

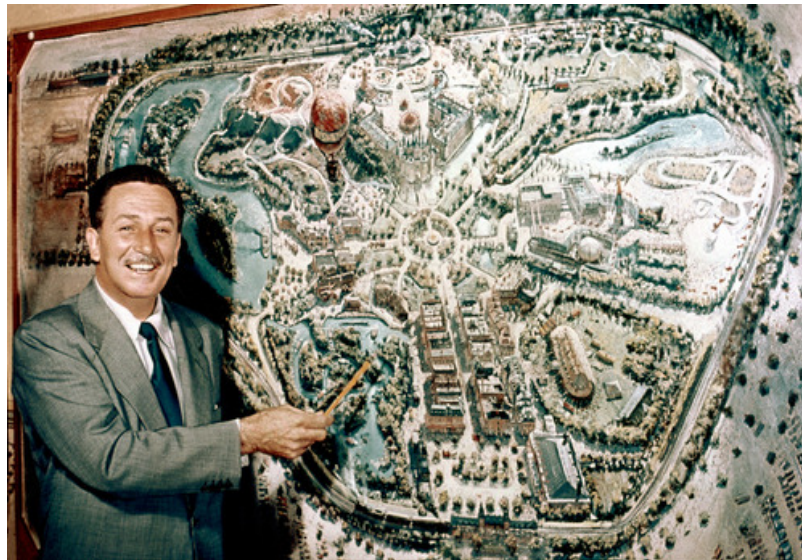
International Submarine Cable Development: New Infrastructure, New Prices?

Tim Stronge
TeleGeography

Outline

- Recent Cable Investment
- Planned Builds
- Reasons to Construct Cables
- Geography of International Connectivity
- Future of Capacity Prices

The Magical Kingdom of Submarine Cables



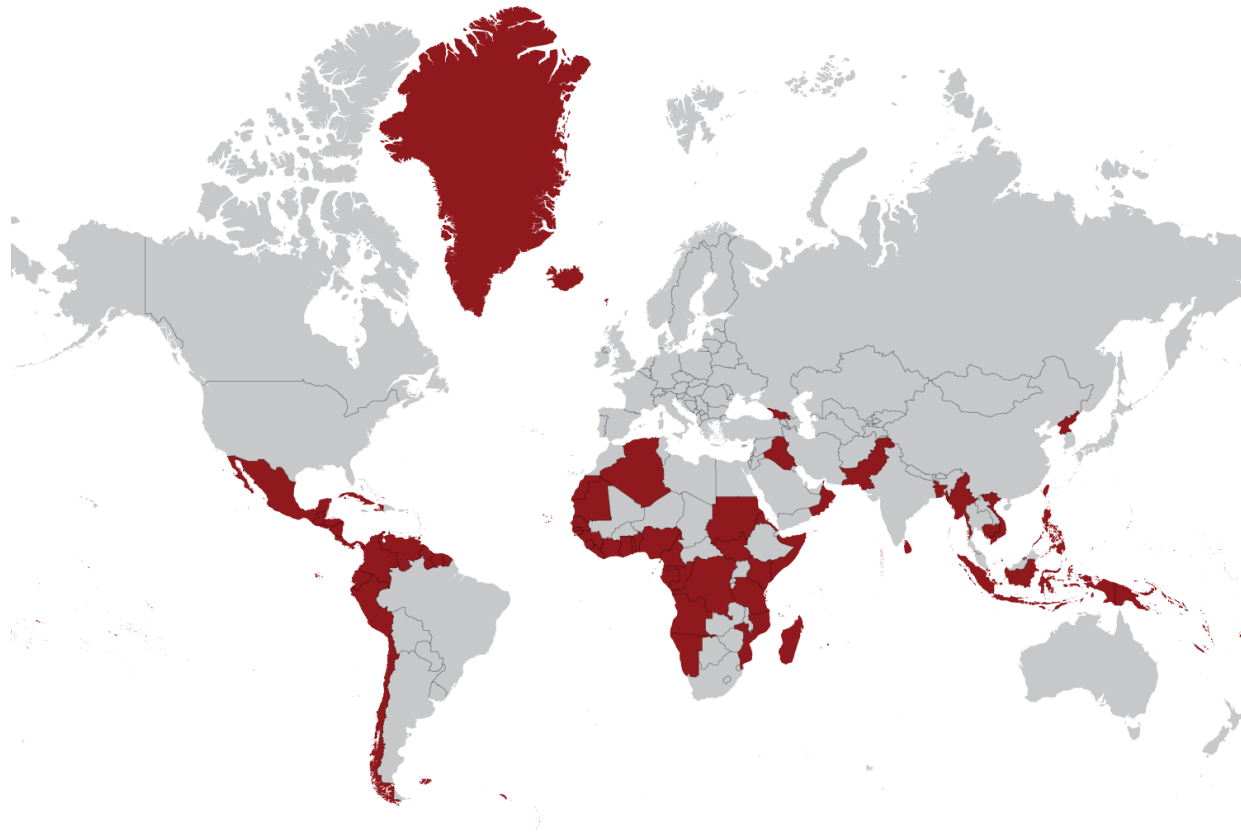
Recent Cable Investment

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Connectivity: 1998

Countries without Fiber-Optic Connectivity (Shaded Red)



Connectivity: Now

Countries without Fiber-Optic Connectivity (Shaded Red)



The Final Investment Frontier?

Countries without Fiber-Optic Connectivity

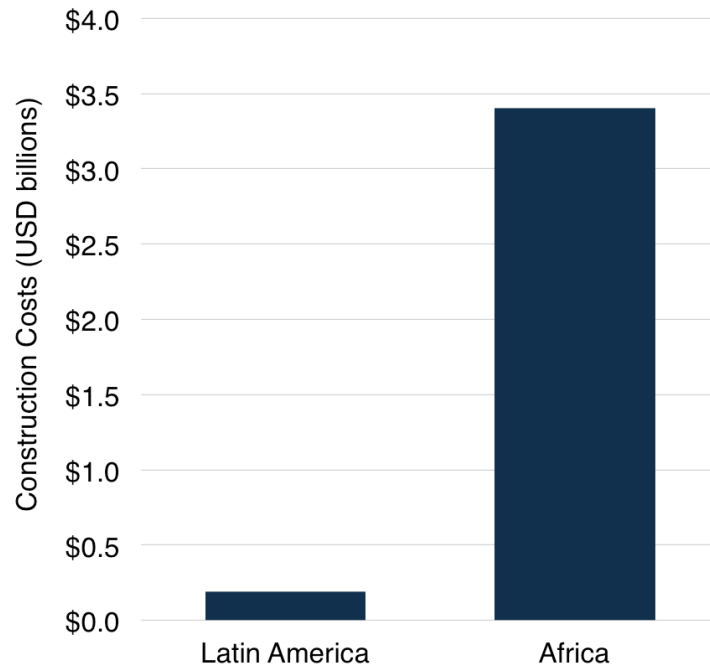
Country	Population
Eritrea	4,996,000
Guinea-Bissau	1,800,000
Timor Leste	1,000,000
* Solomon Islands	500,000
Western Sahara	400,000
* Vanuatu	230,000
* Tonga	102,000
Kiribati	100,000
Palau	21,000
Cook Islands	19,390
Wallis and Futuna	15,000
Nauru	13,000

Country (continued)	Population
Tuvalu	10,000
* Saint Helena	6,241
Falkland Islands	2,913
Norfolk Island	2,302
Niue	1,909
Christmas Is. (Indian Ocean)	1,403
Tokelau	1,400
Ascension Island	1,270
Antarctica	1,000
Cocos (Keeling) Islands	600
Pitcairn Islands	67
South Georgia	30

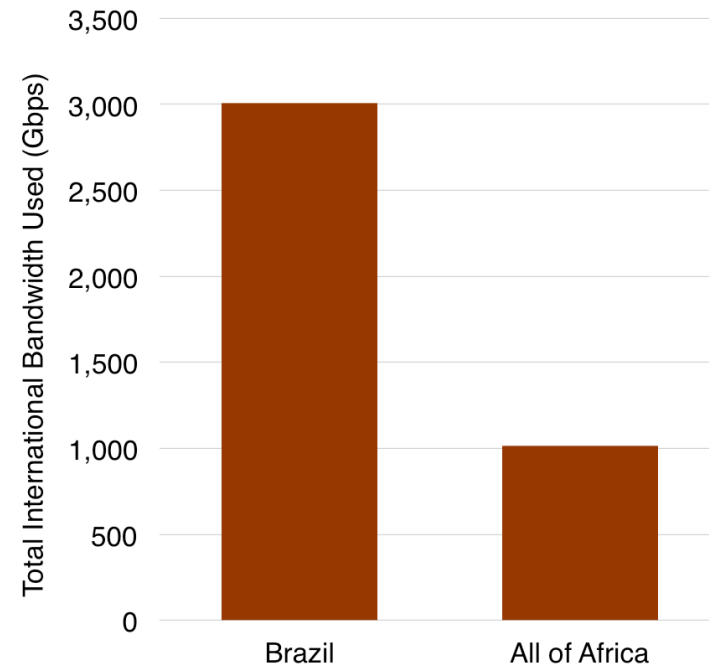
Notes: List includes independent countries and semi-autonomous entities that have no access to international submarine fiber-optic networks via direct landings or terrestrial fiber connections through neighboring countries. Countries with an asterisk (*) would be connected by international cables proposed for construction in the next three years.

