



BROADBAND IN PENNSYLVANIA: AN UPDATE ON STATE AND FEDERAL ISSUES

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Broadband In General

- Term refers to the ongoing public and private debate on how to provide reasonably priced internet, voice, video, and wireless to all consumers using new technology.
- Law and policy is subject to state and federal law
- A lot of confusion about the words, law, and policy. Broadband refers to facilities (“bricks”) and internet service (“clicks”); to the public, it means internet service.
- This Update: Technology, Economic, and Legal Issues for internet service; voice is fairly uniformly present & reasonably priced but this could change.



9 Points About Broadband

Technology: *What is PANS & When Does It Replace POTS?*

- Telco uses Internet Protocol (IP); Cable uses Docsis 3.0
- Two network owners (telco-cable) sell to consumers (> 90%)
- People without broadband (82%) served by 3 (ATT, CTL, VZ)

Economics: *Who Owns & Builds Broadband Networks?*

- Cable & Telco own most; Broadband to all costs \$50-350B
- Federal Fund: \$3.7B/year for voice/broadband; PA got \$77M
- PA: Spent > \$1.2B/Ch. 30; Gives \$34M/year for voice service.

Legal Issues: *Information Service or Telecommunications?*

- Internet Service (Broadband Internet Access Service(BIAS)) is now telco
- FCC is directing the “conditions” needed to get federal money
- Who does Carrier of Last Resort (COLR), Reliability, Security?



8 Figures About Broadband

- 82% - Nation's telephone exchanges owned by Verizon, ATT, CenturyLink (formerly Qwest) without broadband;*
- 93% - Facilities controlled by cable and telco providers;*
- 95% - Nation's wholesale wireless minutes sold by Vz, ATT/Cingular, Sprint*
- 5% - Wireless consumers that can use 95% of spectrum*
- 50B – Cost to build a 10 to 30 Mbps broadband network*
- 350B – Cost to build a 100 Mbps broadband network*
- 3.7B – FCC 2014 support for high-cost broadband*
- 34M – Pennsylvania's state fund to support voice COLR*

*Source: *In re: Natl Broadband Plan*, Docket 09-51, FCC Staff Update (9/29/09), slides 38, 44, 47; *In re: IP-Enabled Services*, Docket 04-36, Covad Comments (5/28/4), p. 8 and MCI Comment (5/28/4), p. 13; *In re: Nextel Transfer to Sprint Communications*, Docket 05-36, Bessen Declaration, (2/17/5), p. 19; *In re: Net Neutrality*, Docket 09-191, CTIA Ex Parte on Net Neutrality (9/20/10); *In re: Open Internet*, Docket No. 14-28, CTIA Ex Parte (9/4/14); *In re: National Broadband Plan*, Docket No. 09-51 FCC Staff Update (9/29/9), slides 38, 44, and 45; *FCC Joint Board Monitoring Report* (2015), Table 1.9; HB 1417, House Consumer Affairs Hearing, Chairman Gladys M. Brown Testimony (8/25/15), p. 2



7 Considerations

- Telephone carriers have Carrier of Last Resort (COLR)*
- Carriers with federal USF must provide BB (COLR).*
- Cable and other providers (CLECs) have no COLR for anything.*
- Broadband is capital intensive and expensive to price.*
- FCC now directs local telcos with “conditions” on support.*
- Broadband Internet Access Service (BIAS) is now telco*
- Broadband Deployment means **Availability** (Is It There) and **Affordability** (Can Consumers Afford It).*
- **Deployment** is needed for health, education, and economic development; constantly changing policies.

Source: 66 Pa.C.S. § 3011et. Seq.; *In re: Natl Broadband Plan*, Docket 09-51, Staff Update (9/29/15), Slide 44; *In re: CAF*, Docket 10-90 (11/18/11) aff'd *In re: FCC*, 753 F.3d 1014 (10th Cir. 2014), cert den. Nos. 14-610 (5/4/15); 47 U.S.C.A. §§ 332, 601 et seq. and 701 et seq.; *In re: Open Internet*, Docket 14-28 (3/12/15), appeal *USTA v. FCC*, Docket No. 15-1063 (D.C.C.A.); *In re: CAF*, Docket 10-90 (3/27/16); Hudson & Parker, *Electronic Byways: State Policies for Rural Development Through Telecommunications*, (Westview: Aspen Institute, 1992); NARUC Telecommunications Staff Subcommittee, *Rural Universal Service Reform* (November 8, 2015), J. Witmer, Pa. PUC, editor.



