STATE OF VERMONT
PUBLIC UTILITY COMMISSION

Case No. 21-4060-PET

Petition of Consolidated Communications of Vermont Company, LLC and Consolidated Communications of Northland Company (both d/b/a "Consolidated Communications") for approval of a Successor (2022-2024) Incentive Regulation Plan, pursuant to 30 V.S.A. § 226b	

REBUTTAL TESTIMONY OF

KENNETH MARTIN

ON BEHALF OF CONSOLIDATED COMMUNICATIONS

March 4, 2022

SUMMARY OF TESTIMONY

Witness Kenneth Martin provides testimony in rebuttal of Dr. Ankum's prefiled testimony from January 21, 2022 regarding the current level of competition in broadband and voice markets in the State of Vermont.

REBUTTAL TESTIMONY OF
KENNETH MARTIN
ON BEHALF OF CONSOLIDATED COMMUNICATIONS

Q1. Please state your name, position, and business address.

A1. My name is Kenneth Martin. I am a Director at Altman Solon, a global strategic management consulting firm focused on the telecommunications industry. My business address is Altman Solon, 101 Federal Street, 28th Floor, Boston, MA 02110.

Q2. Have you previously testified before the Vermont Public Utility Commission ("Commission")?

A2. Yes, in prefiled testimony in this matter in 2021.

Q3. What is the purpose of your testimony?

A3. Altman Solon has been retained by Consolidated Communications to provide background on the competition level in the broadband and voice markets in Vermont. I led a team of Altman Solon consultants to study the level and nature of broadband and voice competition in Vermont. In this testimony, I address Dr. Ankum's testimony on the level of competition in Vermont.

Q4. Please summarize your testimony.

A4. My testimony below reviews arguments made by Dr. Ankum and provides additional data on the level of competition within Vermont.

Q5. Please describe how competition in the broadband market in Consolidated's ILEC footprint differs from Vermont as a whole.

A5. Dr. Ankum states in his answer to Question 7 on pages 5 and 6 of his testimony that "Consolidated overgeneralizes the extent to which these alternative communications media translate into actual alternative services available to Vermont consumers…" and argues that "[t]o accurately understand how competition is impacting Consolidated and its customers, one must focus more directly on conditions within the Company's service territory."[1] Dr. Ankum does not cite any source or provide any data describing how the level of competition in Consolidated's footprint differs from Vermont as a whole. In fact, the level of competition for broadband within Consolidated's territory is nearly the same as for Vermont as a whole. The FCC reports the level of broadband coverage at the census block level of fixed providers by advertised speed, technology type, and whether the provider serves residential and/or business customers. Based on the FCC definition of "served" as a census block with advertised broadband speeds of at least 25 Mbps download and 3 Mbps upload, over 99.9% of households[2] in both Vermont as a whole and within Consolidated's footprint as of 2020 are in census blocks having access to at least 25 down and 3 Mbps up speeds from at least two broadband providers, with 93.4% having access to three or more in Vermont as a whole and 93.8% having access to three or more in Consolidated's Vermont footprint.[3]

[1] Prefiled Direct Testimony of August Ankum, Ph.D. On Behalf of the Vermont Department of Public Service, January 21, 2022.
[2] FCC estimated household counts by census block. https://www.fcc.gov/staff-block-estimates
[3] FCC Form 477, June 2020, https://www.fcc.gov/general/broadband-deployment-data-fcc-form-477 . Note that this FCC Form 477 data includes satellite and excludes mobile wireless broadband.

Figure A: Vermont and Consolidated Households in CBs served by Broadband Providers with 25/3 Mbps[4]

Vermont Households Served by Number of Broadband Providers with 25/3Mbps				
Number of Broadband Provider Advertising >=25 Mbps Down and >=3 Mbps Up	VT Percent of Households	VT Percent of Households (Cumulative)	Consolidated VT Percent of Households	Consolidated VT Percent of Households (Cumulative)
0	0.0%	100.0%	0.0%	100.0%
1	0.0%	100.0%	0.0%	100.0%
2	6.6%	100.0%	6.2%	100.0%
3	38.1%	93.4%	39.8%	93.8%
4	46.3%	55.3%	44.4%	54.1%
5 or More	9.0%	9.0%	9.7%	9.7%
Total	100.0%		100.0%	

On a weighted average basis,[5] both Vermont and Consolidated households are in census blocks with 3.58 broadband competitors offering at least 25 down and 3 Mbps up speeds. On this metric, the level of broadband competition within the Consolidated ILEC footprint is nearly identical to Vermont as a whole.

