



Broadband in Tennessee

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CQA
Model • Measure • Manage

CostQuest Associates

Cincinnati ~ Seattle ~ Washington D.C.

Founded in 1999, CostQuest Associates is internationally recognized as the leading telecommunication network modeling, costing and profitability expert. We deliver comprehensive solutions to complicated business challenges. These robust solutions reflect the highly specific needs of your business, including the impact of financial, economic, and regulatory environments.



OUR WORK

Broadband & USF Models

Network Models for Large-Scale Use. CACM being used as the FCC's CAF Phase II model, NBP U.S. (National Broadband Plan/FCC), SBCM (State Broadband Cost Model) used in many U.S. States, CPM Hong Kong, NUSC Australia, CostPro-Core New Zealand

Valuation & Appraisal

Property Tax, M&A and more. Support Fiber, Cable, Wireless, Mobile, and Tower Companies. AT&T, VZN, Comcast and others use CQA's Valuation and Appraisal Services. Also support Water/Waste Water Utilities.

RCN & Loop Models

CQRM is use by carriers with operations in over 40 states. It has been adopted and well received by commissions in all UNE and Tax proceedings

Wireless Work

Wireless Network/Cost Models, Geospatial Studies. Wireless Models NTIA, CTIA, Drive Testing Design and Reporting, Auction Assessment, GIS Analysis, Policy Support

Business Case/Profitability Models

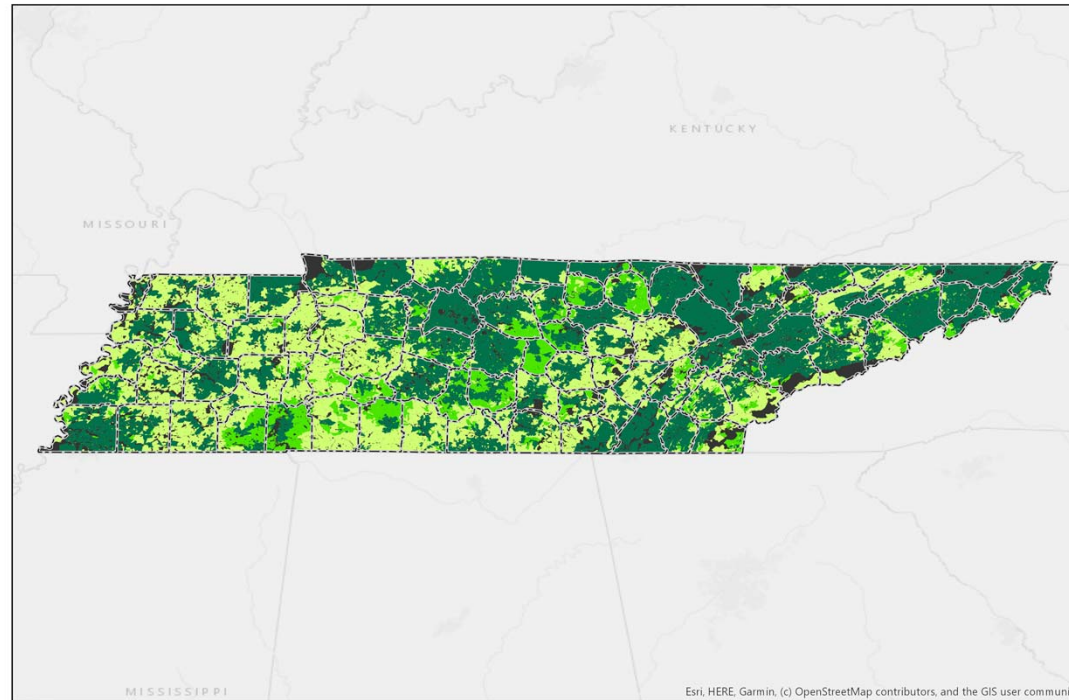
GBCM (Gigabit City Model), COMPASS, MAPS, ProfitMap, CPMS, and MIDAS – economic based contribution models over various business dimensions.

REPORTED COVERAGE - TENNESSEE 477

REPORTED COVERAGE IN TN – FCC 477

Terrestrial Fixed Broadband Speed Coverage (Tennessee)

