

Better Options for Montgomery County:
Upgrading Cable TV Business Models

by
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Good evening.

My name is Lloyd Etheredge. My background includes eight years as a faculty member at MIT and current work with foundations concerning new communication technology.²

The traditional business model of cable companies is no longer in the best interest of the County. I suggest you negotiate two options as part of the franchise transfer:

1.) A right to control at least one two-way 5-6 Mbps channel at a reasonable price.³

2.) A right to purchase a direct fiber-optic connection at a reasonable price.⁴

¹ Testimony of Dr. Lloyd S. Etheredge to the Management and Fiscal Policy Committee of the Montgomery County Council. July 18, 2002, 7:30 PM.

² I am a resident of Montgomery County, at 7106 Bells Mill Rd. in Bethesda (20817); 301-365-5241; lloyd.etheredge@yale.edu (E-mail); URL: www.policyscience.net. I am testifying as an individual.

³ This can be used as an Internet (desktop PC) broadband video channel; it also is a simple engineering step to permit it to be viewed on television sets of digital subscribers.

⁴ I will defer to this written statement a third recommendation concerning the growing and unregulated attention tax rate - i.e., that Montgomery County seek an alliance with other governments whose citizens are served by AT&T Comcast, to build negotiating leverage.

Like similar companies, AT&T Cable and Comcast secure revenue not merely from

I. Background

Today, more than 160 wavelengths of light can share each fiber optic strand and 100 million miles of the new fiber have been laid worldwide.⁵ But we use less than 2% of the capacity, in part because construction stopped at the last mile or local loop - several thousand yards from end-users in Montgomery County and elsewhere. Cable companies do not find it in their business interest to provide the final large-capacity connection. We probably have a digital telecom capacity of at least 150 million bits per second (150 Mbps) for each County resident.⁶ Most residents have only a 56-thousand (56 K)bps dial-up connection. Even when AT&T and Comcast's mislabeled broadband Internet options provide a reliable 500 thousand (K)bps in the local loop - they still permit access to less

monthly fees paid by subscribers, but also by selling access for advertising. For example, a for-profit cable channel would typically be charged several hundred million dollars to be carried. De facto these charges are paid, in turn, by subscribers through an attention tax as a captive audience for each channel's advertisers. Last year, the cable industry received \$14.4 billion in advertising revenue (www.ncta.com); the average (unregulated) tax rate by cable companies on four leading cable channels is nearing 20% for paid commercials. (The rate can go to 30% for prime time network shows.) Louis Chunovic, "TV Clutter Reaches All-Time High," *Electronic Media*, March 11 2002.

The expanding commercials are annoying, intrusive, of lower-quality than in earlier years, and degrading the viewing experience. The disrespect for customers is egregious.

⁵ The technology is called dense wavelength division multiplexing (DWDM). In the summer of 2002, firms are demonstrating upgrades in the 250 wavelengths/fiber range and engineering speculation is that the theoretical maximum may be 1,000 wavelengths or higher.

⁶ I do not have current data for Montgomery County, but it may be available to the County Executive. The conservative estimate in my testimony is based on Harrisburg, PA: Even Harrisburg, Pennsylvania, one of the most bandwidth-starved U. S. cities studied in this report, has access to capacity equivalent to over one STM-1 circuit [155 Mbps] per capita. Telegeography Inc., *Terrestrial Bandwidth 2002: Long-Haul Bandwidth Supply and Demand* (Washington, DC: Telegeography Inc., 2002) i. The per capita capacity available in the Washington, DC area may be several orders of magnitude greater.

than 1% of the County's installed capacity; the rest is unused and wasted.⁷⁸

Today, local cable companies use a Fiber to the Neighborhood design. Fiber nodes are rolled forward to within several thousand feet and lower-capacity coaxial cables are used to carry several hundred downstream television channels for the final distance.

- What I am suggesting is that - now - the County Council assure each user in Montgomery County have the right to trade-in one of the hundreds of downstream entertainment channels and use this capacity as a two-way, high-speed 5-6 Mbps Internet video channel under their own control.⁹

⁷ Cable company Internet broadband is a residual, after a fixed allocation for all of the downstream television channels on the coaxial cable. Thus, the Internet capacity is divided among the users in a neighborhood, and it fluctuates depending upon the number of other users and what they are doing. The Up to . . . ads for broadband are unreliable. I have not seen specific performance data for AT&T Cable or Comcast, but nationally less than half of the purchasers of this type of broadband receive even a reliable 500 Kbps: Sue Zeidler, *Experts: Broadband Not Ready for Hollywood* [On-line] (Reuters, February 3, 2002; 9:08 AM 2002 [accessed February 3 2002]).