Using a lower broadband speed threshold of advertised speeds of at least 4 Mbps download and 1 Mbps upload, over 99.9% of both Vermont and Consolidated households are in census blocks having access to at least two providers and 98.7% of Vermont households are in census blocks having access to three or more providers while 98.8% of Consolidated's households are in census blocks having access to three or more providers.[6]

[4] FCC 477, June 2020, https://www.fcc.gov/general/broadband-deployment-data-fcc-form-477
[5] To calculate weighted average number of competitors for Vermont and Consolidated's footprint, we use FCC Form 477 data on number of competitors reporting that they serve each census block and weight by the number of households in each block across both Vermont and Consolidated's footprint.
[6] FCC estimated household counts by census block. https://www.fcc.gov/staff-block-estimates

Figure B: Vermont and Consolidated Households in CBs served by Broadband Providers with 4/1 Mbps[7]

Vermont Households Served by Number of Broadband Providers with 4/1Mbps				
Number of Broadband Provider Advertising >=4 Mbps Down and >=1 Mbps Up	VT Percent of Households	VT Percent of Households (Cumulative)	Consolidated VT Percent of Households	Consolidated VT Percent of Households (Cumulative)
0	0.0%	100.0%	0.0%	100.0%
1	0.0%	100.0%	0.0%	100.0%
2	1.3%	100.0%	1.2%	100.0%
3	13.8%	98.7%	12.1%	98.8%
4	60.6%	84.9%	60.4%	86.6%
5 or More	24.4%	24.4%	26.3%	26.3%
Total	100.0%		100.0%	

On a weighted average basis, Vermont households are in census blocks with 4.10 broadband competitors offering at least 4 down and 1 Mbps up speeds while Consolidated households are in census blocks with 4.14 broadband competitors offering at least 4 down and 1 Mbps up speeds. On this metric, the level of broadband competition within the Consolidated ILEC footprint is slightly higher than Vermont as a whole.

The same analysis of FCC Form 477 data for business broadband reveals a similar finding that Consolidated's footprint has a competitive presence at the same level as the state as a whole. Utilizing FCC data and 2021 business location data from data vendor InfoUSA, 99.9% of business locations in both Vermont and Consolidated's footprint are in census blocks having access to two or more fixed providers with advertised speeds of at least 25 Mbps down and 3

[7] FCC 477, June 2020, https://www.fcc.gov/general/broadband-deployment-data-fcc-form-477

Mbps up. [8] Furthermore, 93.4% of business locations in Vermont and 93.5% of business locations in Consolidated's footprint are in census blocks having three or more broadband providers operating in their area.[9]

Figure C: Vermont Business Locations in CBs served by Broadband Providers with 25/3 Mbps[10]

Vermont Business Locations Served by Number of Broadband Providers with 25/3Mbps				
Number of Broadband Provider Advertising >=25 Mbps Down and >=3 Mbps Up	**VT Percent of Business Locations**	**VT Percent of Business Locations (Cumulative)**	**Consolidated VT Percent of Business Locations**	**Consolidated VT Percent of Business Locations (Cumulative)**
0	0.0%	100.0%	0.0%	100.0%
1	0.1%	100.0%	0.1%	100.0%
2	6.5%	99.9%	6.5%	99.9%
3	35.4%	93.4%	36.4%	93.5%
4	54.3%	58.0%	53.1%	57.1%
5 or More	3.8%	3.8%	4.0%	4.0%
Total	100.0%		100.0%	

Likewise, providers that advertise speeds of at least 4 Mbps down and 1 Mbps up cover census blocks containing nearly all (99.9%) of both Vermont business locations and business locations in Consolidated's footprint.[11]

[8] FCC 477, June 2020, https://www.fcc.gov/general/broadband-deployment-data-fcc-form-477; InfoUSA Business Locations, 2021,https://www.dataaxleusa.com/lp/partner/. InfoUSA Business Locations information is available with a service subscription.
[9] FCC 477, June 2020, https://www.fcc.gov/general/broadband-deployment-data-fcc-form-477; InfoUSA Business Locations, 2021, https://www.dataaxleusa.com/lp/partner/
[10] FCC 477, June 2020, https://www.fcc.gov/general/broadband-deployment-data-fcc-form-477; InfoUSA Business Locations, 2021, https://www.dataaxleusa.com/lp/partner/
[11] FCC Form 477, June 2020, https://www.fcc.gov/general/broadband-deployment-data-fcc-form-477; InfoUSA Business Locations, 2021, https://www.dataaxleusa.com/lp/partner/

Figure D: Vermont Business Locations in CBs served by Broadband Providers with 4/1 Mbps [12]

Vermont Business Locations Served by Number of Broadband Providers with 4/1Mbps				
Number of Broadband Provider Advertising >=4 Mbps Down and >=1 Mbps Up	VT Percent of Business Locations	VT Percent of Business Locations (Cumulative)	Consolidated VT Percent of Business Locations	Consolidated VT Percent of Business Locations (Cumulative)
0	0.0%	100.0%	0.0%	100.0%
1	0.1%	100.0%	0.1%	100.0%
2	2.4%	99.9%	2.4%	99.9%
3	13.5%	97.5%	12.0%	97.6%
4	70.3%	84.0%	70.9%	85.5%
5 or More	13.7%	13.7%	14.6%	14.6%
Total	100.0%		100.0%	

Likewise, data from the Vermont Department of Public Service survey of access to broadband by minimum available speed also shows that the availability of broadband within Consolidated's footprint mirrors that of the state in total. The survey found that 80.3% of all locations in Vermont and 81.0% in Consolidated's footprint had access to internet with speeds of at least 25 Mbps download speed and 3 Mbps upload speed.[13] The survey also found that 96.2% of all locations in Vermont and 96.2% in Consolidated's footprint had access to speeds of at least 4 Mbps down and 1 Mbps up.[14] Note that satellite providers were not included in this data.[15] Furthermore, the Vermont Broadband Statistics also show that the availability of residential

