The Startling Extent of the Digital Divide

And How to Fix It

29 March 2022

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https://connectingappalachia.org/

Connecting Appalachia

Partners and Funders

OMEGA
OHIO MID-EASTERN GOVERNMENTS ASSOCIATION

BUCKEYE HILLS regional council

OHIO VALLEY
REGIONAL DEVELOPMENT COMMISSION

EASTGATE
Regional Council of Governments

1804
OHIO UNIVERSITY
Voinovich School of Leadership and Public Affairs

OhioSE
ECONOMIC DEVELOPMENT

OME-RESA

Noble county
COMMUNITY · HERITAGE · PROGRESS

ARC

OARnet
An OH·TECH Consortium Member

FOUNDATION FOR APPALACHIAN OHIO
Give. Grow. Create.

EDA
U.S. ECONOMIC DEVELOPMENT ADMINISTRATION

BroadbandOhio

INNOVATEOhio

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Positioning Our Region for the Win

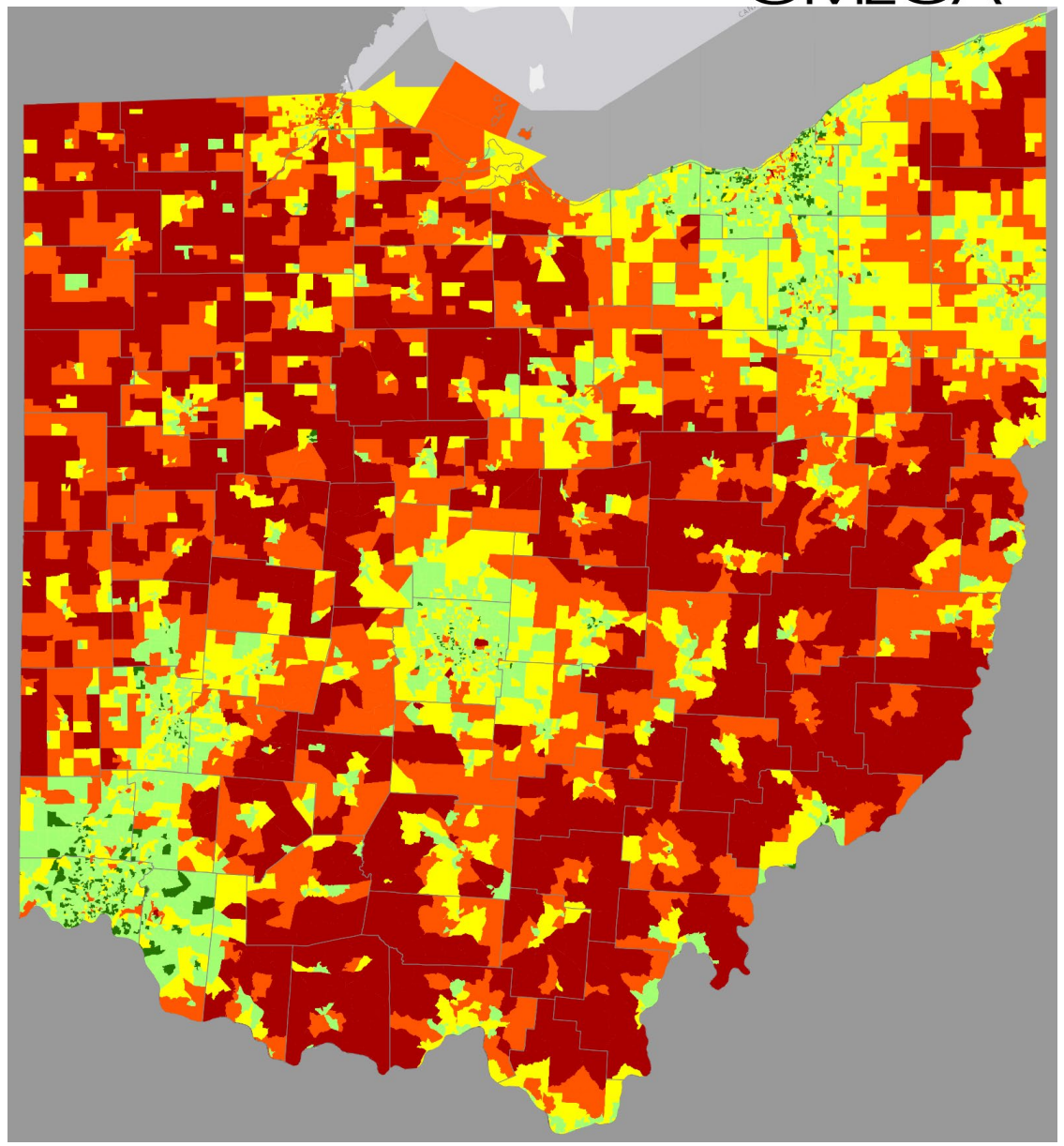
A. Identify and prioritize

B. Secure funding

C. Track and enforce

Startling Extent of the Digital Desert

- 9+ million consumer-initiated tests
- **Encourage involvement** – **promote participation** in speed testing and surveys to improve accuracy further https://connectingappalachia.org/get-involved/speedtest/



