



Municipal Broadband Network Feasibility Study Results

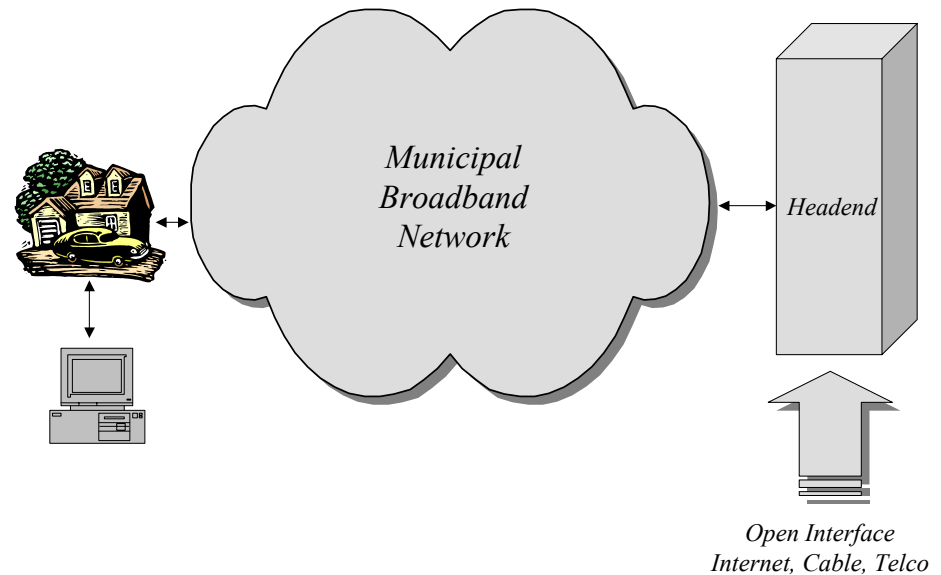
Town of Amherst, NH

June 30, 2003

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Municipal Broadband Network

- *Optical fiber network owned by Town of Amherst*
- *Fiber connectivity to homes and businesses: 10-100 Mbps service, Fiber to the Home (FTTH)*
- *Integration of school, fire, police, public safety, healthcare*
- *Open access network allowing any service provider/ISP*
- *Municipality provides “bit” backbone only; service provider owns end-users*

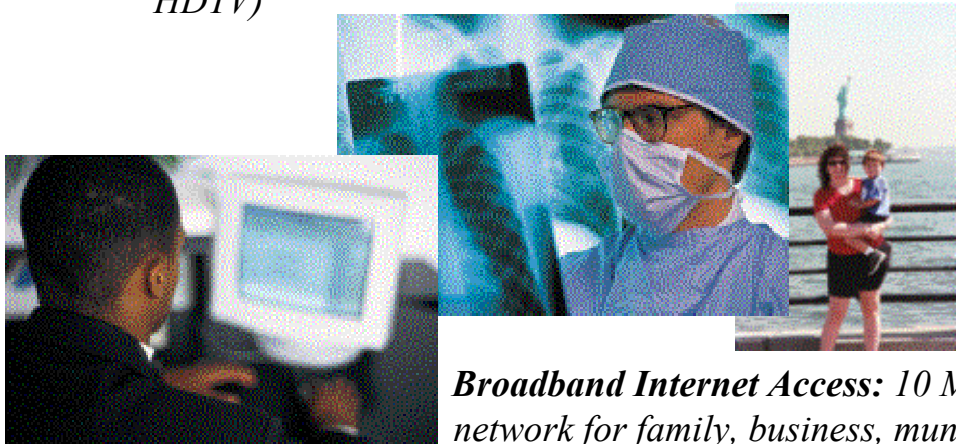


Fiber-to-the-Home Services

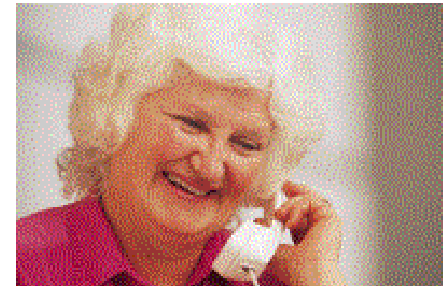


Video Services: Standard and enhanced video services (digital, video on demand, HDTV)

Telephone Services: Access to multiple telephone service providers, offering choice and cost savings



Broadband Internet Access: 10 Mbps or greater; a secure, ultra high speed network for family, business, municipal, medical, educational, public safety.



What are Opportunities and Risks?

Opportunities

*Immediate
New Revenue for Municipality*

*Improved Economic
Development Area*

*Enhance Services and Competitive
Environment*

Risks

*Bond Obligations:
Ensure Revenue Up-Front*

*Technology Choice and
Implementation:
Fiber Backbone*

*Competing New
Technology: Provide Open
Network*

Market Research Study

Implementation

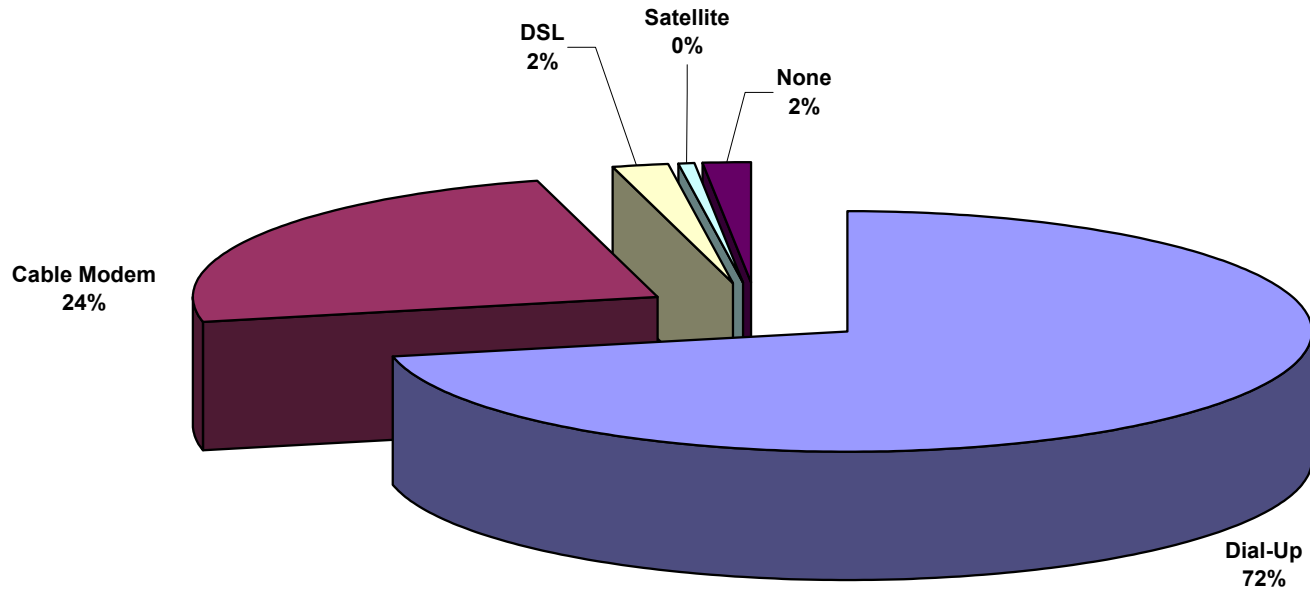
- *Residential survey conducted by Town in November 2002; voters of 11/5/2002 election asked to participate*
- *1,000 voters polled; 1,012 results allowing multiple ISPs per household*
- *Merton processed raw data to arrive at results*
- *Accuracy level from sample size better than +/- 3%*

Highlights of Study

- *27% have broadband (cable modem / DSL / satellite), 72% have dial-up*
- *62% satisfied with current speed of Internet access*
- *72% pay less than \$30 per month for Internet service*
- *45% have second telephone line for Internet access*
- *45% willing to pay at least \$30 per month for faster speed*
- *28% willing to pay at least \$40 per month for faster speed*
 - *Only 20% of dial-up users will pay \$40+*
 - *40% of cable modem users will pay \$40+*