⁸ Estimates of potential fiber capacity are likely to be too low. The major cost to install fiber cable is construction (digging) and Comcast, like other companies, probably has installed several extra hollow plastic pipes that can be used to add new-generation fiber cables and vastly expand the County's local loop systems at low additional cost.

⁹ Most families divide their television viewing among about 10 channels. Thus, most of the hundreds of pay-per-view and other channels are typically unused and available. Cable companies already provide this dedicated, user-controlled, channel swap in some locations in the country, typically for professional telecommuting and vastly overcharge for it.

It is not clear that a simple one-time reconfiguration would justify any increase in monthly rates; today, a subscription to a premium channel might cost \$5/month, and AT&T Comcast does not make this much profit from me on the channel that I would trade-in. I would be skeptical of any higher charge than \$5/month to give this broadband

A Subscriber-Controlled digital channel will operate like the telephone system. To connect to billions of people in the world you only need one pair of copper wires - with connections that can be switched.

The choice is for freedom and competition. This franchise improvement will permit County residents to linkup with any source, anywhere in the world. AT&T Comcast will no longer be a monopoly middleman for its hundreds of entertainment and pay-per-view television channels.

- The most exciting impact will be a cornucopia of new benefits and business opportunities in the County. Desktop videoconferencing should start to become widely used by next year, and do-it-yourself Internet television channels and video-on-demand resources will be everywhere.¹⁰ We will become a leader in new, high-tech applications and an attractive test site for startup companies. I have given examples in Tables 1 and 2.

Table 1
Consumer Bandwidth and Applications¹¹
(with current compression technology)

5 Kbps	human speech
20 Kbps	audio + slide presentations

capacity to consumers in Montgomery County.

¹⁰ We also will be using a small portion of the County's digital cable infrastructure (which was mostly created for evening entertainment) with increased efficiency, to support a new universe of 9-5 applications, when most people are too busy to watch television.

¹¹ For an overview: George Abe, *Residential Broadband* (Indianapolis, IN: Cisco Press, 2000).

*56 Kbps	painful, 3" window, jerky & murky television * (This is where most users are, today.)
126 Kbps	Mini-screen 3G cellular videophones (MPEG-4 compression); CD-quality sound ¹²
384 Kbps	Internet television for simple lectures, full-screen video telephone
500 Kbps	VCR-quality video for many old (slow movement) movies. [Despite the advertising claims, only about half of the so-called high-speed Internet connections currently offered by cable companies give this much capacity reliably.]
1 Mbps	Fast action video games w/ simple graphics. If you just want Web pages to download quickly, this is the fastest Internet connection that it makes sense to buy. Faster last mile connections will not improve the current Internet's overall response, given the way Web pages are stored and retrieved from around the Net.
1.5 - 6 Mbps	SDTV (standard definition television) at 1.5 - 2 Mbps but requirements vary by content: basketball and action movies (e.g., new scenes every 2 seconds) need higher capacity, 5-6 Mbps. Assures video-on-demand for all television programs and movies incl. CD-quality sound for concerts. Good 2-way teleconferencing with several people.
19.3 Mbps+	High Definition television (HDTV); telepresence realism (?)

¹² National Science and Telecommunications Board, *Broadband: Bringing Home the Bits* (Washington, DC: National Research Council, 2002) 92.

Table 2
Examples: Montgomery County's Future with
a Subscriber-Controlled 5-6 Mbps Option

Personal videoconferencing

- Montgomery County residents can check-in, quickly and easily, with relatives in nursing homes; parents can check-in with their kids at day care.
- Quick committee meetings for many organizations.

Education

- Homework support groups in elementary schools, including on-line access to teachers aides.
- Online video resources from the public library system.

Entertainment

- Blockbuster creates an online video-on-demand archive that competes with the video-on-demand options and prices of AT&T Comcast.
- Hollywood studios and Premium Channels - HBO, Disney and Discovery - sell direct to Montgomery County consumers at lower prices.

