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Sloan 2004 Annual Conference

TIP

Telecommunications: Facilitating Outsourcing and Offshoring

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CITI

Focus on Facilitating Offshoring

- Domestic outsourcing via telecom is old story
  - ✓ Toll free services
  - ✓ Private corporate networks
  - ✓ Telecom-based economic development projects (call centers, teleports)
  - ✓ Tele-commuting
  - ✓ Competition policy

International Telecom Facilities

- Historically, jointly owned international cable and satellite facilities were co-owned by consortia of national monopoly telephone companies
  - ✓ Capacity constrained, prices and profits high
- Explosion of the Internet and domestic telephone competition drove international demand
- Submarine fiber optics perfected to handle demand at low cost
- U.S. Government policy encouraged competitive entry, including opening foreign end
  - ✓ Global Crossing
  - ✓ Tyco
  - ✓ Level 3
  - ✓ FLAG

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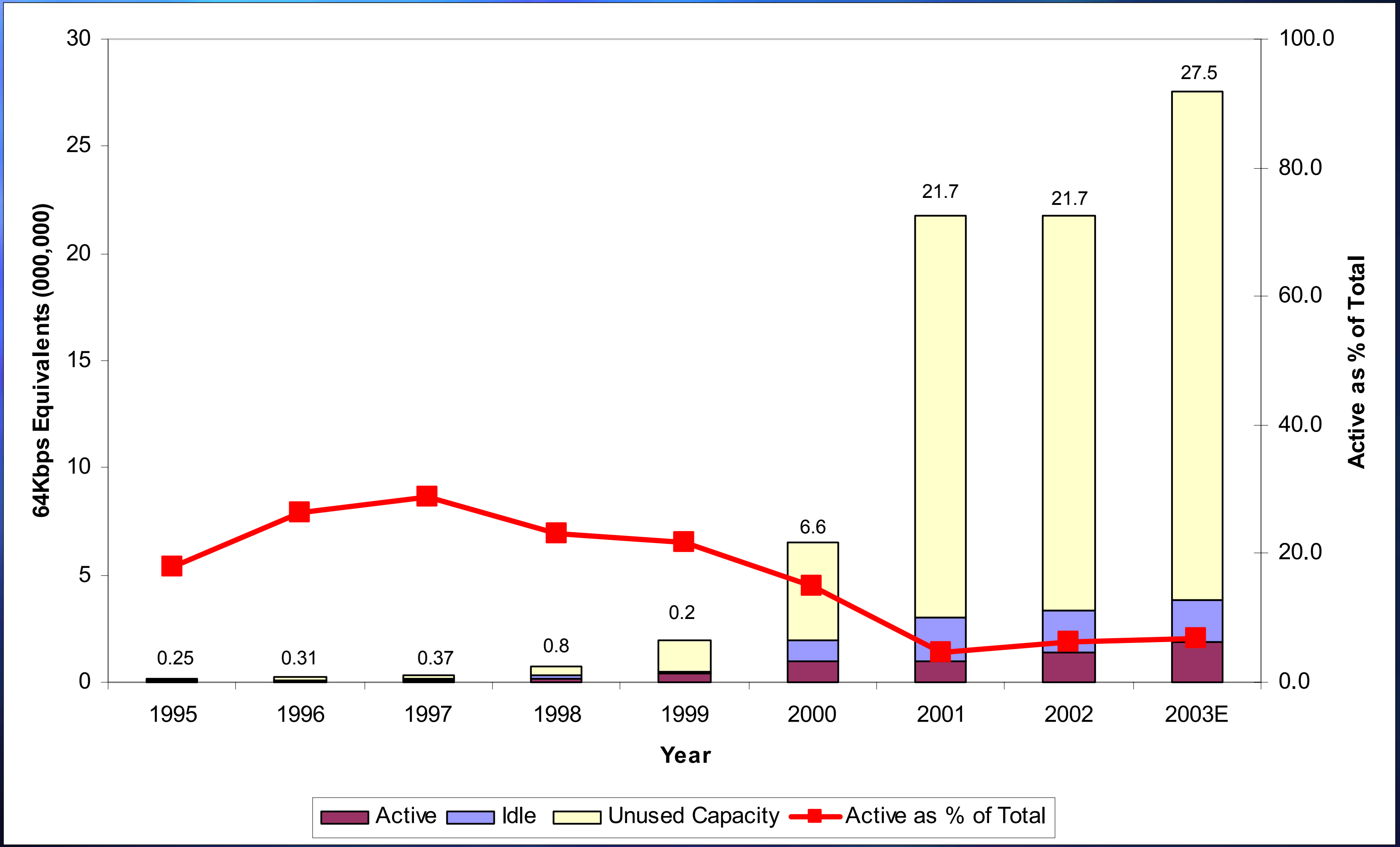
Trans-Atlantic Cables

