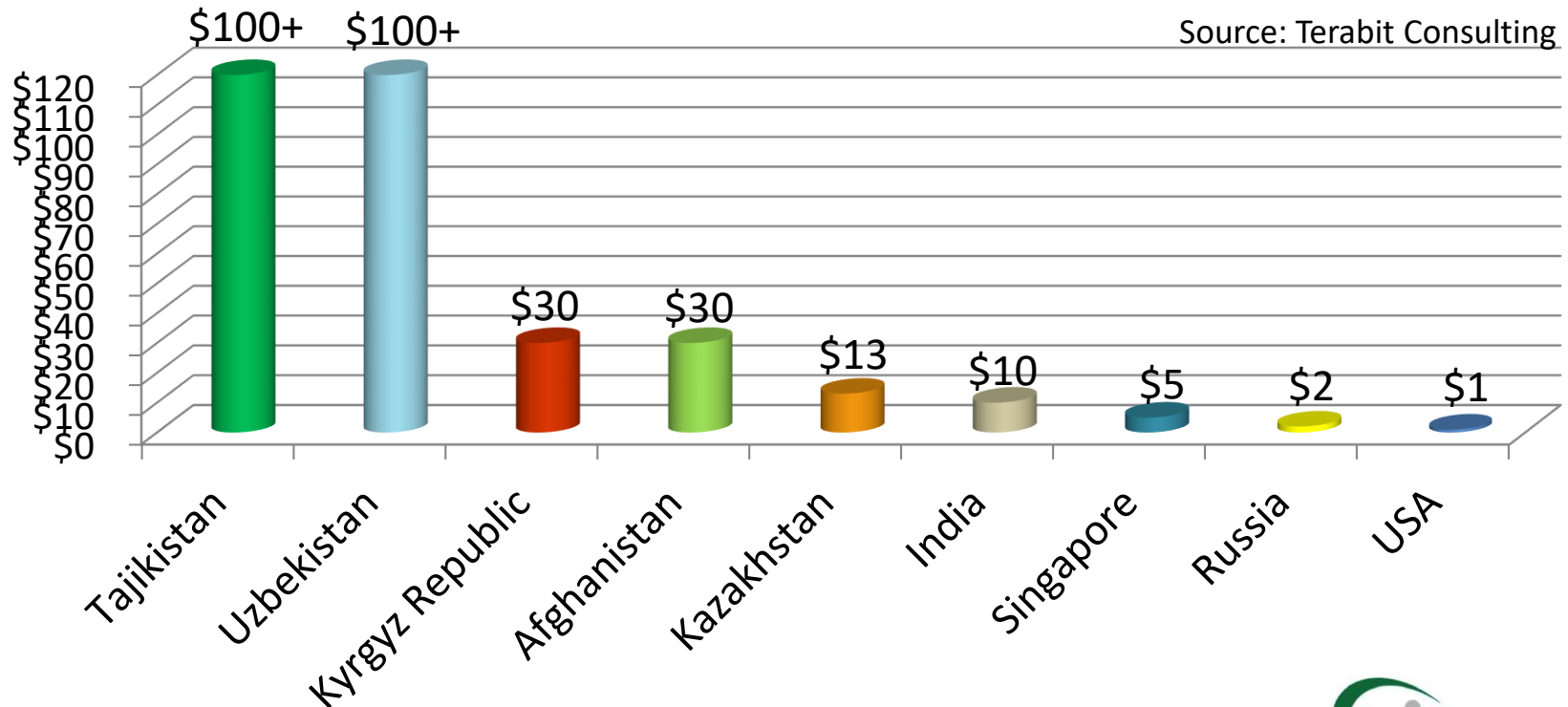


Many Western European markets: >100 Kbps per capita

# Wholesale Bandwidth Prices

- Wholesale bandwidth prices are 10 to 100+ times higher in Central Asia than in America or Europe