- All but Satellite



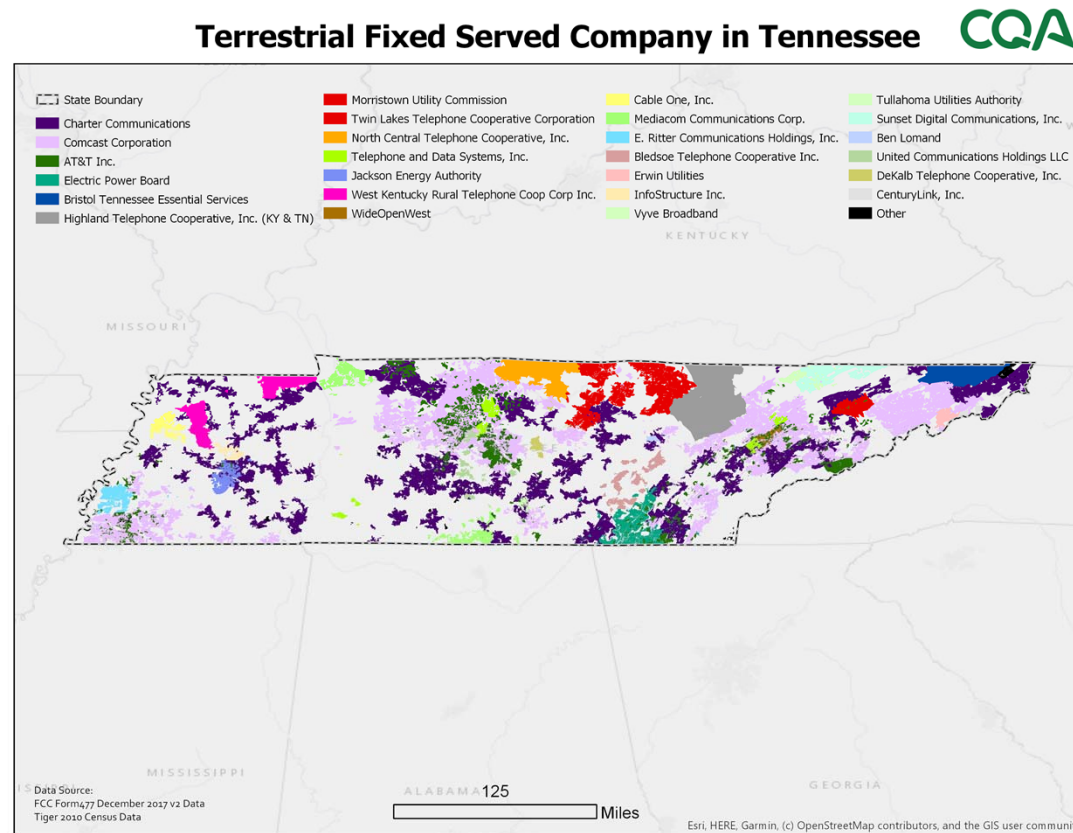
County Boundary Unserved Served
No Housing Unit Block Underserved

120 Miles



REPORTED COVERAGE IN TN – FCC 477 by Carrier

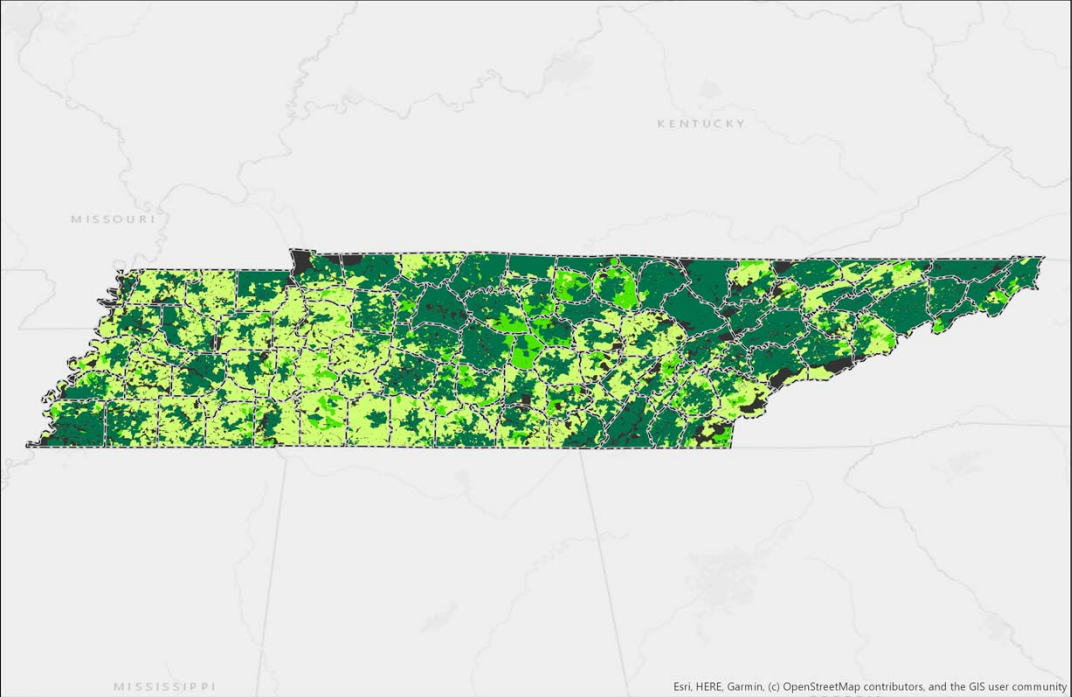
- All but Satellite
- Served (>100Mbps)



