

# Executive Summary



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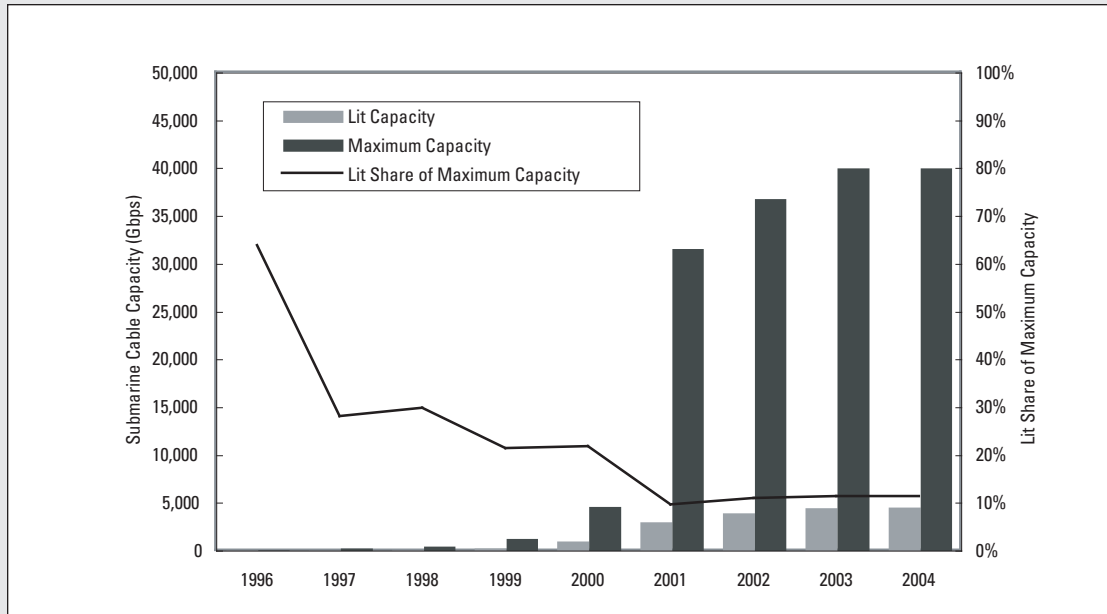
After a four-year downturn, the submarine cable industry is still struggling to find stable ground. Increases in demand for bandwidth, while significant, have not offset a substantial collapse in prices. The prolonged downturn has forced dozens of carriers to restructure their operations and finances, often under Chapter 11 bankruptcy protection. Virtually every cable operator has declared bankruptcy or undergone some type of financial restructuring. While a few companies have exited the wholesale bandwidth market, the pace of consolidation has been too slow to have any softening effect on the competitive environment in the near term.

*Submarine Networks*, the first volume of *International Bandwidth 2004*, quantifies past, present, and future subsea capacity supply and demand; offers a primer on bandwidth products, contracts, and technology; reviews data on cable construction, upgrade, and maintenance costs; and presents detailed analysis and data for circuit and wavelength pricing. The report also includes detailed, two-page profiles of 76 undersea cable networks (the online edition contains 100 more profiles in a searchable database). The second volume of *International Bandwidth*, *Terrestrial Networks*, extends the analysis and statistics to long-haul networks on land.

## Supply

Most of the new submarine cable systems that entered service in recent years did so with initial capacities far below their designed limits. At the end of 2003, the proportion of lit-to-upgradeable capacity on major cable systems was just 11.3 percent, as opposed to 64 percent in 1996 (see Figure 1. Submarine Cable Lit and Maximum Capacities, 1996-2004). With no new construction or upgrades occurring on the major submarine cable routes, all new cable builds are occurring along under-served routes. For example, FLAG Telecom's FALCON project and the Tata Indicom India-Singapore cable will provide a significant capacity boost to India, a country with historically constrained access to international bandwidth. Several smaller cables are scheduled for the Persian Gulf and the Caribbean. In addition, plans are underway for a major East African system, which would provide several countries with submarine cable connectivity for the first time.