Unserved
- Below 10/1
- Above 10/1, Below 25/3

Underserved
- Above 25/3 , Below 50/10
- Above 50/10, Below 100/20

Served
- Above 100/20

Based on Ookla® Speedtest Intelligence® data for February 2020 through August 2021 using all providers combined data

Summary of Findings

Unified Speed Rating in Mbps		Speeds as Reported: Populated Square Miles	Speeds as Reported: % of Sq Miles	Speeds as Reported: Households
1	< 10/1	20,464	51%	440,231
2	>=10/1 < 25/3	6,239	15%	351,069
3	>=25/3 < 50/10	5,315	13%	1,177,143
4	>=50/10 <100/20	6,907	17%	2,612,514
5	>= 100/20	1,350	3%	821,943
Totals		40,275	100%	5,402,900

FCC Mapping based on **Carrier Claims**
Unserved Ohio Households
200,000

Microsoft Projections
Unserved Ohio Households
2,000,000

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Why does rural broadband require subsidy?

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	City or Area of Ohio	Households per Square Mile	Median Household Income	Density Compared to Columbus
Cities and Towns	Columbus	1,510	$49,478	100%
	Marietta	693	$35,556	46%
	Logan	604	$29,691	40%
	McConnelsville	486	$25,563	32%
Rural Expanse	Entirety of Meigs County	26	$33,407	1.7%
	Carthage Township, Athens County	17	--	1.1%
	Monroe Township, Perry County	12	--	0.8%

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Leveling the Playing Field

U.S. Communications Act of 1934

"All people in the United States shall have access to rapid, efficient, nationwide communications service with adequate facilities at reasonable charges."

Federal Communications Commission

$100+ Billion

1990 - 2020

Telcos

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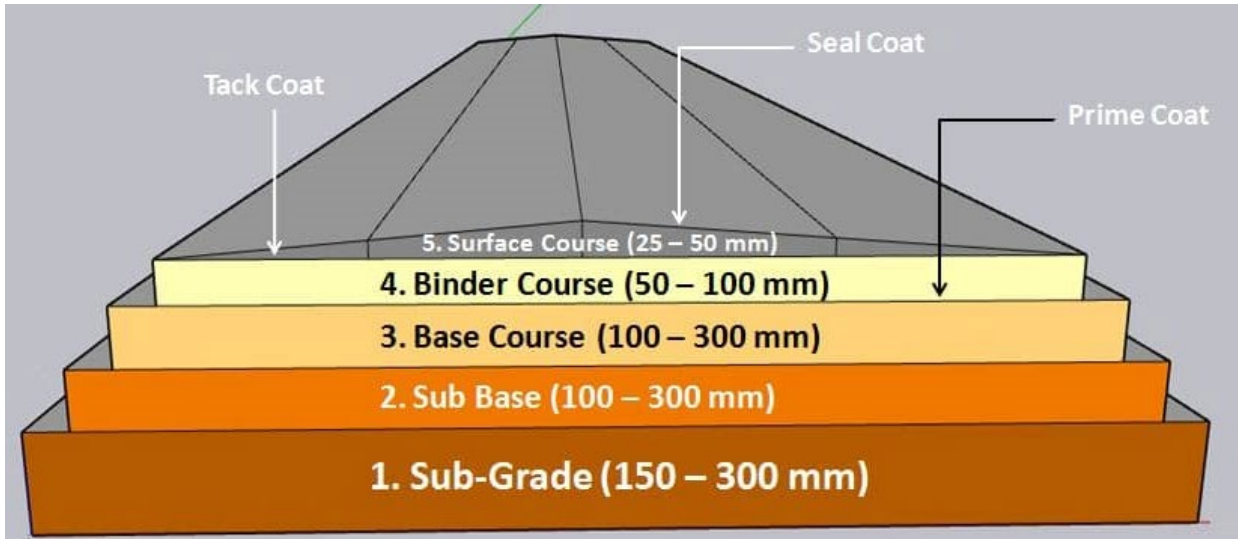
Decrepit Copper

- The copper cables serving rural America are 50+ years old, well past end-of-life
- This decrepit infrastructure fails to deliver reliable landline telephone service let alone broadband
- Staffing levels so low that restoration takes multiple weeks
- **De facto abandonment** by large telcos
- **Poses life/safety risks**, particularly in areas also lacking cell service