## Wholesale Transit Pricing per Mbps (\$USD)

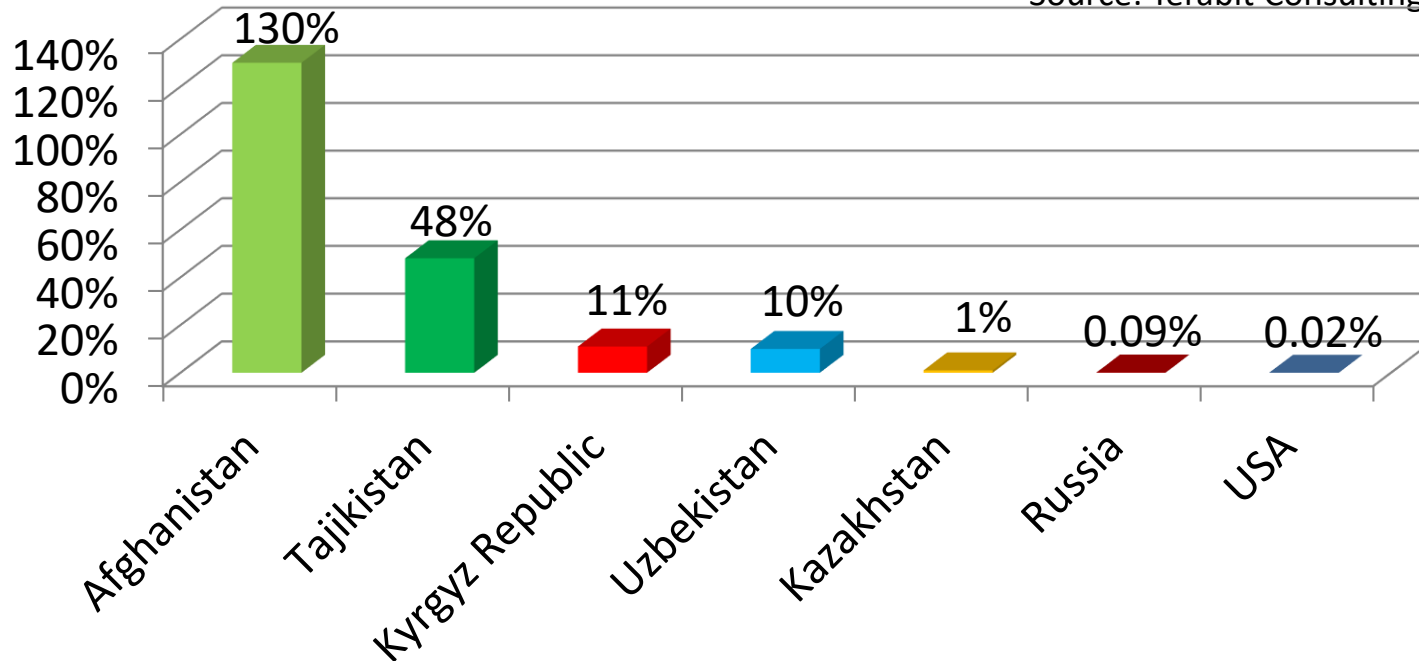


# Consumer Internet Prices

- Internet subscriptions in many Central & So. Asian markets: unaffordable to the majority of the population
- High international bandwidth costs are a primary cause

**1 Mbps Internet Subscription as % of Per-Capita GDP**

Source: Terabit Consulting



# **PART II: INSUFFICIENT REGIONAL BANDWIDTH INFRASTRUCTURE AND ITS EFFECTS**

# Weak Regional Infrastructure

- There are **no coherent, purpose-built, cost-effective pan-regional** fiber optic networks for Central & South Asia
- International connectivity consists of **bilateral, point-to-point, closed-access** trans-border links
- International connectivity via these links is:
  - **Extremely expensive**
  - **Low-capacity and not technologically-competitive**
  - **Unreliable**
  - **Subject to great political risk**



# **The Impact of Low International Bandwidth & Weak International Infrastructure**

- **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
  - Prevents regional integration within the aegis of knowledge-based economic development
- **More specifically within the telecom environment: higher wholesale and consumer prices, and lower broadband adoption rates**