[12] FCC Form 477, June 2020, https://www.fcc.gov/general/broadband-deployment-data-fcc-form-477; InfoUSA Business Locations, 2021, https://www.dataaxleusa.com/lp/partner/
[13] By convention, this report refers to broadband speeds with the formulation: X Mbps down and Y Mbps up or X/Y Mbps, meaning X megabits per second download speed and Y megabits per second upload speed.
[14] https://publicservice.vermont.gov/content/broadband-availability
[15] Altman Solon team communication with Vermont Department of Public Service staff, identified in my Direct Prefiled Testimony.

broadband for Vermont as a whole is virtually identical to Consolidated's footprint, with both having 4/1Mbps available to 96.9% of residential locations.[16]

Figure E: Vermont Broadband Statistics Summary as of February 21, 2022[17]

Vermont Broadband Statistics Summary as of February 21, 2022			
Location Type by Area Type	**Percent of Locations Served 25/3 or Better**	**Percent of Locations Served 4/1 or Better**	**Percent of Locations Without 4/1 or Better**
Residential - VT Total	82.0%	96.9%	3.1%
Non-Residential - VT Total[18]	71.5%	92.2%	7.8%
All Buildings - VT Total	80.3%	96.2%	3.8%
Residential - Consolidated	82.7%	96.9%	3.1%
Non-Residential - Consolidated	72.2%	92.1%	7.9%
All Buildings - Consolidated	81.0%	96.1%	3.9%

Q6. Do you agree with Dr. Ankum's characterization of your analysis as to the level of voice competition in Vermont?

A6. Dr. Ankum states in his answer to Question 7 on page 6 of his testimony that the analysis in my prefiled testimony "exaggerates the degree of competition, particularly for residential and small business."[19] However, Dr. Ankum does not provide any data to rebut any of the data or analysis included in my report. His testimony does not provide evidence to refute that from the perspective of any one Vermont consumer, there will typically be 3-5 mobile network operators (AT&T, Verizon, T-Mobile, US Cellular, and VTel Wireless)[20], dozens of Mobile Virtual

[16] https://publicservice.vermont.gov/content/broadband-availability
[17] https://publicservice.vermont.gov/content/broadband-availability
[18] Non-Residential includes all other locations listed in the Vermont Broadband Statistics data, including commercial, government, and camp/campground locations.
[19] Prefiled Direct Testimony of August Ankum, Ph.D. On Behalf of the Vermont Department of Public Service, January 21, 2022.
[20] FCC Mobile Form 477, https://www.fcc.gov/mobile-deployment-form-477-data

Network Operators (such as Boost Mobile, Consumer Cellular, Cricket, Google Fi, Mint Mobile, Straight Talk, TracFone, Virgin Mobile, and Xfinity Mobile)[21], 61 over-the-top VoIP providers[22] that can deliver voice over 4up/1down Mbps broadband connections that are available to over 99.9% of households and business locations in Consolidated's footprint based on FCC data[23] and 96.1% based on Vermont Broadband Statistics[24] (which excludes satellite broadband), in addition to facilities- based wireline voice from Consolidated, a Cable MSO in most locations (84% of households are in census blocks where FCC Form 477 lists a cable MSO as providing broadband), and overbuilders in many locations.[25]

Q7. Do you agree with Dr. Ankum's characterization that the competitive service alternatives available to Vermont consumers are limited?

A7. Dr. Ankum in his answer to Question 8 on page 6 of his testimony does not provide any data to rebut any of the data or analysis included in my report. His argument instead draws on the example of how there is only one ILEC in each location and that CLECs and cable companies often do not build out to all locations within ILEC footprints, without providing any data on the number of operators by type. Dr. Ankum also dismisses wireless networks since they do not have "ubiquitous coverage in Vermont," again without providing any data on level of coverage.[26] However, according to FCC data, 99.95% of households (all but 106) are within census blocks

[21] See for example: https://www.wirefly.com/content/phone-plans/vermont/Burlington
[22] FCC Voice Telephone Services Report, June 2019, https://www.fcc.gov/voice-telephone-services-report.
[23] FCC 477, June 2020, https://www.fcc.gov/general/broadband-deployment-data-fcc-form-477
[24] https://publicservice.vermont.gov/content/broadband-availability
[25] FCC 477, June 2020, https://www.fcc.gov/general/broadband-deployment-data-fcc-form-477
[26] Prefiled Direct Testimony of August Ankum, Ph.D. On Behalf of the Vermont Department of Public Service, January 21, 2022, at page 7.

with voice service from at least one wireless provider within Consolidated's ILEC footprint.[27] Furthermore, as of 2019, Vermont consumers subscribed to wireless voice at twice the rate of wireline voice, with 95% wireless voice lines as a percent of population versus 47% wireline voice lines as a percent of population.[28] As of 2019, ILEC switched voice lines only account for 16% of total Vermont voice lines versus wireless voice, which accounted for 66.7% of total Vermont voice lines.[29] There is no rationale or discussion of why unless wireless is "ubiquitous", despite over four times the level of adoption of ILEC switched voice line, it should in Dr. Ankum's view be dismissed as a competitive option for consumers.