Cable Development Not Balanced

Cost of New Cables, 2009-2012



Int'l Bandwidth Usage, 2012

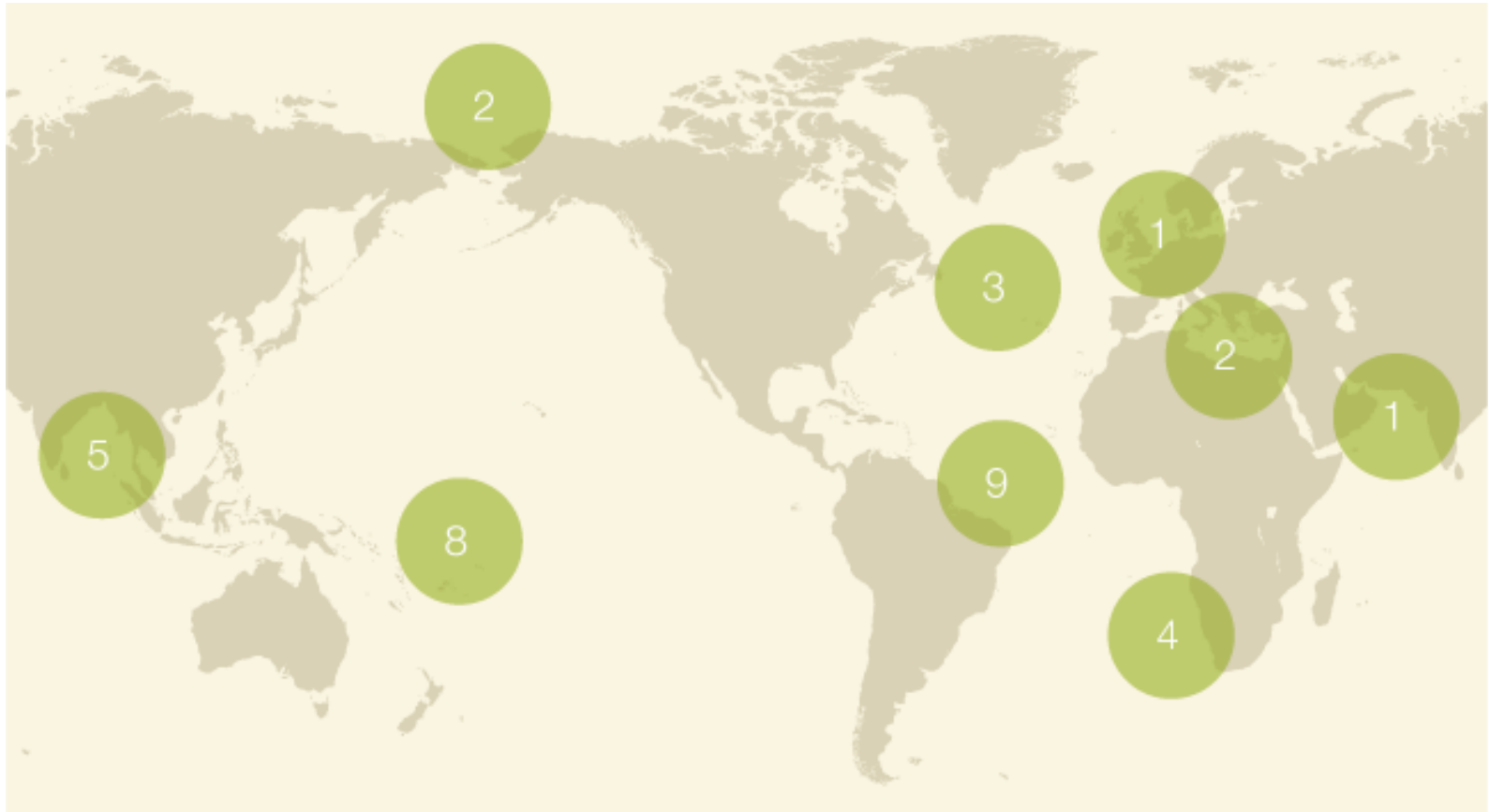


Planned Cable Builds

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Proposed Cables



Proposed Cables that are Funded



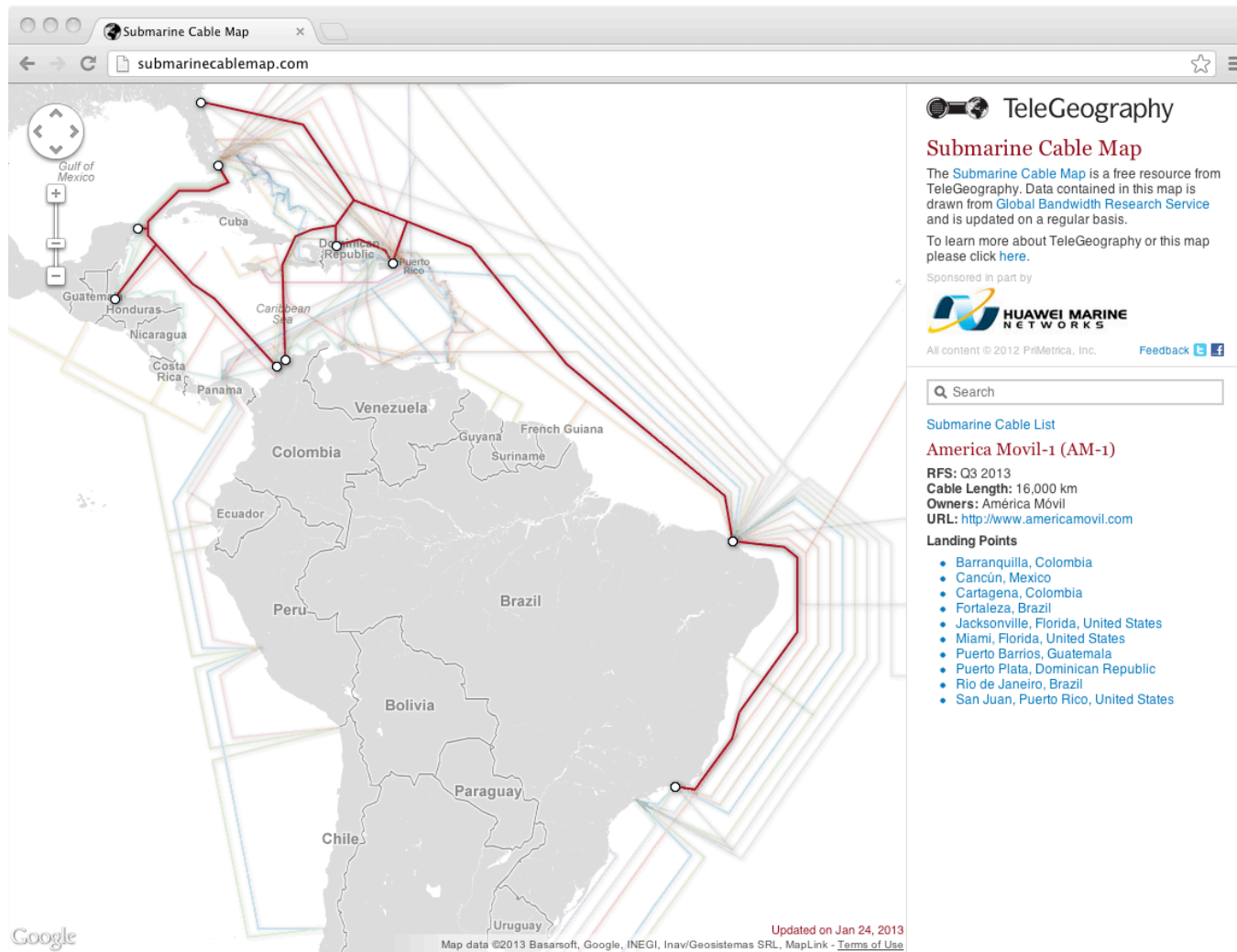
Where's the Development?

- Regions getting the most attention:
 - Latin America
 - Southeast Asia
 - South Pacific
- Lots of talk about other regions but not much action yet:
 - Trans-Atlantic
 - Australia
 - Trans-Pacific
 - Northwest Passage/Arctic