6 Technology Platforms

- Wireline – USF carriers to provide broadband at 1/10 Mbps over the next 5 years; FCC says fiber gives nearly unlimited scalability and performance; uses IP technology.*
- Wireless – CTIA states this is not equal to wireline; FCC says it is no substitute for wireline in January 2016; needs wireline for backhaul.*
- Cable – relies on Docsis 3.0, mostly present in residential areas due to cable video legacy but moving into business enterprise markets.*
- Satellite – Title VI (content); FCC applies speed benchmarks as a fixed service, but says this cannot meet the 3/25 Mbps standard.*
- Broadcast – Content provided over the air; concerns with retransmission costs charged to carriers that are not broadcasters*
- IP Networks – Internet Protocol; relies on Header-Load to manage traffic; Header can state sender, receiver, content, nature, priority.*

*Sources: *In re: CAF*, Docket 10-90 (12/18/14), para. 4; *In re: Natl Broadband Plan*, Docket 09-51, Staff Update (9/29/9), slide 38; *In re: Open Internet*, Docket 14-28, CTIA Ex Parte (9/4/14), *FCC Broadband Progress & Section 706 Rpt*, Docket No. 15-191 (1/29/16), para. 17, *FCC Local Competition Report*, (October 2014), Fig. 4-8; HB 1417, House Consumer Affairs Hearing, Tourje Testimony (8/25/15), pp. 2-3; *In re: Broadband Progress & Section 706 Report* (January 29, 2014), para. 18; *In re: CAF III Auction*, Docket No. 10-90 (May 26, 2016), para. 30; *In re: Retransmission*, Docket No. 10-71, Frontier & CenturyLink Ex Parte (3/24/14), *In re: Special Access*, Docket 05-25, Reply Comments of BT Americas (2/19/16); Edward Felton, Nuts & Bolts of Network Neutrality (Prof. of CompSci & Public Affairs, Princeton University: 2006) <http://itpolicy.princeton.edu/pub/neutrality.pdf>; *In re: Broadband National Plan*, Dockets 09-51, Pa. PUC Comments (7/15/10, (10/12/10); *In re: Open Internet*, Docket 14-28, Pa. PUC Comment (3/28/14); NARUC Telecommunications Staff Subcommittee, *Federal Universal Service* (November 8, 2015), J. Witmer, Pa. PUC, editor.



Technology

- The old technology used copper lines and switches to provide voice or fax calls; costs increased with distance.*
- New technologies are Fiber-Internet Protocol (IP) and Docsis 3.0 (cable); technologies send voice, data, and video at the speed of light; distance is irrelevant; “last mile” facilities from the telephone central office and remote or cable head-end to premises is the issue.*
- There are multiple platforms for technologies & content but last mile to consumers is largely cable and telco.*

Sources: Francis Caircross, *The Death of Distance* (Harvard Business School Press, 2001); *In re: National Broadband Plan*, Docket 09-51, Staff Update (9/29/9); *FCC Broadband Progress & Section 706 Report*, Docket 15-191 (1/29/16)



Wireline Broadband

[w]e find that consumers have advanced telecommunications capability only to the extent that they have access to both fixed and mobile broadband service. As they currently exist, fixed and mobile broadband services are not functional substitutes for one another, as some commenters have suggested.

FCC Section 706 Report, Docket No. 15-191 (January 29, 2016), paragraph 17.



Wireless Broadband

- Fixed networks have significantly higher capacity and predictability of resource requirements, whereas mobile networks are far more capacity constrained, with constantly changing user requirements and operating environments. Fixed networks involve channels that are relatively clean with signal regeneration, while mobile channels are impaired with interference, multipath and blockage, varying by location and from one millisecond to the next.

In re: Open Internet & Net Neutrality, Cellular Industry Ex Parte, Docket 14-28 (9/4/14).



Economics & Competition

- Monopoly: one provider serves all consumers.
- The old network used “social” pricing, a practice in which high-cost rural areas were “averaged” with lower cost urban areas to arrive at average or blended rate.
- The old network had prices above cost in urban areas but below cost in rural areas; all consumers were served using average pricing.
- Competition exists where average price is above cost but not where average price is below cost.
- Trebing definition: 5-7 firms with roughly equal size make companies price takers; 4-5 with over 60% is oligopoly.*

Source: Garfield & Lovejoy, Public Utility Economics (Prentice Hall, 1964), NARUC Telecommunications Staff Subcommittee, *Federal Universal Service* (November 8, 2015), J. Witmer, Pa. PUC, editor.; Professor Harry Trebing, *Market Power in Public Utilities Industries* NARUC Annual Studies Program: 2000), pp. 3-4.