REPORTED COVERAGE IN TN – FCC 477

- Wireline

Terrestrial Fixed Wireline Broadband Speed Coverage (Tennessee)



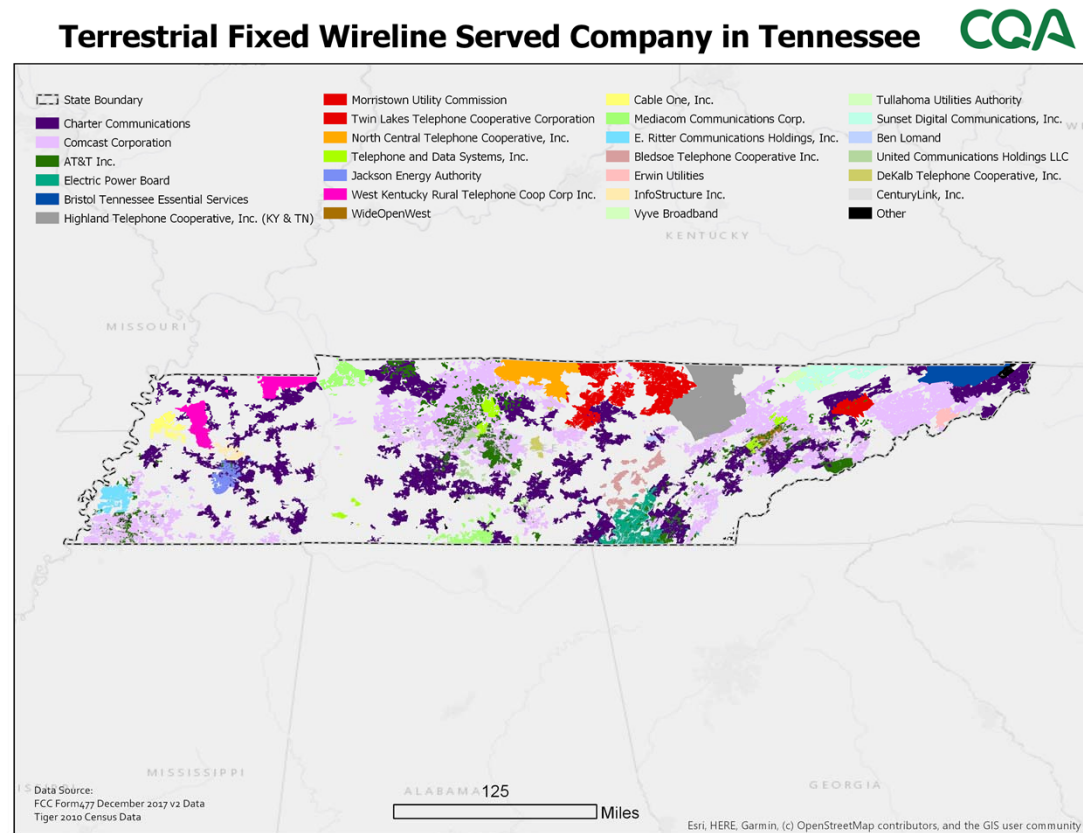
County Boundary Unserved Served
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REPORTED COVERAGE IN TN – FCC 477 by Carrier

- Wireline
- Served (>100Mbps)



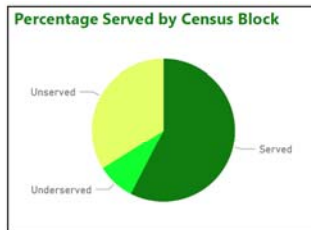
SIZING THE TN ISSUE – BASED ON 477

SIZING THE TN ISSUE – Based on 477 Coverage

TN Demographics and Investment Cost

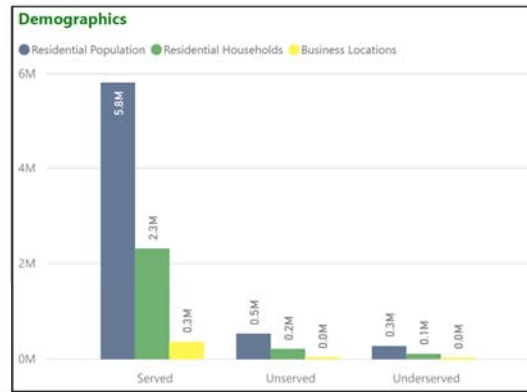
* Demographic data (Geosresults) is through Q3 of 2017. Some Census Blocks had no Financial data. Business locations does not include Small Offices or Home Offices.

