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June 8, 2015

VIA ECFS

Ms. Marlene H. Dortch
Secretary
Federal Communications Commission
445 12th Street, SW
Washington, DC 20554

Re: GN Docket No. 13-5, *Technology Transitions;* GN Docket No. 12-353, *AT&T Petition to Launch a Proceeding Concerning the TDM-to-IP Transition*; WC Docket No. 05-25, *Special Access Rates for Price Cap Local Exchange Carriers*; RM-10593, *AT&T Corp. Petition for Rulemaking to Reform Regulation of Incumbent Local Exchange Carrier Rates for Interstate Special Access Services*; WC Docket No. 15-1, *Windstream's Petition for Declaratory Ruling Seeking to Confirm ILEC's Continued Obligation to Provide DS1s and DS3s on Unbundled Basis After Technology Transitions*

Dear Ms. Dortch:

On June 4, 2015, James Stegeman, Mark Guttman (by telephone), and Joann Lawler of CostQuest Associates; Jennie Chandra, William Kreutz, and Marlena Barzilai of Windstream; and John Nakahata and Henry Shi of Harris, Wiltshire & Grannis, LLP, on behalf of Windstream, met with the following FCC staff (some by telephone) regarding two white papers prepared by CostQuest, which are simultaneously being filed in the above-referenced dockets:[1]

Matthew DelNero	Susan Lee
David Grossman	Daniel Kahn
Tirrill Moore	Virginia Metallo
Jack O'Gorman	David Zesiger
Jack Erb	Pam Arluk
William Layton	John Visclosky
Richard Flannery	Michele Berlove
Vanessa Riley	Alex Johns

[1] *See* Letter from Jennie Chandra, Windstream Corporation, to Marlene H. Dortch, Secretary, FCC, GN Docket Nos. 13-5 & 12-353, WC Docket Nos. 05-25 and 15-1, and RM-10593 (filed June 8, 2015).

Christopher Koves
Steve Rosenberg
Talmage Cox
Ken Lynch

Heather Hendrickson
Jean Ann Collins
Eric Ralph
Aleks Yankelevich

Windstream presented the attached slides, which describe CostQuest's last-mile cost model study design and key findings of its analysis.

CostQuest's first white paper, entitled "Analysis of Fiber Deployment Economics for Efficient Provision of Competitive Service to Business Locations,"[2] demonstrates that the revenue required to support CLEC overbuilding of a last-mile fiber facilities—in the face of the lower market share that CLECs can expect—remains prohibitively high for most business locations. In addition, surveyed pricing data suggest that current wholesale Ethernet prices may exceed retail Ethernet prices in some locations. Such conditions make it difficult, if not impossible, for a CLEC relying on ILEC last-mile connectivity to compete for business service customers at many of those locations. Furthermore, at pricing levels based on available data, the paper shows that wholesale price reductions are not likely to have a meaningful impact on a CLEC's decision to build its own facilities because no matter what the wholesale price, in most instances there is no economically feasible case for a customer to deploy its own last-mile facilities. Finally, the paper demonstrates that ILECs continue to enjoy a dramatic advantage over CLECs in the average cost per building of new last-mile fiber deployment—an advantage that is largely attributable to the incumbents' much larger market shares, which is a direct result of the ILEC first mover advantage rooted in the monopoly era. In other words, CLECs face a much higher threshold than ILECs for fiber loop construction to be economically feasible. Thus, competition for most business service customer locations likely will continue to depend on CLECs' being able to lease ILEC last-mile inputs so that they can connect their CLEC fiber backbone facilities to individual customer locations.

The first white paper serves as an update to a prior cost study that was filed by AT&T in 2002 and was relied upon by the Commission in the *Triennial Review Order*.[3] In particular that study formed a basis for the Commission's conclusion that:

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[2] *See* Attachment A to *id.*

[3] *See* Attachment B to Letter from Joan Marsh, Director, Federal Government Affairs, AT&T, to Marlene Dortch, Secretary, FCC, CC Docket Nos. 01-338, 96-98, 98-147 (filed Nov. 25, 2002) ("AT&T Study Letter"). That study was cited by the Commission in its *Triennial Review Order*. *See, e.g.*, *Review of the Section 251 Unbundling Obligations of Incumbent Local Exchange Carriers*, FCC 03-36, 18 FCC Rcd. 16,978, 17,156 ¶ 298, n.859 (2003) ("*Triennial Review Order*") (citing the AT&T study when finding "for DS1 loops and some DS3 loops, overbuilding

> [A] single DS3 loop, generally, can not [sic] provide a sufficient revenue opportunity to overcome these barriers. Because our impairment analysis rests most heavily on the ability of a self-deploying carrier to recover its sunk and fixed costs, the inability to recover such costs at a single DS3 level results in impairment.[4]

AT&T's analysis supported its efforts to encourage the Commission to establish unbundled DS1 and DS3 capacity loops notwithstanding the availability of DS1 and DS3 special access services. AT&T specifically noted the potential for ILECs, with special access rate it stated "are admittedly *not* offered at cost-based rates" and at "exorbitant levels," to "simply drop its prices below the CLEC's costs, but still above the ILEC's costs, and remain profitable."[5] As AT&T observed, "[B]y setting prices below the CLEC's costs [from the lower of building or buying], the ILEC would make it impossible for the entrant to remain economically viable."[6]

CostQuest's second white paper, entitled "Network Cost Differentials Over Time,"[7] analyzes the changes in cost of network deployment over time as the technology is transitioning from copper and TDM to fiber and IP. This analysis shows that the overall costs for building,

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to enterprise customers that require services over these facilities generally does not present sufficient opportunity for competitors to recover their costs and, therefore, may not be economically feasible").