Cable Name	Cost	Gbps	Circuits	Cost/Ckt	Service Date
TATs 8,9,10,11	$1,346,000,000		68,040	$19,782	retired 2002,03
TAT 12/13	$756,000,000	30	468,750	$1,613	Sep-96
AC-1	$750,000,000	140	2,187,500	$343	May-98
Columbus III	$236,000,000	40	625,000	$378	Dec-99
Level 3/AC2	$600,000,000	1280	20,000,000	$30	
TAT 14	$1,500,000,000	640	10,000,000	$150	Apr-01
FLAG-1	$1,200,000,000	2,400	37,500,000	$32	Jun-01
Hibernia Atlantic	$630,000,000	1280	20,000,000	$32	Apr-01
Tyco Atlantic	Not Reported	2560	40,000,000		Jun-01
Apollo	$1,200,000,000	6400	100,000,000	$12	Jan-03

Source: FCC 2002 Circuit Status Report

Trans-Atlantic Submarine Cable Capacity



Trans-Pacific Cables

Cable Name	Cost	Gbps	Circuits	Cost/Ckt	Service Date
HAW 4/TPC 3	$601,000,000		7,560	$79,497	retired 2003
TPC 5	$1,240,000,000	20	312,500	$3,968	
PC-1	$1,200,000,000	640	10,000,000	$120	Dec-99
China-US	$1,100,000,000	80	1,250,000	$880	Jan-00
Southern Cross	$800,000,000	480	7,500,000	$107	Nov-00
Japan-US	$1,000,000,000	640	10,000,000	$100	Sep-01
Tyco Pacific	$1,700,000,000	5120	80,000,000	$21	Dec-02
FLAG Pacific	$1,200,000,000	5120	80,000,000	$15	Abandoned
360 Networks	$1,200,000,000	3840	60,000,000	$20	Abandoned