Dr. Ankum further dismisses OTT VoIP since it requires paying for broadband service and stating that as subscription levels are only 3.4%, "[t]his suggests that OTT VoIP is not an attractive form of voice telephone service for the majority of Vermont consumers."[30] There is again no data or analysis provided on the cost of broadband or OTT VoIP or discussion of why current levels of adoption justify dismissing it as an option for consumers. Note that 83.4% of Vermont households had adopted broadband by 2019[31] and the cost of popular OTT VoIP options can be as low as $0 per month with $100 purchase of equipment[32] or $49.99 for an annual plan (under $5 per month).[33]

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[27] FCC Mobile Form 477, https://www.fcc.gov/mobile-deployment-form-477-data
[28] FCC Voice Telephone Services Report, June 2019; US Census American Community Survey, 2019, https://www.census.gov/acs/www/data/data-tables-and-tools/subject-tables/, https://www.fcc.gov/staff-block-estimates
[29] FCC Voice Telephone Services Report, June 2019, https://www.fcc.gov/voice-telephone-services-report.
[30] Prefiled Direct Testimony of August Ankum, Ph.D. On Behalf of the Vermont Department of Public Service, January 21, 2022, at page 7.
[31] US Census American Community Survey, 2019, https://www.census.gov/acs/www/data/data-tables-and-tools/subject-tables/
[32] https://www.ooma.com/home-phone/
[33] https://www.magicjack.com/

Dr. Ankum also states that, "[b]roadband providers routinely advertise their services as delivering speeds that are far greater than consumers actually experience" and that "coverage area maps found on mobile wireless providers' websites tend to exaggerate their coverage"[34] without citing any data to quantify prevalence of these issues or to what extent these issues may impact consumer options. Dr. Ankum points to the Department's 2018 Mobile Wireless Drive Test, but offers no analysis of how the Drive Test impacts options for consumers and simply concludes without analysis that it "implies that not all consumers will have access to acceptable service quality for wireless options that are available from their homes and businesses."[35] However, the Drive Test purpose was to determine the level of gaps in wireless broadband below 5Mbps for the purpose of challenging 1km blocks for the Mobility Phase II program and the data was collected while driving; it was not a test of stationary wireless voice coverage in residences and commercial buildings.[36] The 2019 level of wireless voice substitution in Vermont at 47.7% shows that wireless was the most common consumer choice for voice in Vermont, far exceeding ILEC switched voice adoption.[37]

Q8. Do you agree with Dr. Ankum's use of Burlington and Greensboro to illustrate the actual conditions that consumers face in Consolidated's service territory?

A8. In his answer to Question 10 on pages 8-10, Dr. Ankum selects two towns, Burlington and Greensboro to demonstrate differences in consumer choice in different areas of Vermont,

[34] Prefiled Direct Testimony of August Ankum, Ph.D. On Behalf of the Vermont Department of Public Service, January 21, 2022, at page 8.
[35] Prefiled Direct Testimony of August Ankum, Ph.D. On Behalf of the Vermont Department of Public Service, January 21, 2022, at page 8.
[36] https://publicservice.vermont.gov/content/mobile-wireless-drive-test
[37] https://www.cdc.gov/nchs/nhis/erwirelesssubs.htm

without conducting analysis of the full range of areas throughout Vermont and Consolidated's ILEC territory.[38] In doing so, he provides an incomplete picture of the prevalence of competition across Consolidated's footprint. The figure below shows that for towns in different household density tiers, over 90% of residential locations have access to terrestrial broadband with at least 4/1Mbps, which is sufficient to support OTT VoIP.

Figure F: Vermont Broadband Statistics Summary as of February 21, 2022[39]

Vermont Broadband Statistics Summary as of February 21, 2022

Households per Square Mile	Number of Towns	Residential Locations	Percent of Locations Served 25/3 or Better	Percent of Locations Served 4/1 or Better	Percent of Locations Without 4/1 or Better
>1000	5	23,056	100.0%	100.0%	0.0%
200-1000	8	20,615	99.6%	99.9%	0.1%
100-200	9	23,462	98.0%	99.5%	0.5%
50-100	16	35,603	93.5%	98.6%	1.4%
20-50	65	76,864	81.9%	97.3%	2.7%
10-20	88	58,241	63.9%	94.0%	6.0%
<10	67	22,307	59.6%	92.0%	8.0%

Dr. Ankum's example of Greensboro also ignores that 96% of locations have access to terrestrial broadband service at 4/1 Mbps or higher, which is sufficient to support OTT VoIP. Using FCC Form 477 data, we can see that within Consolidated's ILEC territory all towns have at least 2 broadband competitors on a weighted average basis with at least 25/3Mbps.

[38] Prefiled Direct Testimony of August Ankum, Ph.D. On Behalf of the Vermont Department of Public Service, January 21, 2022.
[39] https://publicservice.vermont.gov/content/broadband-availability

Figure G: Weighted Average Number of Broadband Providers, by Town

Vermont Towns by Weighted Average Count of Broadband Providers, Consolidated Footprint		
Weighted Average Number of Competitors, Weighted by Households at Census Block Level	**Vermont Towns by Number of Broadband Providers with at least 25/3Mbps**	**Vermont Towns by Number of Broadband Providers with at least 4/1Mbps**
0	0	0
>0,<1	0	0
>=1,<2	0	0
>=2,<3	68	14
>=3,<4	140	115
>=4,<5	13	83
>=5	0	9

With respect to Greensboro, FCC Form 477 data shows a weighted average 2.7 competitors with at least 25/3Mbps and 5.1 competitors with at least 4/1Mbps. The FCC shows that broadband providers in Greensboro include: Consolidated, Comcast, Hughes, ViaSat, Kingdom Connection / Pear Networks, and Cloud Alliance.