SpeedSource	Type	CBs w/ HU	Total Investment	Residential Population	Residential Housing Units	Residential MDU	Business Locations*
Served	R	65390	0	1,952,662	840,436	11,362	49,192
Served	S	72331	0	3,813,001	1,690,256	48,475	179,626
Served	U	457	0	56,576	31,293	1,609	4,050
Underserved	R	18293	215,736,452	248,634	113,317	993	5,877
Underserved	S	2208	16,984,075	19,387	8,978	253	6,949
Underserved	U	12	122,472	56	19	3	101
Unserved	R	68163	506,466,840	473,615	215,681	1,316	7,846
Unserved	S	13083	35,325,843	41,743	18,770	655	14,402
Unserved	U	179	1,197,808	3,211	921	22	600
Total		240116	775,833,489	6,608,885	2,919,671	64,688	268,643

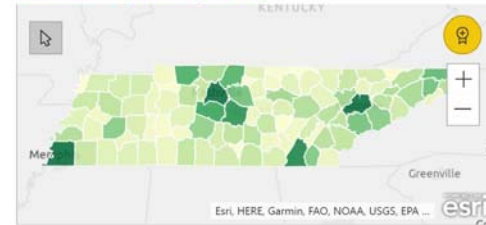


240116
Total CBs

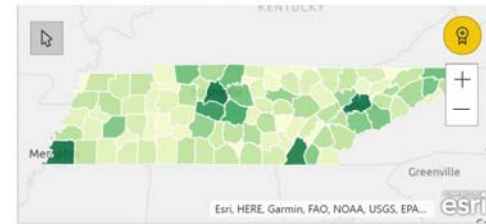
81076
CBs with No HUs



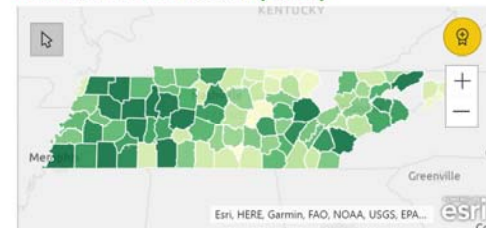
Residential Population by County



Business Locations by County



Total Investment for Unserved by County*

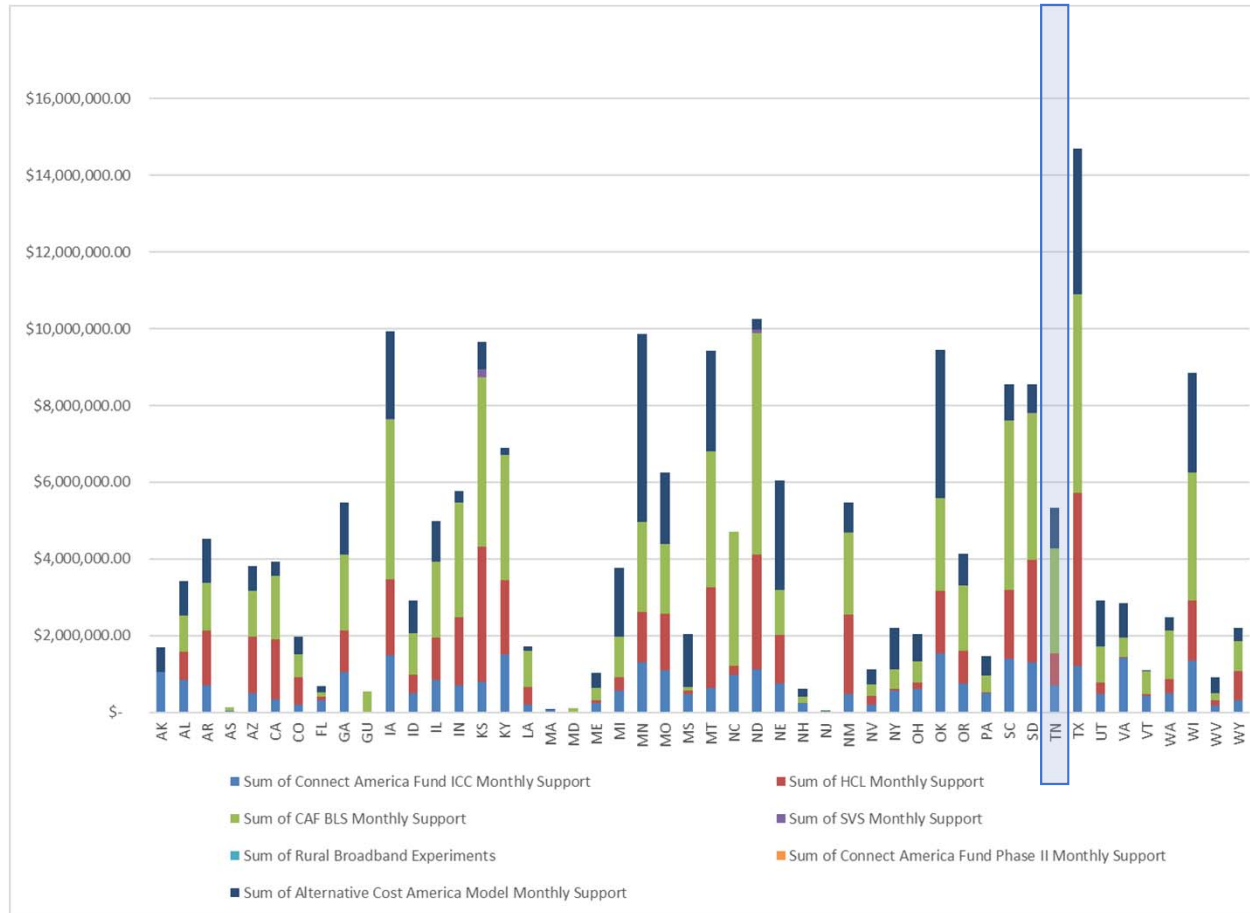


Current Funding

Current Federal Funding

State	SAC	Study Area Name	Revenue Type	Cost Type	ETC	Connect America Fund ICC Monthly Support	HCL Monthly Support	CAF BLS Monthly Support	Rural Broadband Experiments	Connect America Fund Phase II Monthly Support	Alternative Cost America Model Monthly Support	Total High Cost Monthly	Total High Cost Quarterly
TN	290280	ARDMORE TEL CO	R	C	Y	\$ 24,131	\$ -	\$ 82,461	\$ -	\$ -	\$ -	\$ 106,592	\$ 319,776
TN	290553	BEN LOMAND RURAL	R	C	Y	\$ 51,238	\$ 98,800	\$ 490,182	\$ -	\$ -	\$ -	\$ 640,220	\$ 1,920,659
TN	290554	BLEDISOE TEL COOP	R	A	Y	\$ 54,885	\$ -	\$ 207,479	\$ -	\$ -	\$ -	\$ 262,364	\$ 787,092
TN	290559	CONCORD TEL EXCHANGE	R	C	Y	\$ 58,814	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 58,814	\$ 176,442
TN	290561	CROCKETT TEL CO	R	C	Y	\$ 14,759	\$ -	\$ -	\$ -	\$ -	\$ 175,635	\$ 190,394	\$ 571,181