[4] *Triennial Review Order* at 17,170-71 ¶ 320; *see also id.* at 17,156 ¶ 99 n.860. The Commission also concluded with respect to DS1 capacity loops:

> While we recognize that retail business customer rates are typically higher than residential rates, the record reflects that the revenues generated from small and medium enterprise customers are not sufficient to make self-deploying DS1 loops economically feasible from a cost recovery perspective.[964] As we have stated, our impairment findings rely most heavily on the economic feasibility of competitive LECs to self-deploy and recover sunk costs.[965] Competitive LECs do not have the ability to recover sunk costs in self-deploying DS1 loops.

Id. at 17,174 ¶ 326.

[5] AT&T Study Letter at 1-2.

[6] *Id*. at 2.

[7] *See* Attachment B to Letter from Jennie Chandra, Windstream Corporation, to Marlene H. Dortch, Secretary, FCC, GN Docket Nos. 13-5 & 12-353, WC Docket Nos. 05-25 and 15-1, and RM-10593 (filed June 8, 2015).

operating, and maintaining fiber/IP-based services generally are less than those for legacy services. This suggests that all carriers, including ILECs, will continue to have their own significant business reasons for migrating from TDM to IP and from copper to fiber networks. Requirements to provide equivalent wholesale special access before and after such transitions and to continue to unbundle DS1 and DS3 capacity UNE loops merely maintain the existing regulatory status quo and do not negate these important business incentives for transitioning to fiber/IP services. Indeed, under a regime merely requiring equivalent wholesale pricing, ILECs attain a windfall as they transition to lower cost networks but still charge wholesale rates based on more expensive legacy cost conditions.

In response to a question from the staff, Windstream observed that the GeoResults non-residential market share data in slide 11 include the CLEC affiliates of AT&T, Verizon, and CenturyLink. Including the Bells' affiliates in the CLEC category offers a slightly more conservative picture of the difference between the ILECs' versus CLECs' market shares. Specifically, if these affiliates were excluded, the CLEC nationwide average non-residential market share would be 20.2%. But CLECs, even when competitive carrier operations of the three largest ILECs are excluded, still would hold a market share twice that of large cable providers and would continue to offer the primary source of competition to the ILECs. The average single market share of the largest CLEC (other than AT&T, Verizon, or CenturyLink) in each market would be 9.9%, while the nationwide market share of the single most successful CLEC would be unchanged. It is also interesting to note that the CLEC affiliates of AT&T, Verizon, and CenturyLink attain CLEC revenues from proportionately more business locations of 100 employees or more than they do of smaller business locations; other CLECs offer a far greater source of competition for service to small and medium-sized business locations.

In addition, Windstream explained that the CostQuest model is a "greenfield" analysis. The analysis, therefore, does not recognize that an ILEC may already have critical inputs available that it can leverage for fiber deployments at less or no cost, such as existing conduit or building entrances. In contrast, Windstream's experience is that CLECs usually must construct new conduit and establish building entrances when extending loop facilities to a new location. This infrastructure disparity constitutes a further inherent advantage for the ILEC, the first mover and historical monopoly.

As Windstream has advocated and as the Commission has consistently recognized, just and reasonable wholesale rates, terms, and conditions for last-mile access continue to be vital for business services competition. Such competition is critical to ensure business, nonprofit, and government customers enjoy lower prices and greater innovation in the IP Era. The model calls into significant question ILEC arguments that barriers to entry to providing facilities-based last-mile facilities are low, and that preventing ILECs from increasing CLECs' wholesale costs for TDM special access or unbundled DS1 and DS3 capacity loops as a result of the ILEC shifting to

IP or fiber will disincentivize CLECs from building their own facilities, or ILECs from making such a conversion. Thus, the Commission should act to ensure that wholesale special access services on at least equivalent terms and unbundled DS1 and DS3 capacity loops remain available during and following the IP transition.

Finally, Windstream urged the Commission to act on its proposal to establish six principles for ensuring discontinued TDM special access inputs are replaced with at least equivalent IP inputs. These principles reaffirm that an ILEC may not engage in a price squeeze by pricing retail inputs at levels below comparable wholesale inputs. The principles also would ensure that the IP transition is not used as an excuse to increase per-Mbps rates above those charged for TDM inputs, while offering ILECs flexibility to respond to modern-day customer demands for service tiers, which may differ from traditional TDM-based service increments.