Imagine if road maintenance ceased for a few decades

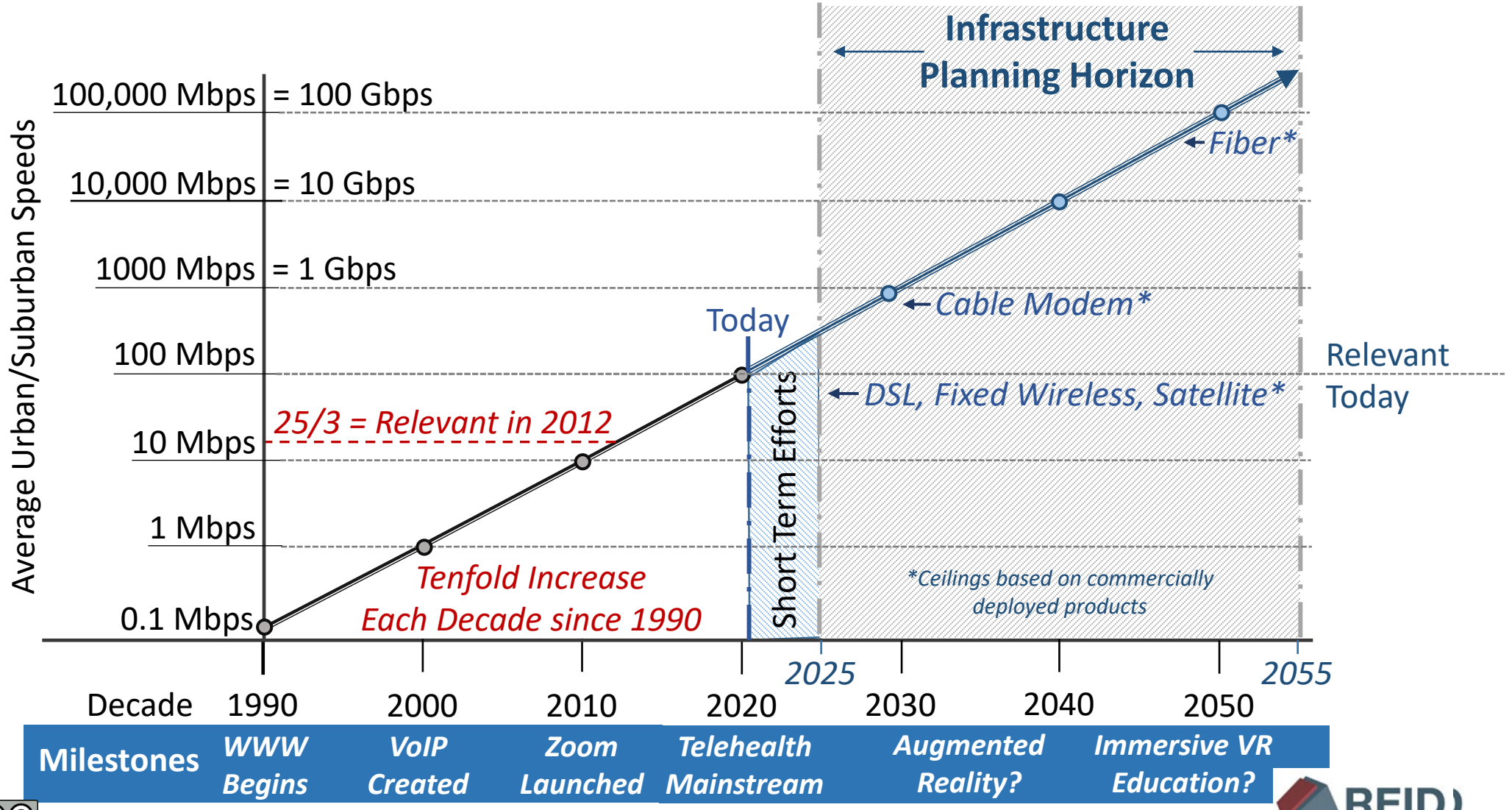
Lack of Specifications



- Infrastructure projects require specifications
- Unlike roadway projects, broadband efforts have largely lacked detailed specifications
- Focus has instead been on speed targets, missing key longevity and capacity issues