TN	290562	DEKALB TEL COOP	R	C	Y	\$ 1,748	\$ -	\$ -	\$ -	\$ -	\$ 281,359	\$ 283,107	\$ 849,320
TN	290565	HIGHLAND TEL COOP-TN	R	A	Y	\$ 127,405	\$ -	\$ 294,848	\$ -	\$ -	\$ -	\$ 422,253	\$ 1,266,758
TN	290566	HUMPHREY'S COUNTY	R	C	Y	\$ 13,931	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 13,931	\$ 41,793
TN	290570	LORETTO TEL CO	R	A	Y	\$ 41,903	\$ 9,028	\$ 69,546	\$ -	\$ -	\$ -	\$ 120,477	\$ 361,432
TN	290571	MILLINGTON TEL CO	R	C	Y	\$ 7,054	\$ -	\$ 108,566	\$ -	\$ -	\$ -	\$ 115,620	\$ 346,861
TN	290573	NORTH CENTRAL COOP	R	C	Y	\$ 65,257	\$ 359,227	\$ 452,645	\$ -	\$ -	\$ -	\$ 877,129	\$ 2,631,387
TN	290574	CENTURYTEL-OOLTEWAH	P	C	Y	\$ -	\$ -	\$ -	\$ -	\$ 138,569	\$ -	\$ 138,569	\$ 415,707
TN	290575	TENNESSEE TEL CO	R	C	Y	\$ 116,131	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 116,131	\$ 348,393
TN	290576	PEOPLES TEL CO	R	C	Y	\$ 27,140	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 27,140	\$ 81,420
TN	290578	TELLICO TEL CO	R	C	Y	\$ 34,692	\$ -	\$ -	\$ -	\$ -	\$ 598,005	\$ 632,697	\$ 1,898,091
TN	290579	TWIN LAKES TEL COOP	R	C	Y	\$ 25,457	\$ 300,809	\$ 763,493	\$ -	\$ -	\$ -	\$ 1,089,759	\$ 3,269,276
TN	290580	CTZENS-FRNTR-VOL ST	P	C	Y	\$ -	\$ -	\$ -	\$ -	\$ 177,217	\$ -	\$ 177,217	\$ 531,651
TN	290581	UTC OF TN	R	C	Y	\$ 7,843	\$ 57,208	\$ 225,165	\$ -	\$ -	\$ -	\$ 290,216	\$ 870,648
TN	290583	WEST TENNESSEE TEL	R	C	Y	\$ 15,318	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 15,318	\$ 45,954
TN	290584	YORKVILLE TEL COOP	R	A	Y	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
TN	290598	WEST KENTUCKY RURAL TELEPHONE	R	A	Y	\$ 6,993	\$ 13,953	\$ 38,136	\$ -	\$ -	\$ -	\$ 59,082	\$ 177,246
TN	295185	SO. CENTRAL BELL -TN	P	C	Y	\$ -	\$ -	\$ -	\$ -	\$ 2,178,155	\$ -	\$ 2,178,155	\$ 6,534,466
						\$ 694,699	\$ 839,024	\$ 2,732,522	\$ -	\$ 2,493,941	\$ 1,054,998	\$ 7,815,184	\$ 23,445,553