Figure 1. Submarine Cable Lit and Maximum Capacities, 1996-2004



Notes: Capacity based on lit, protected capacity at the end of the respective year. Capacity for 2004 is projected based on capacity upgrade announcements and new cable construction information as of March 2004. Trans-Atlantic, trans-Pacific, U.S.-Latin America, intra-Asia, and Europe-Africa-Asia cables are included. Maximum capacity based on initial system design capacity.

Source: TeleGeography research

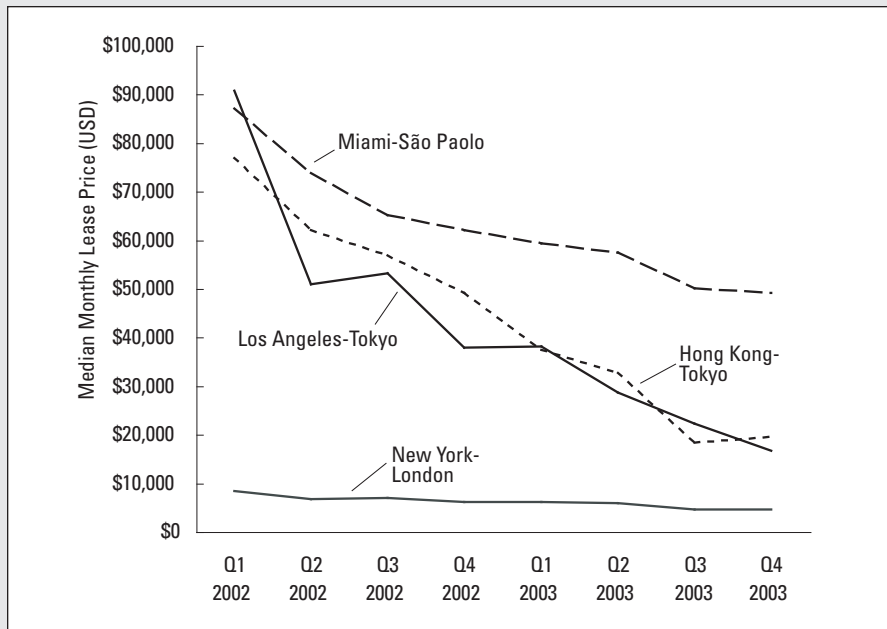
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## Capacity Prices

The international bandwidth market has been caught in a deflationary spiral for more than five years. Business restructuring has done little to halt the decline in prices—if anything, it has added fuel to the fire by facilitating further rounds of price reductions. The long-haul bandwidth market has not yet emerged from this cycle of cost cutting and subsequent price cutting.

STM-1 lease prices are the most useful common denominator for comparing pricing trends across regions. Average London-New York STM-1 circuit prices declined from \$6,039 per month in the first quarter to \$4,461 in the fourth quarter of 2003. The rate of price erosion has actually slowed on this route somewhat in the past two years—the median STM-1 circuit price had plummeted 65 percent in 2001 and 70 percent in 2000. The median price of an STM-1 lease on the major trans-Pacific route between Los Angeles and Tokyo fell 56 percent in 2003 to approximately \$16,625 per month. Circuit prices between the U.S. and Latin America have been relatively stable by the standards of the undersea capacity market. Median STM-1 lease prices between Miami and São Paulo fell by a relatively modest 17 percent to \$49,000 per month during 2003. The undersea cable market in Asia has been in the throes of a ferocious price war. STM-1 monthly lease prices between Hong Kong and Tokyo dropped 54 percent in 2003.

Figure 2. STM-1 Price Trends, 2002-2003



Notes: Prices reflect median STM-1 monthly lease prices, exclusive of installation fees.