Separately, on June 5, 2015, John Nakahata spoke with Matthew DelNero and Madeleine Findley. He pointed out that the CostQuest white papers supported the continued importance of reaffirming that the requirement for ILECs to provide unbundled access to DS1 and DS3 capacity loops is not limited to copper loops or loops with TDM-based electronics. He thus urged that the Commission move forward to grant the declaratory ruling sought by Windstream in WC Docket No. 15-1.[8]

Please contact me if you have any questions.

Sincerely,

John T. Nakahata
Counsel to Windstream

cc:

Matthew DelNero
David Grossman
Tirrill Moore
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Daniel Alvarez
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Pam Arluk
John Visclosky
Michele Berlove
Alex Johns
Heather Hendrickson
Jean Ann Collins
Eric Ralph
Aleks Yankelevich
Rebekah Goodheart
Nicholas Degani
Madeleine Findley
Carol Mattey

[8] *See* Petition for Declaratory Ruling of Windstream Corporation, WC Docket No. 15-1 and GN Docket No.13-5 (filed Dec. 29, 2014).

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Analysis of Fiber Deployment Economics for Efficient Provision of Competitive Service to Business Locations

CostQuest and Windstream

Presentation to FCC Staff

June 4, 2015

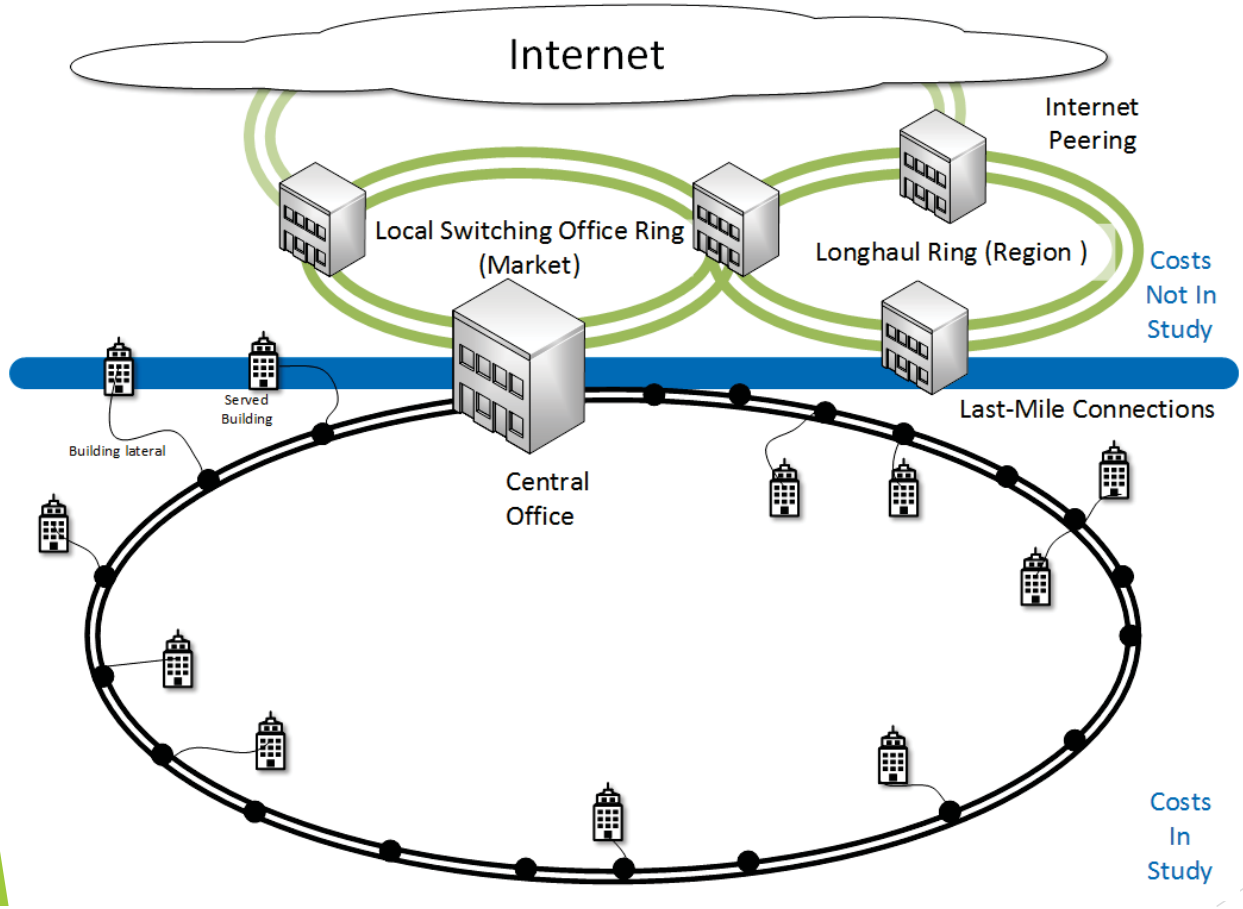
Summary

- Last-mile cost model was developed to address the economics of overbuilding last-mile facilities and under what conditions an overbuild is economically viable. This model is highly configurable and thereby allows for testing sensitivities of various conditions.
- This analysis employs deployment assumptions from a prior AT&T study and, wherever possible, uses modern-day technologies and inputs that are publicly available.
- Findings of the analysis include the following:
  - It continues to be uneconomic for a CLEC to build out its own last-mile networks facilities unless it can attain substantial end user penetration. Costs to install last-mile facilities (fiber ring, laterals, and electronics) and establish new building entries remain significant.
  - Increased market penetration dramatically reduces per-location cost. Thus, the early entrant (usually ILEC) possesses a significant unit cost advantage.
  - Some data suggest that retail Ethernet rates may be lower than wholesale rates for some service speeds. In such cases, leasing will not be a viable alternative because the CLEC cannot expect to recover its lease expense.