Q9. Do you agree with Dr. Ankum's conclusions as to whether wireless and fixed VoIP and OTT VoIP are substitutes for Consolidated's BLES service?

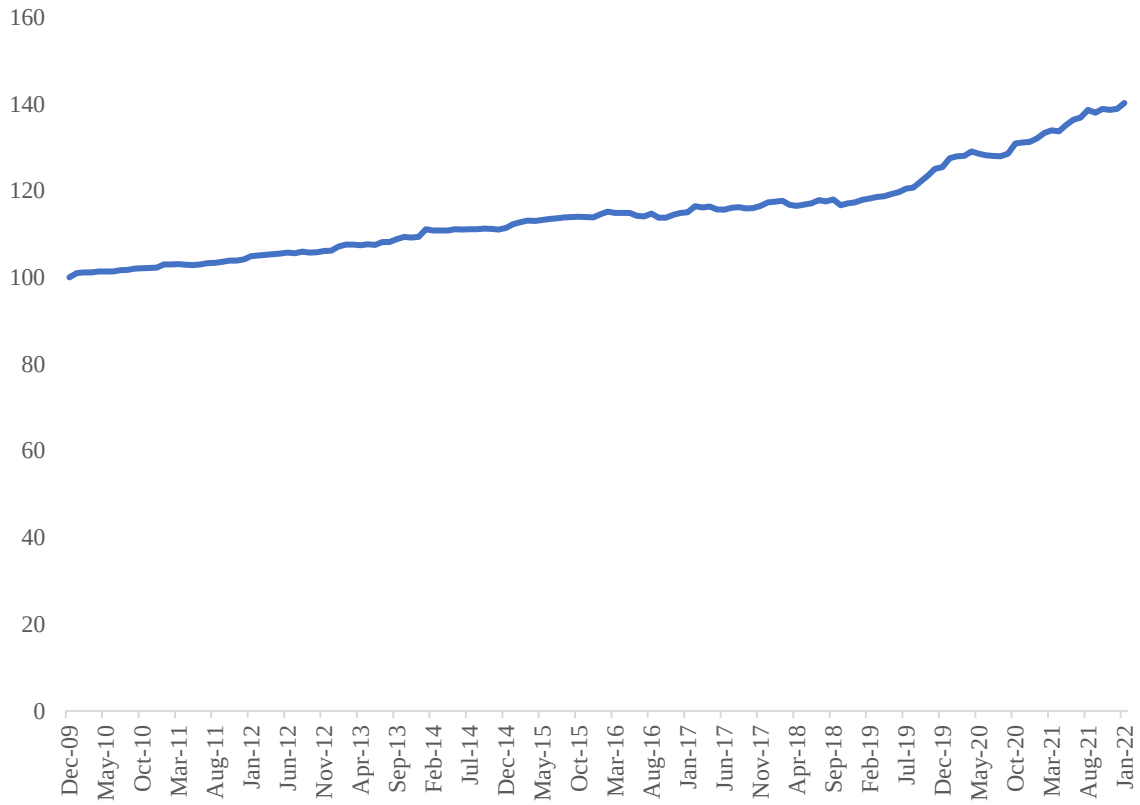
A9. In his answer to Question 14 on page 14, Dr. Ankum states that "[f]ew, if any, of the alternative means of communication are direct substitutes for Consolidated's BLES service."[40] Dr. Ankum does not provide data, analysis, or evidence to inform whether or not wireless voice, facilities-based VoIP, or OTT VoIP are direct substitutes for BLES service. Instead, he argues without providing evidence that "mobile wireless service and broadband service bundles are

[40] Prefiled Direct Testimony of August Ankum, Ph.D. On Behalf of the Vermont Department of Public Service, January 21, 2022.

available at considerably higher price levels than BLES."[41] This approach ignores that most Vermont households already have broadband and wireless subscriptions and do not need to subscribe to new incremental services to cut the wireline voice cord. The classic economics test of whether goods and services are substitutes is "when an increase in the price of one leads to an increase in the quantity demanded of the other."[42] Data from the Bureau of Labor Statistics shows that the price for landline telephone services have been increasing steadily since 2009, shown in the figure below indexed to 2009.[43]

[41] Prefiled Direct Testimony of August Ankum, Ph.D. On Behalf of the Vermont Department of Public Service, January 21, 2022, at page 14.
[42] Microeconomics by Robert Pindyck, Daniel Rubinfeld.
[43] https://data.bls.gov/ CPI for All Urban Consumers (CPI-U) Series Id: CUUR0000SEED04,CUUS0000SEED04, Not Seasonally Adjusted, Series Title: Land-line telephone services in U.S. city average, all urban consumers, not seasonally adjusted, Area: U.S. city average, Item: Residential telephone services.