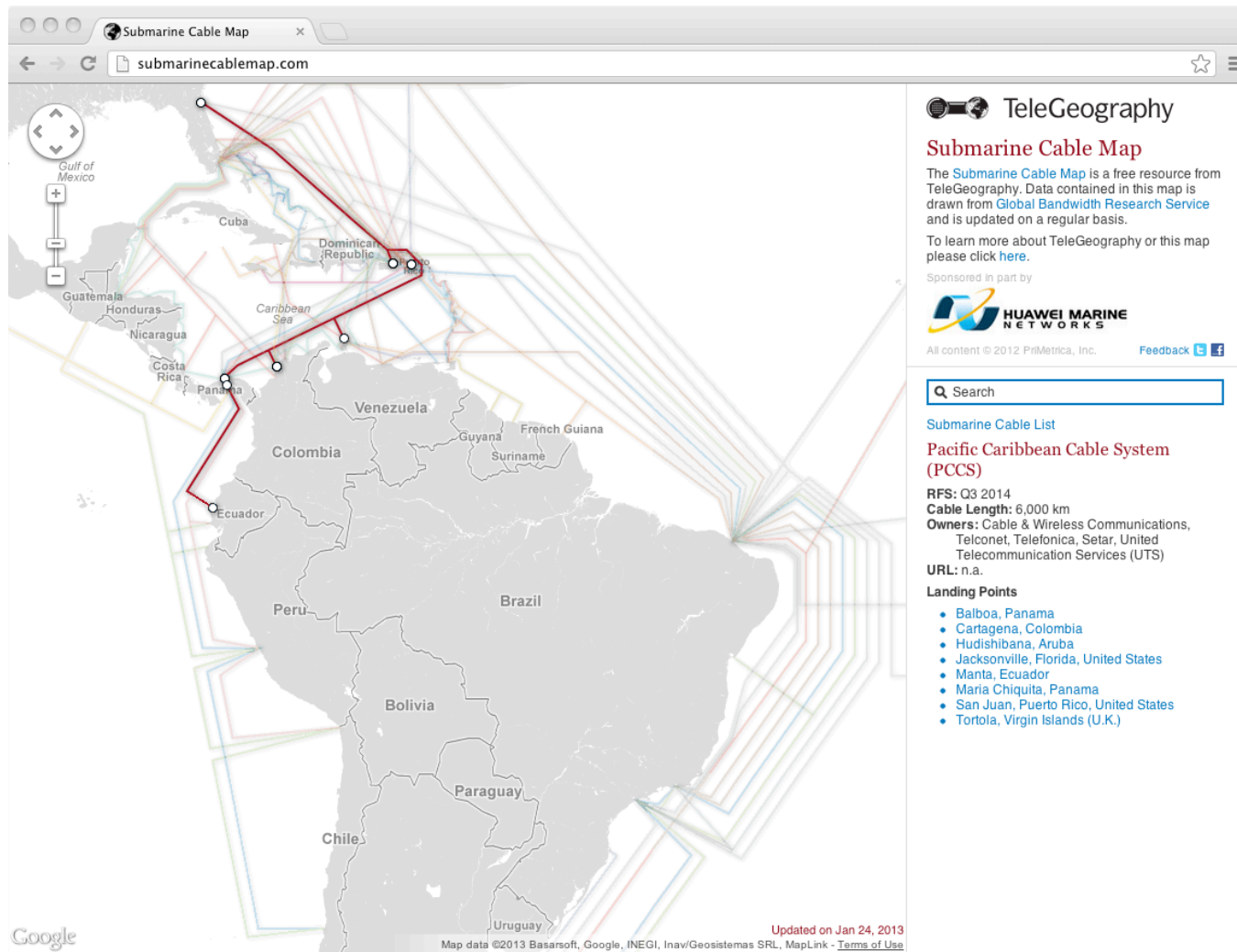
Planned Cables in Latin America

Cable Name	RFS	Landing Countries
GlobeNet Segment 5 (Bermuda-U.S.)	Q1 2013	Bermuda, United States
American Movil-1	Q3 2013	Brazil, Colombia, Dominican Republic, Guatemala, Mexico, United States
GlobeNet Colombia Express	Q4 2013	Colombia, branching unit on existing GlobeNet cable
South Atlantic Cable System (SACS)	Q3 2014	Angola, Brazil
Pacific Caribbean Cable System (PCCS)	Q3 2014	Aruba, Curacao, Ecuador, Panama, Puerto Rico, United States, U.K. Virgin Islands
WASACE Americas	Q3 2014	Brazil, Colombia, Panama, United States
South Atlantic Express (SAEx)	Q4 2014	Brazil, Saint Helena, South Africa
WASACE Africa	Q4 2014	Brazil, Nigeria
Seabras-1	Q1 2015	Brazil, United States
SACS Segment 2 (United States)	n.a.	Brazil, Colombia, United States
SACS Segment 4 (Uruguay)	n.a.	Brazil, Uruguay
SACS Segment 5 (Europe)	n.a.	Brazil, Canary Islands

