Are Multiple Broadband Infrastructures Sustainable: Key Characteristics of Competing Broadband Platforms

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Agenda – Key Characteristics of Competing Broadband Platforms

- Overview of Broadband Market
- Fiber
- Wireless
- WiMax
- Broadband over Power Lines (BPL)

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Overview of Broadband Market

Overall revenue growth forecast depends on type of market and type of broadband (BB) network that will likely be available in the next 1-2 years:

KEY PLAYERS	Urban	Suburb/Exurb	Rural	KEY PLAYERS
Cable MSOs RBOCs/LECs Satellite	Fiber, Cable, DSL, Wireless	Fiber, Cable, DSL, Wireless	DSL, WiMax	RLECs Satellite

Current U.S. BB Market:

- 20 largest Cable & DSL providers account for 95% of all BB subs
- 2004: Record 8.6M total subs added
- Cable maintains 60% share of market
- % of lines +200 Kpbs in both directions: Cable (94%), DSL (29%)

Leichtman Research 2004 & 2005

Broadband Internet Provider	Subscribers at end of 4Q 2004	Net Adds in 2004
Cable		
Comcast	6,992,000	1,707,000
Time Warner	3,913,000	685,000
Cox	2,571,246	583,746
Charter	1,884,400	356,600
Cablevision	1,352,541	295,521
Adelphia**	1,322,677	371,271
Bright House Networks*	725,000	105,000
Mediacom	367,000	87,000
Insight	330,500	100,500
RCN*	220,000	22,457
Cable One	178,300	44,500
Total Top Cable	19,856,664	4,358,595
DSL		
SBC	5,104,000	1,588,000
Verizon	3,559,000	1,240,000
Bell South	2,096,000	634,000
Qwest	1,037,000	400,000
Covad	533,200	16,200
Sprint	492,000	188,000
ALLTEL	243,325	90,297
Cincinnati Bell	142,575	59,175
CenturyTel	131,000	32,000
Total Top DSL	13,338,100	4,247,672
Total Broadband	33,194,764	8,606,267

Broadband Penetration by Region

	Residential Broadband Penetration	Percent Cable Vs. DSL
New England	27.80%	71.00%
Far West	27.20%	50.00%
Mideast	25.10%	74.00%
Southwest	19.60%	62.00%
Great Lakes	18.40%	66.00%
Plains	18.40%	68.00%
Southeast	18.20%	63.00%
Rocky Mountain	17.10%	58.00%

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Fiber Deployment

Who's investing in fiber?

- As of 5/10/05: 400 U.S. Communities receive FTTH service (+83% from 2004)
  - CLECs (40%), Non-Bell ILECs (33%), RBOCs (16%), Muni (6%)#
- U.S. Fiber Market Predictions (homes passed) vary:
  - 2009: 11.8M?^
  - 2010: 60M?*

Capabilities: Telco Fiber Networks vs. Cable & Satellite (DirecTV/DISH)

** Per Household*	FTTP	FTTN/FTTC	Cable	Satellite
Maximum Downstream Rate*	62.5-125 Mbps	25-50 Mbps	3-5 Mbps	500 Kbps
Maximum Upstream Rate*	5 Mbps	3 Mbps	<1 Mbps	50 Kbps

Sources: Deloitte Research, Verizon

#TR Daily 5/10/05
^Telephony Online 4/28/05
*Broadband Daily 1/20/05

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Fiber Costs & ROI

Deployment Costs

- Verizon (FiOS) – FTTP - $1,000 per home
  - FTTP-based FiOS BB now offered in 250+ communities^
  - $1B spent to pass 1M homes; will pass 3M homes in 13 states in 2005^^
- SBC (Lightspeed) – FTTN
  - IPTV still in development
  - $4B to be spent over the next 3 years to pass 18M homes in 13 states by mid-2008*
- BellSouth - FTTC
  - Network will offer download speeds of 12-24Mbps
  - Trial of IPTV in late 2005 will depend on Microsoft software testing

Costs: Buried Deployment can range $80-$260K per mile; Aerial deployment: $17-37K per mile#

Telcos Must Offer Value-Added Services To Get An ROI

Base services	Monthly revenues
Broadband service	$30
Video	$45
Total	$75
Potential value-added services	
Enhanced software-based security (FW, spyware AV)	$5-$10
Personal media storage	$5-$10
Premium HDTV channels	$15
Home automation and home security service	$20-$30
Total	$45-$65
Total: Base and value-added services	$115-$135

Source: "The Business Model for Telco TV" Forrester Research – 5/19/05

ROI COULD TAKE UP TO 1-2 YEARS

Capital Expenditures per household:

- FTTN: $800
- FTTP: $1,500+
- Line cards/set-top boxes: $500-600

Source: Forrester Research – 5/19/05

^Verizon 1Q05 Earnings Announcement 4/27/05
^^Ivan Seidenberg Pres. at Supercomm 6/7/05
*CIBC DataTimes 6/9/05
#Forrester 5/19/04

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Wireless

VerizonWireless EvDO Coverage Map

Evolution Data Only (EvDO)

- Average download speeds of 300-500Kbps with bursts of 2.0-2.4Mbps
- Deployment costs of $1B per year (VerizonWireless & Sprint)^

Deployments

- VZW: Sept. '04; spent $4B annually over past 4 years; NYC investment totaled $435M in 2004, $138M YTD in 2005#
- Alltel: 1Q05 in Tampa, Akron, Cleveland*
- Sprint: Trial underway; 60 metro areas by early 2006**
- Bell Canada: 2005-2006 in major Canadian business centers # #

Blackberry

- Research in Motion's (RIM) Blackberry: 2.5M subs worldwide, partners with all U.S. mobile networks (CDMA, GSM, iDEN) and 802.11b^^

^ VZW 9/22/04 & Sprint PCS 6/22/04
#VZW 5/7/05
*Alltel 3/29/04
**www.evdoinfo.com
##Bell Canada PR 12/14/05
^^RIM PR (4/5/05)

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WiMax – "Wi-Fi on Steroids"

WiMax (802.16) –

- **Capital Cost per customer: $240 (2007), $80 (2008) due to advances in mobile devices; usage will be VoIP driven[^]**
- **Current entrants offer download speeds of 500Kbps (residential), 3.0Mbps (business)[#]**
- **Currently testing: Intel, Nokia, Sprint, BellSouth**
- **Intel predicts speeds of 50-100Mbps[*]**
- **Muni usage: 0.5-0.6% of all munis**
  - **Marietta, GA ends service after losing $35M**
  - **Lafayette, LA and others face legal battles from Telcos and MSOs; 13 states have passed laws with 12 more in-progress**
- **Global 2009 Market Projection: 7M subs[^^]**

WIMAX GROWTH

Worldwide Sales of WiMax Equipment	Sales
2004	$20 million*
2005	$40 million**
2006	$160 million
2007	$550 million
2008	$1 billion
2009	$1.6 billion

* Pre-WiMax certified gear (equipment likely to be similar to WiM when that standard is approved in July)
** A mix of pre-WiMax certified and certified equipment.
Source: Sky Light Research. Data released November 2004

^MetaGroup 8/11/04
#www.cawinet.com
*Reuters 5/9/05
^^ABI (The Bridge) 3/11/05

Will WiMax be a success?

"I think that will be very competitive with those technologies, and especially where those technologies aren't built out, in rural areas. "Will it compete with wired access? Absolutely. Will it be perhaps the only broadband solution you have in some areas? Absolutely, especially in rural areas." **- Craig Barrett, CEO - Intel**

"WiMax ... has a tremendous advantage over CDMA2000 1x EV-DO or WCDMA HSDPA. ... One of the great things is that it has the name. But it's still not a technology," Jacobs quipped, referring to the fact that WiMax for fixed broadband will not ship until later this year and the mobile version of it is still being standardized. **- Irwin Jacobs, CEO - Qualcomm**

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Broadband over Power Lines (BPL)

BPL: "2005 – Pivotal year for the technology. Critical for the future of BPL"*

- **Early Success[^]:**
  - **Cinergy (first utility to deploy BPL commercially) currently passes 50,000 homes in Ohio; Duke Energy – 15,000 homes**
  - **ComTek – first CityWide network in Manassas,VA; $29/mo. with download speeds up to 500Kbps; testing 100Mbps apps**
  - **ConEd/Ambient/Earthlink JV for 213-unit condo on NYC's Upper West Side[~]**
- **U.S. Market Projections (3-5 yrs)[~]**
  - **$4.5B Revenue, 13M subs**
- **Potential Roadblocks**
  - **Cost-prohibitive? TXU believes deployment across 70-80% of its territory will cost $300M-500M; could look to outsource[#]**
  - **Technical constraints: NARUC Task Force finds that current BPL technology is feasible to reach clusters of residential homes but not to widely disbursed rural users[^^]**

BPL initially is as much about an upgrade to the electrical management and delivery network (i.e. "Smart grid capabilities" - cost savings through remote meter monitoring, dynamic monitoring to prevent surges or implement spot blackouts to manage demand) as it is the delivery of residential broadband to capture new revenue streams.

*Yankee Group 5/2005
^Comm Daily 5/10/05
~CED 4/1/05
#Dallas Morning News 4/21/05
^^NARUC 2/15/05

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