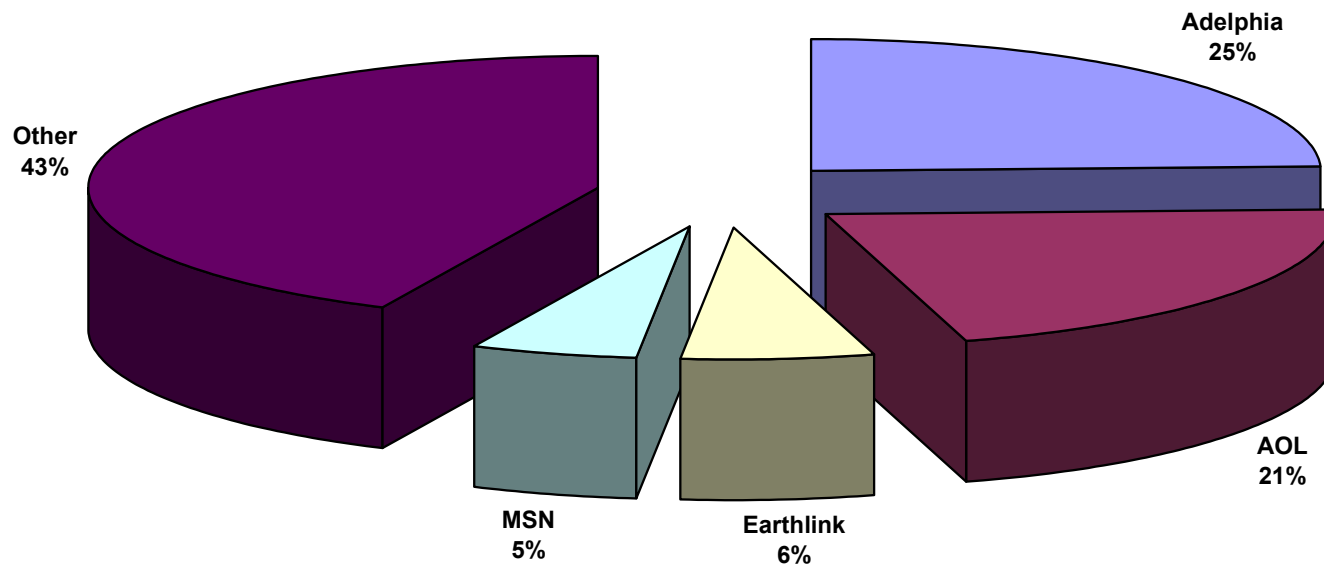
Internet Access Demographics

Internet Access by Type



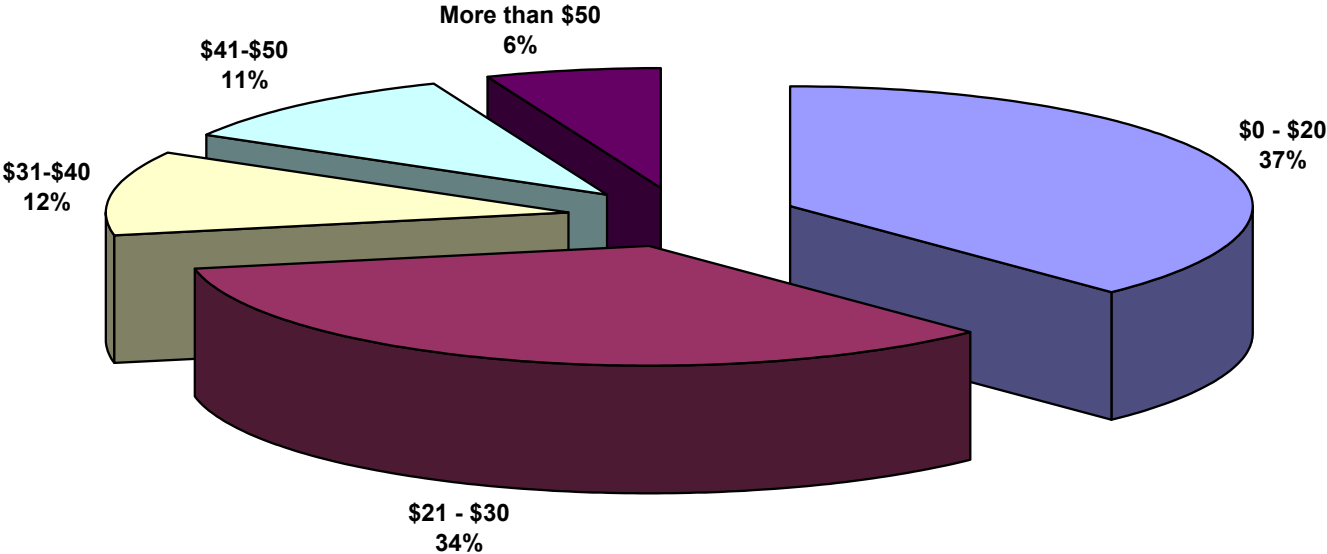
ISPs

Internet Access by ISP



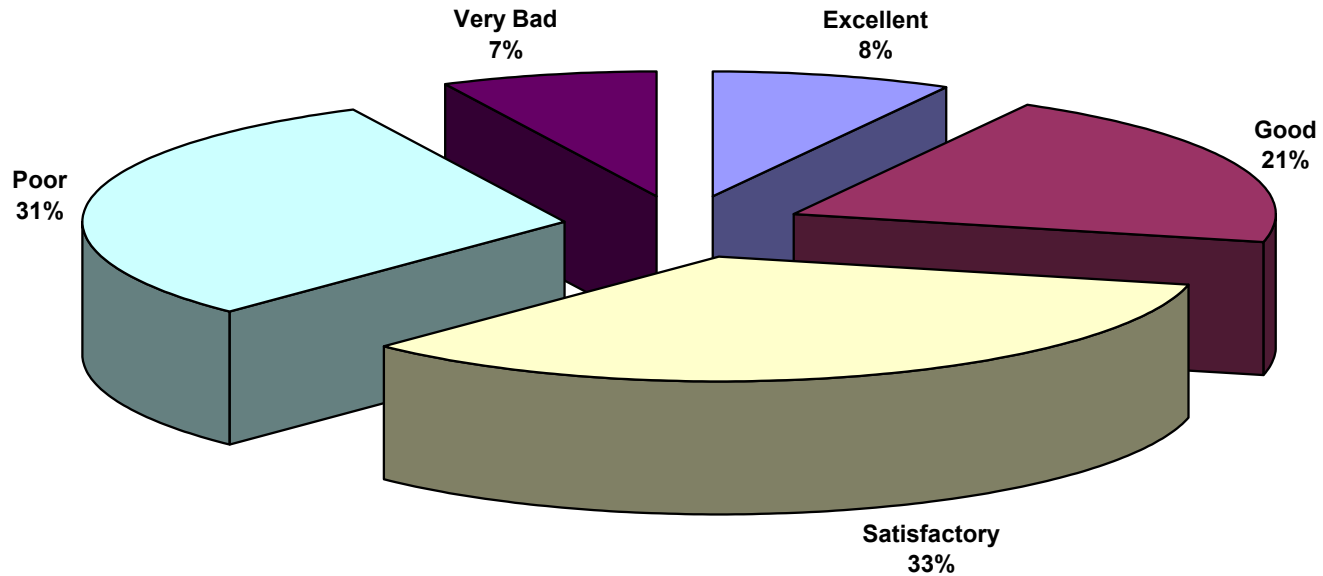
Current Cost of Internet

Current Cost of Internet Service



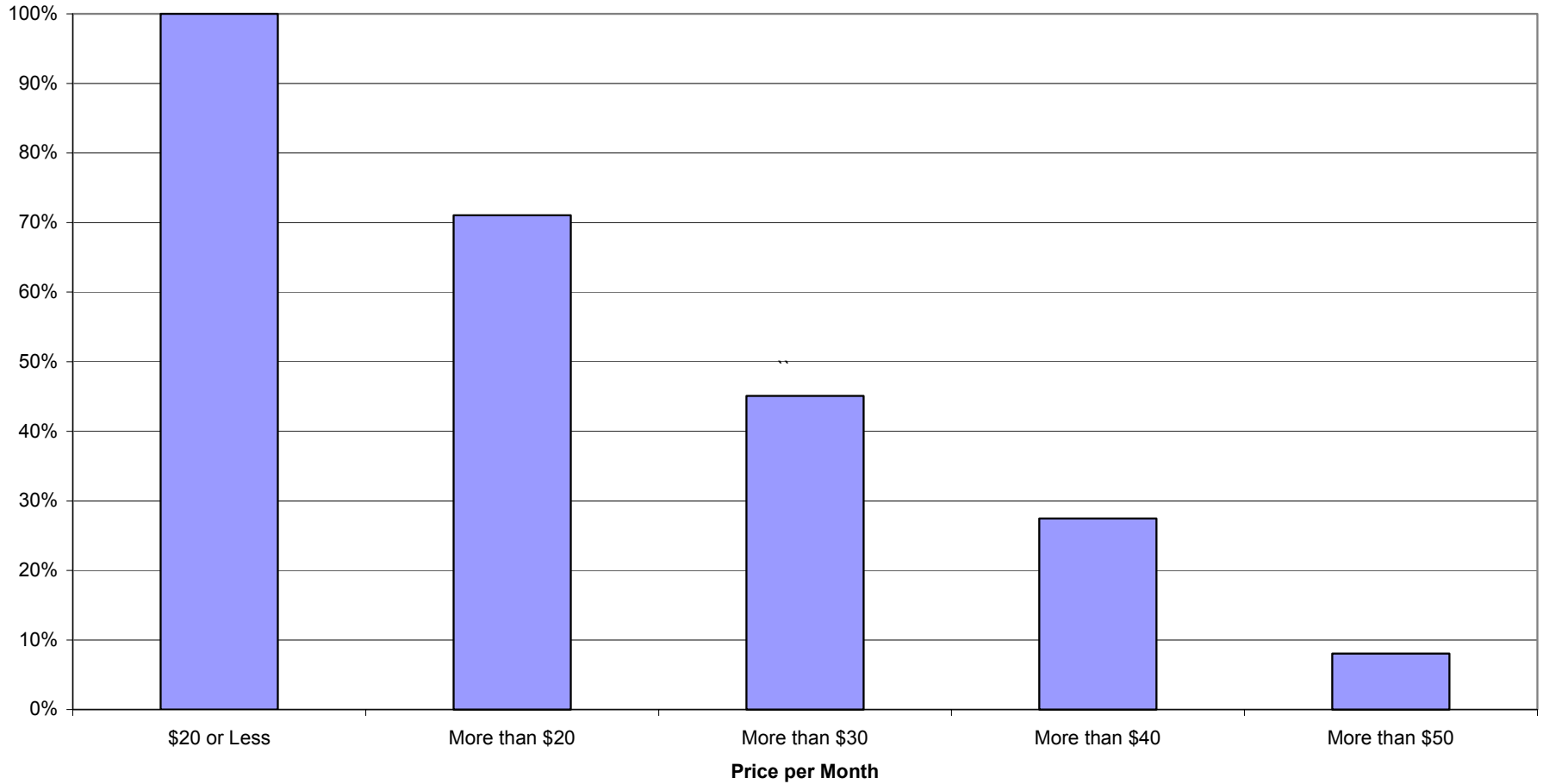
Satisfaction with Speed

Satisfaction with Speed of Internet Service

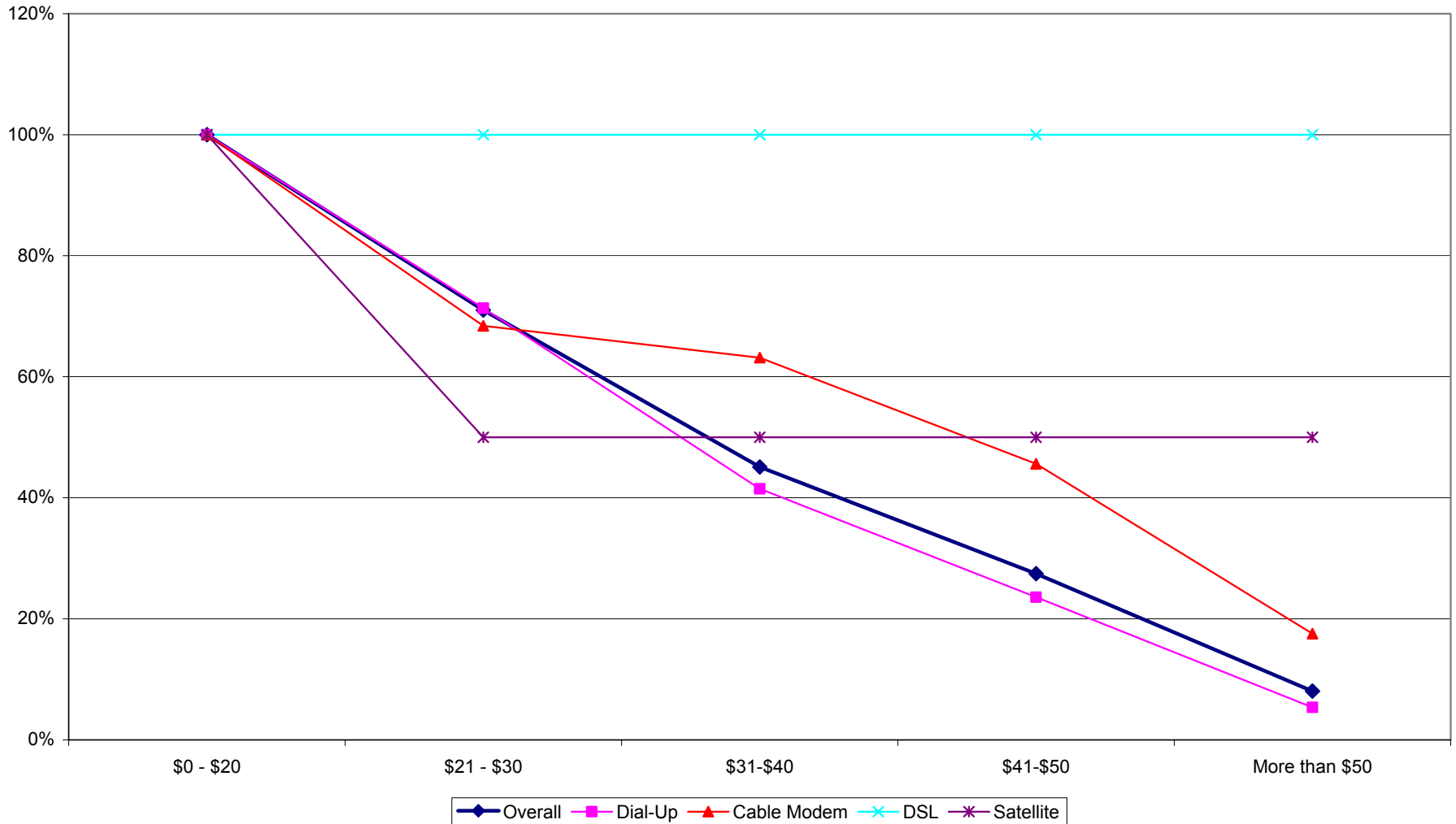


Pay for Higher Speed

Pay For Speed



Pay for Speed by Current Access Type



Conclusions

- *High current satisfaction → weak potential demand for MBN broadband services*
- *Weak pricing power overall for broadband*
- *Subscribers are extremely price sensitive, especially large dial-up customer base*
- *\$30/month or less for broadband Internet could provide good size market for MBN*