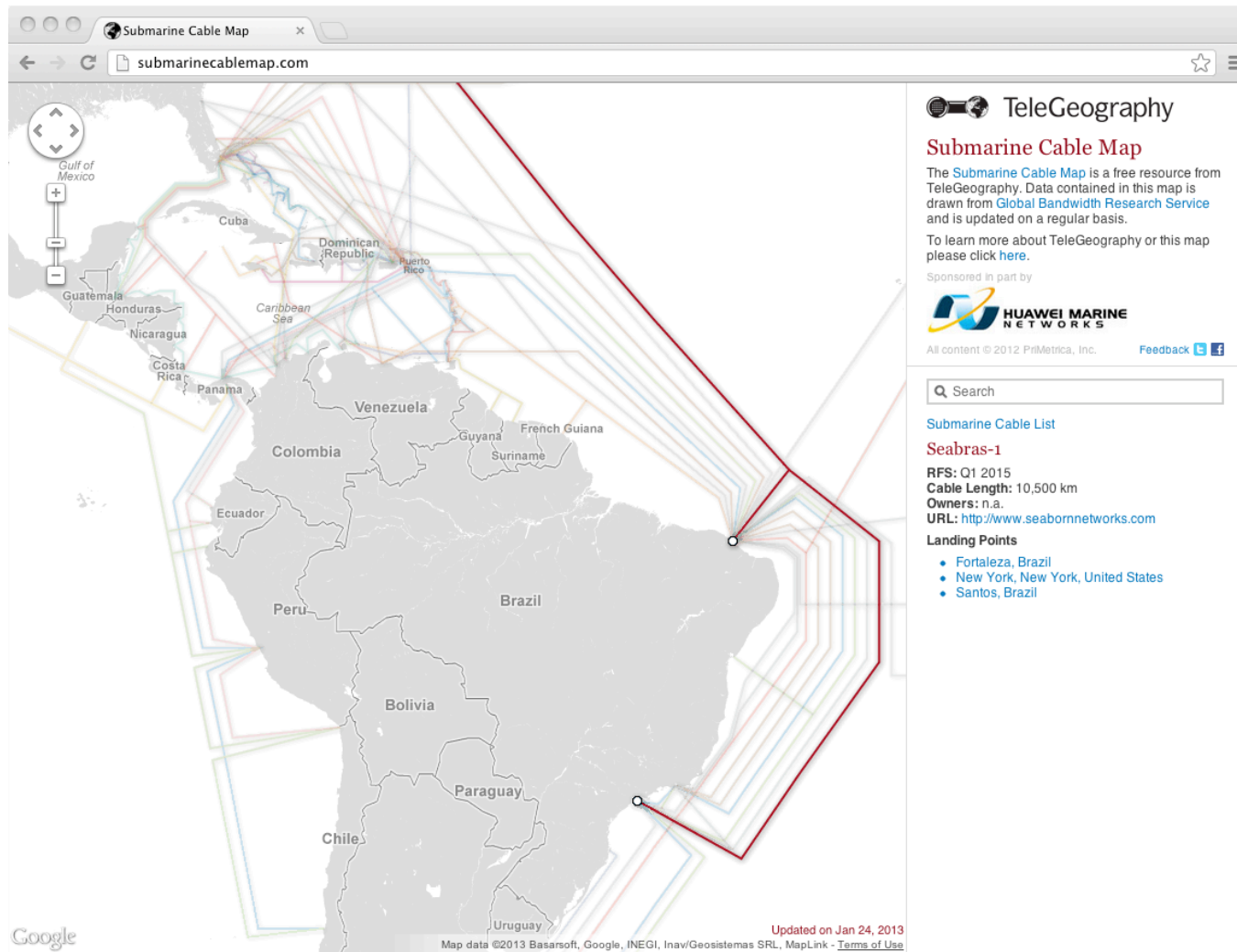
Planned Cables: AM-1



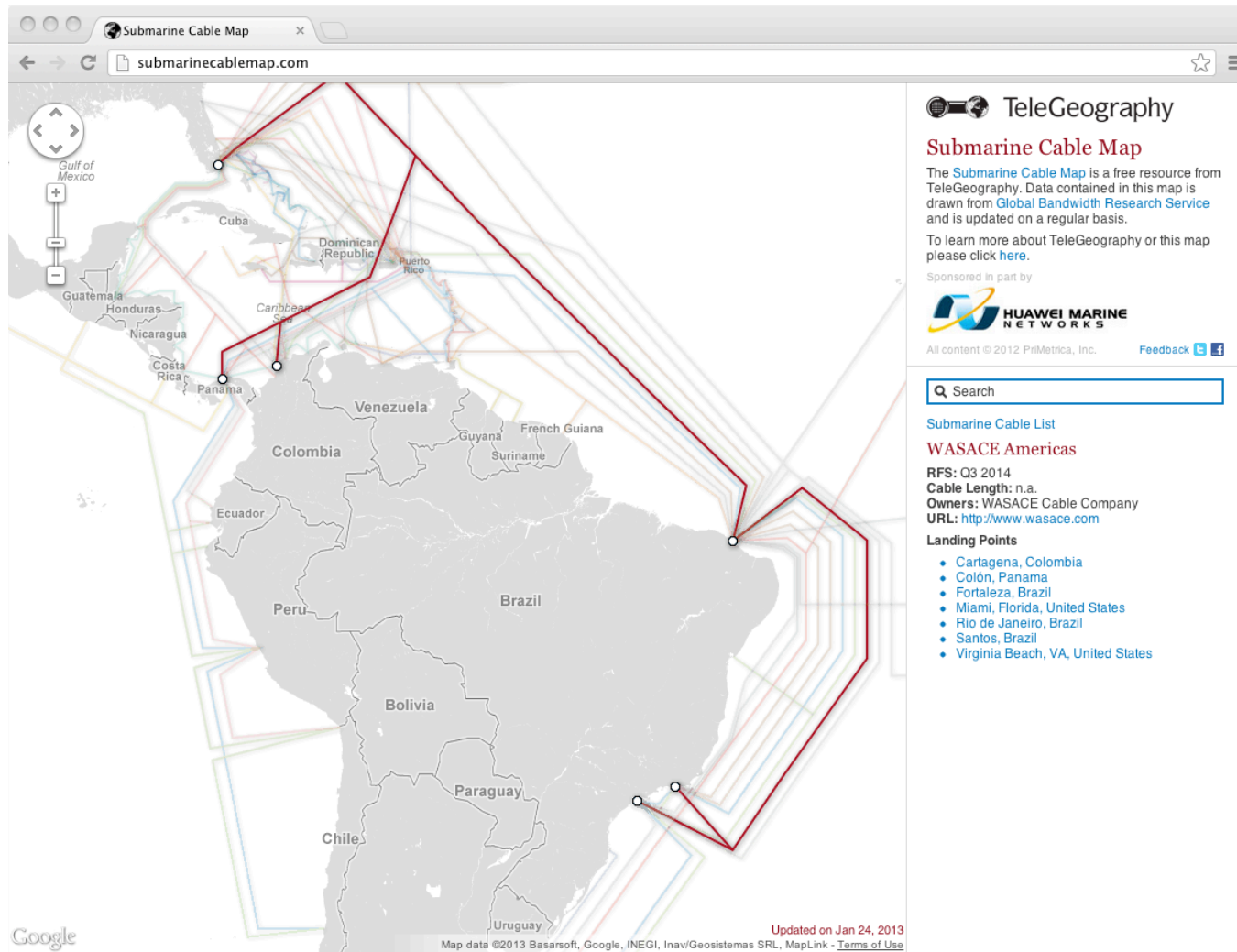
Planned Cables: PCCS



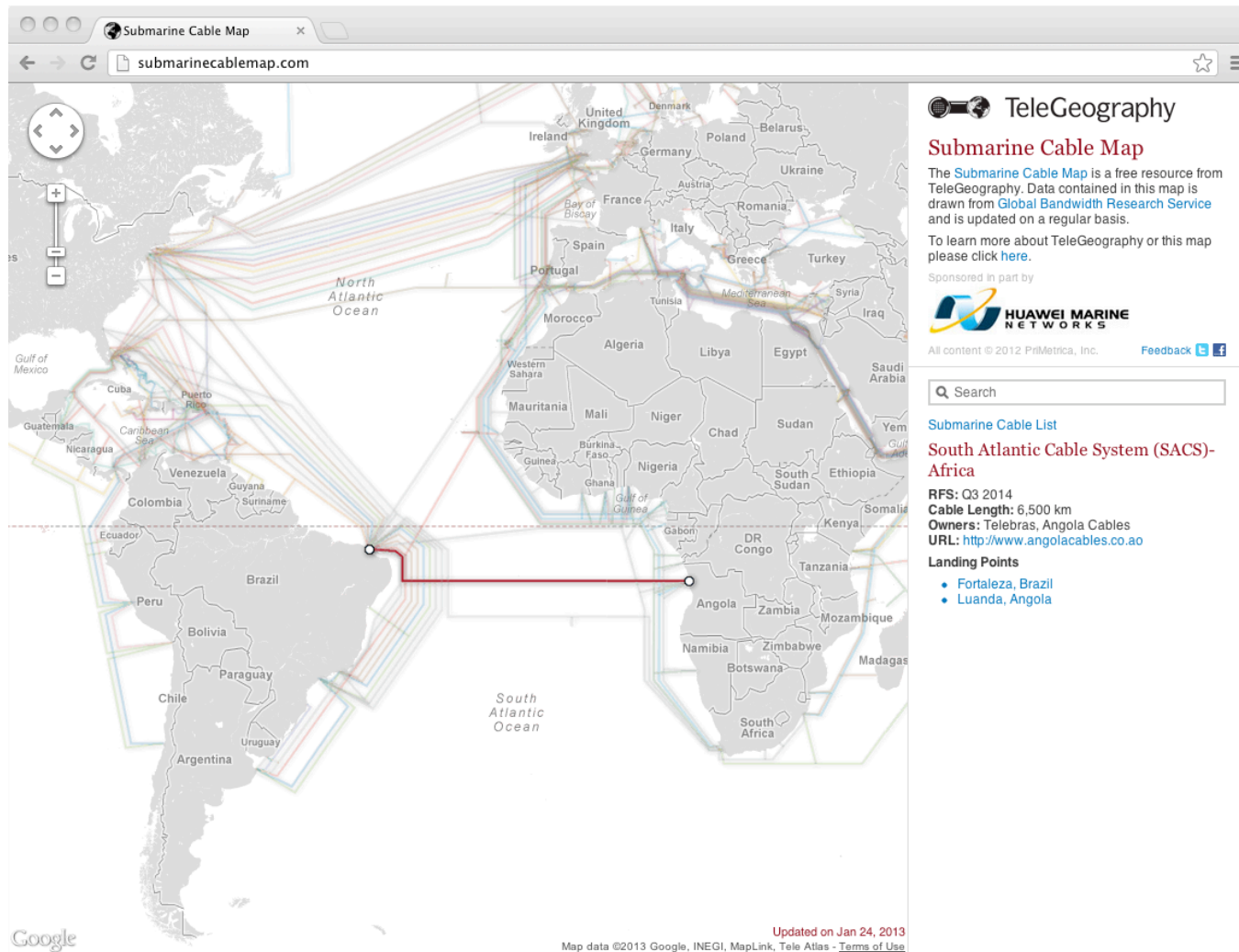
Planned Cables: Seabras



Planned Cables: WASACE



Planned Cables: SACS

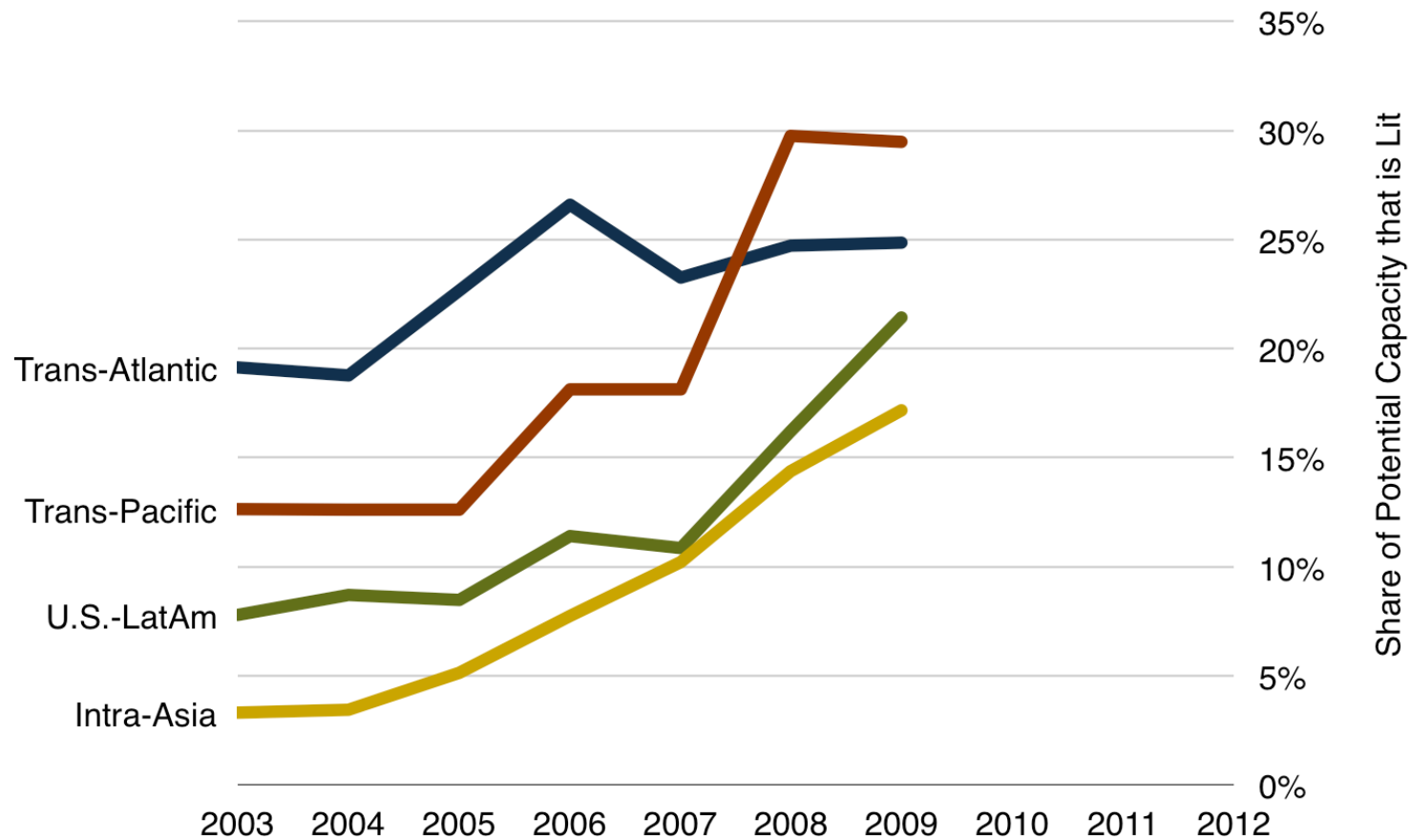


Reasons to Construct Cables

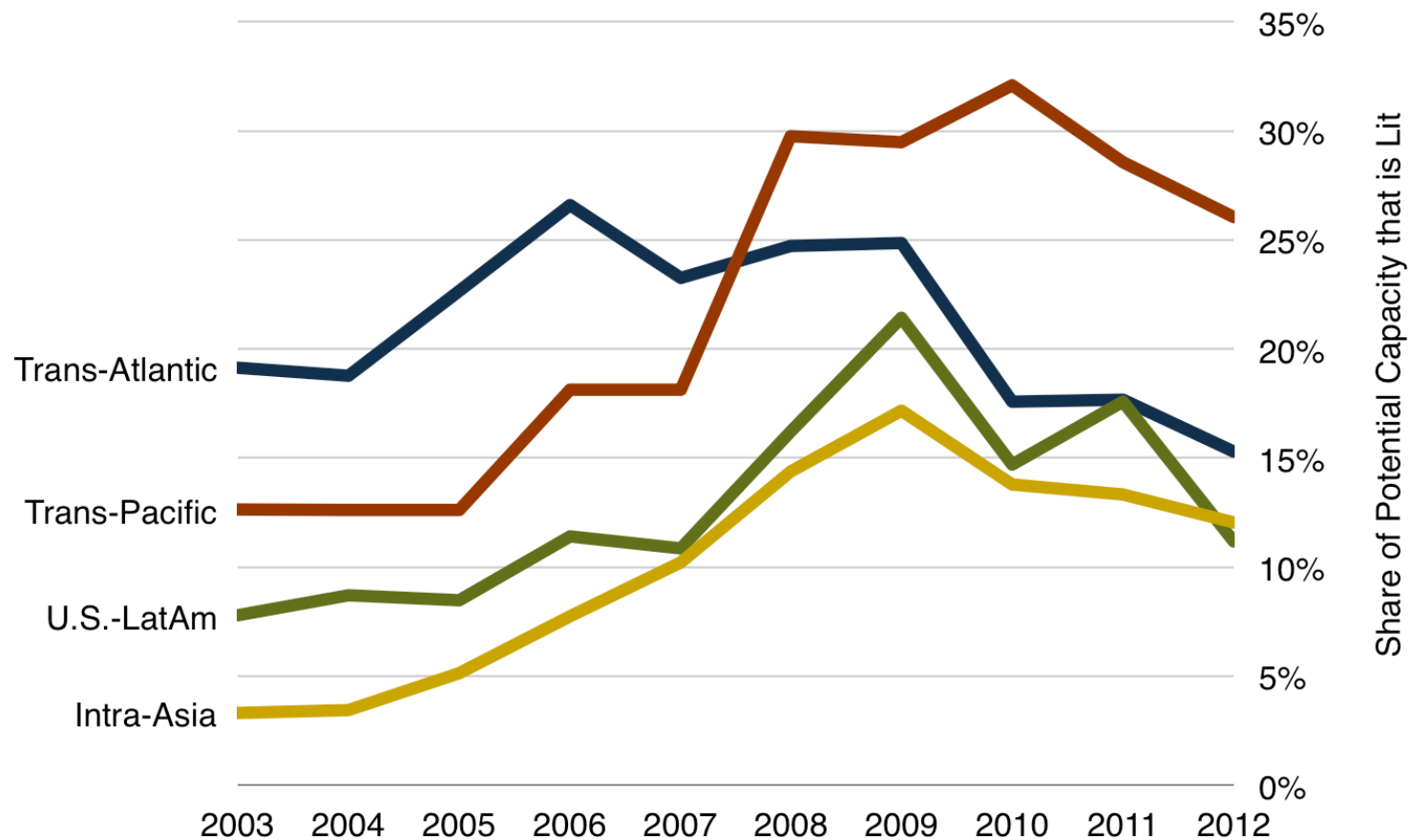