Source: FCC 2002 Circuit Status Report

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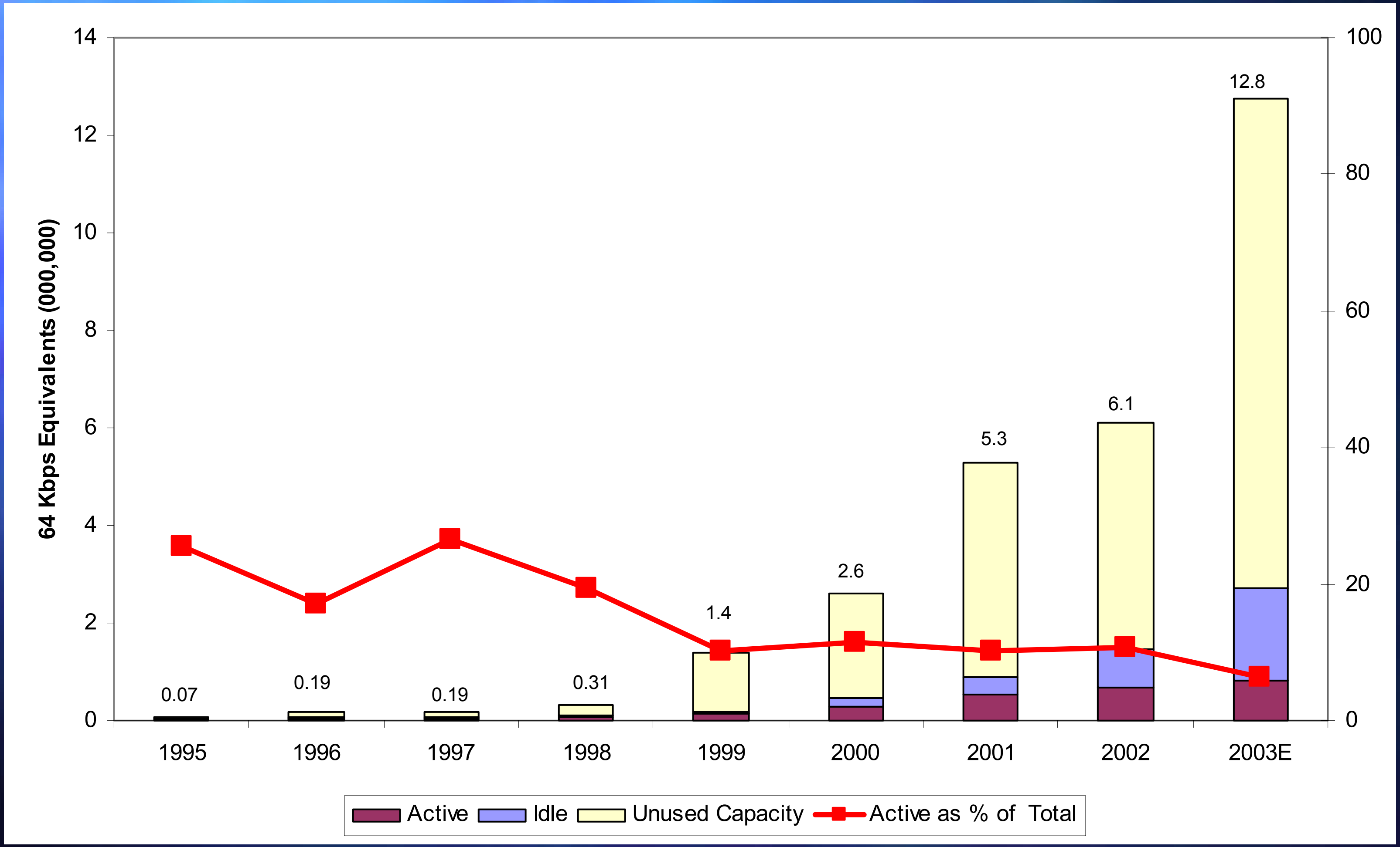
Trans-Pacific Submarine Cable Capacity