Comparison of Current Federal Funding



Broadband Deployment and Hurdles

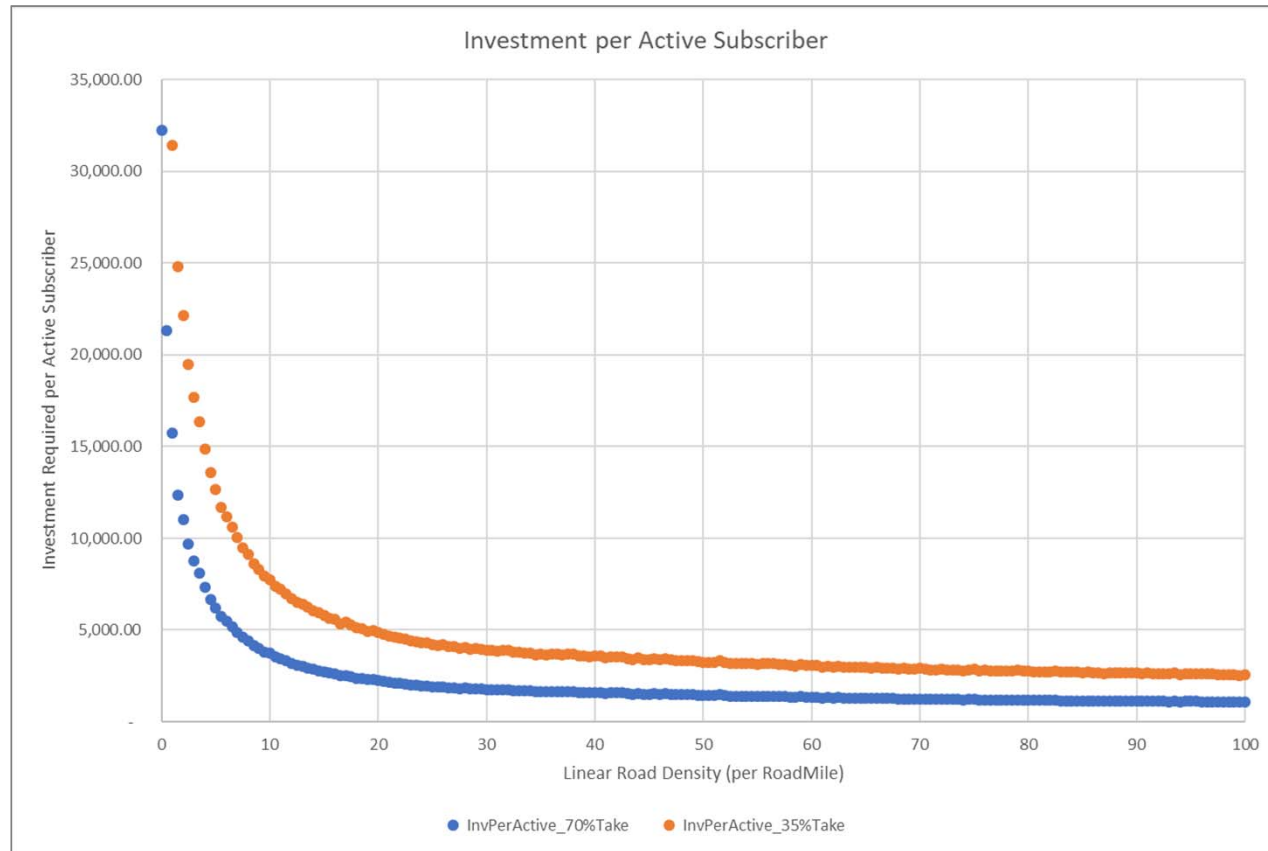
Broadband Deployment and Hurdles

- Broadband Technologies, Owners, and Issues
 - Copper based, DSL
 - Existing phone company plant, augmented to provide broadband service
 - In many deployments, speed limitations exist
 - Aging plant – quality issues
 - Cable HFC, Fiber Deep (Docsis.x)
 - Cable companies
 - Typically deployed in non-Rural areas
 - Aging plant
 - Fiber
 - Cable and Phone companies, new entrants, Electric coops, municipalities
 - New build with Financial hurdles
 - Fixed Wireless
 - Phone companies, WISPs, new entrants,
 - Capacity/speed limitations
 - Coverage issues
 - Satellite