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Capacity Exhaustion?

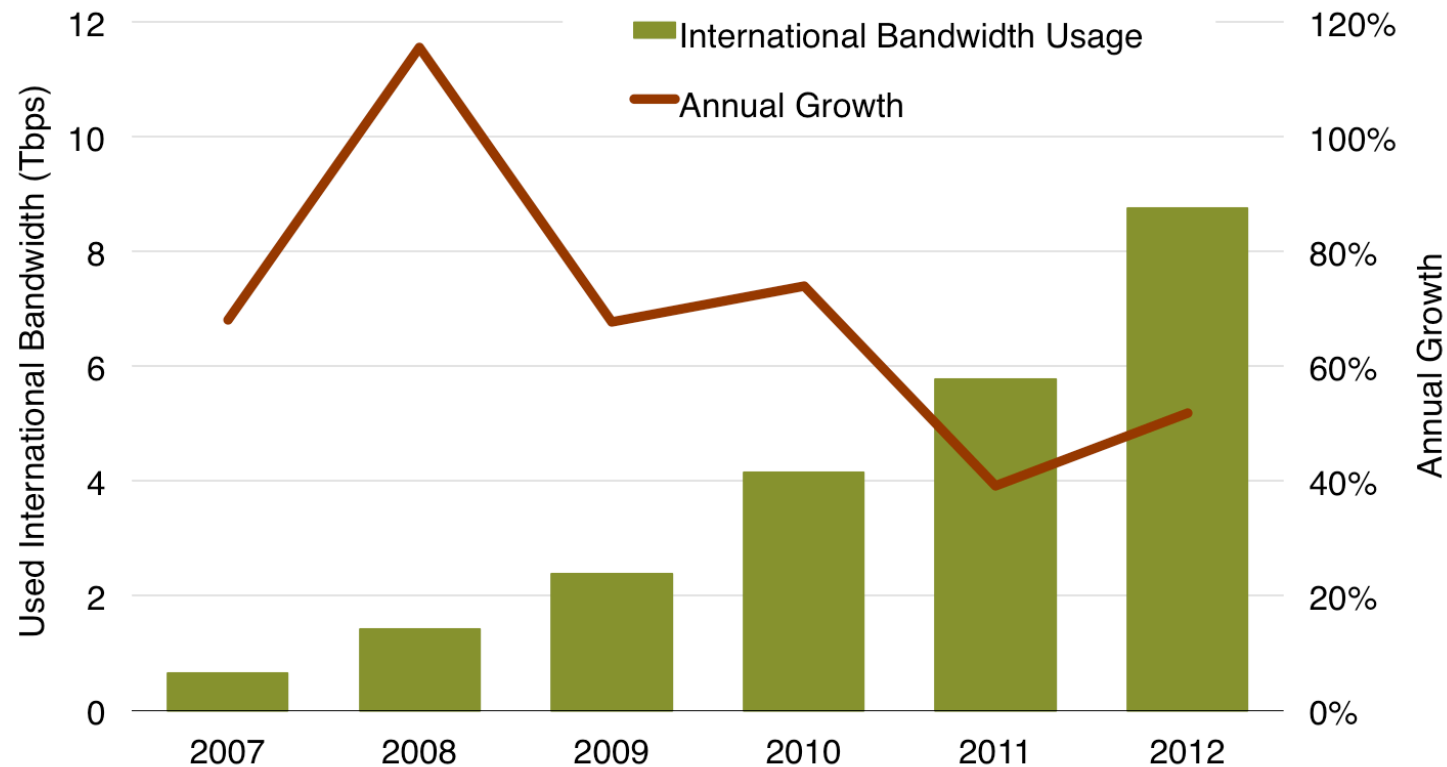


Capacity Exhaustion? (Nope.)



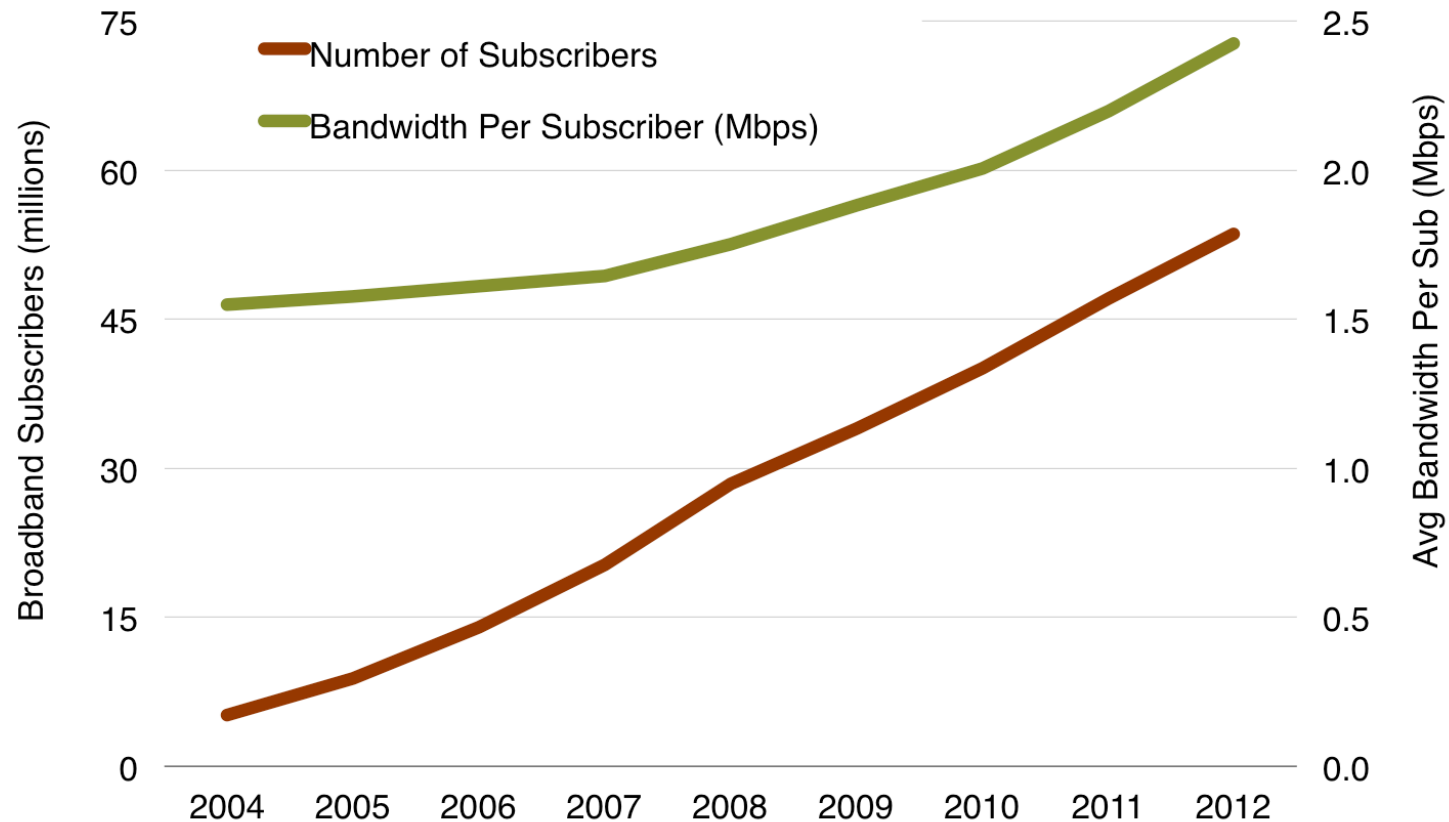
Bandwidth Demand Growth: Slowing, but Still Strong

Latin American Used International Bandwidth, 2007-12



End-users Drive Internet Traffic

LatAm Broadband Subscribers and Average Access Speeds



Who Reaches these Subscribers?