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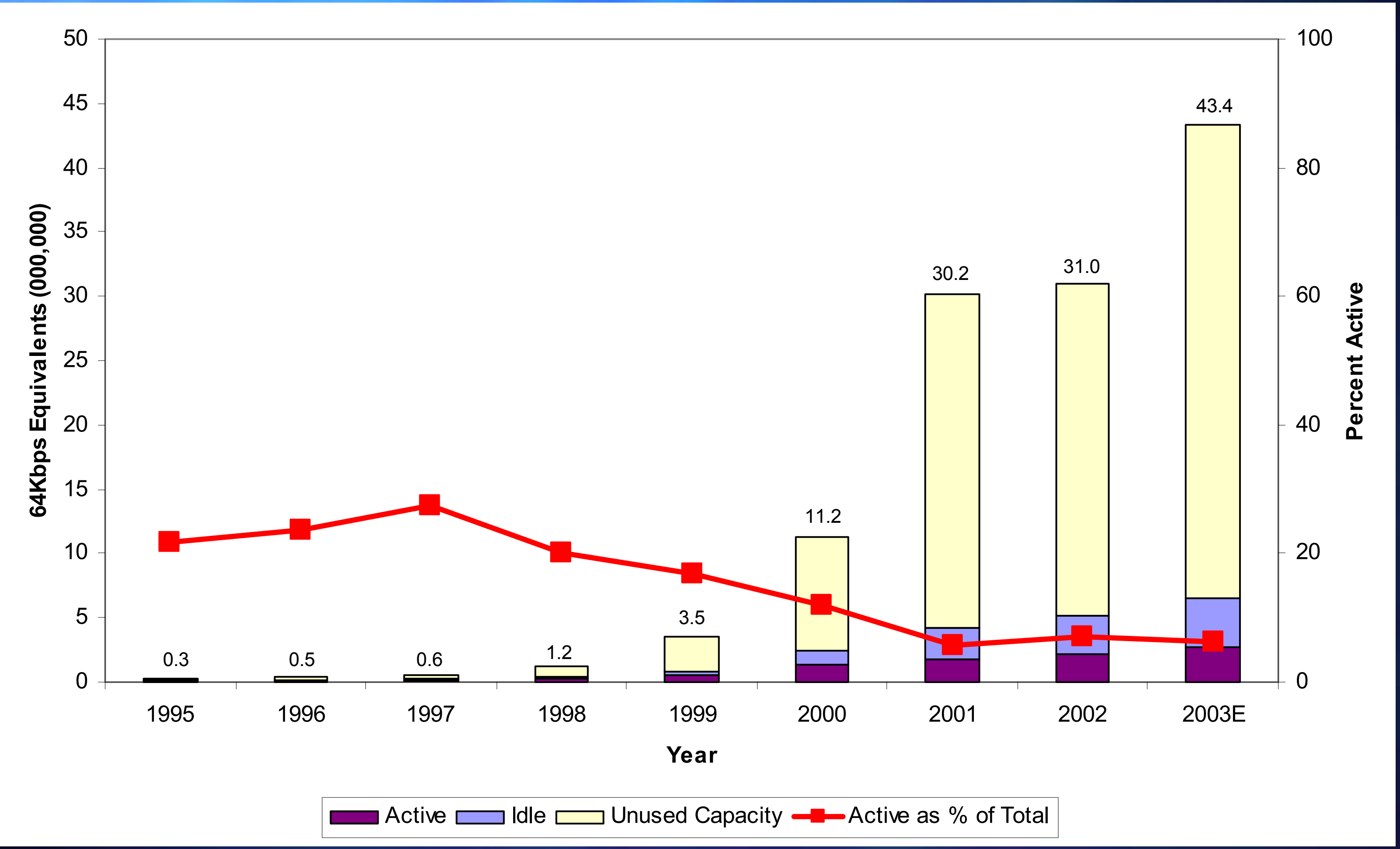
Global Submarine Cable Capacity



Then the Bust

- Multiple parallel submarine fiber systems with virtually unlimited capacity come on line
  - ✓ And don't forget satellites
- Strong international Internet volume growth (33% in '02, 99.8% in '03) fails to meet unreasonable expectations
  - ✓ Internet/data = 85% of submarine bandwidth usage
- Price competition as competitors attempt to capture economies of scale
  - ✓ Current STM-1 (672 voice circuits) lease rates down 80% from mid-2000, down 95% since 1998
- Bankruptcies ("Return of the Living Dead")
  - ✓ Restructured bankrupt carriers now charging 50% of solvent carriers' rates for trans-Atlantic capacity