  - Current wholesale Ethernet rates, even if less than retail rates, may have little or no impact on a CLEC's decision to deploy its own-last mile facilities.
- In addition, a review of network cost differentials over time shows that—while new deployment costs still pose a high hurdle for market entry—overall costs for building, operating, and maintaining fiber/IP services generally are less than those for TDM services.

Model Development

- **Cost model developed with flexibility to modify**
  - Mostly used CAF Phase II cost model (CAM) input assumptions for CapEx and OpEx
  - Ring construction parameters (size of ring, number of customers) and presumed building entry fees are derived from a prior AT&T last-mile cost study
  - Electronic costs, fiber sizes, and presumed conduit availability are based on Windstream experience
  - Develops investments and monthly costs per building in a manner consistent with CAM (annual charge factors, useful lives, etc.)
  - Highly configurable model, so assumptions can be varied to explore sensitivities
- **Three sensitivity analyses**
  - Revenue Hurdle Analysis (based on Telogical retail rates survey)
  - Build vs. Buy Analysis (based on AT&T and CenturyLink published wholesale rates)
  - Density and Market Share Analysis (using GeoResults non-residential market data)

The Modeled Network



Costs associated with collocation are attributed to the local service office ring (i.e., not in the study)

Network Component Investments

Network Component	Capital Investment
Building Ring	$2,082,446
Building Lateral (20 buildings)	$80,281
Customer Premise 1 Gbps Electronics (20 buildings)	**BEGIN HIGHLY CONFIDENTIAL [redacted] END HIGHLY CONFIDENTIAL**
Customer Premise 10 Gbps Electronics (20 buildings)	**BEGIN HIGHLY CONFIDENTIAL [redacted] END HIGHLY CONFIDENTIAL**
CO Electronics – Ethernet	**BEGIN HIGHLY CONFIDENTIAL [redacted] END HIGHLY CONFIDENTIAL**
Total: Up to 1 Gbps Ethernet in each building	$2,327,257
Total: 1 Gbps to 10 Gbps Ethernet in each building	$2,591,256
Per Building: Ethernet, Up to 1 Gbps	$116,362
Per Building: Ethernet, 1 Gbps to 10 Gbps	$129,563

AT&T study assumptions: 30-mile ring, 20 laterals, 20 active buildings

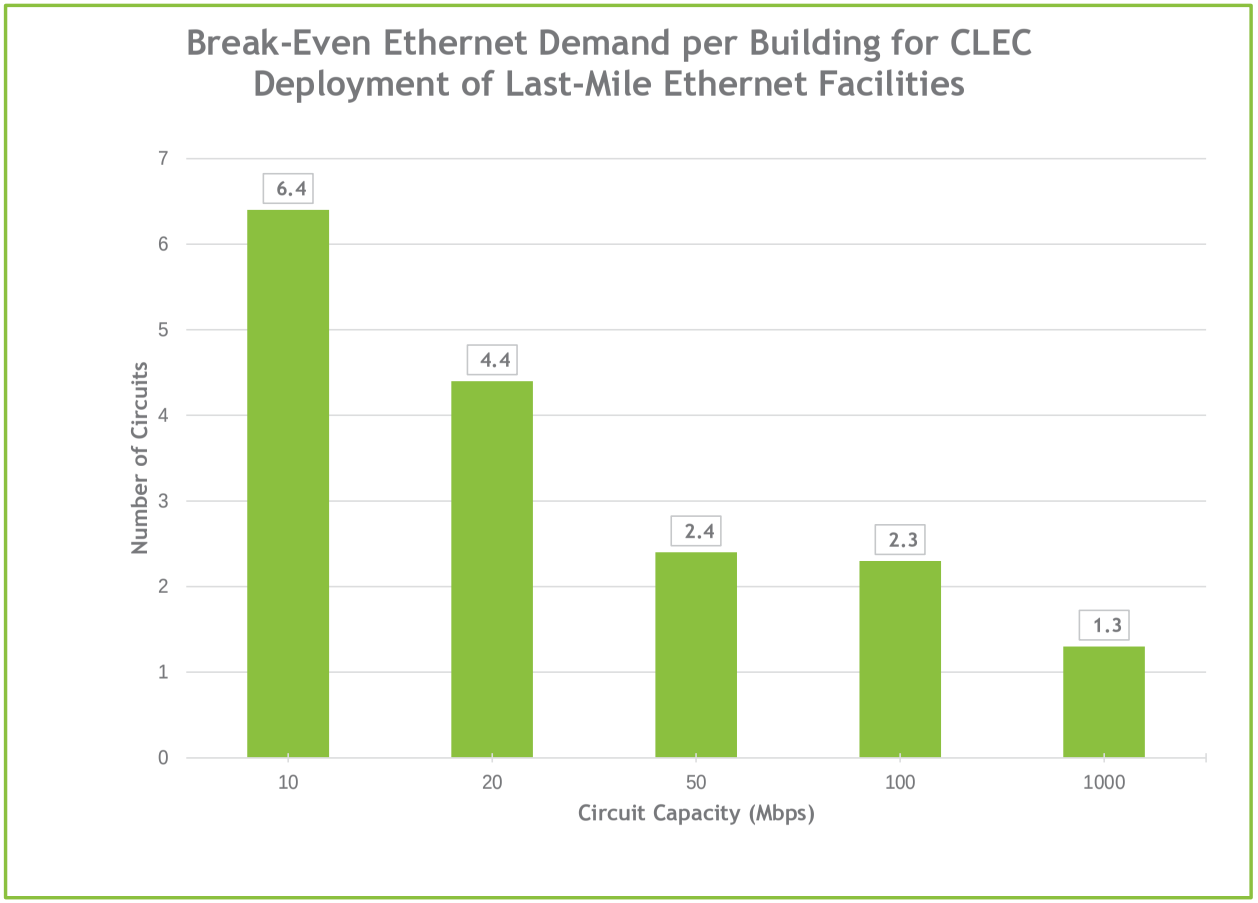
AT&T study: Letter from Joan Marsh, AT&T, to Marlene Dortch, Secretary, FCC, CC Docket Nos. 01-338, 96-98, 98-147, Attachment B (Nov. 25, 2002) (study cited favorably in the TRO).