Long-Term Perspective

Technology neutral" but must meet the speed requirements of 2055



Basis of Projections

Not All Fiber Created Equal

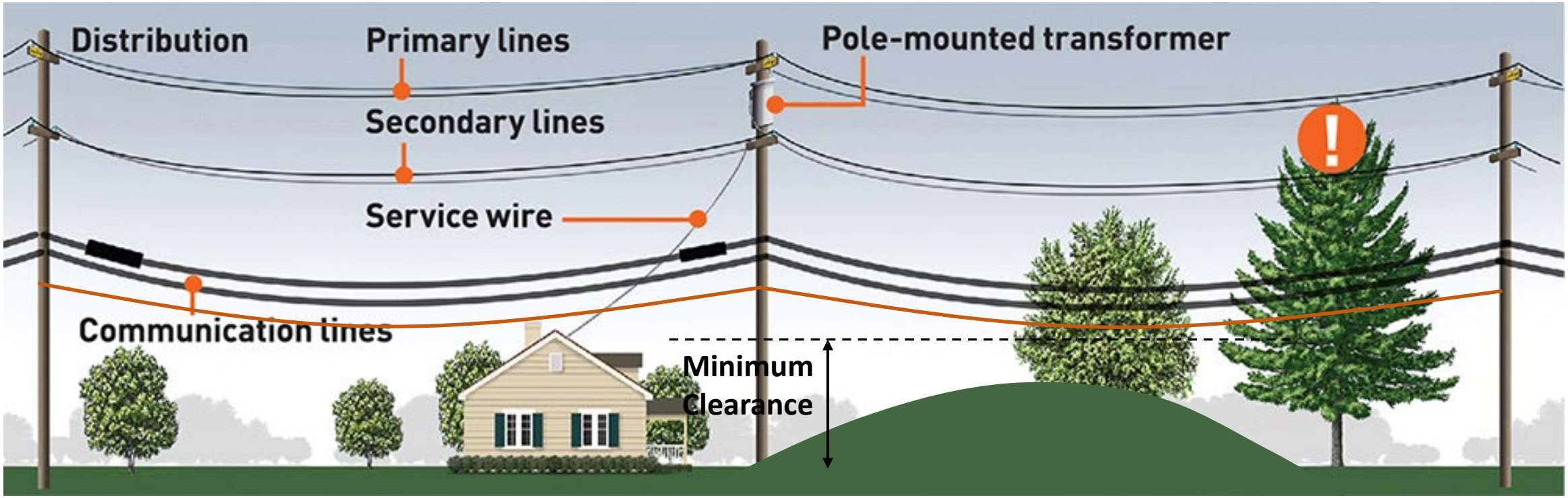
Aspect and Per Mile Costs	Low	Projected	High
Make-Ready on Utility Poles	$32,000	$41,000	$ 60,000
Fiber and Construction	$32,000	$40,000	$ 40,000
Total per Fiber Mile	**$64,000**	**$81,000**	**$100,000**

- High-strand-count design
  - Minimum of one dedicated fiber strand per household
  - Sufficient strands for mobile/5G services and SmartGrid
  - Minimum of 50% space fiber strands for future requirements
- Armored cable with high-grade fiber strands installed to USDA Rural Utility Services specifications
- Assumes aerial installation on existing utility poles after “make-ready” preparations completed to NESC specifications
- Underground high-strand-count in conduit will add $10,000 to $50,000 per mile

Make-Ready Realities

Getting the existing poles ready for an additional attachment

- Clearance issues
- Age of poles



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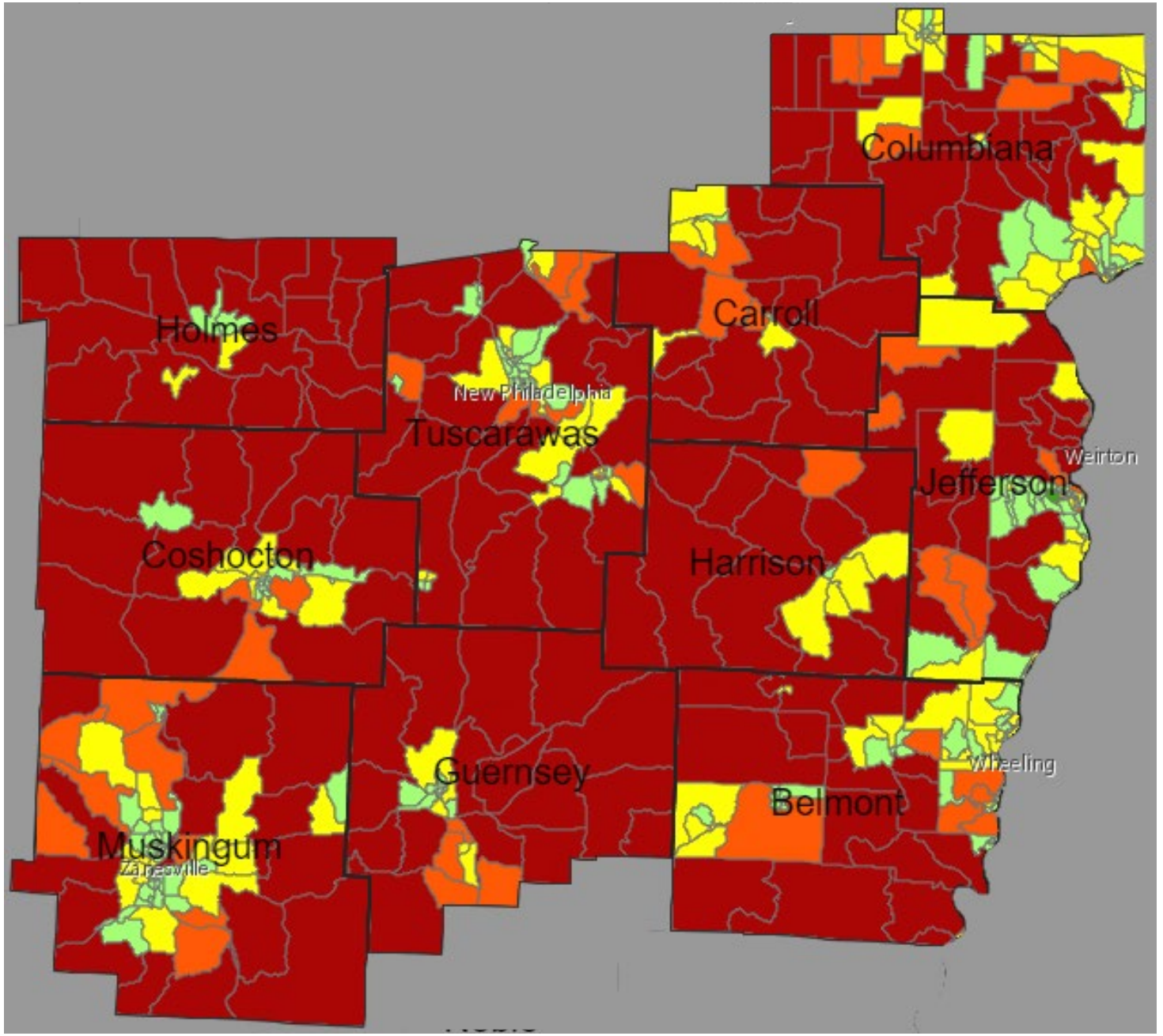
OMEGA Counties