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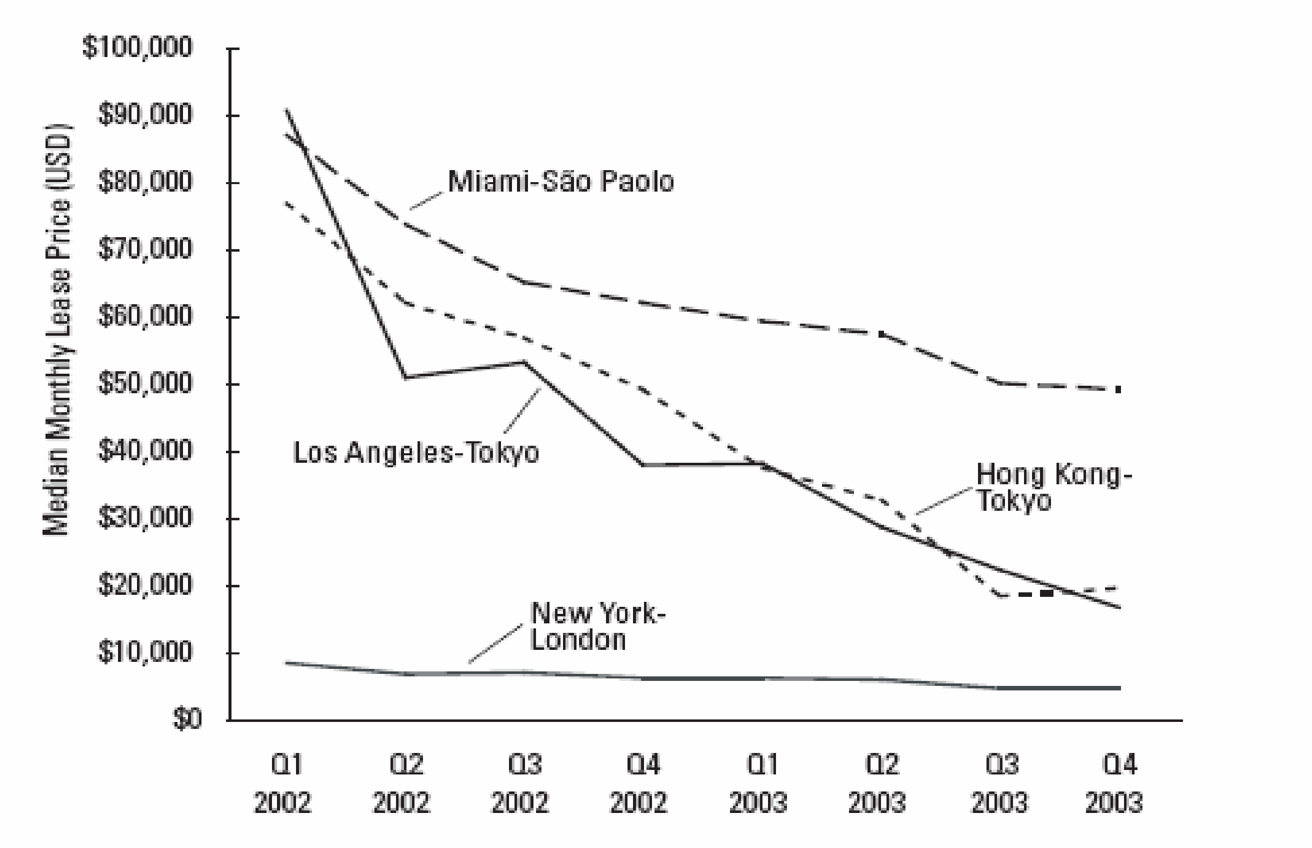
STM-1 Price Trends 2002-2003



Notes: 1)Prices are median monthly lease excluding installation fees;