Work

- Routine business videoconferencing.
- Telecommuting.

New Business Opportunities

- Local, user-friendly advertising. Montgomery County newspapers can create on-line video showcasing weekly specials on children's clothing; video clips of new restaurants; homes for sale.
- Critical mass of users supports growth on next-generation communication companies in the County.

Culture

- On-line & video-on-demand Internet access to Strathmore Hall concert hall, Kennedy Center public concerts; Smithsonian Campus on the Mall programs. Home theater quality sound. Linkups to any source, worldwide.

Health

- HMOs like Kaiser can create online video archives of health information, including versions in Spanish and other languages, and for handicapped

people who can use electronic devices connected to the Internet.¹³

Other

- All large files download much faster.
- R&D-oriented startup companies, students, and other residents can access state-of-the-art scientific conferences online & via video-on-demand archives- e.g., www.videocast.nih.gov.
- New options for Maryland Public Television Online.

In closing, may I call to your attention that Montgomery County lags behind Singapore, where the public library system has the educational programs of the Discovery Channel online for video-on-demand viewing by school children? It is ironic, since the Discovery Channel is here and we have the unused capacity, that similar future-oriented options are not available here.

Madam Chairman, I have included further discussion in my written testimony. I will be pleased to respond to any questions.

II. Additional Comments

1.) You should know that both AT&T and Comcast have shockingly bad reputations with consumers for their advanced communication services (e.g., the limited Internet broadband options available in the County.) With this testimony I will provide the staff a copy of the annual reader's survey by [PC Magazine](#) (now on sale and dated August 2002) showing (p. 116) Comcast broadband's summary grade of D- and AT&T broadband with a summary grade of C-. (At least one company has an A+.) Montgomery County has a record of splendid public services: I do not believe that we can count upon either of these companies

¹³ For a further discussion of health innovations, see working papers for a Health Channel on www.policyscience.net.

(or both, combined) to meet our expectations for higher-end services, with their current business models, unless you negotiate these agreements.

2.) Today (as discussed above, in footnote 7) the Internet broadband option in the County is overpriced and available as a residual capacity, after all the downstream television and music channels are assigned. The capacity is divided among users in a neighborhood and varies, de facto, depending upon the number of other users and what they are doing. Unlike this broadband option, my recommendation can provide 5-6 Mbps reliably and will not degrade services to other subscribers in the neighborhood. The current hybrid architecture of fiber and coax (HFC) typically distributes capacity among several hundred homes but it can be arbitrarily expanded by rolling-forward the fiber optic nodes to serve smaller segments. Even if every subscriber in a neighborhood elects to trade-in one downstream cable channel for a two-way channel under their control, engineers can reconfigure the HFC architecture to meet the demand.¹⁴

3.) A recent study by the National Academy of Sciences/National Research Council recommends that local governments explore the option of direct fiber-optic connections to the home. The option might cost \$1500/household (or more, depending upon the number of adopters along a street.) The cost could be amortized over several years, similar to paying for water or sewer connections: One question that the market has not yet explored is whether the consumer would make a significant [relatively future-proof] capital investment, similar to the \$1,000 to \$2,000 that a computer costs today, as part of obtaining Internet

¹⁴ For a technical discussion: National Science and Telecommunications Board, *Broadband: Bringing Home the Bits* 245-95. Roll-out sequences would include Fiber-to-the-Curb (at the end of each block) and, later, Fiber-to-the-Home.

service . . . ¹⁵ Today, the typical American family spends almost \$900/year on its Internet dial-up (\$264), basic cable (\$456), and long distance telephone (\$216) and all these costs might be reduced - and many other current and future services enhanced - with direct fiber and competitive purchasing of these services.¹⁶ While the option might reduce a flow of profits to AT&T Comcast in the long-run, it would have a short-term advantage of permitting the new company to amortize its debts more quickly than anticipated.

5.) The freedom and competitive options achieved by these two recommendations would threaten - but only threaten - the monopoly profits of AT&T Comcast. While it will no longer be a monopoly middleman, it still can run a profitable business by charging competitive prices, providing good customer service, and by innovation.

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¹⁵ Ibid., 158.

¹⁶ Robert J. Samuelson, "Telecom's Disconnect," *The Washington Post*, February 27 2002.