- *No data to estimate video services market; all MBN video revenue projections would be guesswork*

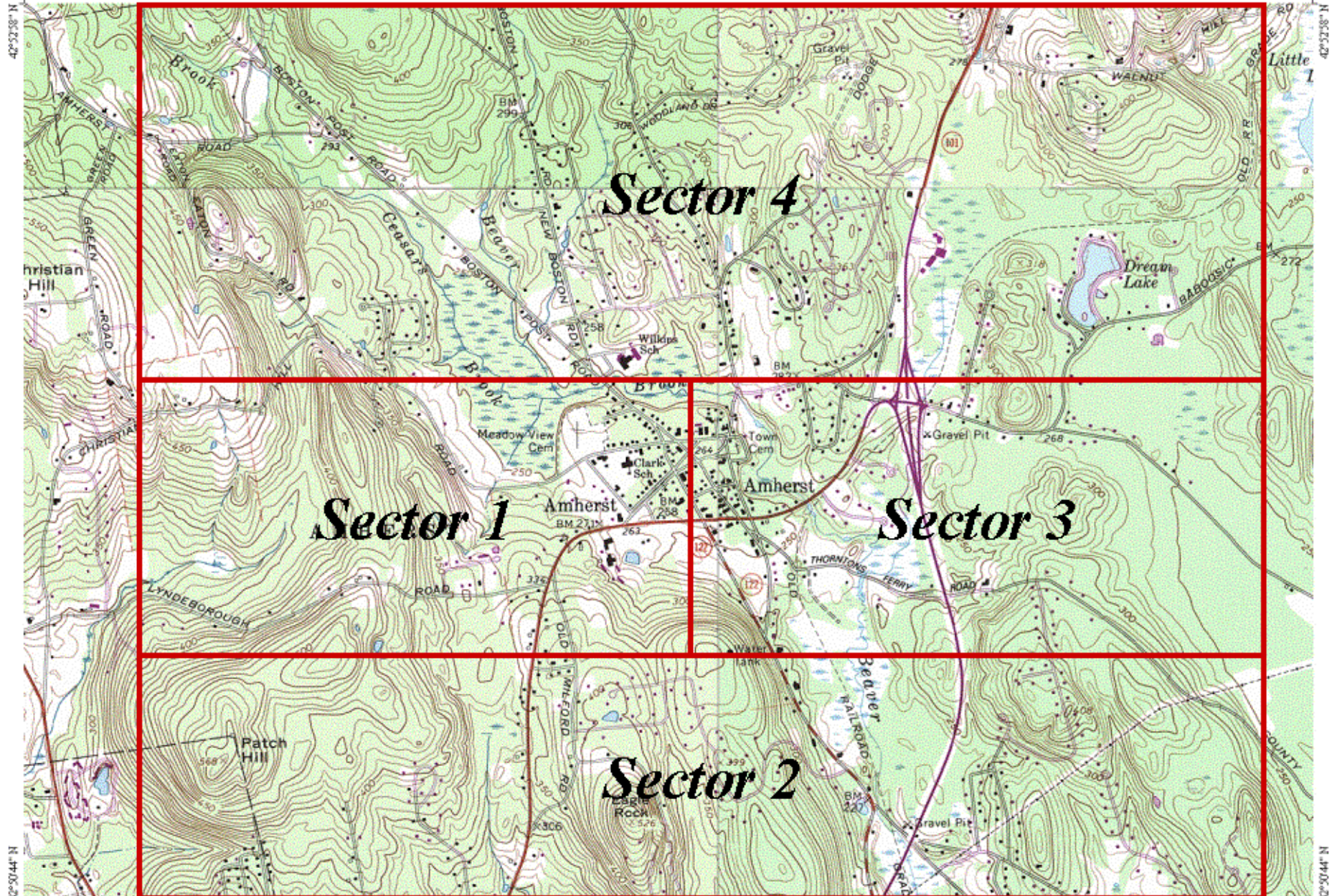
Network Details

Preliminary Network Design

- *4 sectors overlaid on town GIS map*
- *Smaller sectors have higher density of users*
- *Larger sectors have lower density of users*
- *Capital expenses driven by total subscribers passed, and distance between and center of serving area and radius of serving area*

42°52'58" N
71°39'52" W

WGS84 71°35'25" W
42°52'58" N



71°39'52" W

WGS84 71°35'25" W

MN | TH
16°



Key Metrics

Sector	Street Miles	Average Frontage	Weighted Average Frontage	Total Frontage	Percent Frontage	HH/mi
1	28	200	60	215,400	20%	38.46
2	29	307	92	330,280	31%	37.14
3	31	238	71	256,429	24%	34.74
4	12	500	50	179,500	17%	29.92

