The Global Submarine Cable Market and Its Impact on Indonesia’s Connectivity Needs

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Emerging and Less-Developed Markets: Key to the Growth of the Submarine Cable Market

• Submarine cables are the dominant means of international communications
  • Satellite only handles 0.5% of international traffic
• It is an optimal time for new investment
  • Unit costs have been constantly driven downward by technological advances
  • The industry’s competitive environment has evolved considerably, with more attractive pricing from suppliers
The Historical Evolution of the Global Submarine Cable Market

New Submarine Cable Investment by RFS Date
Source: 2016 Undersea Cable Report (Terabit Consulting)
Global Bandwidth Demand, 2011-2015

Intercontinental submarine cable bandwidth has increased from ~50 Tbps in 2011 to ~140 Tbps in 2015 (30% CAGR)

Growth is highest in:
- South Asia & ME
- Southeast Asia
- Australia
- Latin America
- Africa
Emerging and Less-Developed Markets: Key to the Growth of the Submarine Cable Market

• The submarine communications market is strong
  • Direct investment in new systems now averages $1.5-$2 bil & 35k km/yr.
  • Upgrade market exceeds $100 mil/yr.

• The recovery of the submarine industry has been driven largely by investment in developing markets and greenfield routes
  • driven by a new “development-oriented model of international fiber investment”
A New Development-Oriented Model of International Fiber Investment

PPP Structures
- SPV w/ Gov’t. Sharehold
- SPV w/ Gov’t Contribution
- BOT Concessions
- Project Mgmt. Contracts

Government
- Multilateral Development Banks and Other IFIs
- System and Equipment Suppliers
- Private Investors
- Network Developers
- Fixed & Mobile Operators
- ISPs
- Content Providers
- ISPs
- Content Providers

Content Providers
- Appropriate Cost-Sensitive Solutions
Since 2003, the share of investment serving less-developed and emerging markets has increased from 33% to more than 60%.

The largest gainers:

- Africa
- South Asia/Middle East
- Caribbean
- South Pacific
Progress in the Expansion of International Fiber Connectivity to Unserved Countries

In nominal terms, the industry’s efforts to connect the unconnected have been impressive. Civilian-inhabited countries and territories unserved by fiber:

- 79 in 2005
- 29 in 2015

(0.5% of population)
The Bandwidth Divide:
43% of Countries Have Insufficient Bandwidth

Classification of Countries and Territories by International Bandwidth per Capita, 2015
Source: Terabit Consulting International Bandwidth Databank

Average (10-29.9 Kbps): 29%
High (50-99.9 Kbps): 15%
Very High (100 Kbps or greater): 13%
Low (less than 10 Kbps): 43%

Average Per-Capita GDP of Countries and Territories in Each International Bandwidth Classification, 2015

<table>
<thead>
<tr>
<th>Classification</th>
<th>Average GDP per Capita, 2015 (PPP terms)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very High (100+ Kbps)</td>
<td>$45,776</td>
</tr>
<tr>
<td>High (50-99.9 Kbps)</td>
<td>$38,582</td>
</tr>
<tr>
<td>Average (10-29.9 Kbps)</td>
<td>$22,126</td>
</tr>
<tr>
<td>Low (&lt;10 Kbps)</td>
<td>$6,839</td>
</tr>
</tbody>
</table>

Source: Terabit Consulting International Bandwidth Databank
The Economic Impacts of Weak Submarine Connectivity & Weak International Bandwidth

• A constrained telecom environment
  • High wholesale and consumer prices
  • Lower broadband penetration rates
  • Compromised services and applications with lower reliability and utility
• More importantly, at the macro level: a major obstacle to economic and human development
  • Detachment from the digital economy
  • Continued economic inefficiencies and restrained growth
  • Impediment to regional integration (submarine connectivity is crucial for ASEAN Single Telecommunications Market)
  • Lack of access to critical social development tools (telemedicine, distance learning, scientific/research networks)
In the ASEAN region, the difference between the “bandwidth-richest” country and the “bandwidth poorest” country is 925x. In more than half of countries, bandwidth is so low as to be a serious obstacle to overall development. (based on Terabit Consulting threshold of <10 Kbps YE14)
Indonesian International Bandwidth Demand, 2005-2015