Source: TeleGeography research

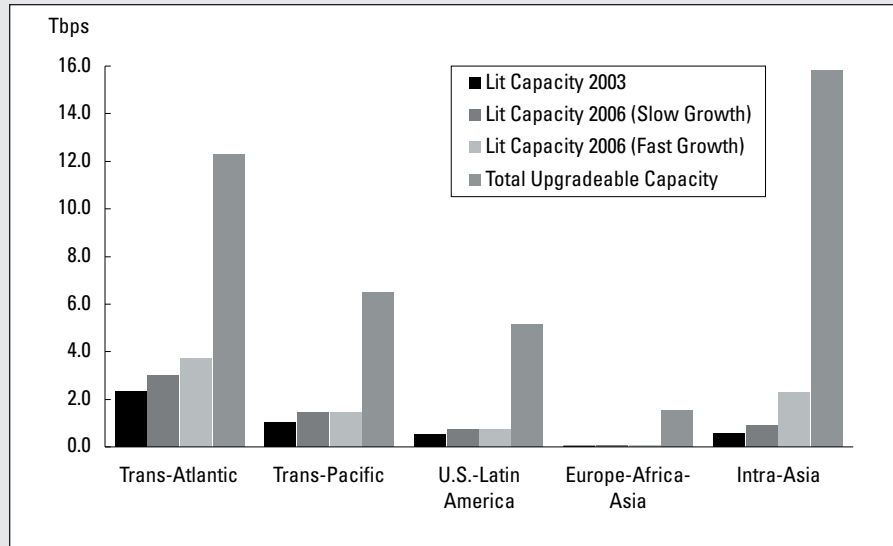
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An ominous trend is emerging on the trans-Atlantic route: carriers that have restructured under Chapter 11 bankruptcy protection are beginning to underprice their financially solvent rivals. In the fourth quarter of 2003, trans-Atlantic STM-1 lease prices from carriers that had emerged from bankruptcy were 50 percent lower than prices charged by more financially stable carriers—approximately \$3,000 per month compared with \$6,000 per month. No such trend can yet be discerned on other major undersea routes, but many other trends first seen in the Atlantic have ultimately been repeated in other markets.

## Demand

TeleGeography's bandwidth demand analysis presents original research findings on how bandwidth buyers have deployed new capacity into their own networks (voice, Internet, and non-Internet data networks) and at what pace. These bandwidth usage data indicate that network deployments have been growing rapidly—particularly for the Internet, which accounts for roughly 85 percent of submarine bandwidth usage. After increasing by a “mere” 33 percent in 2002, new deployments of bandwidth for usage in international Internet backbones grew by 99.8 percent in 2003—a substantial re-acceleration. Thanks in large part to surging Internet bandwidth usage, capacity purchases appear set for double-digit growth in 2004. At these growth rates, inventories of lit bandwidth would run out by 2006 or 2007 on most major routes. Submarine cable owners will likely respond to expanding demand by upgrading existing cables rather than building entirely new systems. Sufficient unlit capacity exists on most routes to last into the next decade (see Figure 3. Anticipated Supply Requirements).

Figure 3. Anticipated Supply Requirements



Notes: Capacity data are as of year-end. Capacity at year-end 2006 assumes that submarine bandwidth providers upgrade cable capacity to maintain 10 percent excess inventory over purchased capacity. For details on the “Slow” and “Fast” scenarios, see Figure 9 on page 106. Intra-Asia cables include SeaMeWe-3 and FLAG Europe-Asia, which also serve the Europe-Africa-Asia route. Total upgradeable capacity is based on the maximum design capacity of existing systems.

Source: TeleGeography research

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Though robust Internet traffic growth continues to draw in submarine bandwidth for use in international Internet backbones, demand increases will not result in another frenzy of cable construction. Instead, most suppliers will intervene by lighting wavelengths and fiber pairs on an as-needed basis. Cable operators can take this incremental approach to supply expansion because their cables are engineered with a vast pool of potential but unlit capacity from which to draw. Thus, even when lit capacity and demand finally come into balance, a significant overhang of potential capacity will remain. With few supply constraints in sight that might place upward pricing pressure, circuit prices will continue to fall towards—and, in some cases, below—costs. For providers of submarine bandwidth, the race to the bottom endures.