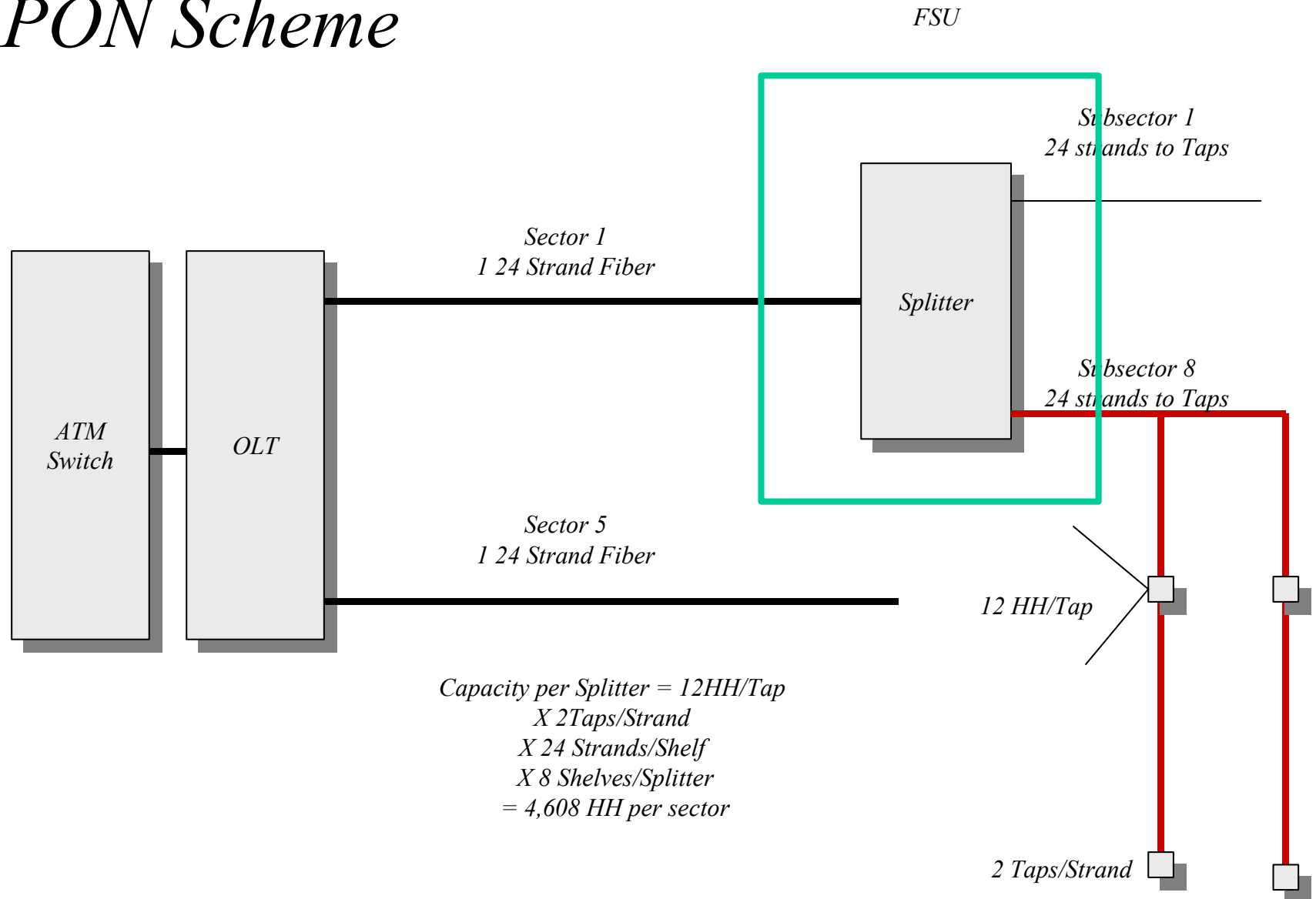
Total Average
Frontage

273 981,609 93%

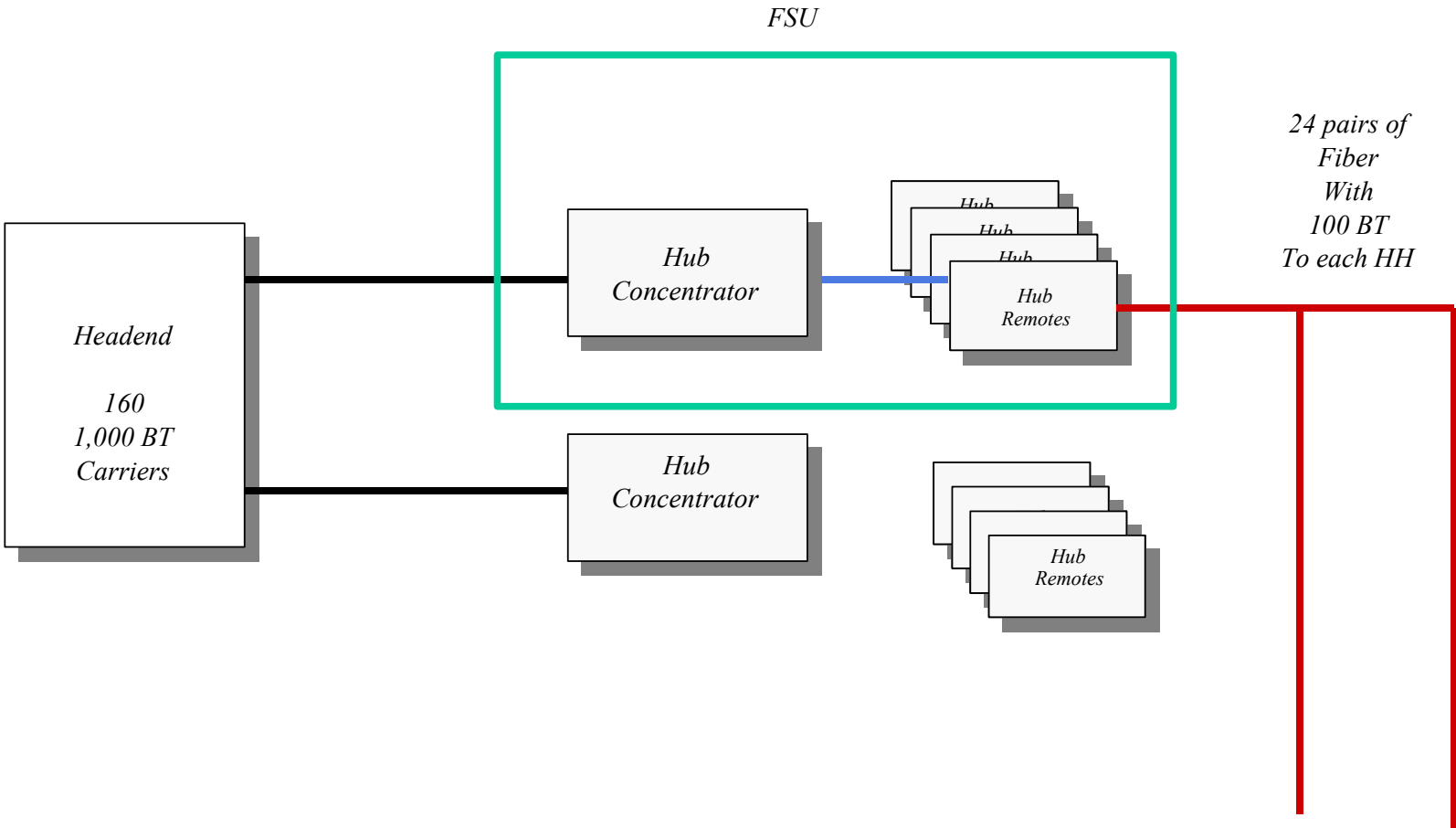
Optical Technologies for FTTH

<i>Passive Optical Networks (PON)</i>	<i>Gigabit Ethernet (GigE)</i>	<i>GigE-Lite</i>
<i>Passive technology; each user shares a data link (like in cable modem)</i>	<i>Active technology; each user has own data link</i>	<i>Active technology; each user has own data link</i>
<i>Non-powered field units; lower cost of operations and maintenance</i>	<i>Powered intelligent devices in field; higher cost of operations and maintenance</i>	<i>Powered intelligent devices in field; higher cost of operations and maintenance</i>
<i>Transmission protocol is ATM or Ethernet</i>	<i>Transmission protocol is Gigabit Ethernet</i>	<i>Transmission protocol is Gigabit Ethernet</i>
<i>Backbone Capacity: 622 Mbps downstream, 155 Mbps upstream (for ATM PON); less scalable</i>	<i>Backbone Capacity: 1 Gbps (1,000 Mbps) upstream and downstream; highly scalable</i>	<i>Backbone Capacity: 1 Gbps (1,000 Mbps) upstream and downstream; highly scalable</i>
<i>Supports data, video and telephony with QoS</i>	<i>Supports data, video and telephony</i>	<i>Supports data and digital (IP) video & IP telephony</i>
<i>More mature technology offered by established vendors</i>	<i>Less mature technology offered by smaller private companies</i>	<i>Less mature technology offered by smaller private companies</i>

PON Scheme



Gigabit Ethernet (GigE)



Opportunities to Reduce Capital Costs

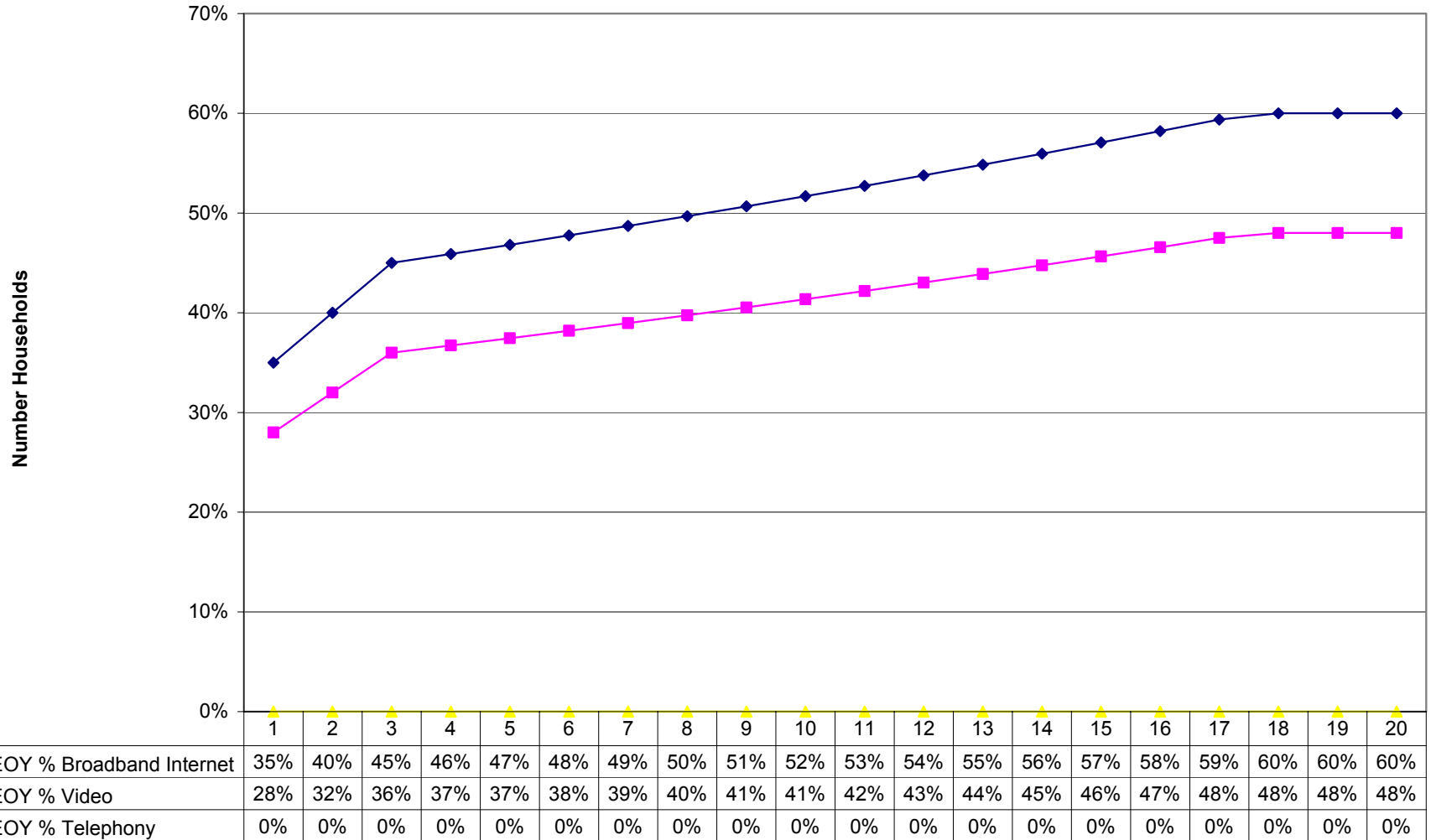
- *Build Amherst as incremental network to Goffstown, NH*
 - *Use Goffstown headend and headend equipment*
 - *Amherst MBN is then just extension of Goffstown MBN*
- *Use GigE-Lite approach – cheaper CPE supporting data and digital video only*
 - *Need set-top box (converter) for analog TVs if video required*
 - *Plug and play with digital-ready TVs*