- Below 10/1
- Below 25/3 >10/1
- Below 50/10 >25/3
- Above 50/10

Reveals that **78%** of the populated acres and **33%** of the households remain unserved



OOKLA

Based on Ookla® Speedtest Intelligence® data for February 2020 through August 2021 using all providers combined data

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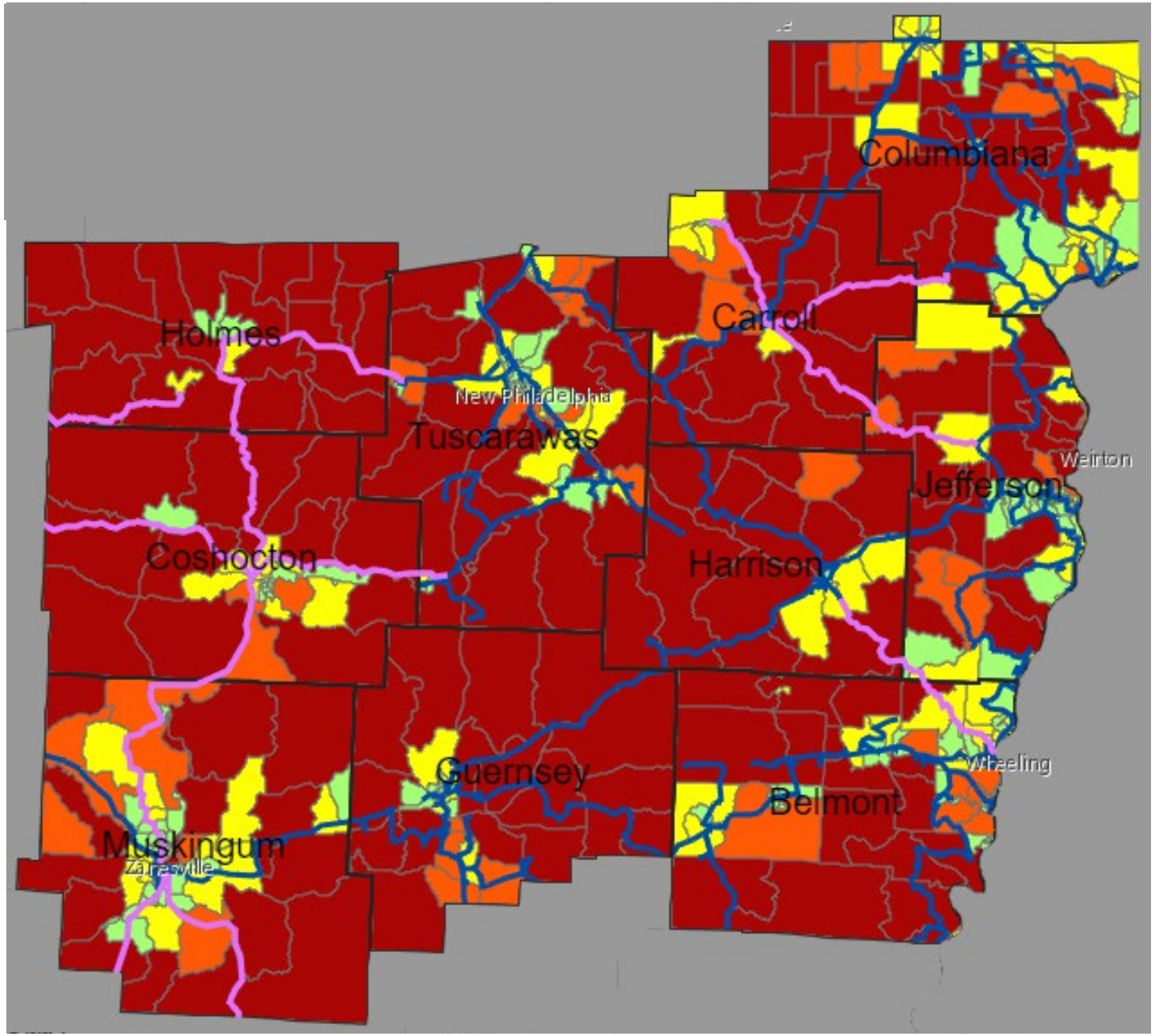
OMEGA Counties