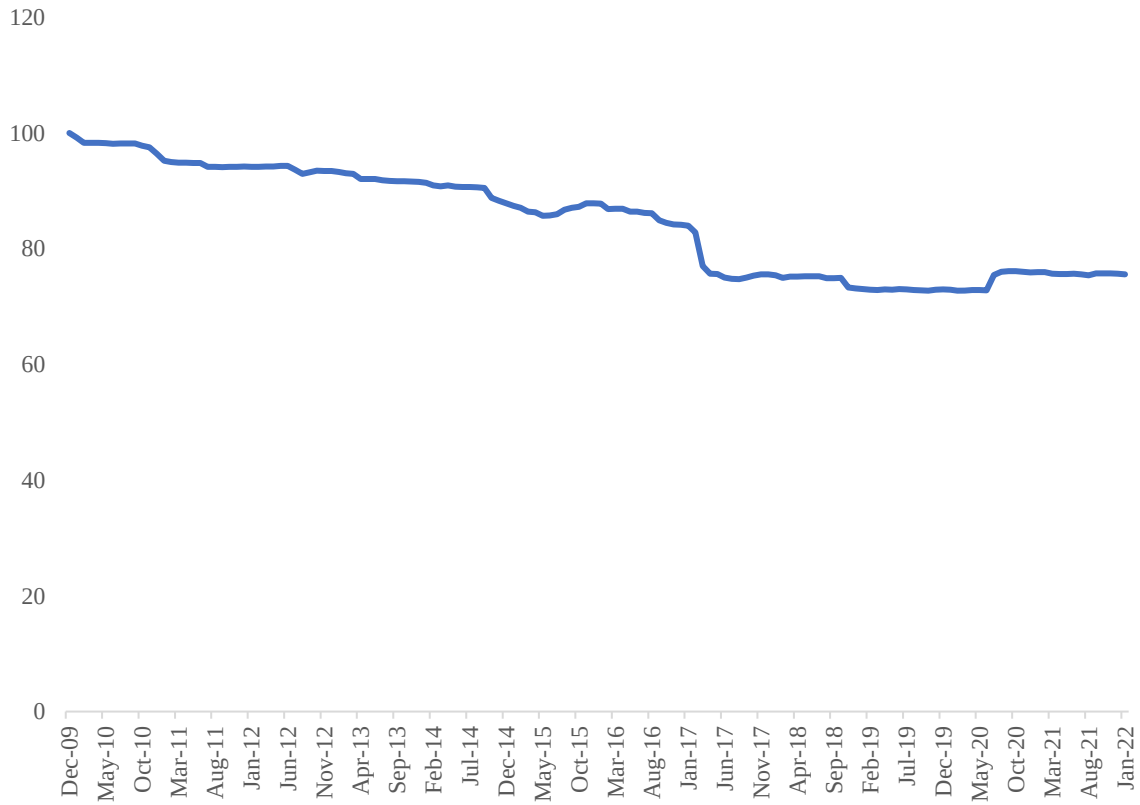
Figure H: Landline Telephone Services in US City Average Price, All Urban Consumers, Not Seasonally Adjusted, Indexed to 100 in 2009



Meanwhile, the price for wireless telephone services have been decreasing over the same period, shown below, again indexed to 2009.[44]

[44] https://data.bls.gov/ CPI for All Urban Consumers (CPI-U) Series Id: CUUR0000SEED03,CUUS0000SEED03, Not Seasonally Adjusted, Series Title: Wireless telephone services in U.S. city average, all urban consumers, not seasonally adjusted, Area: U.S. city average, Item: Wireless telephone services.

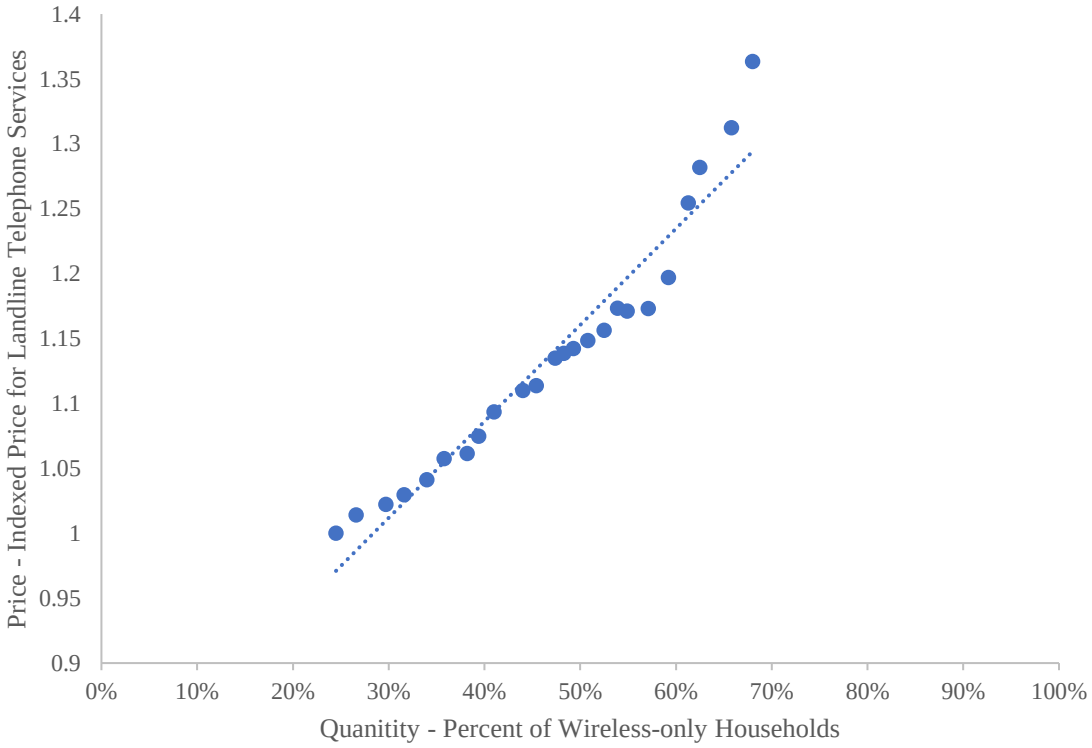
Figure I: Wireless Telephone Services in US City Average Price, All Urban Consumers, Not Seasonally Adjusted, Indexed to 100 in 2009