Network Operations & Maintenance

- *Operations*
 - *Business Management*
 - *Operations Support System (OSS) driven by network and subscriber requirement*
 - *Network management*
 - *Network provisioning, monitoring and management provided by Merton / third party*
- *Maintenance*
 - *First Level Maintenance, repair and return provided by Merton / third party*

MBN Project Financials

Users



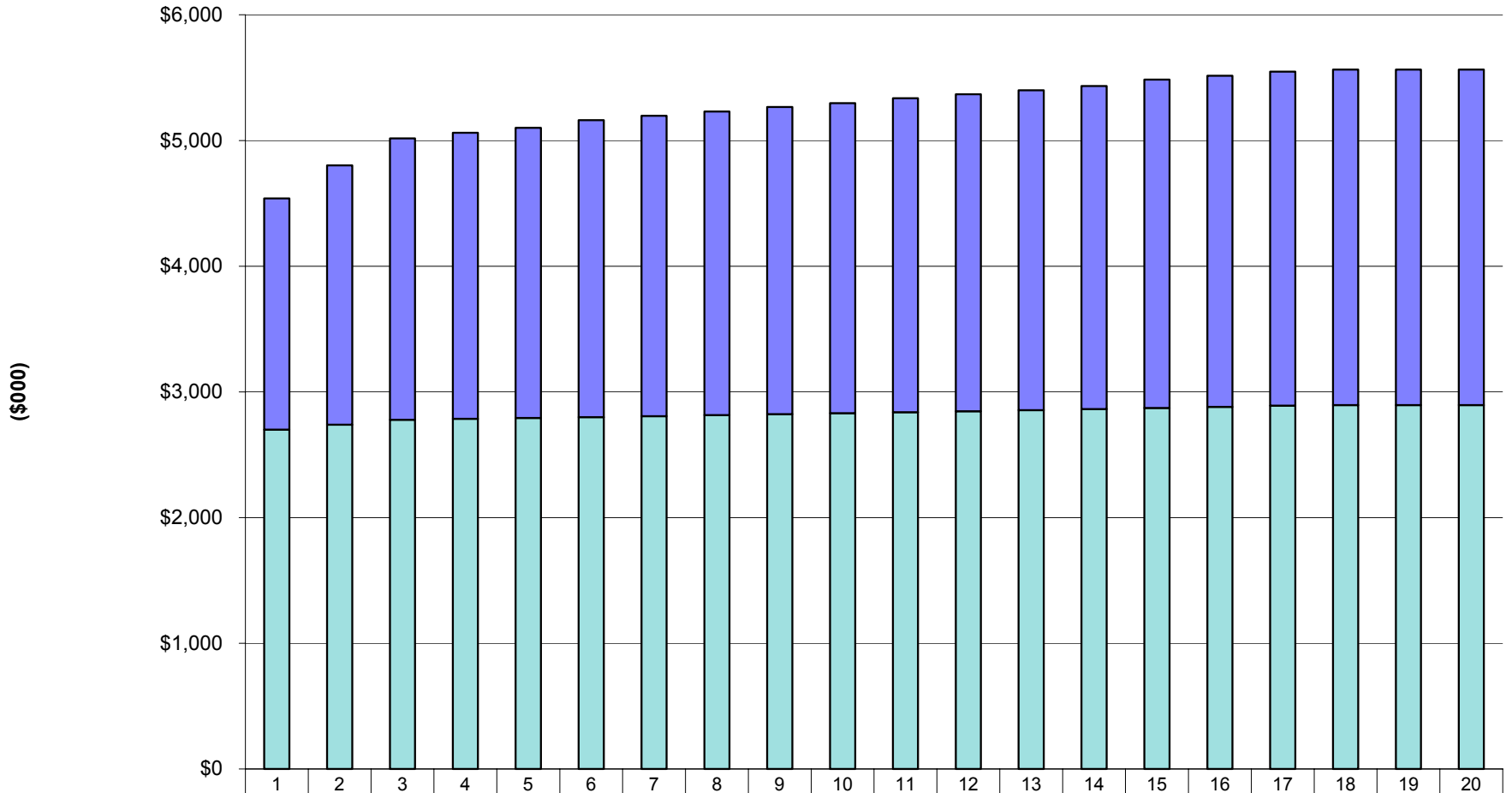
Key Factors

Year	1	2	3	4	5	6	7	8	9	10
<i>EOY Large Business Users</i>	-	-	-	-	-	-	-	-	-	-
<i>EOY SME Users</i>	-	-	-	-	-	-	-	-	-	-
<i>EOY Households</i>	# 1,257	1,436	1,616	1,648	1,681	1,714	1,749	1,784	1,819	1,856
<i>Total EOY Users</i>	1,257	1,436	1,616	1,648	1,681	1,714	1,749	1,784	1,819	1,856
<i>Total EOY Users Penetration %</i>	35%	40%	45%	46%	47%	48%	49%	50%	51%	52%
<i>Total Avg Number End-Users</i>	1,077	1,346	1,526	1,632	1,664	1,698	1,732	1,766	1,801	1,838
<i>Avg Penetration End-Users</i>	30%	38%	43%	45%	46%	47%	48%	49%	50%	51%
<u>Broadband Internet Access</u>										
<i>EOY Penetration Large Businesses</i>	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
<i>EOY Penetration SMEs</i>	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
<i>EOY Penetration Households</i>	35%	40%	45%	46%	47%	48%	49%	50%	51%	52%
<i>EOY % Broadband Internet</i>	35%	40%	45%	46%	47%	48%	49%	50%	51%	52%
<i>Installation Charge Large Businesses</i>	\$500	\$500	\$500	\$500	\$500	\$500	\$500	\$500	\$500	\$500
<i>Installation Charge SMEs</i>	\$250	\$250	\$250	\$250	\$250	\$250	\$250	\$250	\$250	\$250
<i>Installation Charge Households</i>	\$50	\$50	\$50	\$50	\$50	\$50	\$50	\$50	\$50	\$50
<i>Avg Fee/ Month/ User Large Businesses</i>	\$60	\$60	\$60	\$60	\$60	\$60	\$60	\$60	\$60	\$60
<i>Avg Fee/ Month/ User SMEs</i>	\$40	\$40	\$40	\$40	\$40	\$40	\$40	\$40	\$40	\$40
<i>Avg Fee/ Month/ Households</i>	\$20	\$21	\$21	\$22	\$23	\$23	\$24	\$25	\$25	\$26
<u>Video</u>										
<i>EOY Penetration Large Businesses</i>	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
<i>EOY Penetration SMEs</i>	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
<i>EOY Penetration Households</i>	28%	32%	36%	37%	37%	38%	39%	40%	41%	41%
<i>EOY % Video</i>	28%	32%	36%	37%	37%	38%	39%	40%	41%	41%
<i>Avg Fee/ Month/ User Large Businesses</i>	\$7	\$7	\$7	\$7	\$7	\$7	\$7	\$7	\$7	\$7
<i>Avg Fee/ Month/ User SMEs</i>	\$7	\$7	\$7	\$7	\$7	\$7	\$7	\$7	\$7	\$7
<i>Avg Fee/ Month/ Households</i>	\$7	\$7	\$8	\$8	\$9	\$9	\$9	\$10	\$10	\$11

Capital and Bond Requirements

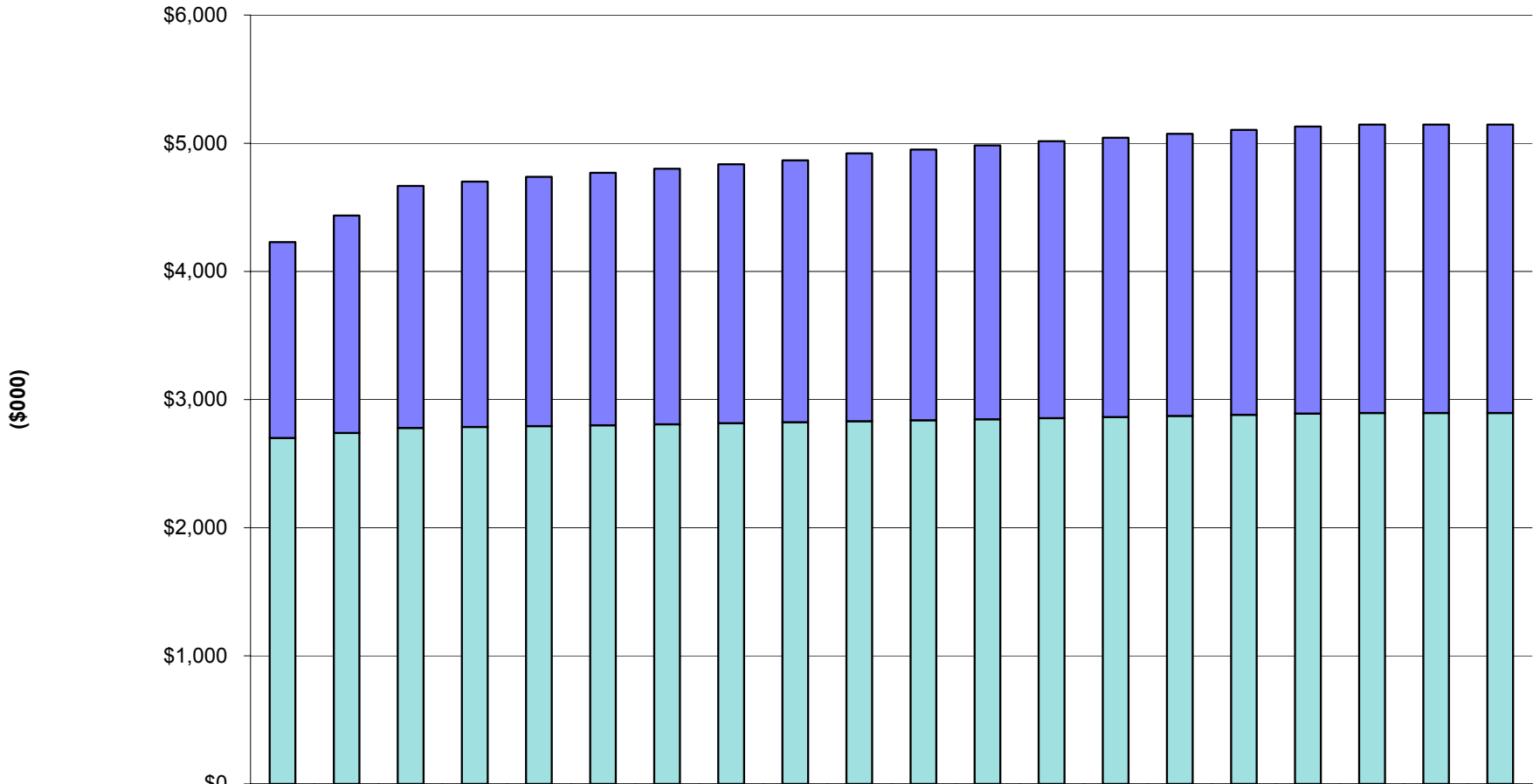
	<i>Passive Optical Network (PON)</i>	<i>Gigabit Ethernet (GigE)</i>	<i>GigE-Lite</i>	<i>GigE-Lite With Goffstown Headend</i>
<i>Total Capital (over 20 years)</i>	<i>\$5.7 million</i>	<i>\$5.3 million</i>	<i>\$4.2 million</i>	<i>\$3.9 million</i>
<i>Bond Size</i>	<i>\$5.7 million</i>	<i>\$5.2 million</i>	<i>\$3.8 million</i>	<i>\$3.5 million</i>