2) STM-1= 51.8 Mbps / 672 voice circuits

Source: Telegeography

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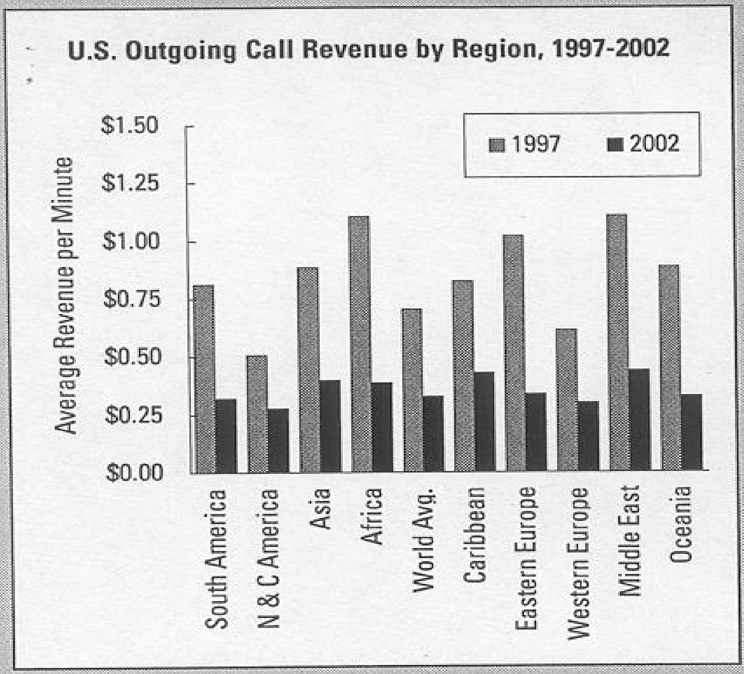

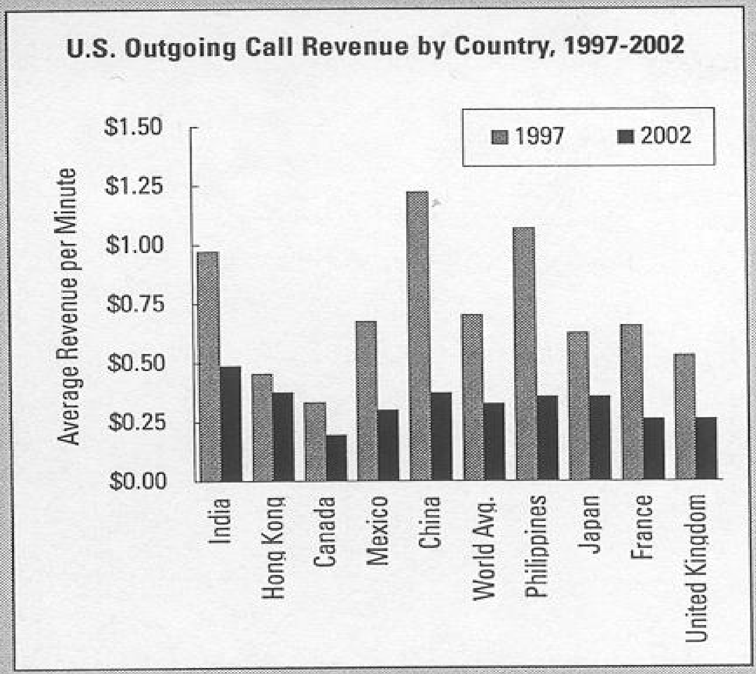

Source: FCC carrier filings and TeleGeography 2003

Considerations for Offshoring

- Telecom prices will remain low in absence of capacity shortages
  - ✓ Normal volume growth would not work off excess capacity for at least a decade
- Developing countries are adding spurs to interconnect to major international fiber optic networks
  - ✓ Ex: Singapore-Chennai, India: 8.4 Tbps (highest bandwidth in world…100+ million equivalent voice circuits) for $650M

Considerations for Offshoring

- There is an unappreciated risk of capacity constraints (and pricing power) as result of:
  - ✓ Higher than expected volume due to new applications (video, Internet 2, VoIP, gaming), more offshoring, economic growth, etc.
  - ✓ Capacity reductions due to:
    - Consolidation to "last man standing"
    - Unrepaired cuts (cables abandoned) as Internet automatically routes around cuts
  - ✓ Up to five-year lead time to deploy major new cable but investors won't fund speculative builds

Return to Oligopoly?

- When (not if) new capacity is needed, consortium model is likely to reassert itself with government acquiescence
  - ✓ Pricing discipline
  - ✓ Investor preference
- More stability, less volatility

Implications for Offshoring

- There will always be sufficient capacity to support offshoring
- Prices will continue to be low in immediate future
- International telecom prices may increase in 5-10 years (from an extremely low base) and may therefore have some marginal effect on offshoring business case