- Below 10/1
- Below 25/3 >10/1
- Below 50/10 >25/3
- Above 50/10
- Existing Middle Mile
- Proposed Middle Mile



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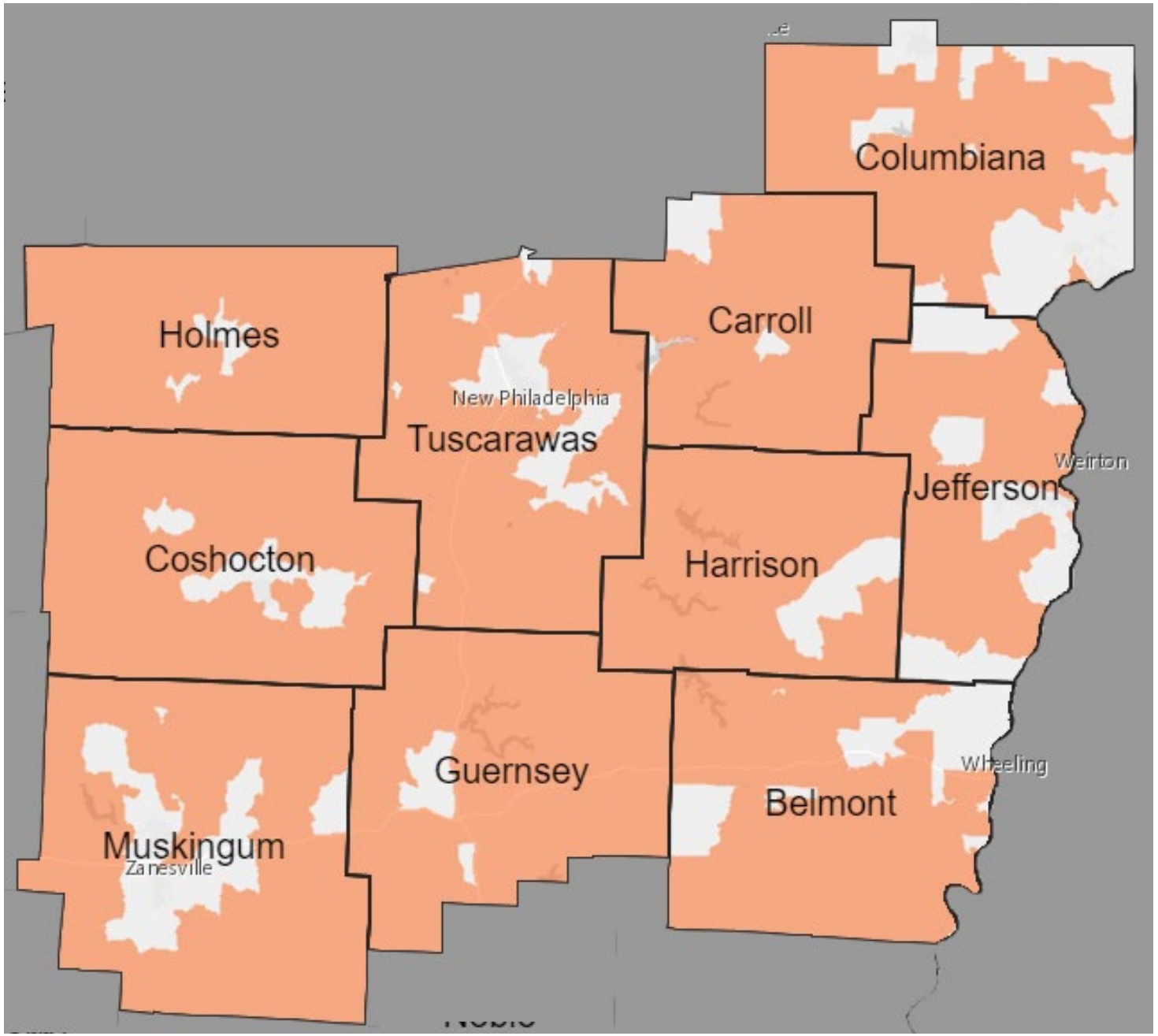
OMEGA Counties