Capital (PON)



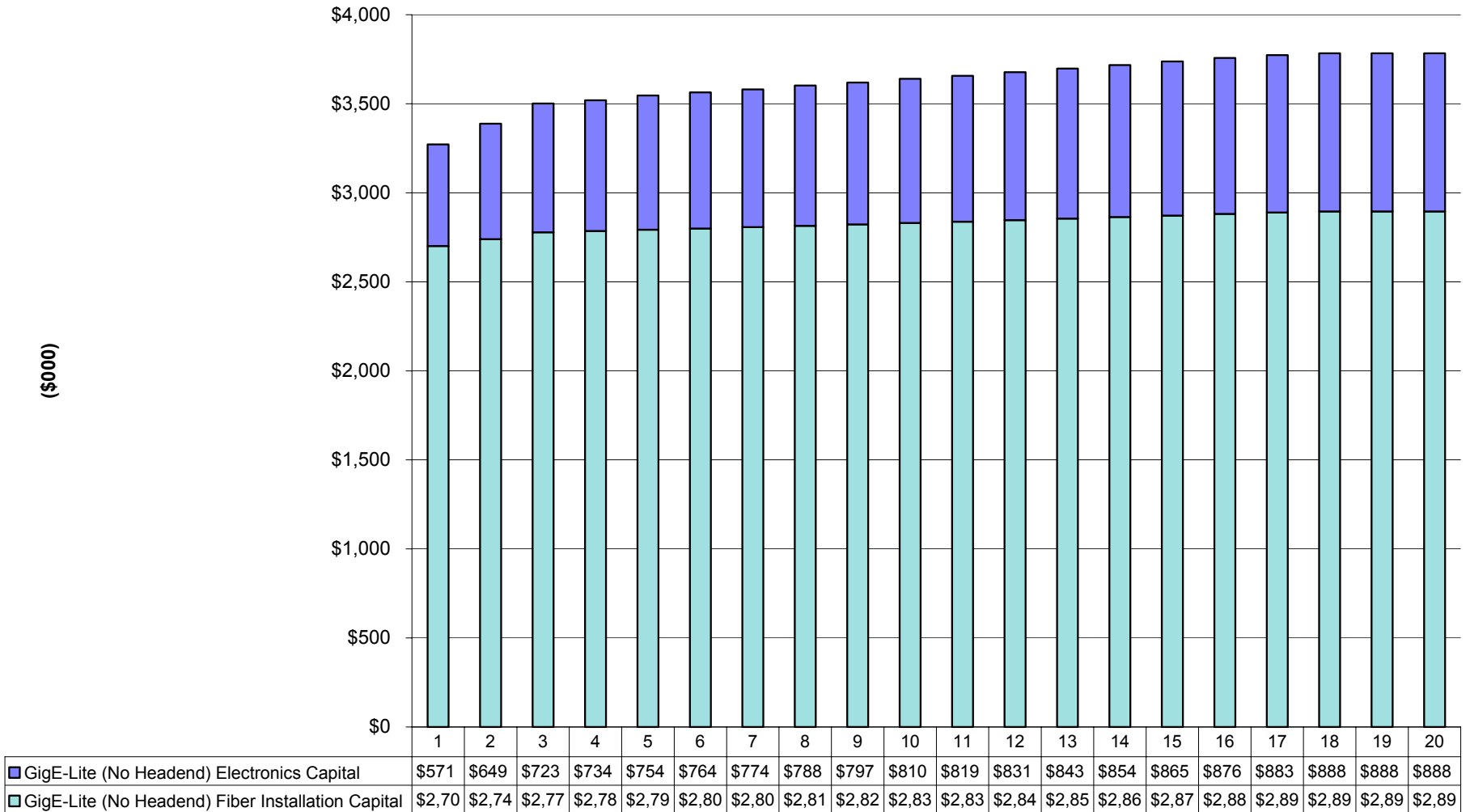
■ PON Electronics Capital	\$1,838	\$2,063	\$2,239	\$2,276	\$2,308	\$2,361	\$2,389	\$2,415	\$2,444	\$2,467	\$2,498	\$2,522	\$2,545	\$2,569	\$2,612	\$2,635	\$2,657	\$2,669	\$2,669	\$2,669
■ PON Fiber Installation Capital	\$2,701	\$2,740	\$2,779	\$2,786	\$2,793	\$2,800	\$2,807	\$2,815	\$2,823	\$2,831	\$2,839	\$2,847	\$2,855	\$2,864	\$2,872	\$2,881	\$2,890	\$2,895	\$2,895	\$2,895

Capital (GigE)

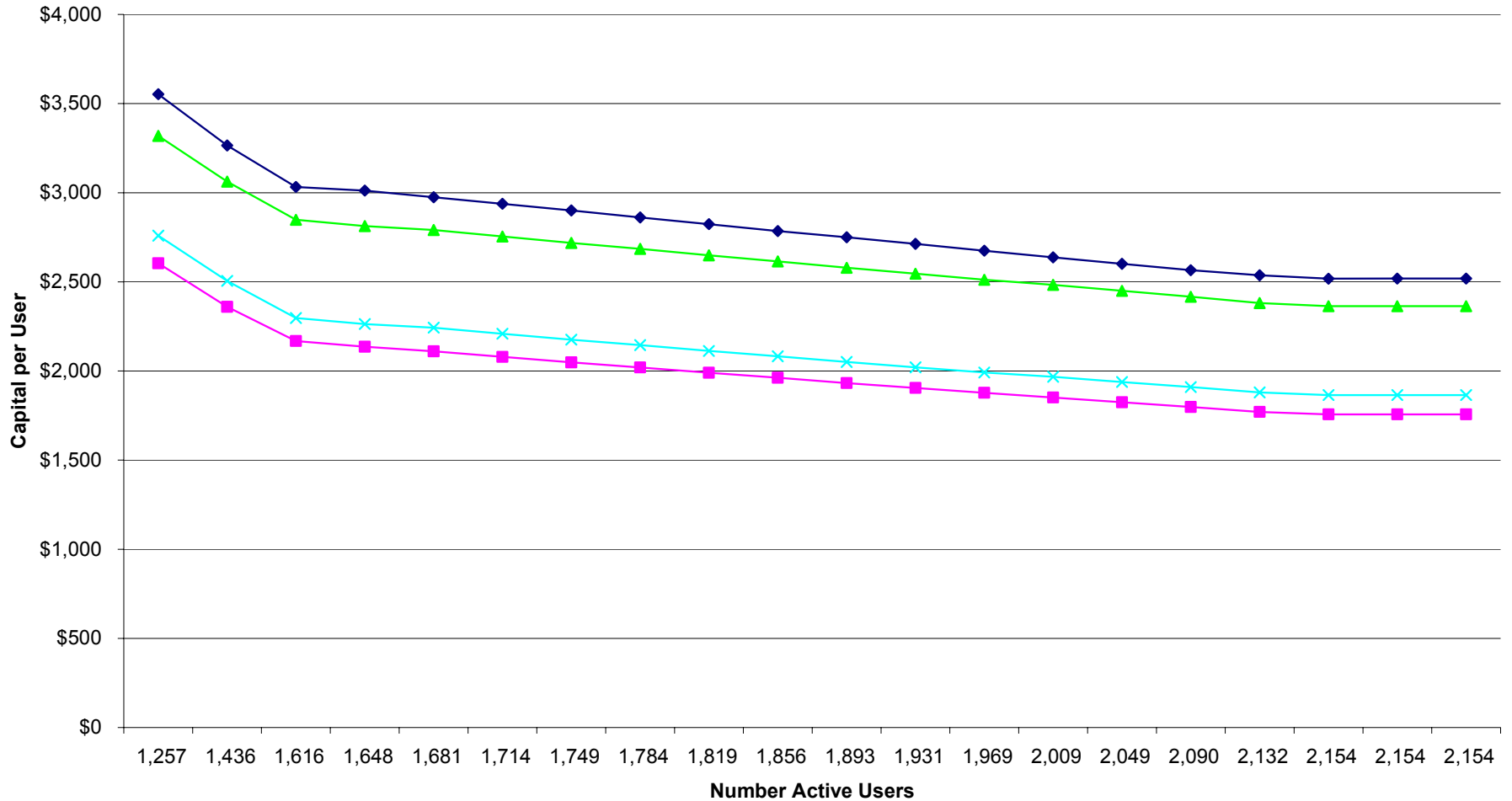


GigE Electronics Capital	\$1,529	\$1,697	\$1,889	\$1,915	\$1,945	\$1,970	\$1,994	\$2,021	\$2,044	\$2,091	\$2,112	\$2,137	\$2,160	\$2,179	\$2,201	\$2,223	\$2,240	\$2,251	\$2,251	\$2,251
GigE Fiber Installation Capital	\$2,701	\$2,740	\$2,779	\$2,786	\$2,793	\$2,800	\$2,807	\$2,815	\$2,823	\$2,831	\$2,839	\$2,847	\$2,855	\$2,864	\$2,872	\$2,881	\$2,890	\$2,895	\$2,895	\$2,895

Capital (w/ Goffstown, GigE-Lite)