Upstream Provider	Broadband Subscribers Reached (m)
World	
Level 3	369.5
TeliaSonera	345.4
Caribbean & Atlantic	
Verizon Business	0.3
Broadband One	0.3
Central America	
America Movil	8.2
Verizon Business	5.9
South America	
Telefonica	14.7
Telecom Italia	10.7

Notes: Data reflect number of broadband subscribers of ISPs reached by single-hop ASN adjacency through upstream Internet backbone providers. Data based exclusively on BGP table analysis and do not reflect actual traffic or IP transit revenues of the upstream providers.

Limited Competition

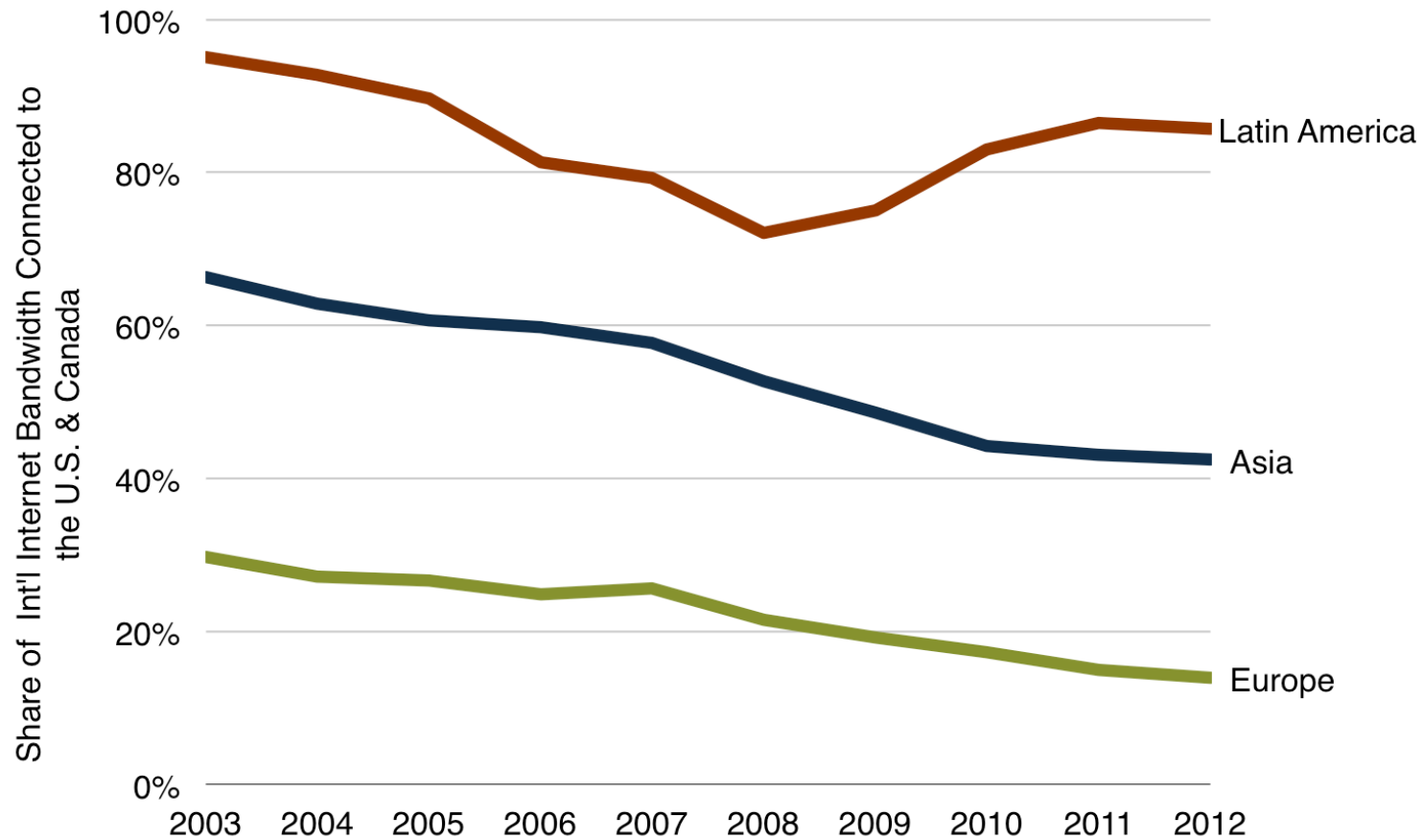
Transport Tri-opoly to Brazil:

- Level 3 (Global Crossing) / Telecom Italia
- Telefonica
- Globenet (Oi)

Geography of International Connectivity *AKA*

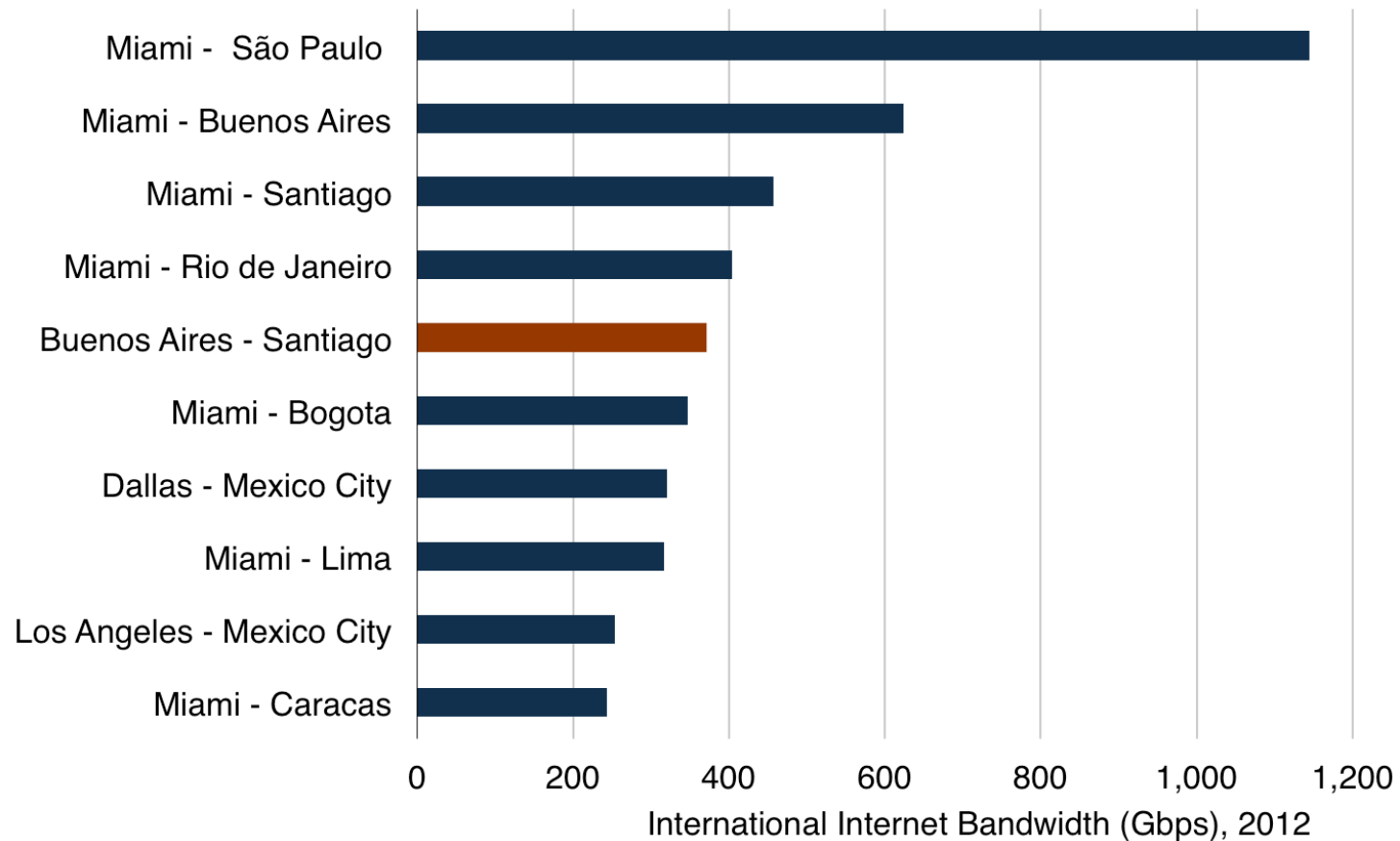


Connectivity Still Focused on U.S.