Broadband Economics: US and PA

- FCC fund spent \$7.8B on four programs in 2014, i.e., high cost, low-income, schools & libraries, rural health.*
- \$3.7B of the \$7.8B is to support high-cost areas.*
- \$50B for a 50 Mbps network; \$350B for 100 Mpbs.*
- PA paid \$130M more into the FCC fund PA received; this includes support for our high cost areas, low-income consumers, schools and libraries, and rural health.*
- At 4.9M households with 2.3 per household, annual cost is about \$26.53 or \$2.21 per household per month.*

Source: FCC Universal Service Monitoring Report (2015), Table 1.9; *In re: Broadband National Plan*, Docket No. 09-51, FCC Staff Update (9/29/9), slides 38, 44, and 47; Census Facts U.S. Census Bureau, <http://www.census.gov/quickfacts/table/PST045215/42>



PA Broadband Economics

- PA: 100% broadband availability at Ch. 30 speeds of 128 kpbs up/1.5 Mpbs down (Pa speed < FCC speed).
- PA: PUC rate increases to fund Chapter 30 from 2005 is \$1.2B.*
- PA: PUC monitors compliance with Ch. 30 commitments & continues approving rate increases to support it.
- PA: 803K without broadband at FCC speed; 278K, or 3%, are urban; 532K, or 20%, are rural.*
- US: 33.9M without broadband at FCC speed; 10.5M, 10%, are urban; 23.4M, or 39%, are rural.*
- CAVEAT: relies on FCC maps and data often disputed*.

Source: In re: CAF II Auction Process, Docket No. 01-92, Pa. PUC Comments, (July 21, 2016), p. 6; *But see* In re: Inter-carrier Compensation, Docket No. 01-92 (Missoula Plan), Pa. PUC Reply Comments 12/22/8), Appendix D (\$1.2B through 2008 including state USF distributions); 66 Pa. C.S. § 2015(a)(2); FCC Broadband Progress Report, Docket No. 15-191 (January 29, 2016), Appendix D; *In re: CAF*, Docket 10-90 USCS EX Parte (2/25/16)



FCC Support for PA Broadband

- US: Mobility Fund I (once), Mobility Fund II (ongoing), CAF I (1 time/2 rounds), CAF II (ongoing), Remote Area Fund (not done) and Rural Experiments (RBE).*
- PA: \$10K locations in CAF I, round 2; \$8.5M is planned.*
- PA: \$27,694,806 in CAF II taken will get broadband at 1/10 to 76,777 locations in 5 years.* Verizon refused support; federal support will be auctioned but the rule are under discussion with concern on keeping Verizon's declined money in-state & not migrating elsewhere.*
- PA: No carrier lost FCC support where annual cost > 3K*
- PA: No carrier lost FCC support if cost > \$250/month *
- PA: No Rural Broadband Experiment (RBE) recipients*

Source: In re: Universal Service Monitoring Report (2015), Figures 2, 3, 4, 5, 6, 7, 10, and 11; *In Re: Connect America Fund*, Docket No. 10-90 (CAF II Auction), Pa. PUC Comments (July 16, 2016)...



Legal Issues

- 2 Classes: Information Service or Telecommunications*
- Information Service: FCC regulates*
- Telecommunications: FCC and the states regulate*
- States did intrastate; FCC did interstate/international*
- Telecommunications Act of 1996 (TA-96) put each regulator into the other's domain.*
- FCC: 2011 *CAF Order* successfully claims power over intrastate networks & services as “conditions” to federal USF*
- FCC: Goal is a national ubiquitous broadband network.*

*Sources: 47 U.S.C. § 153; *AT&T Corp. v. Iowa*, 525 U.S. 366, (1999), *Verizon v. FCC*, 535 U.S. 467 (2001); Edward W. Felten, *Nuts & Bolts of Network Neutrality* (Prof. of CompSci & Public Affairs, Princeton University: 2006) <http://itpolicy.princeton.edu/pub/neutrality.pdf> ; *In re: CAF*, Docket 10-90 (11/18/11) aff'd *In re: FCC*, 753 F.3d 1014 (10th Cir. 2014), cert den. Nos. 14-610 (5/4/15); NARUC Telecommunications Staff Subcommittee, *Federal Universal Service* (November 8, 2015), J. Witmer, Pa. PUC, editor