CAM: Input workbooks are available for download at http://www.fcc.gov/bureaus/onnect_America_Cost_Model_v4.1.1Default%20Inputs.zip. The CAM Capex inputs provided labor, material, and structure values. Capital Cost (Annual Cost factors) and Operating Expense factors also were taken from the adopted CAM (ACF8 50 V6 and Opex V8).

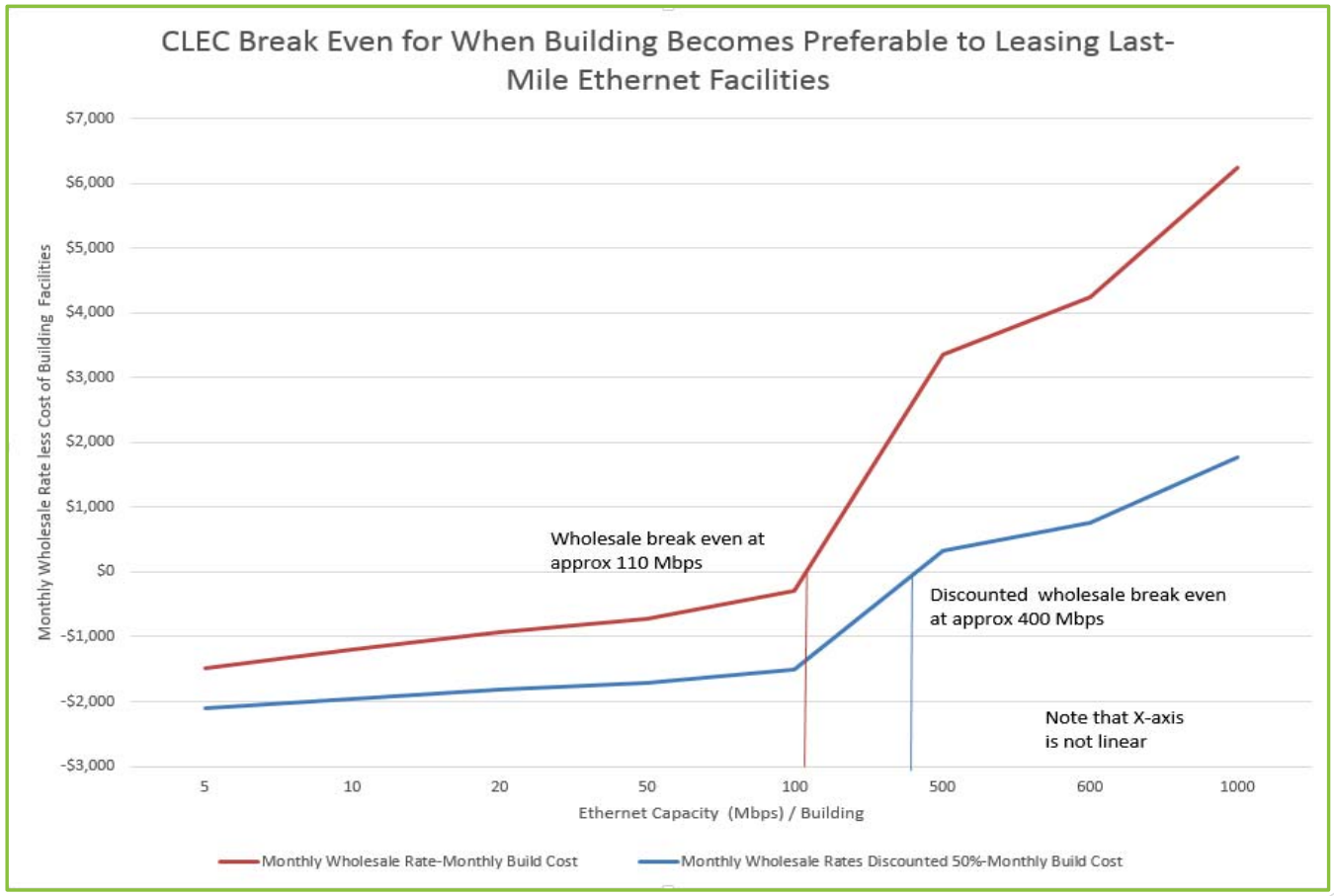
Monthly Costs of Network Components

Network Component	Monthly Cost
Building Ring	$35,764
Building Lateral (20 buildings)	$1,402
Building Rent (20 buildings @ $678/month/building)	$13,560
Premise if 1 Gbps Electronics (20 buildings)	**BEGIN HIGHLY CONFIDENTIAL [redacted] END HIGHLY CONFIDENTIAL**
Premise if 10 Gbps Electronics (20 buildings)	**BEGIN HIGHLY CONFIDENTIAL [redacted] END HIGHLY CONFIDENTIAL**
CO Electronics – Ethernet	**BEGIN HIGHLY CONFIDENTIAL [redacted] END HIGHLY CONFIDENTIAL**
Total: Up to 1 Gbps Ethernet in each building	$54,238
Total: 1 Gbps to 10 Gbps Ethernet in each building	$59,874
Per Building: Ethernet, Up to 1 Gbps	$2,712
Per Building: Ethernet, 1 Gbps to 10 Gbps	$2,994

Revenue Hurdle Analysis



Build-Versus-Buy Analysis



Retail Price Constraints May Limit Viability of Using ILEC Leased Wholesale Access

Ethernet Bandwidth (Mbps)	Average Retail Pricing (Telogical Survey)	AT&T and CenturyLink Average Wholesale Pricing *3-Year Term – Non-Critical*	
		Public	With 50% Discount
10	$427	$1,510	$755
20	$616	$1,790	$895
50	$1,122	$1,994	$997
100	$1,196	$2,413	$1,206
1000	$2,157	$8,958	$4,479