Biggest Roads Lead Northward

Top 10 International Internet Routes of Latin America



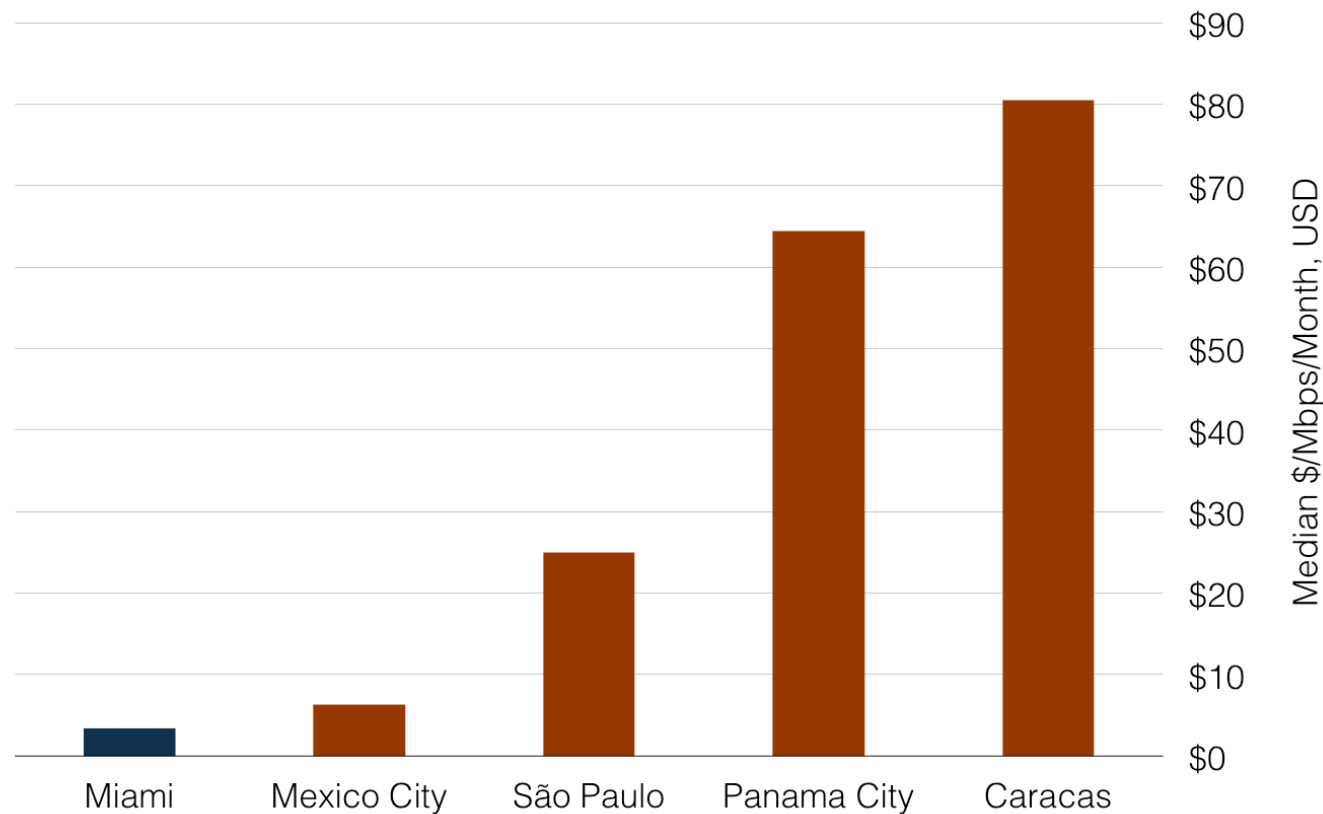
Future of Capacity Prices

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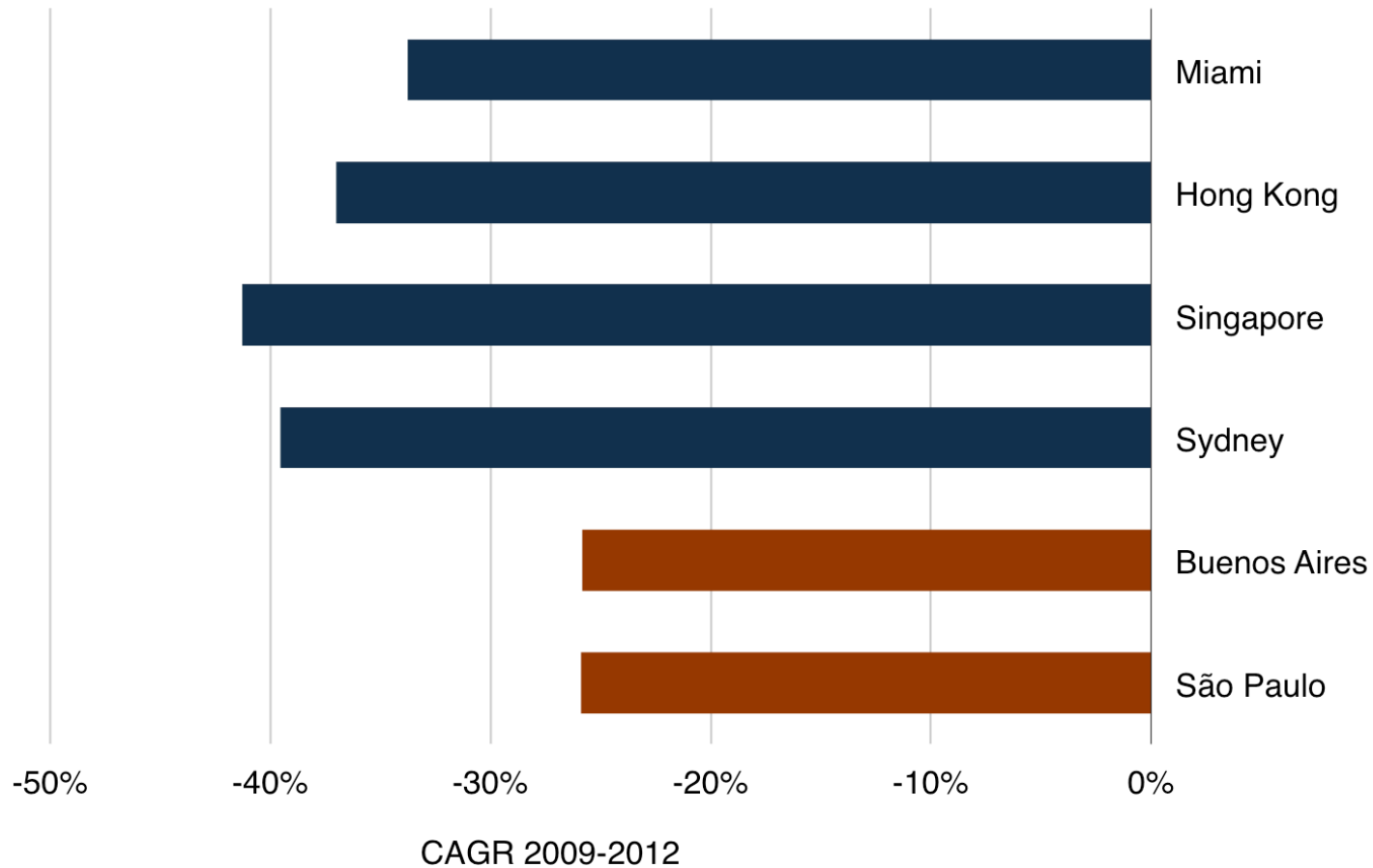
One Reason to Connect to Miami: Prices

GigE Full Port IP Transit Prices, Q4 2012



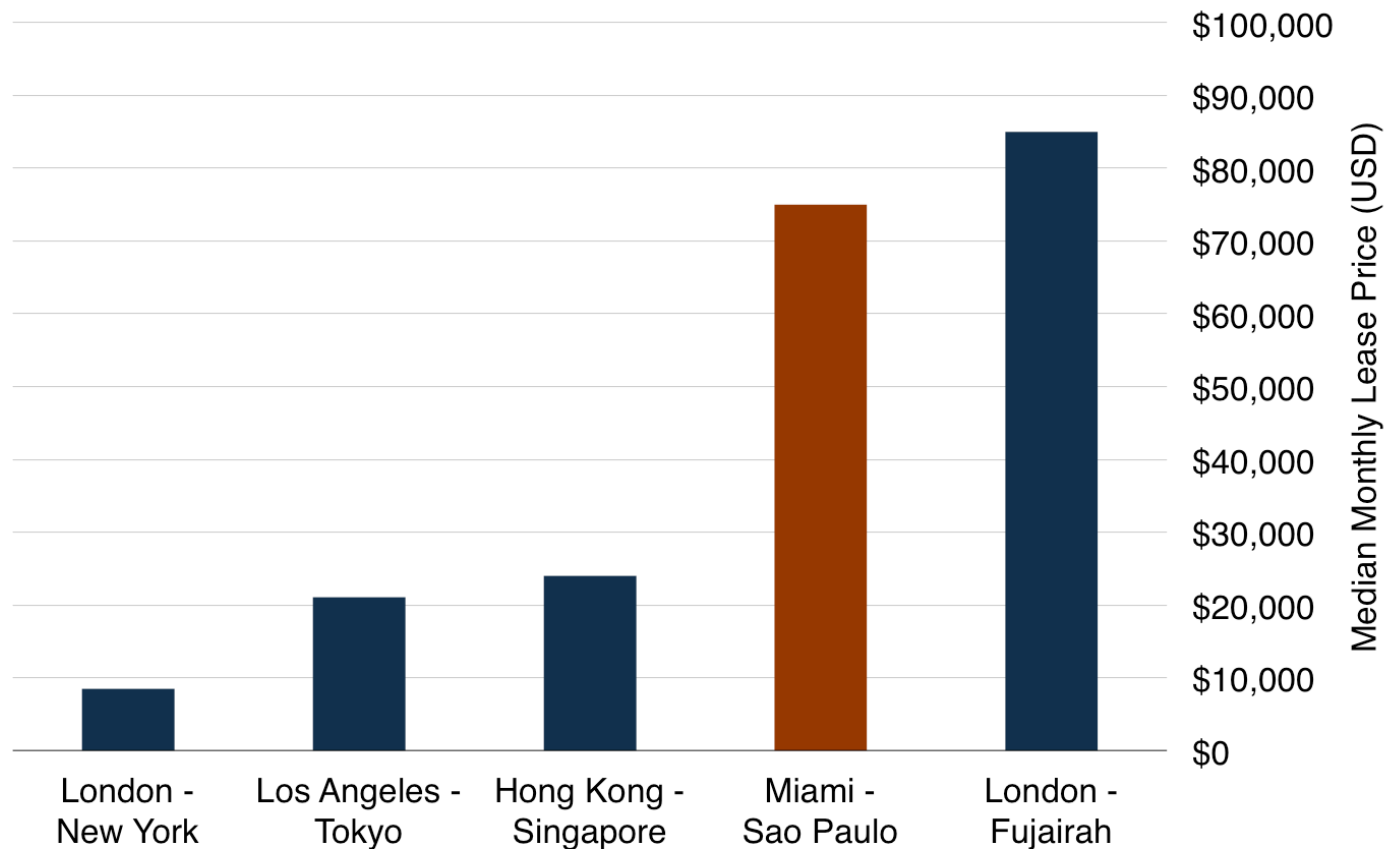
Faster Declines in the U.S.