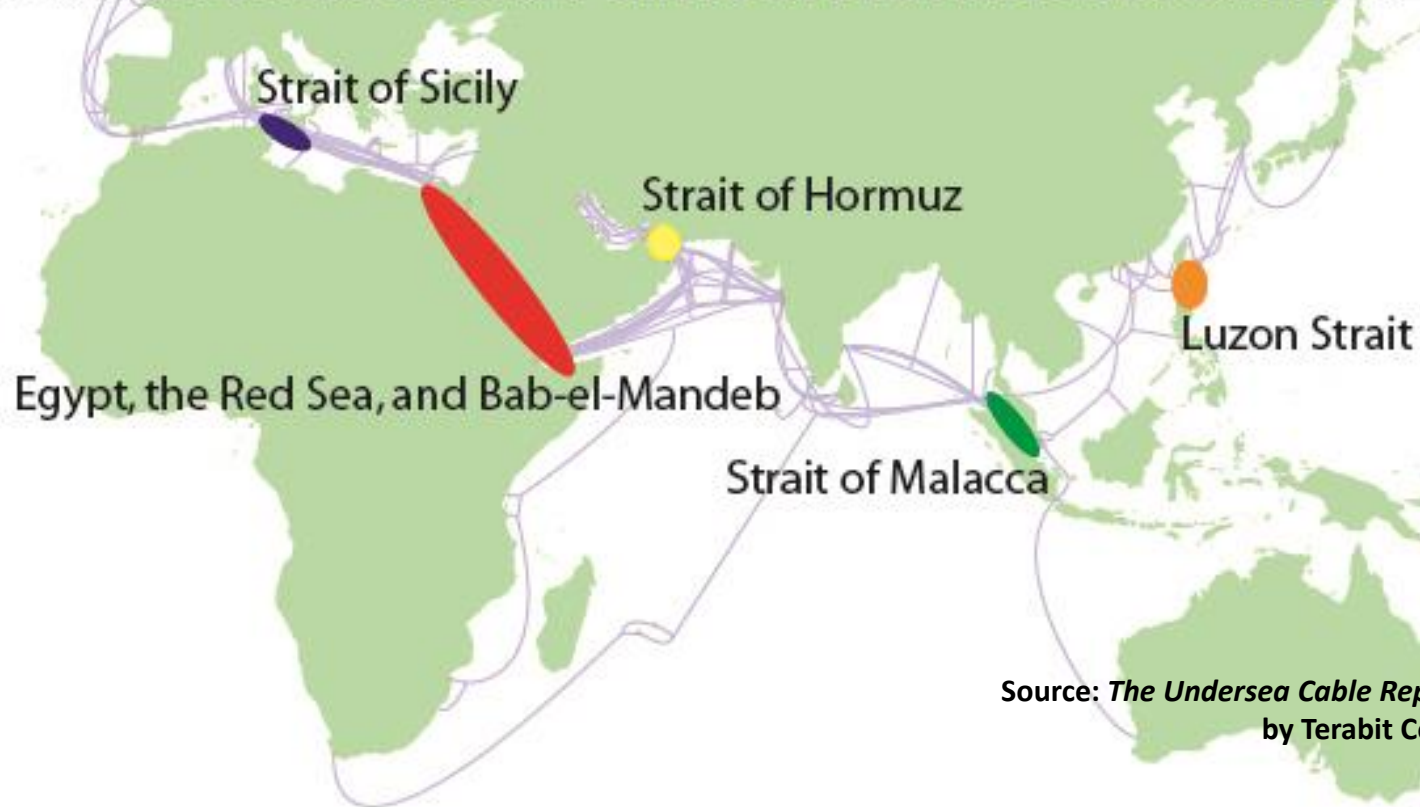
# **PART III: THE BENEFITS OF IMPROVED FIBER CONNECTIVITY FOR CENTRAL ASIA AND SOUTH ASIA**

# **Improved Regional Fiber Connectivity: Telecom Benefits & Opportunities for Cent. & So. Asia**

- 1. Would bring lower-cost, higher-volume bandwidth**
  - Digital CASA would improve the region's access to bandwidth hubs in 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 domestic networks**
  - The region's domestic fiber is essentially "stranded" by a lack of international connectivity; the value of this infrastructure will increase exponentially according to the number of connections (Metcalf)
- 4. Would present a stronger opportunity for the sale of transit capacity to neighbors & share of Europe-Asia**
  - Digital CASA would allow for the region's countries to efficiently export bandwidth to neighboring markets (in Phase I), and also to capture a share of the lucrative Europe-to-Asia transit market (currently in excess of 15 Tbps)

# Terrestrial as a Solution for Submarine

## UNDERSEA CABLE CHOKE POINTS AFFECTING ASIA & MIDDLE EAST



Source: *The Undersea Cable Report 2015*  
by Terabit Consulting

The global telecommunications industry is desperate for a cost-effective solution that would avoid undersea choke points. Digital CASA could be an alternative.

# Economic Benefits & Gov't. Financial Benefits

## 1. Benefits to consumers and end-users

- Improved regional connectivity would reduce end-users' unit costs per Mbps, increase their Internet throughput and reliability
- This would greatly enhance the utility and value of each country's Internet infrastructure and promote the growth of the digital economy

## 2. Economic growth

- Improvement in ICT infrastructure yields:
  - Increased demand for the output of other industries (demand multiplier)
  - New opportunities for production in other industries (supply multiplier)
  - New goods and services for consumers (final demand)
- It also increases firms' innovation capabilities and increases the probability of new products, innovations, and organizations

# Economic Benefits & Gov't. Financial Benefits

(Continued)

## 3. Increased government revenue

- Growth in economic output from ICT investment results in greater tax revenue
- Increased employment in the telecommunications sector
- Greater collections from telecom licenses and excise
- Rent collections from transport and utility ROWs

## 4. Regional stability through better international and intercultural relations

- More efficient routing of trans-border traffic would encourage trans-border initiatives in the education, healthcare, and research sectors that would not otherwise be possible.
- Telecommunications networks are a key element of regional integration

# **PART IV: STRATEGY FOR IMPROVING REGIONAL FIBER INFRASTRUCTURE**

# Principles to Guide Future Network Development

## 1. Developed to function and be monitored as a 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 (ESCAP Asian Information Superhighway), 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.