Sources: Telogical Systems DIA retail rates survey data (obtained 4/20/15); AT&T Switched Ethernet Guidebook (12/15/14), Port, Bandwidth & Network to Network Interface, Non-Critical class of service; Qwest Communications Rates and Services Schedule Interstate No. 1 (5/19/14) Metro Optical Ethernet (MOE) Port, Bandwidth Profile & CO MOE and CO Connecting Channel, 3-year term, Non-Critical class of service.

Current Wholesale Ethernet Rates May Not Impact a CLEC's Fiber Deployment Decision

- The analyses suggest that an economically rational CLEC will base its decision to self-deploy on the revenue hurdle analysis, which establishes that self-deployment to serve a single customer with less than 1 Gbps of capacity per building (i.e., $2,712/month in revenue) would be uneconomic.
- In this situation, the fact that wholesale lease payments may present a more appealing option at certain speed tiers below 1 Gbps (e.g., at/below 400 Mbps when a 50% wholesale discount is presumed) would appear to be irrelevant to the CLEC's decision to build; the only way in which wholesale rates would impact the CLEC's decision making is if leasing appeared to be preferable at levels above 1 Gbps of capacity, i.e., at levels where self-deployment presents an economically viable alternative for the CLEC.
- As modeled, the availability of wholesale Ethernet alternatives, therefore, does not appear to crowd out economically efficient construction of CLEC fiber facilities in the last mile.