 - Hughes and Viasat
 - Capacity/speed limitations
 - Latency issues
 - WiFi
 - Any of the above
 - Limited deployment/coverage
 - Mobility LTE and 5G
 - Mobility companies
 - Coverage issues both geographically and inside the home
 - LTE has speed limitations

Broadband Hurdles

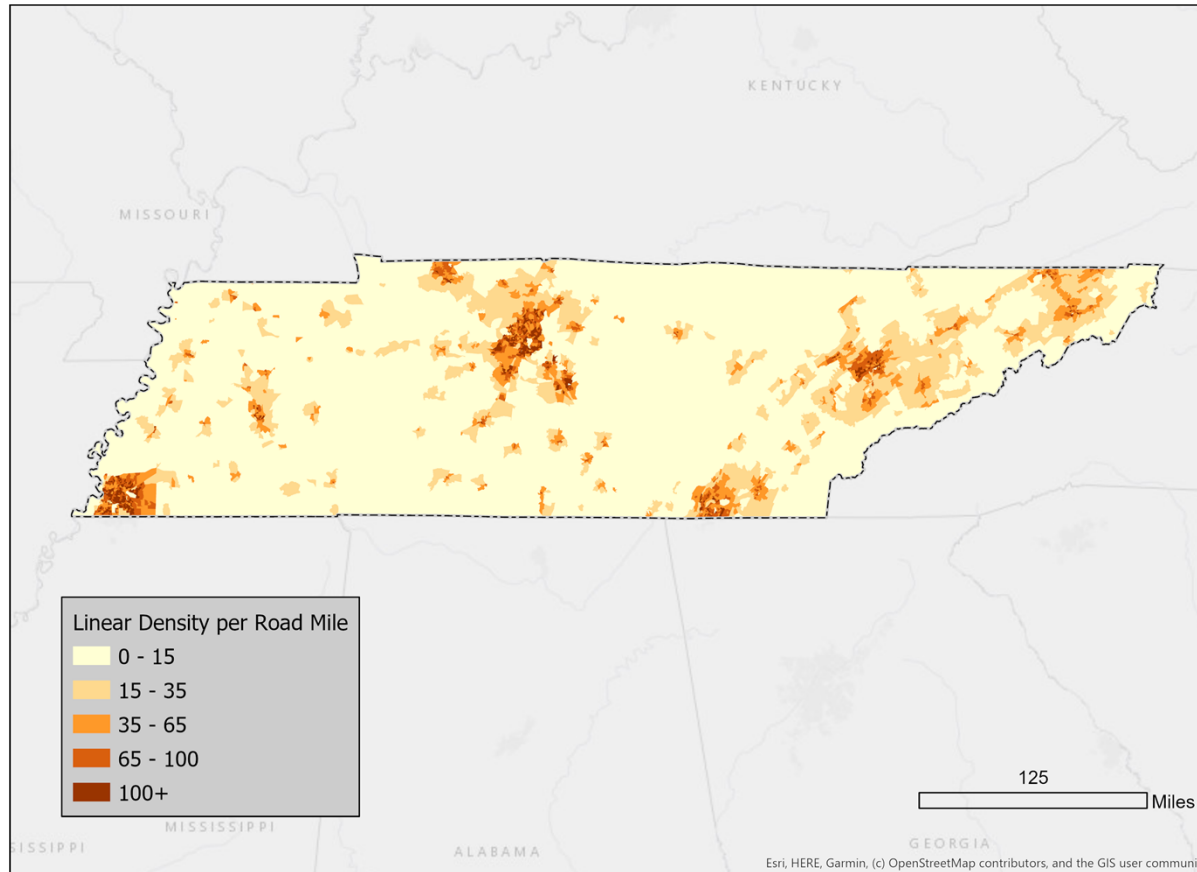
- Deployment hurdles
 - Governmental
 - Regulations
 - Requirements/Funding/Commitments
 - Permitting/Environmental
 - Reconstruction
 - Limitations (e.g., no Muni owned networks)
 - Access
 - ROW
 - Pole/Conduit
 - Capital/Funding
 - Market
 - Competition
 - Cost
 - Cost to deploy
 - Linear Density
 - Operation cost
 - Revenue
 - Market adoption rates
 - Carrier take rates
 - Services offered