Median 10 GigE IP Transit Price Erosion, 2009-2012



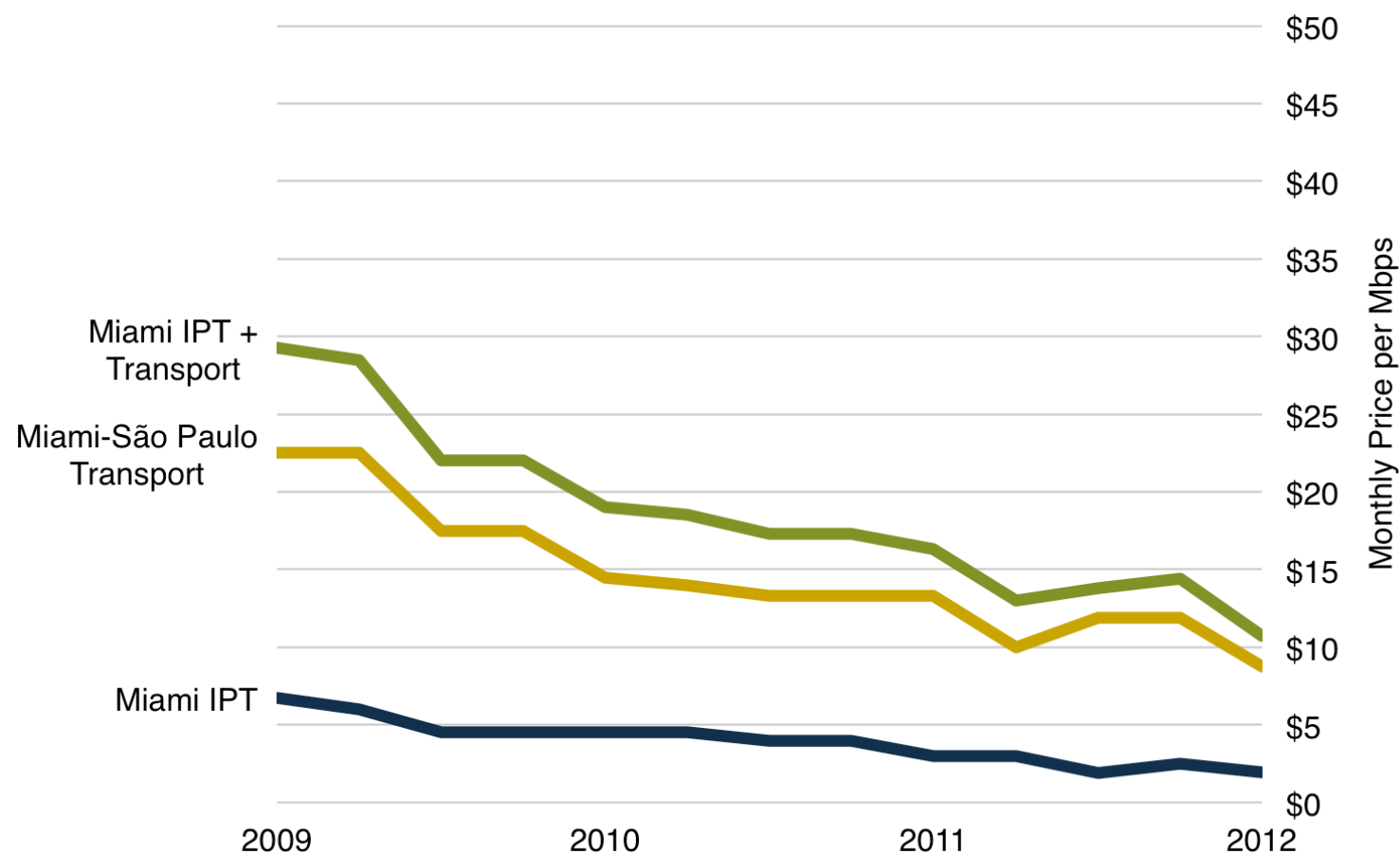
Transport Prices are Still Costly

Median 10 Gbps Wavelength Prices, Q4 2012



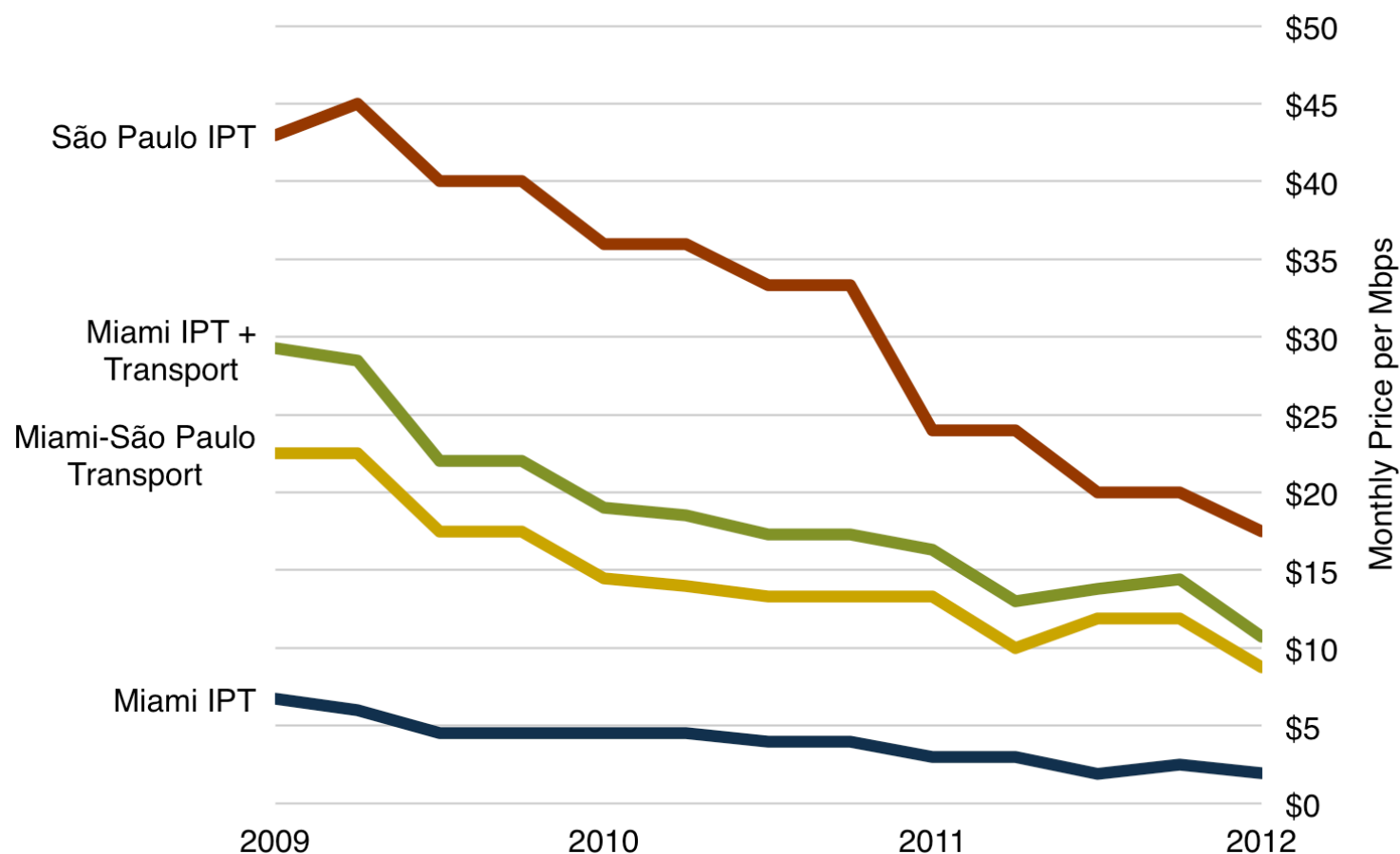
IPT vs. Transport Prices

Monthly Price per Mbps for 10GigE Port and 10 Gbps Wavelength



IPT vs. Transport Prices

Monthly Price per Mbps for 10GigE Port and 10 Gbps Wavelength



So Long, Pardner!

Questions?



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