GeoResults Non-Residential Market Data

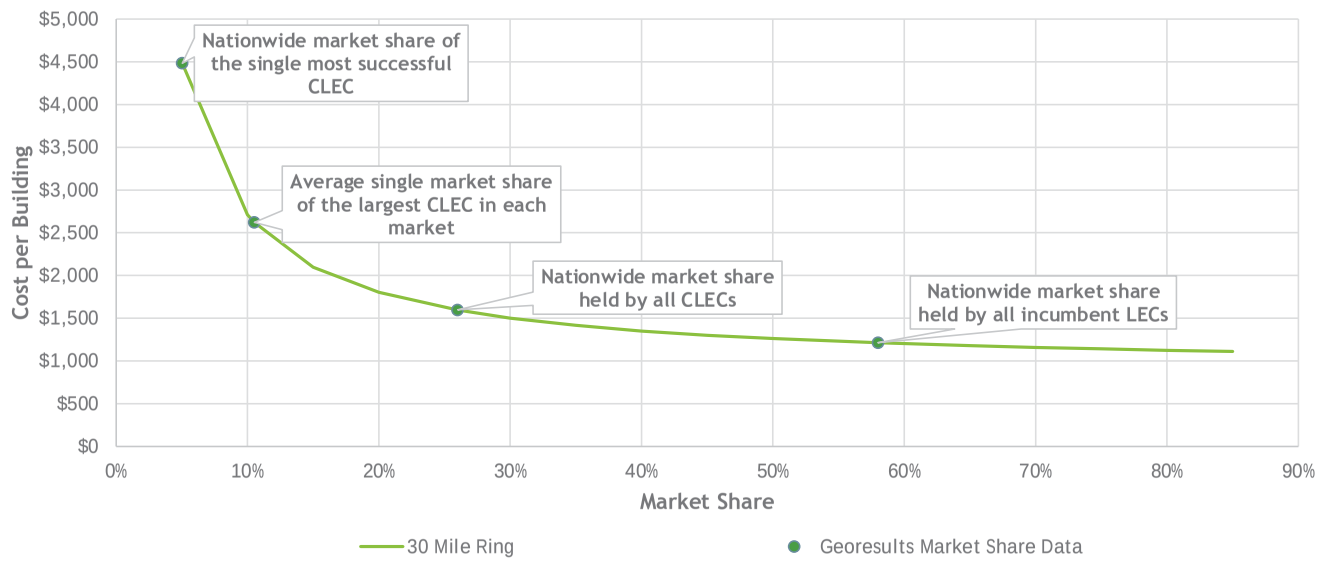
Market Share	Percentage of Total Marketplace
Nationwide market share of the single most successful CLEC	5.0%
Average single market share of the largest CLEC in each market	10.5%
Nationwide market share held by all CLECs	26.0%
Nationwide market share held by all incumbent LECs	58.0%

Source: Non-residential market share values used in this analysis were based on estimated expenditures by non-residential customers on wireline communications during Second Quarter of 2014, as compiled by the independent market research firm GeoResults. CLEC market shares include revenues from services both over CLECs' network facilities as well as last-mile facilities leased from incumbent LECs.

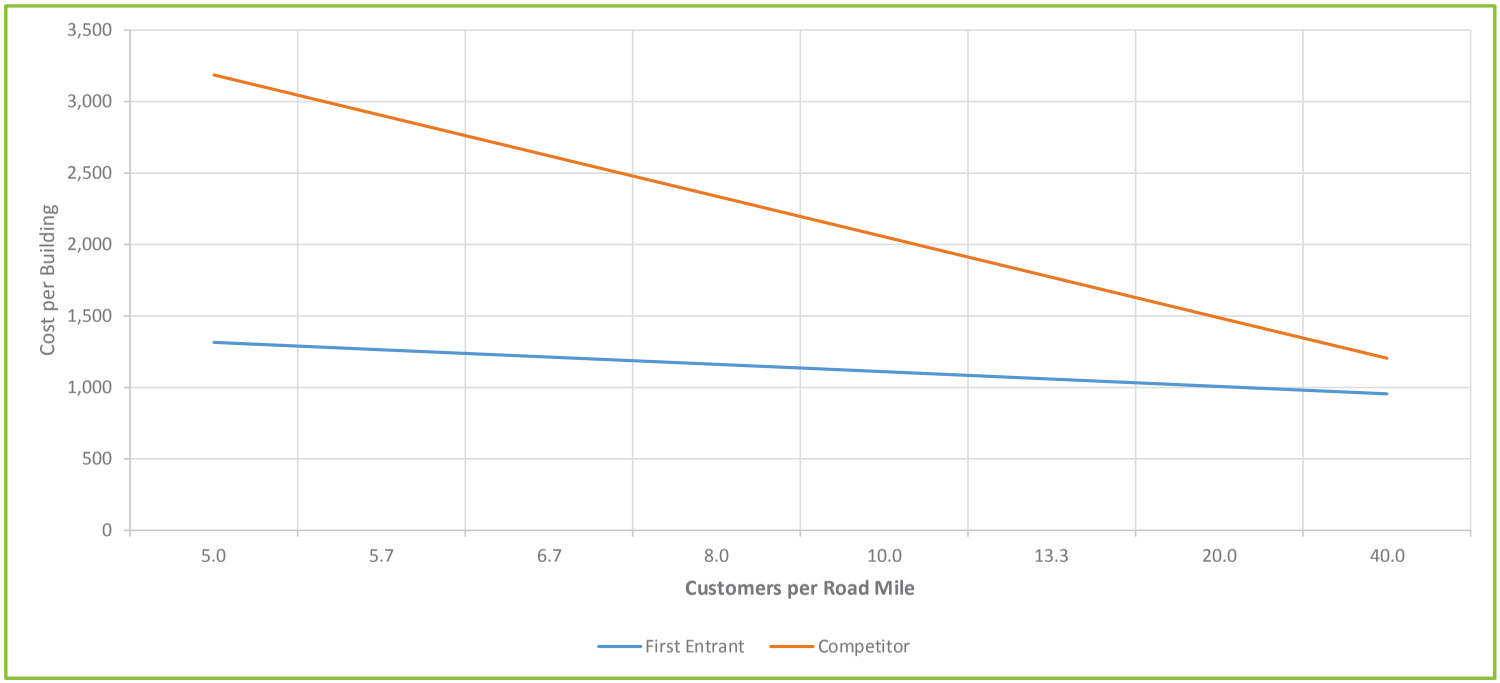
Cost per Customer Location for a 200-Location Market Area: Varying Density and Market Share