Legal Issues: Voice using Broadband

- ***Pulver.com***: Voice over Internet Protocol (VoIP) not using the public network and free is information service not telco.*
- ***Vonage***: states preempted from certificating or mandating 911 on VoIP but other authority retained.*
- ***Time-Warner***: transmission is wholesale telco regardless of the services provided over that network (VoIP or BIAS).*
- ***Missouri Decision***: Vonage preemption of the states goes only to “nomadic” VoIP (Vonage) not “fixed line” VoIP (cable).*
- ***Minnesota Decision***: The Vonage preemption included fixed and nomadic VoIP so states cannot impose mandates.*
- ***IP Enabled Services***: No decision yet if VoIP is telco or information; Cable-modem ISP is information service.*

Sources: In re: pulver, Docket 03-45 (2/29/4); In re: Vonage, Docket No. 03-211 (11/12/4); In re: TimeWarner, Docket 06-55 (3/1/7); Comcast v. Missouri, Case 06-4233-CV-NKL (1/18/7); Vonage v. Minnesota, Civ. No. 03-5287 (10/16/3); In re: IP Services, Docket 04-36, Brand X v. FCC, 545 U.S. 967 (2005).



The Path to Basic Internet Access Service (BIAS)

- **Madison River:** Local phone company fined for blocking internet content under FCC's "ancillary" power in Title I.
- **Comcast :** Comcast fined for blocking Bit-Torrent internet content & Comcast appeals; court reverses FCC because Title I "ancillary power" has no power to fine
- **Verizon:** FCC issues rules on internet content blocking under Section 706; court reverses because the FCC said earlier 706 gives no power; FCC can change their mind.
- **Open Internet Order:** FCC rules Basic Internet Access Service (BIAS) is Title II telecommunications and that 706 also gives it power to regulate; FCC upheld on authority to treat BIAS as federal Title II telco for fixed and mobile BIAS, rehearing petitions pending.

Sources: *Madison River Communications*, File No. EB-05-IH-0110, 20 FCC Rcd 4295 (Enforcement Bur. 2005); *Comcast Corp. v. FCC*, 600 F.3d 642 (D.C. Cir. 2010); *Verizon v. FCC*, 740 F.3d 623 (D.C. Cir. 2014); In re: Open Internet, 14-28 (3/12/15) appealed in *USTA v. FCC*, Docket No.15-1063 (June 14, 2016).



Technology, Net Neutrality, and BIAS

- **Internet Protocol (IP):** technology uses digitized pulses of light (packets) made up of header, load, and footer.
- **Routers & Servers:** route IP packets using header that names sender, recipient, content, speed, & priority.
- **Voice Packets:** Voice (VoIP) needs real time packet priority (RTP) to stop conversation drops, jitter, & latency
- **Video Packets:** Do not need RTP but need buffering access to locally store and retrieve video streams.
- **Data Packets:** Do not need RTP nor buffering but can be quickly disassembled and reassembled.
- **BIAS as Title II Telco:** Net neutrality for service packets.



Federal Law: Title II, Title VI, and BIAS

- **Title II:** Telecommunications is common carrier service. Cannot unreasonably discriminate & must carry messages; information service is not; more oversight.
- **Title VI:** Cable and Satellite content is not common carrier service, has no mandate to provide competitors access, no ban on discrimination nor a mandate to carry all alike; very limited oversight.
- **Competition and Open Access:** Title II must provide access to competitors; Title VI has no such mandates.
- **Result:** Telco competes in the cable-satellite world with no legal rights; cable competes in telco world with rights.



Cable & Telco BIAS: Current Issues

- **BIAS Networks:** FCC rules to govern auction for Verizon support in PA; “voluntary” cost model or legacy support option for Pa. RLECs issued; carriers concerned about transmission rights on networks.*
- **BIAS Complaints:** Consumers told of right to complain if BIAS speed is not provided as promised and paid for.*
- **BIAS Privacy:** NPRM created 3 categories of treatment for private consumer information when buying BIAS.*
- **BIAS Lifeline:** FCC creates low-income support to buy BIAS; third party verifier; less “programs” eligible for \$9.25 discount; 12/1/16 New Program eligibility (TANF, FHPA, Veterans, SNAP); 7/1/17 Lifeline eligibility under the old programs (LIHEAP, SNAP) must be eligible in new ones; *
- **BIAS Competition:** Verizon-CLEC proposal to reduce special access by 15% and impose 4.4% productivity increase annually going forward.