If wireless is a substitute for land line voice, by economic theory, we should see an increase in adoption of wireless as the voice communications mode of choice for consumers corresponding to increases in landline price. Since 2009, we see that in the US as prices for landline telecommunication services have increased so too has the percent of wireless-only US households, evidence of a substitution effect. This is hardly surprising, given that the CDC study that has tracked the prevalence of wireless-only households since 2003 is named "Wireless Substitution." The figure below shows that between 2010 and 2020 as the price for landline telephone services increase (shown here on the y-axis to conform with economics convention),

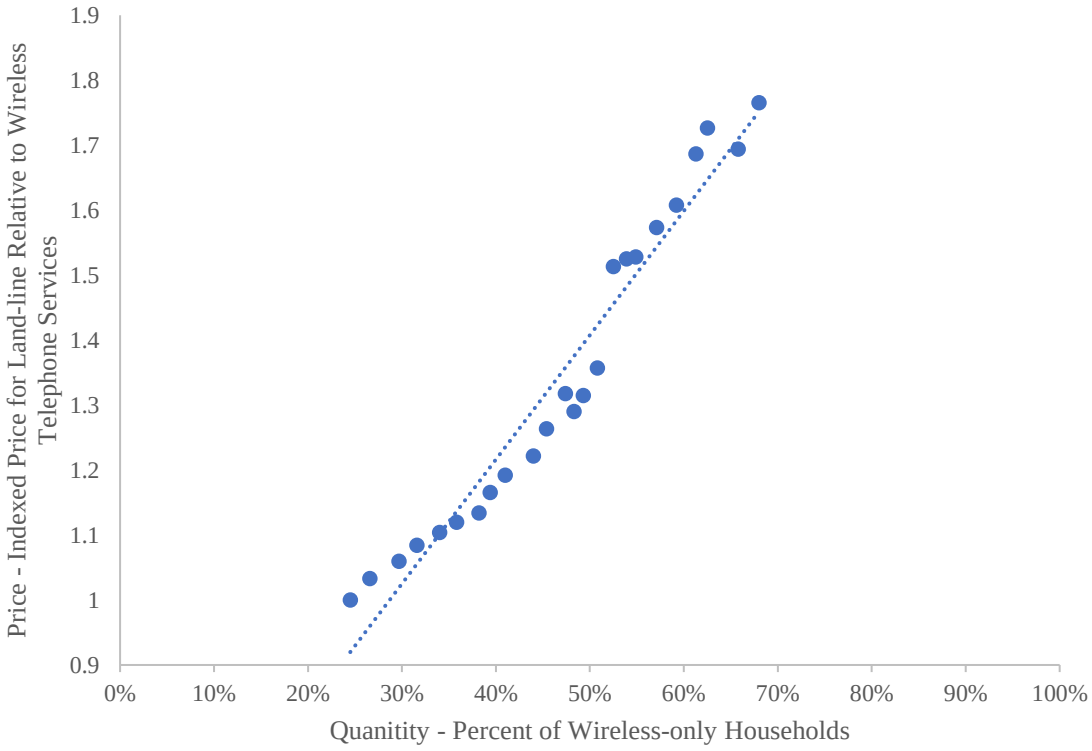
the quantity of wireless-only households also increases, demonstrating a substitution effect. The cross-price elasticity between 2010 and 2020 is +1.2, which indicates a close substitution relationship.

Figure J: Substitution Demand Curve – Landline Price Impact on Wireless-only Voice Adoption (2010-2020)



However, since the price for wireless was falling during the same period, we should consider how the relative price changes between landline and wireless relate to the change in wireless-only households. The figure below shows that the relationship is positive, with a cross-price elasticity between 2010 and 2020 of +0.6, which again indicates a substitution effect.