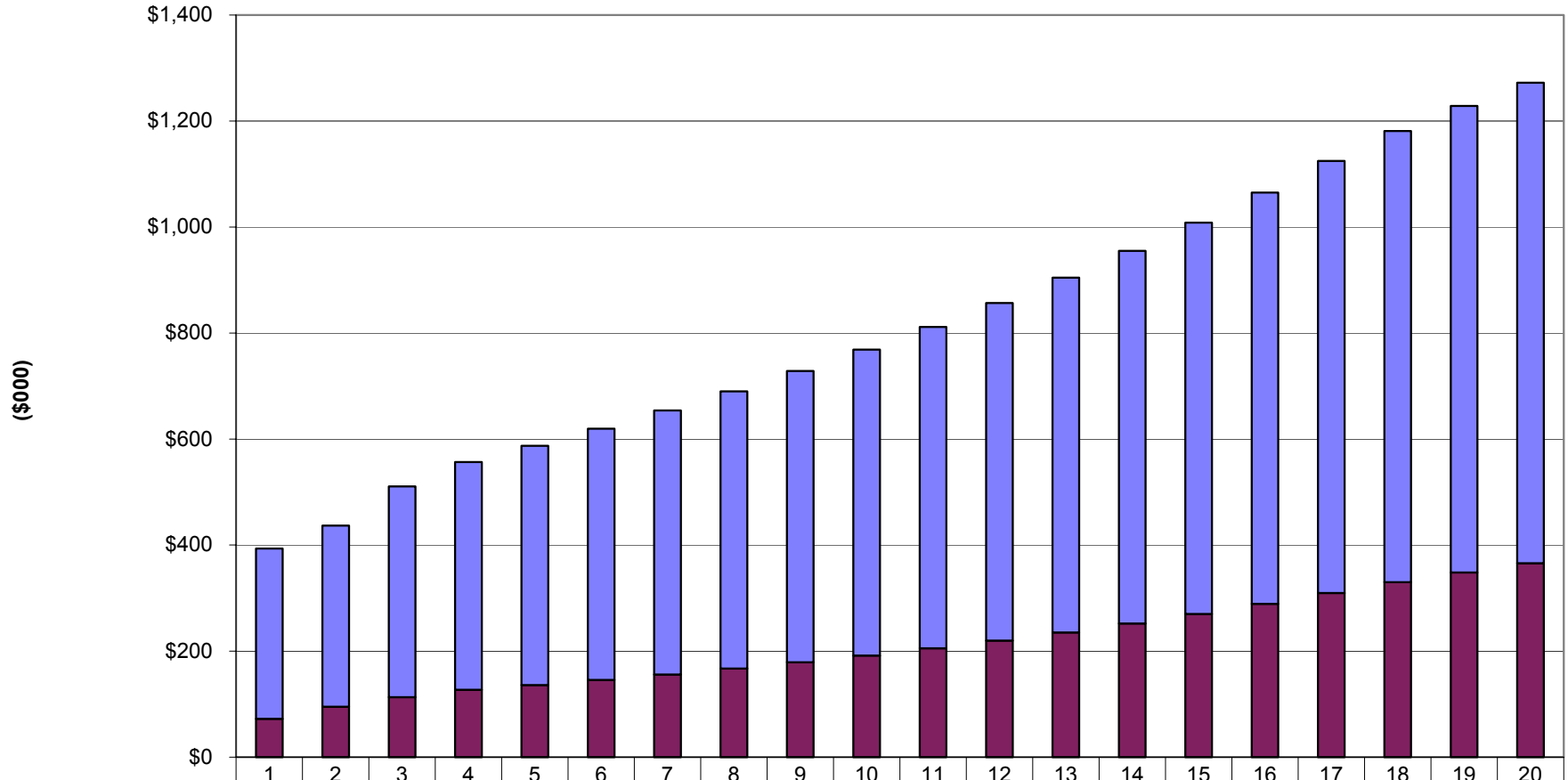


Capital per Subscriber



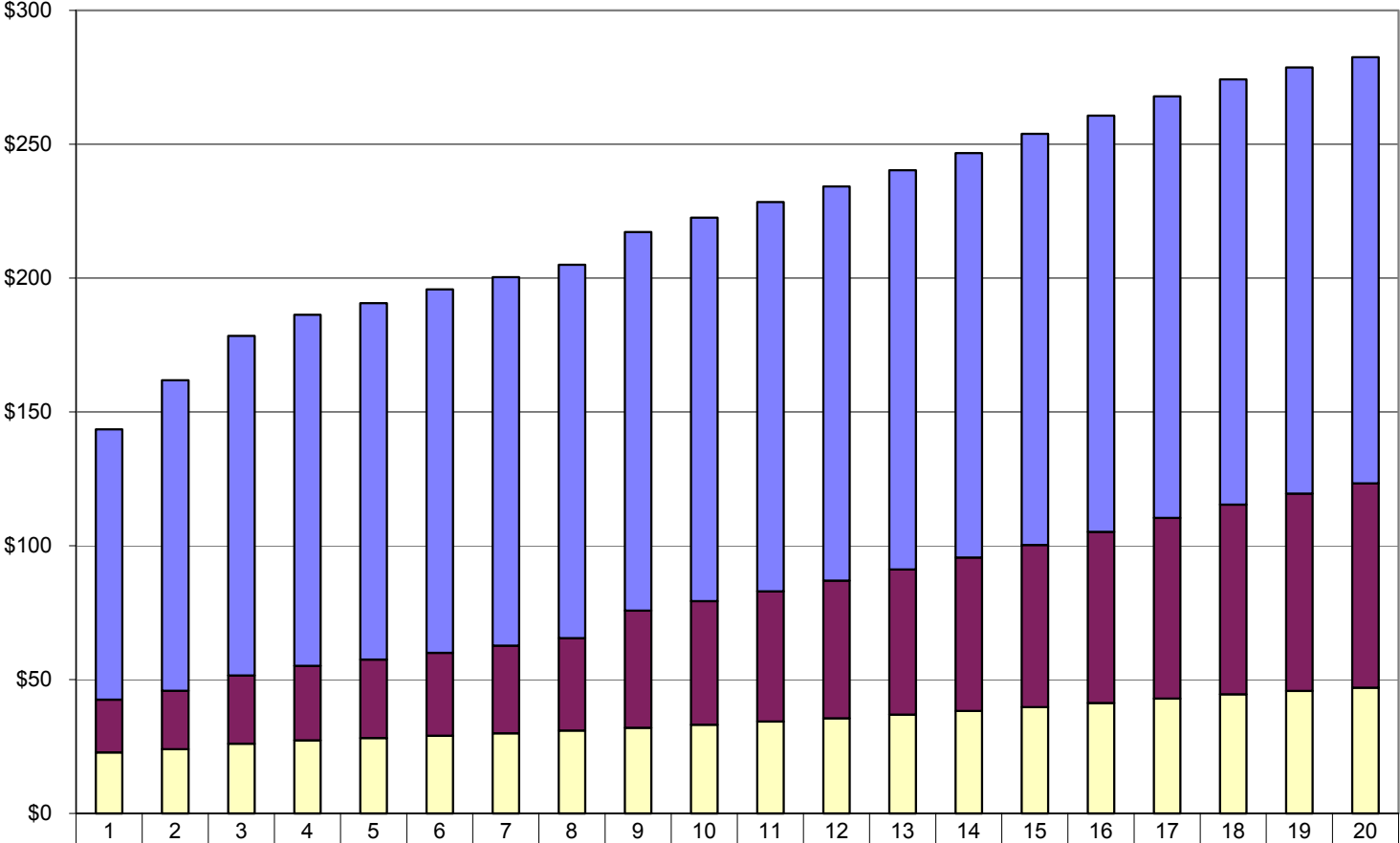
◆ Total PON Capital per User
 ▲ Total GigE Capital per User
 ✕ Total GigE-Lite Capital per User
 ■ Total GigE-Lite (No Headend) Capital per User

Revenues



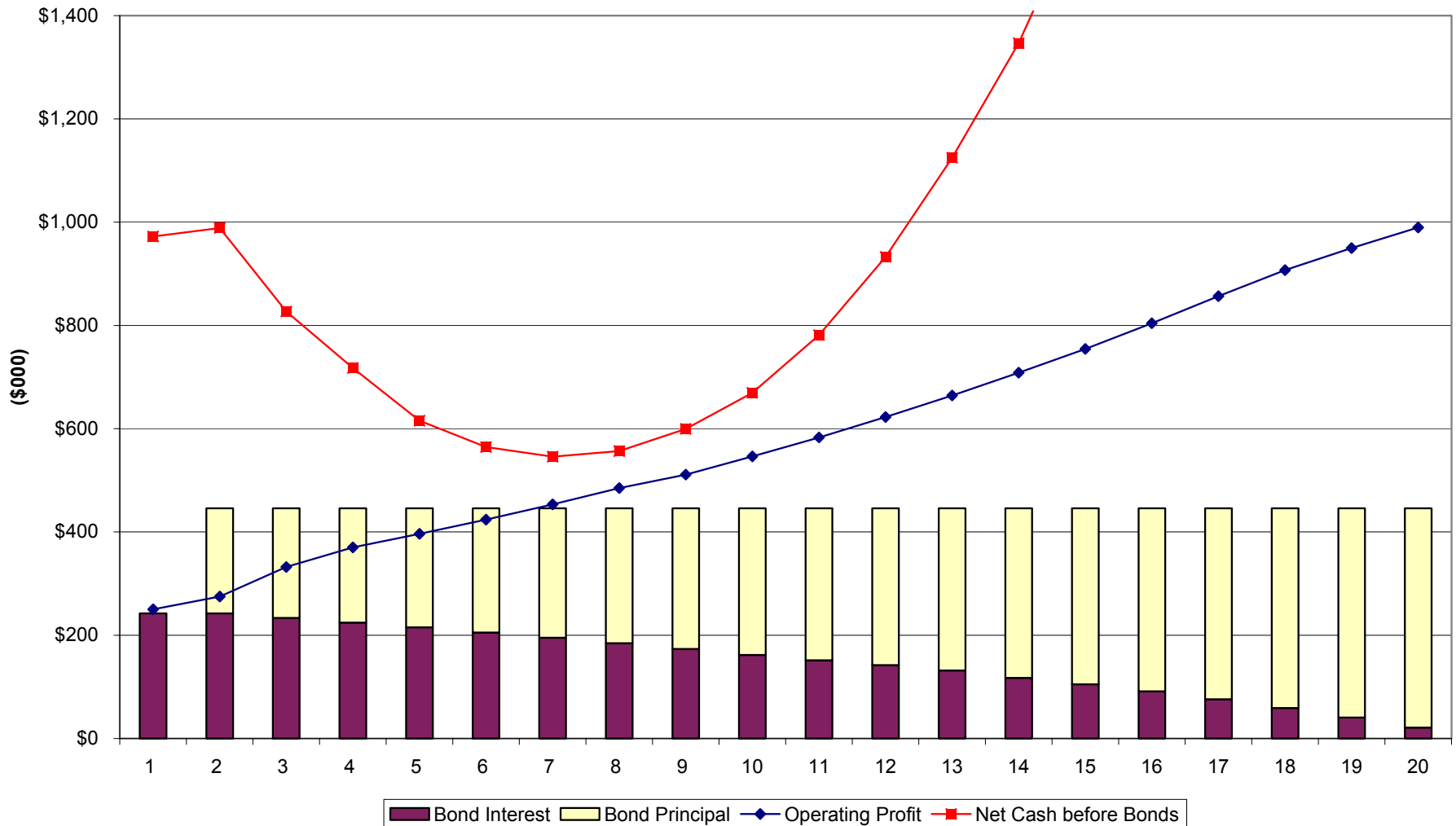
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Network/Internet Access	\$321	\$342	\$397	\$430	\$451	\$474	\$498	\$523	\$549	\$577	\$606	\$637	\$669	\$703	\$738	\$776	\$815	\$851	\$880	\$906
Video	\$72	\$95	\$113	\$127	\$136	\$146	\$156	\$167	\$179	\$192	\$205	\$220	\$235	\$252	\$270	\$289	\$310	\$330	\$348	\$366
Telephony	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0