Market Share	Density	5.00 Bldgs/Mile	5.71 Bldgs/Mile	6.67 Bldgs/Mile	8.00 Bldgs/Mile	10.00 Bldgs/Mile	13.33 Bldgs/Mile	20.00 Bldgs/Mile	40.00 Bldgs/Mile
	Ring Size:	*40 Mile*	*35 Miles*	*30 Miles*	*25 Miles*	*20 Miles*	*15 Miles*	*10 Miles*	*5 Miles*
5.03%	10 Bldgs	5,669	5,076	4,484	3,891	3,299	2,706	2,114	1,521
10.00%	20 Bldgs	3,308	3,010	2,712	2,414	2,116	1,818	1,520	1,222
10.52%	21 Bldgs	3,187	2,904	2,621	2,338	2,054	1,771	1,488	1,204
15.00%	30 Bldgs	2,495	2,297	2,098	1,899	1,701	1,502	1,303	1,105
20.00%	40 Bldgs	2,101	1,952	1,803	1,654	1,505	1,356	1,207	1,058
26.00%	52 Bldgs	1,826	1,711	1,597	1,482	1,368	1,253	1,138	1,024
30.00%	60 Bldgs	1,699	1,599	1,500	1,401	1,301	1,202	1,103	1,003
35.00%	70 Bldgs	1,587	1,502	1,417	1,332	1,246	1,161	1,076	991
40.00%	80 Bldgs	1,498	1,423	1,349	1,274	1,200	1,125	1,051	976
45.00%	90 Bldgs	1,433	1,367	1,301	1,235	1,168	1,102	1,036	970
50.00%	100 Bldgs	1,382	1,322	1,263	1,203	1,143	1,084	1,024	965
58.00%	116 Bldgs	1,315	1,264	1,212	1,161	1,110	1,058	1,007	956
65.00%	130 Bldgs	1,271	1,225	1,179	1,133	1,088	1,042	996	950
70.00%	140 Bldgs	1,242	1,200	1,157	1,115	1,072	1,029	987	944
75.00%	150 Bldgs	1,221	1,181	1,141	1,102	1,062	1,022	982	943
80.00%	160 Bldgs	1,199	1,162	1,124	1,087	1,050	1,013	975	938
85.00%	170 Bldgs	1,182	1,147	1,112	1,077	1,042	1,007	972	937

Monthly Ethernet Deployment Cost per Building: Impact of Market Share



Monthly Ethernet Deployment Cost per Building: Impact of Density

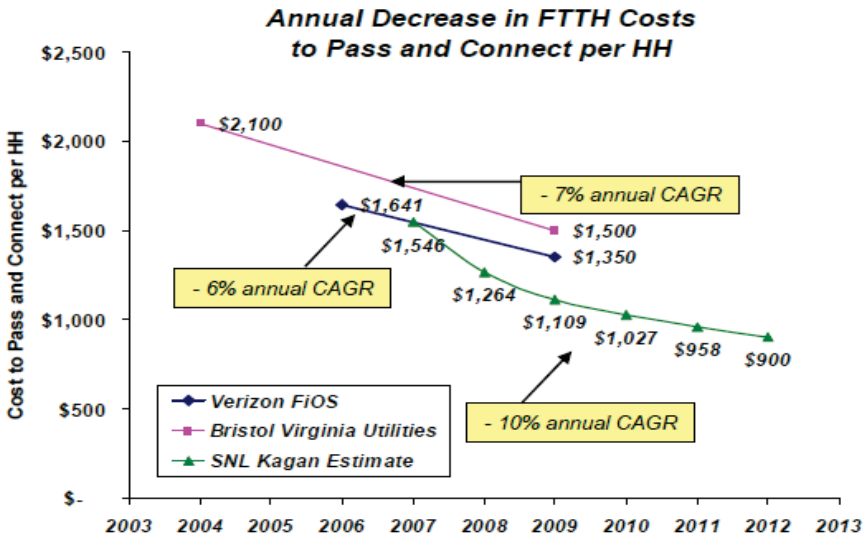


Network Cost Differentials Over Time

- **Labor**: While the overall cost of labor per hour has increased (up by 22% since 2002), significant labor productivity improvements have been achieved with new efficiencies in network construction practices.
- **Fiber**: Price of fiber-optic cable has decreased ~19% since 2003.
- **Electronics**: Cost of electronics for comparable business service has decreased dramatically in recent years.

Source: *Series Report*, Bureau of Labor Statistics, U.S. Dep't of Labor, Produced Price Index Industry Data, Series ID "PCU3359213359210".

Reports Show Lower FTTH Costs



- These reductions in investment required over time are driven by three major factors:
  - Field efficiency improvements by service providers through improved procedures, training and use of innovative labor-saving methods
  - Materials cost reductions through increasing purchase volumes and manufacturing efficiency
  - Fixed cost allocation across a larger number of passed households and subscribers
- It is noteworthy that multiple service providers (not just Verizon) have achieved cost declines – we expect future deployments by other service providers to reap many of these benefits

Source: CSMG FTTH Deployment Assessment (Oct. 13, 2009)