*Sources: *In re: CAF*, Docket 10-90, Auction Rules, FCC Ord (6/10/14) & (12/18/14); *In re: CAF*, Rural Carrier Support (3/30/16), *In re: Open Internet*, Docket 14-28, FCC Ntc (4/4/16); *In re: Open Internet*, Dockets Nos. 14-28 & 16-106, Privacy NPRM, FCC Ord. (4/1/16) & Pa. PUC, Docket No. 16-106 (2016); *In re: CAF and Lifeline*, Docket Nos. 10-90 & 11-42, Lifeline NPRM (3/26/16); *In re: Special Access*, Docket 05-25, Reply Comments of BT Americas (2/19/16), *In re: Retransmission*, Docket 10-71, Frontier-CenturyLink Ex Parte (3/24/16), Pa. PUC Reply Comments (8/9/16).



Voice in US < PA

- US: 96.4% of Americans have voice service
- PA: 98.8% of Pennsylvanians have voice service*

Varies by Income

- 10K: 98.8% for PA versus 96.0% for US
- 30K: 99.1% for PA versus 97.7% for US
- 40K: 99.5% for PA versus 98.1% for US

Sources: 2015 *FCC Joint Board Report* (2015), Table 6.8;



Why?

- Others lack a state USF
- Others completely deregulated all retail voice services
- Others lack regulatory policy aimed at preserving local service



Broadband in US < PA

- US: 33M without broadband with 10M, 10%, urban and 23M, 39%, rural at FCC speed of 3/25*
- PA: 803K without broadband with 270K, or 6%, urban and 532K, or 20%, rural at FCC speed of 3/25.*
- PA carriers to receive 27.6M to serve 76,777 res/biz*
- Caution: Based on Form 477 Data which some claim is not accurately stating the reality of broadband in US and PA.*

Sources: *FCC USF Report (2015)*, Fig. 4; *In re: CAF*, Docket No. 10-90, USCS Ex Parte (February 25, 2j016).



Why?

- Chapter 30 funded broadband 10 years ago and was the most aggressive rural broadband program in the nation*
- Pennsylvania spent over \$1.2B up in rate increases and state USF to finance broadband; rates still increasing.*
- Carriers met their obligations to provide broadband as early as 2008 and PA is at 100% as of 12/31/15*
- Chapter 30 speed is 128 kbps up/1.5 Mbps down now dated given higher FCC speed of 1/10 Mbps for support*
- FCC's newest broadband is 3/25 Mbps (Netflix video)*
- PA paid \$130M/\$26.50 (household per year) into the FCC fund than PA got back.*

*Sources: 66 Pa.C.S. 3011 et seq.; *United States Internet Association, "Deployment of Broadband to Rural America"* (March 2008), pp. 4-5, 13; and U.S. Census Bureau . Census 2000, Table P2, Rural and Urban Population by State; *In re: Inter-carrier Compensation*, Docket No. 01-92, Pa. PUC Comments (4/2/9), ((8/21/8), (12/22/8, App. A); *VoIP Freedom Bill*, § 73 P.S. 2251.1 et. Seq. (Pa. PUC retains public safety authority inter alia except retail rate regulation and consumer protection); *In re: CAF*, Docket 10-90 (12/18/14), para. 2; *FCC Broadband Progress and Section 706 Report*, Docket 15-191 (January 29, 2016), para. 17 and 19; *FCC Joint Board Monitoring Report* (2015), Table 1.9; U.S. Census Bureau, Pennsylvania Quick Facts, <http://www.census.gov/quickfacts/table/PS1045215/42>



10-Point Summary

- Two “last mile” networks are mostly telco & cable
- 3 former Bell Cos. have most of the areas without broadband; FCC reduced others’ support for these 3.
- Broadband costs go up with speed; \$50B to 350B.
- Affordability: Broadband rates increase with speed.
- Federal fund is tiny given the cost; PA fund is very small.
- Wireless is no substitute for wireline; both are needed
- Consumers limited mostly to cable and telco BIAS.
- Consumers want more speed and mobility.
- Internet service is BIAS Title II telco; not information svc.
- FCC now has low-income programs for voice and BIAS



Questions