Below 25/3



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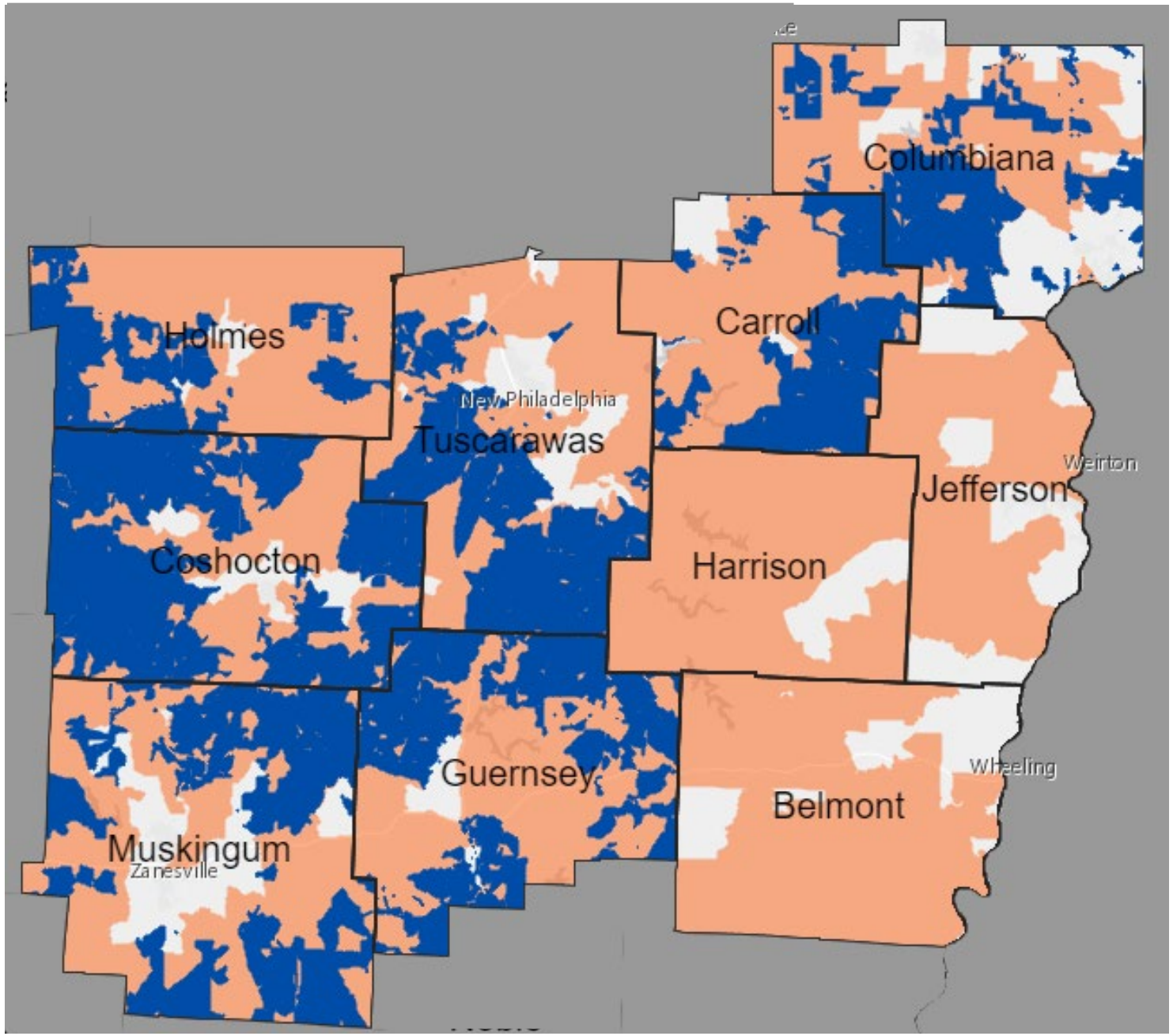
OMEGA Counties