Cost per sub versus Linear Density - Nationally



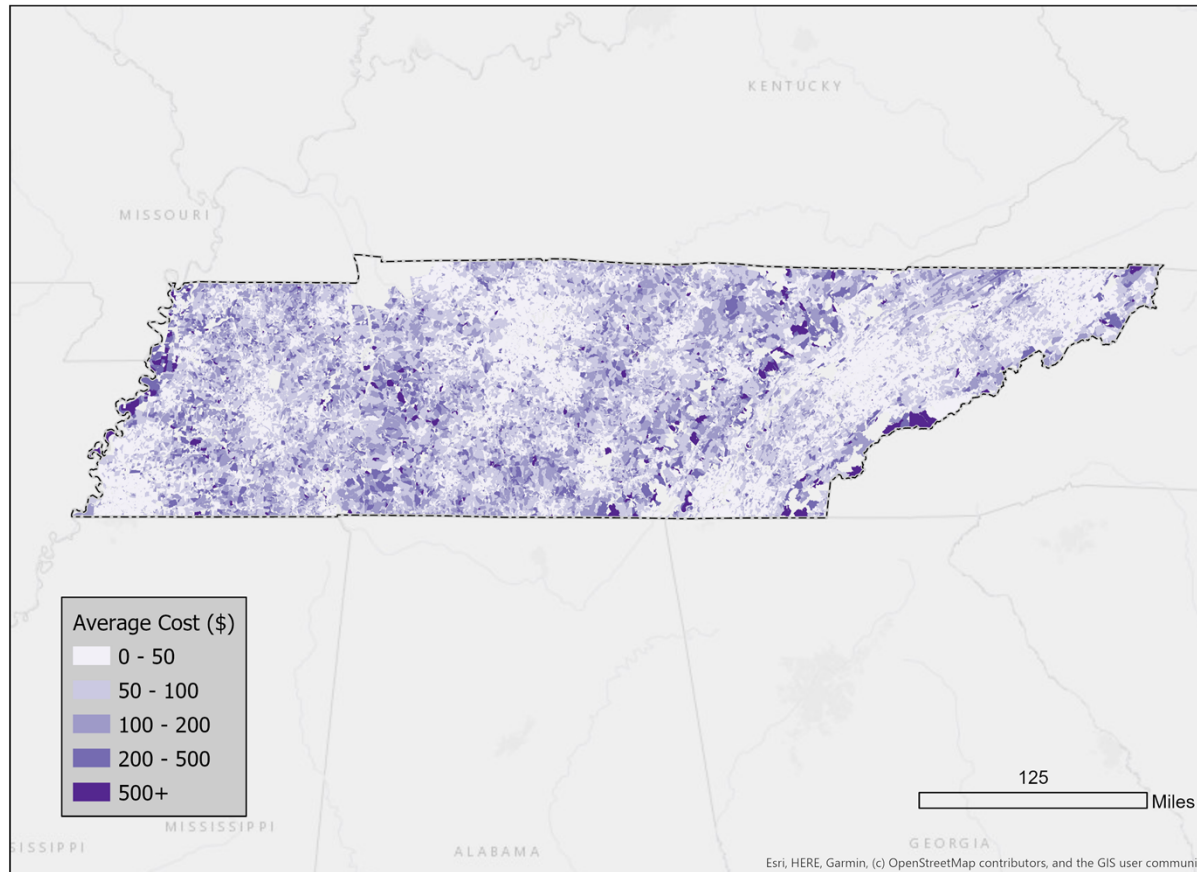
Linear Density in Tennessee

Linear Density in Tennessee



FTTp Average Monthly Service Cost in Tennessee

Fiber to the Prem Average Monthly Service Cost in Tennessee



RDOF, DODC...Donner and Blitzen

Upcoming Federal Programs

- Remote Digital Opportunity Fund (“RDOF”)
 - Future of CAF
 - \$21,781,550 that AT&T in TN receives annually will be put out for competitive bid
 - 2 auctions, offering 10-year funding, up to \$20B in total funding
 - Potentially \$210M in TN
 - CBs that are currently unserved at 25/3 + + +
- Digital Opportunity Data Collection (“DODC”)
 - Potential replacement of the FCC 477 reporting
 - Move from carriers filing at the CB level to coverage polygons
 - Potential tie to the Broadband Serviceable Location Fabric
 - Lat/Lon level

Estimate of RDOF Areas in Tennessee

Rural Digital Opportunity Fund Eligible Area in Tennessee **CQA**