# Principles to Guide Future Network Development

(Continued)

## 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.

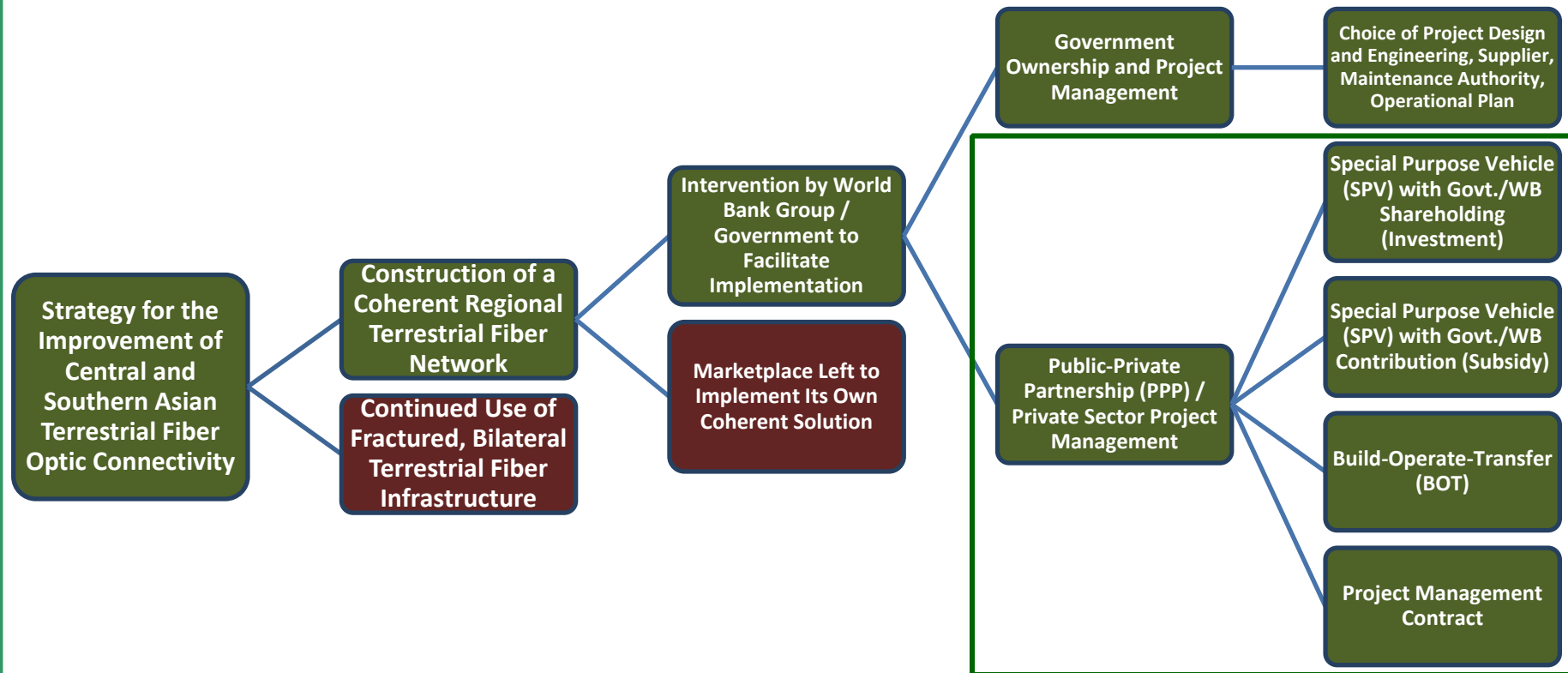
## 5. Open access and non-discriminatory pricing

- 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, managed, and operated within a special independent framework to meet policy goals

- A framework to ensure the neutrality and efficiency of the network
- Should allow participation by all stakeholders while still maintaining arm's-length terms over all capacity sales and leases.

# Options for Regional Network Development



# **Parallel Downstream Policy Initiatives for Bandwidth Success**

- 1. Truly independent and transparent regulatory environment**
- 2. A strong commitment to competition and open-access, non-discriminatory tariff frameworks throughout the entire telecommunications ecosystem**
  - Not only international bandwidth and IP transit
  - Backhaul, interconnection, domestic transport, and access networks
- 3. Local-loop unbundling, as well as antenna and tower site sharing, to ensure competitive service offerings to end-users**
- 4. 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

# Thank you!



**TERABIT**  
Consulting

**Intelligence, Analysis, and Forecasting  
for the International Telecommunications  
Infrastructure Community**

**Michael Ruddy**

Director of International Research

Cambridge Riverview Center

245 First Street, 18th Floor

Cambridge, Massachusetts 02142 USA

Tel.: +1 617 444 8605

Fax: +1 617 444 8405

[mruddy@terabitconsulting.com](mailto:mruddy@terabitconsulting.com)

**[www.terabitconsulting.com](http://www.terabitconsulting.com)**