Source: Terabit Consulting
Indonesian International Bandwidth Demand, 2016-2026

Source: Terabit Consulting
12 existing international cables, but only SMW3 provides intercontinental connectivity

- Of the remaining 11 cables:
  - Six connect only to Singapore
  - Four connect only to Malaysia
  - One connects to Thailand and Singapore

- PT Telkom has historically been the country’s leading submarine cable investor
  - Operates cable stations for Sea-Me-We-3, TIS, DMCS, and BSCS
  - PT Telkom is a major investor in AAG, but access is via BSCS in Singapore

- Six other Indonesian operators have submarine connectivity to Singapore and/or Malaysia
  - PT XL Axiata, PT NAP Info Lintas Nusa, PT Mora Telematika, PT Indosat, PGASCOM, PT Ketrosden Triasmitra, (also Sacofa of Malaysia)
## Existing Int’l. Submarine Cable Connectivity in Indonesia

<table>
<thead>
<tr>
<th>RFS</th>
<th>Route Km</th>
<th>Financing Type</th>
<th>Owner(s)</th>
<th>Cost ($Mil)</th>
<th>Lit Capac. (Tbps)</th>
<th>Design Capac. (Tbps)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sea-Me-We-3 (SMW3)</td>
<td>39,000</td>
<td>Consortium</td>
<td>International consortium of carriers</td>
<td>$1,300</td>
<td>0.480</td>
<td>1.920</td>
</tr>
<tr>
<td>Thailand-Indonesia-Singapore (TIS)</td>
<td>1,077</td>
<td>Consortium</td>
<td>Communications Authority of Thailand (CAT) / PT Telekomikasi (PT Telkom) / Singtel</td>
<td>$33</td>
<td>0.160</td>
<td>1.280</td>
</tr>
<tr>
<td>East-West Submarine Cable System (Indonesia-Malaysia)</td>
<td>969</td>
<td>Government / Carrier</td>
<td>Sacofa Sdn Bhd (Sarawak State Gov’t. / Celcom Malaysia)</td>
<td>$30</td>
<td>0.160</td>
<td>9.600</td>
</tr>
<tr>
<td>Dumai-Melaka Cable System (DMCS)</td>
<td>160</td>
<td>Bilateral carrier</td>
<td>PT Telekomunikasi (PT Telkom) / Telekom Malaysia</td>
<td>$9</td>
<td>0.640</td>
<td>3.200</td>
</tr>
<tr>
<td>Batam-Rengit Cable System (BRCSC) (Indonesia-Malaysia)</td>
<td>63</td>
<td>Bilateral carrier</td>
<td>Telekom Malaysia / PT Excelcomindo (changed name to PT XL Axiata)</td>
<td>$10</td>
<td>0.640</td>
<td>38.400</td>
</tr>
<tr>
<td>Matrix Cable System (Singapore-Indonesia)</td>
<td>1,055</td>
<td>Investor</td>
<td>PT NAP Info Lintas Nusa (Indonesia) / Matrix Networks (Brantwood Int’l. / Causeway Bay Investments)</td>
<td>$35</td>
<td>0.500</td>
<td>6.400</td>
</tr>
<tr>
<td>Moratelindo International Cable System-1 (MIC-1): Batam-Singapore</td>
<td>42</td>
<td>Investor</td>
<td>PT Mora Telematika (also known as PT Moratel Indonesia or Moratelindo) / ViewQwest (Singapore)</td>
<td>$12</td>
<td>0.600</td>
<td>1.280</td>
</tr>
<tr>
<td>Batam-Singapore Cable System (BSCS)</td>
<td>70</td>
<td>Carrier</td>
<td>PT Telekomunikasi Indonesia (PT Telkom)</td>
<td>$13</td>
<td>0.640</td>
<td>7.200</td>
</tr>
<tr>
<td>Jakabare (Java-Kalimantan-Batam-Singapore)</td>
<td>1,330</td>
<td>Carrier</td>
<td>PT Indosat</td>
<td>$40</td>
<td>0.160</td>
<td>3.200</td>
</tr>
<tr>
<td>PGASCOM Java-Sumatra-Batam-Singapore</td>
<td>347</td>
<td>Hydro-carbon Industry</td>
<td>PGASCOM (PT PGAS Telekomikasi Nusantara) (subsidiary of Indonesian Gov’t.-controlled PT Perusahaan Gas Negara)</td>
<td>$20</td>
<td>0.160</td>
<td>38.400</td>
</tr>
<tr>
<td>Batam-Dumai-Malacca Cable System (BDM) (also known as Batam-Dumai-Melaka) (integrating plans for Moratelindo-Batam-Dumai Cable (MBDC))</td>
<td>380</td>
<td>Consortium</td>
<td>Telekom Malaysia / PT XL Axiata / PT Mora Telematika (also known as PT Moratel Indonesia or Moratelindo)</td>
<td>$15</td>
<td>0.640</td>
<td>3.200</td>
</tr>
<tr>
<td>B2JS (Jakarta-Bangka-Batam-Singapore) (including PT Moratel’s B3JS and PT Telkom’s 3rd Route)</td>
<td>761</td>
<td>Investor</td>
<td>PT Ketrosden Triasmitra</td>
<td>$55</td>
<td>0.400</td>
<td>9.600</td>
</tr>
</tbody>
</table>