Operating Expenses

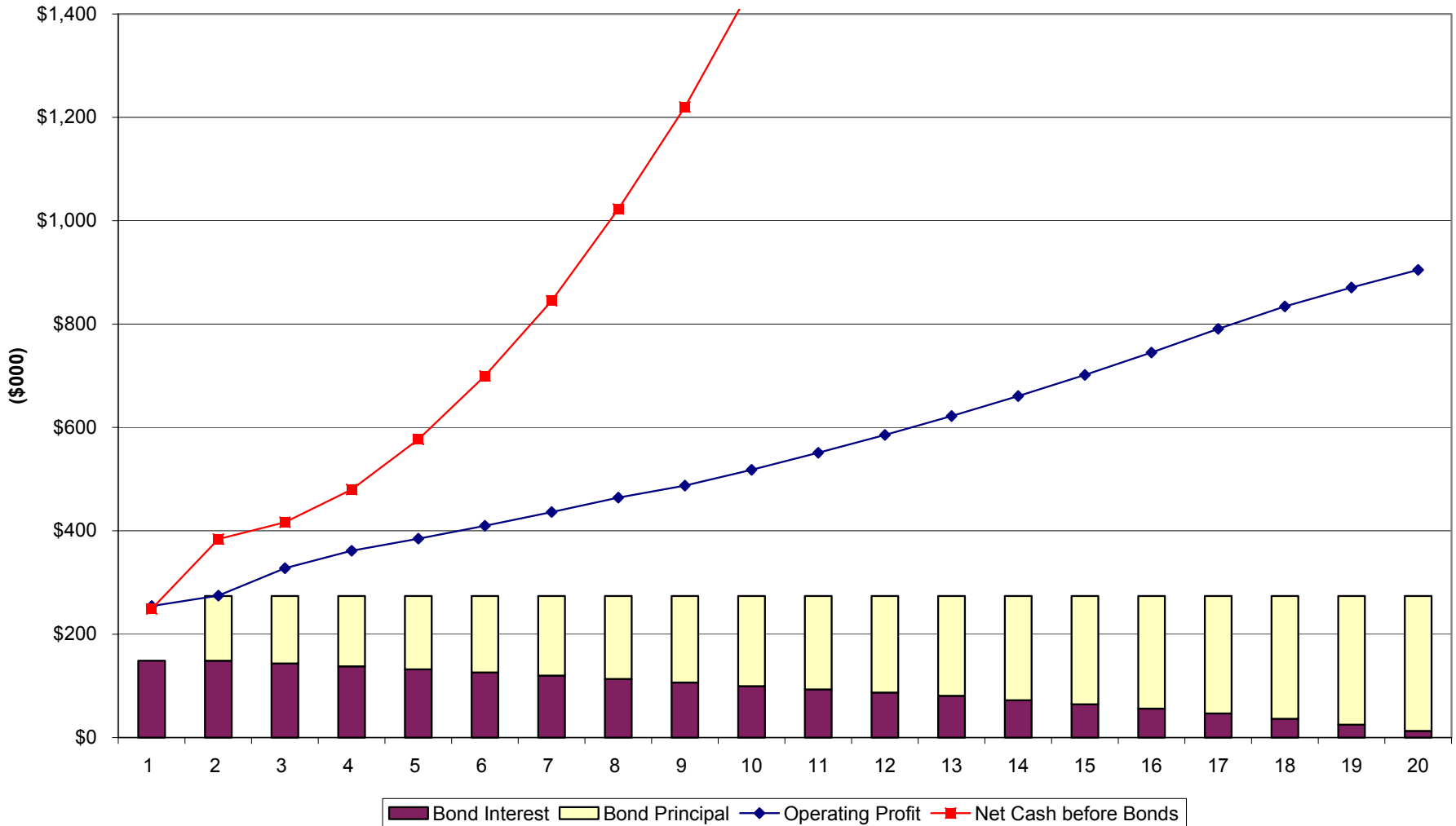


■ Network Operations & Maintenance	\$101	\$116	\$127	\$131	\$133	\$136	\$138	\$140	\$141	\$143	\$145	\$147	\$149	\$151	\$154	\$156	\$157	\$159	\$159	\$159
■ Sales Commissions	\$20	\$22	\$26	\$28	\$29	\$31	\$33	\$35	\$44	\$46	\$49	\$51	\$54	\$57	\$61	\$64	\$67	\$71	\$74	\$76
■ Billing & Administration	\$23	\$24	\$26	\$27	\$28	\$29	\$30	\$31	\$32	\$33	\$34	\$36	\$37	\$38	\$40	\$41	\$43	\$44	\$46	\$47

Bond Coverage (with PON)



Bond Coverage (w/ GigE-Lite, Goffstown Headend)



Cash Flow Projections (PON)

Year	0H2	1	2	3	4	5	6	7	8	9	10
Cash Flow:											
Operating Income	\$0	(\$240,017)	(\$236,777)	(\$184,028)	(\$149,894)	(\$129,613)	(\$105,872)	(\$79,521)	(\$51,605)	(\$28,596)	\$2,581
+ Depreciation	\$0	\$490,225	\$511,725	\$516,133	\$520,073	\$526,126	\$529,673	\$533,038	\$536,670	\$539,726	\$543,657
+ Municipal Debt	\$5,700,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
- Interest Pmt on Debt	\$121,125	\$242,250	\$242,250	\$233,596	\$224,575	\$215,170	\$205,365	\$195,144	\$184,488	\$173,379	\$161,799
- Capital Expenditures	\$4,639,076	\$263,173	\$215,003	\$44,080	\$39,396	\$60,535	\$35,463	\$33,649	\$36,322	\$30,563	\$39,307
- Principal Pmt on Debt	\$0	\$0	\$203,618	\$212,272	\$221,293	\$230,698	\$240,503	\$250,724	\$261,380	\$272,489	\$284,069
- Financing/Misc. Fees	\$325,502	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
- Change in Working Capital	(\$386,590)	\$15,646	(\$198,851)	\$3,750	(\$5,376)	(\$7,930)	(\$6,320)	(\$7,517)	(\$7,981)	(\$8,228)	(\$8,835)
Free Cash Flow	\$1,000,887	(\$270,861)	(\$187,072)	(\$161,592)	(\$109,710)	(\$101,959)	(\$51,210)	(\$18,483)	\$10,856	\$42,928	\$69,899
Cumulative Cash Flow	\$1,000,887	\$730,026	\$542,954	\$381,362	\$271,652	\$169,693	\$118,483	\$100,000	\$110,856	\$153,783	\$223,682

Cash Flow Projections (GigE-Lite, Goffstown Headend)

Year	0H2	1	2	3	4	5	6	7	8	9	10
Cash Flow:											
Operating Income	\$0	(\$96,653)	(\$87,846)	(\$36,778)	(\$5,589)	\$15,961	\$39,332	\$63,733	\$89,918	\$110,908	\$140,098
+ Depreciation	\$0	\$351,271	\$362,617	\$364,390	\$367,099	\$368,835	\$370,556	\$372,697	\$374,389	\$376,478	\$378,145
+ Municipal Debt	\$3,500,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
- Interest Pmt on Debt	\$74,375	\$148,750	\$148,750	\$143,436	\$137,897	\$132,122	\$126,101	\$119,825	\$113,282	\$106,461	\$99,350
- Capital Expenditures	\$3,396,215	\$116,498	\$113,453	\$17,732	\$27,087	\$17,369	\$17,206	\$21,411	\$16,917	\$20,889	\$16,676
- Principal Pmt on Debt	\$0	\$0	\$125,028	\$130,342	\$135,882	\$141,657	\$147,677	\$153,953	\$160,496	\$167,318	\$174,429
- Financing/Misc. Fees	\$181,059	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
- Change in Working Capital	(\$283,018)	\$20,739	(\$122,653)	\$3,544	(\$2,856)	(\$3,296)	(\$3,798)	(\$4,109)	(\$3,895)	(\$4,646)	(\$4,203)
Free Cash Flow	\$131,369	(\$31,369)	\$10,192	\$32,558	\$63,500	\$96,946	\$122,702	\$145,350	\$177,507	\$197,364	\$231,991
Cumulative Cash Flow	\$131,369	\$100,000	\$110,192	\$142,751	\$206,251	\$303,196	\$425,898	\$571,248	\$748,755	\$946,119	\$1,178,110

Opportunities and Risks of MBN Project

Opportunities

- *Using GigE-Lite and Goffstown headend may provide feasible economics*
 - *Estimated revenue potential from MBN more than sufficient to cover financing bonds*
- *Agreements with AoL and MSN being concluded*
- *Significant surplus cash from MBN likely after Year 2 with GigE-Lite, Goffstown headend*
- *Competitive environment, enhanced services, improved economic development*

Risks

- *Weak overall demand for broadband services*
- *Lack of pricing power in market*
- *Video revenue opportunities need to be established*
- *Lower take-rate on video likely with GigE-Lite (need for extra set-top box is complicating)*
- *Network deployment should balance costs with revenues*
- *Choice of technology and vendors*
- *Competing new technologies: wireless, etc.*

Schedule & Next Steps