Figure K: Substitution Demand Curve – Relative Landline-to-Wireless Price Impact on Wireless-only Voice Adoption (2010-2020)



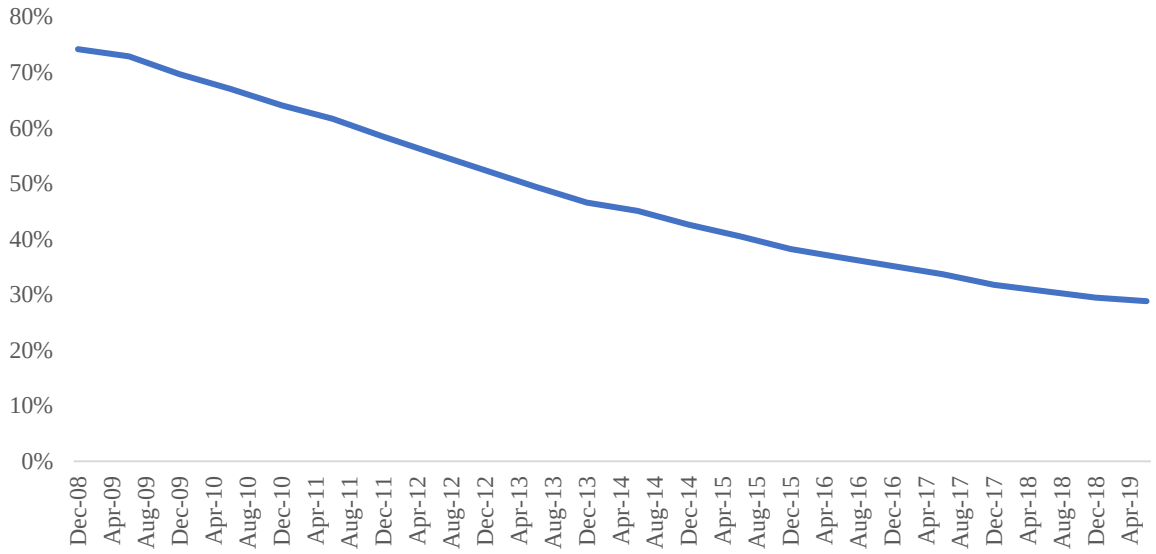
Detecting substitution effects within landline is more challenging.[45] While there are certainly product differences and tradeoffs, for the consumers that have switched, interconnected VoIP and OTT VoIP are clearly substitutes since they are in most cases replacing or substituting a switched ILEC voice line for a VoIP line, disconnecting one for the other rather than buying them independently or complementarily. In making the switch, consumers often realize savings, either by bundling interconnected VoIP and internet versus buying each standalone or by switching from switched voice to OTT VoIP over an existing broadband connection. For

[45] See for example Product Substitution, Functional Equivalency, and the Technology Transition, Sherry Lichtenberg, Ph.D. https://pubs.naruc.org/pub/FA8692DC-FF35-15E4-D78A-2C7017B60FFB

customers that have not yet switched from switched voice, it is harder to determine if they consider VoIP a substitute for switched. Nonetheless, each year, more consumers nationwide and in Vermont and within Consolidated's footprint substitute switched for VoIP, demonstrating that each year, a new portion of consumers show their view that VoIP is a substitute to switched via their purchase actions. Nationally, as of June 2019, 69% of landline voice consumers used VoIP.[46] Therefore, a majority of US consumers and more every year, demonstrate that VoIP is a substitute product for switched voice that they choose. If consumers after switching experienced buyer's remorse and found switched voice to be a better tradeoff, we could expect to see the opposite of what the data tells us: we would see growth in switched voice instead of line loss in every year over the past decade. However, as Figure L shows, even after controlling for wireless substitution, ILECs nationwide have seen share loss to VoIP: 74.2% of consumer landline voice 2008 was ILEC switched, falling each year to 28.8% in 2019.[47] Vermont ILECs have experienced this trend as well, 83.5% of consumer landline voice in 2008 was ILEC switched, falling each year to 53.3% in 2019.[48]

[46] FCC Voice Telephone Services Report, June 2019, https://www.fcc.gov/voice-telephone-services-report
[47] FCC Voice Telephone Services Report, June 2019, https://www.fcc.gov/voice-telephone-services-report
[48] FCC Voice Telephone Services Report, June 2019, https://www.fcc.gov/voice-telephone-services-report

Figure L: US Consumer Switched ILEC Voice Lines as a Percent of Total Consumer Voice Landlines



Q10. Do you agree with Dr. Ankum's conclusions as to how market structure affects the customer choice?

A10. In his answer to Question 15 on page 15, Dr. Ankum states that for both wireless and VoIP, customers would need to make tradeoffs between BLES and the "higher-priced" options.[49] Dr. Ankum does not provide any data on prices to support this assertion, nor does he address what the impact of switching from BLES to wireless-only or VoIP would actually have on net consumer household-level expenditures on communications services. For wireless, as of 2019, the CDC estimated that 87.5% of Vermont adults lived in households that had adopted wireless

[49] Prefiled Direct Testimony of August Ankum, Ph.D. On Behalf of the Vermont Department of Public Service, January 21, 2022.

voice.[50] For households that have already adopted wireless, switching to wireless-only can mean a net savings for consumers by dropping the cost of landline without adding a new subscription. For facilities-based VoIP, 83.4% of Vermont households had adopted broadband by 2019: for these consumers, moving from switched voice to a bundle including VoIP and internet can offer savings on the total household expenditures on communications services.[51] Consumers that already have broadband and switch to OTT VoIP would likely see a savings on the total household expenditures on communications services since OTT VoIP is typically less expensive than switched voice.

Q11. Does this conclude your testimony?

A11. Yes.

[50] https://www.cdc.gov/nchs/nhis/erwirelesssubs.htm
[51] US Census American Community Survey, 2019, https://www.census.gov/acs/www/data/data-tables-and-tools/subject-tables/