Source: Terabit Consulting
# Planned Int’l. Submarine Cable Connectivity in Indonesia

<table>
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<tr>
<th>Route</th>
<th>Financing Type</th>
<th>Owner(s)</th>
<th>Cost ($Mll)</th>
<th>Design Capac (Tbps)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SEA-US</td>
<td>15,000</td>
<td>Consortium Globe Telecom, GTI Corporation, Hawaiian Telcom, PT Telekomunikasi, RAM Telecom International, Teleguam Holdings (GTA Teleguam)</td>
<td>$250</td>
<td>20.000</td>
</tr>
<tr>
<td>Asia Pacific Express West (APX-West) (formerly Australia-Indonesia-Singapore Cable)</td>
<td>4,600</td>
<td>Investor SubPartners</td>
<td>$200</td>
<td>32.000</td>
</tr>
<tr>
<td>Australia-Singapore Cable (ASC)</td>
<td>4,800</td>
<td>Investor Leighton Contractors Telecommunications (Australia-Singapore Cable Ltd.)</td>
<td>$150</td>
<td>36.000</td>
</tr>
<tr>
<td>BIMP-EAGA Submarine and Terrestrial (BEST) Cable Project (also known as BES; formerly known as BIMP-EAGA Rink)</td>
<td>4,000</td>
<td>Government / Carrier / Investor BEST Cable Corporation Pte Ltd (Brunei International Gateway Sdn Bhd / EA Trilink / Sabah Economic Development Corporation (Sabah State Gov’t.), via its S.COMM subsidiary) / China National Technical Import and Export Corporation (CNTIC) / NMV Development (Canada)</td>
<td>$353</td>
<td>24.000</td>
</tr>
<tr>
<td>Trident Subsea Cable</td>
<td>4,287</td>
<td>Investor Trident Subsea Cable Pty Ltd.</td>
<td>$360</td>
<td>8.600</td>
</tr>
</tbody>
</table>

Source: Terabit Consulting
Indonesian Submarine Cable Market: Overview

- Total construction value of Indonesian international submarine cables to date: $1.6 billion
- Planned construction value of Indonesian international submarine cables: $1.7 billion
- Total value of domestic submarine cable investment in Indonesia: $700 million
Keys to the Continued Success of the Indonesian Submarine Cable Market

1. Public and private efforts to provide broadband connectivity to the entire archipelago
2. Healthy competition and appropriate regulation in broadband, telephony, and managed bandwidth markets
3. Leveraging of Indonesian submarine cable operators’ extensive expertise
4. Ability of submarine suppliers to offer innovative, appropriate, and cost-effective solutions
THANK YOU

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