Below 25/3

Charter in RDOF* Phase 1



*RDOF = FCC Rural Digital Opportunity Fund

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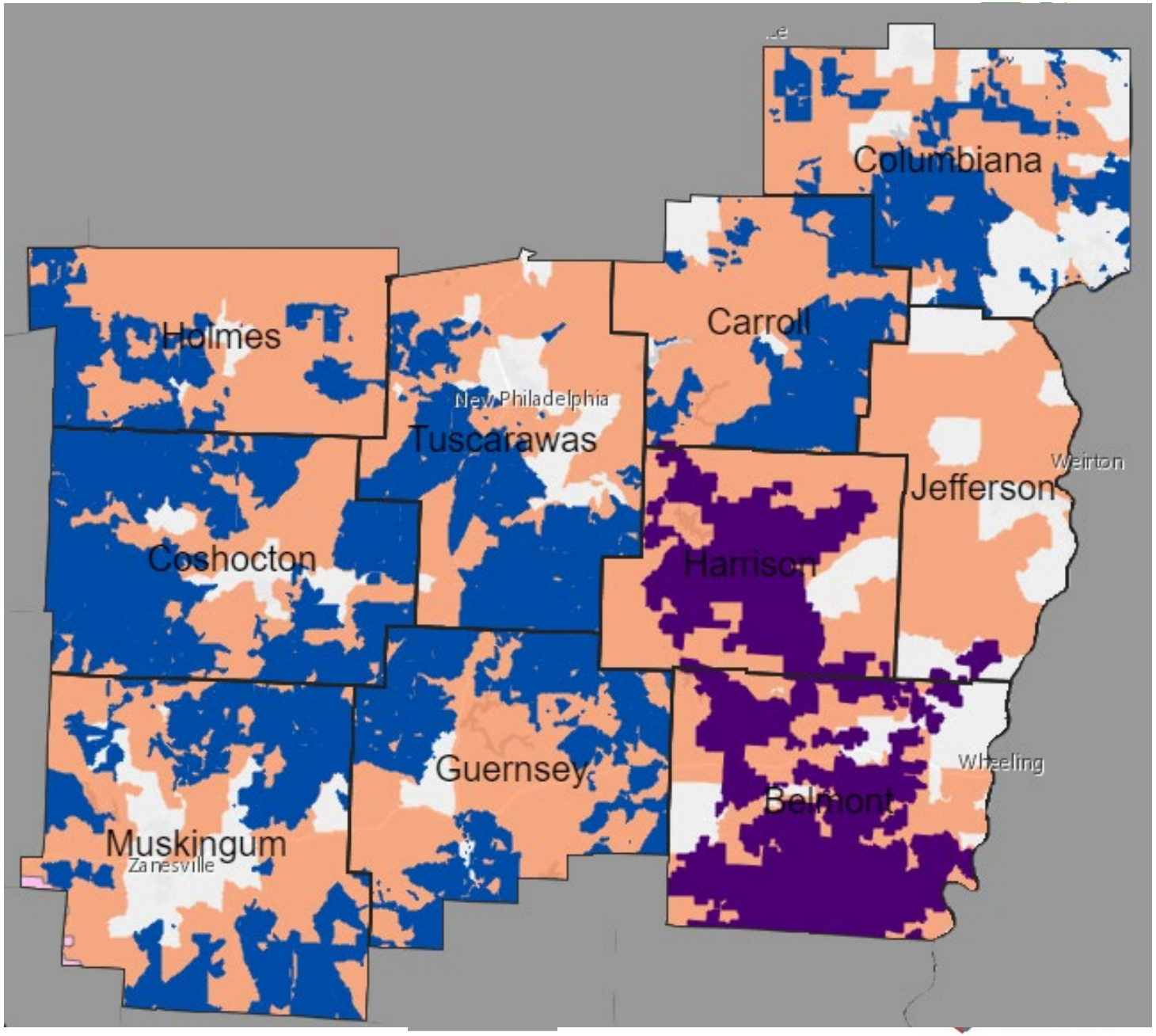
OMEGA Counties

Below 25/3

Charter in RDOF* Phase 1

South Central Power in ORBEG** Phase 1



*RDOF = FCC Rural Digital Opportunity Fund

** ORBEG = Ohio Residential Broadband Expansion Grant

Ohio Residential Broadband Expansion Grant – Round 1 – Fiber

County	ISP 1	ISP 2	ISP 3
Belmont	South Central Power	Comcast	
Carroll	Spectrum		
Columbiana	Comcast		
Coshocton	Spectrum		
Guernsey	Windstream		
Harrison	South Central Power	Comcast	Frontier
Holmes			
Jefferson	South Central Power	Comcast	Frontier
Muskingum	Spectrum	Windstream	
Tuscarawas			

Will map the addresses as soon as released by BroadbandOhio

Identifying Truth on the Ground

Speedtest Intelligence® Raw Data

Form 477 Data
Rural Digital Opportunity Fund Phase 1 Eligible Locations
Connect America Cost Model v4.2

Carrier Reports of Actual Deployments

State E-911 Addresses

Key Demographic Data

Roadway Layer

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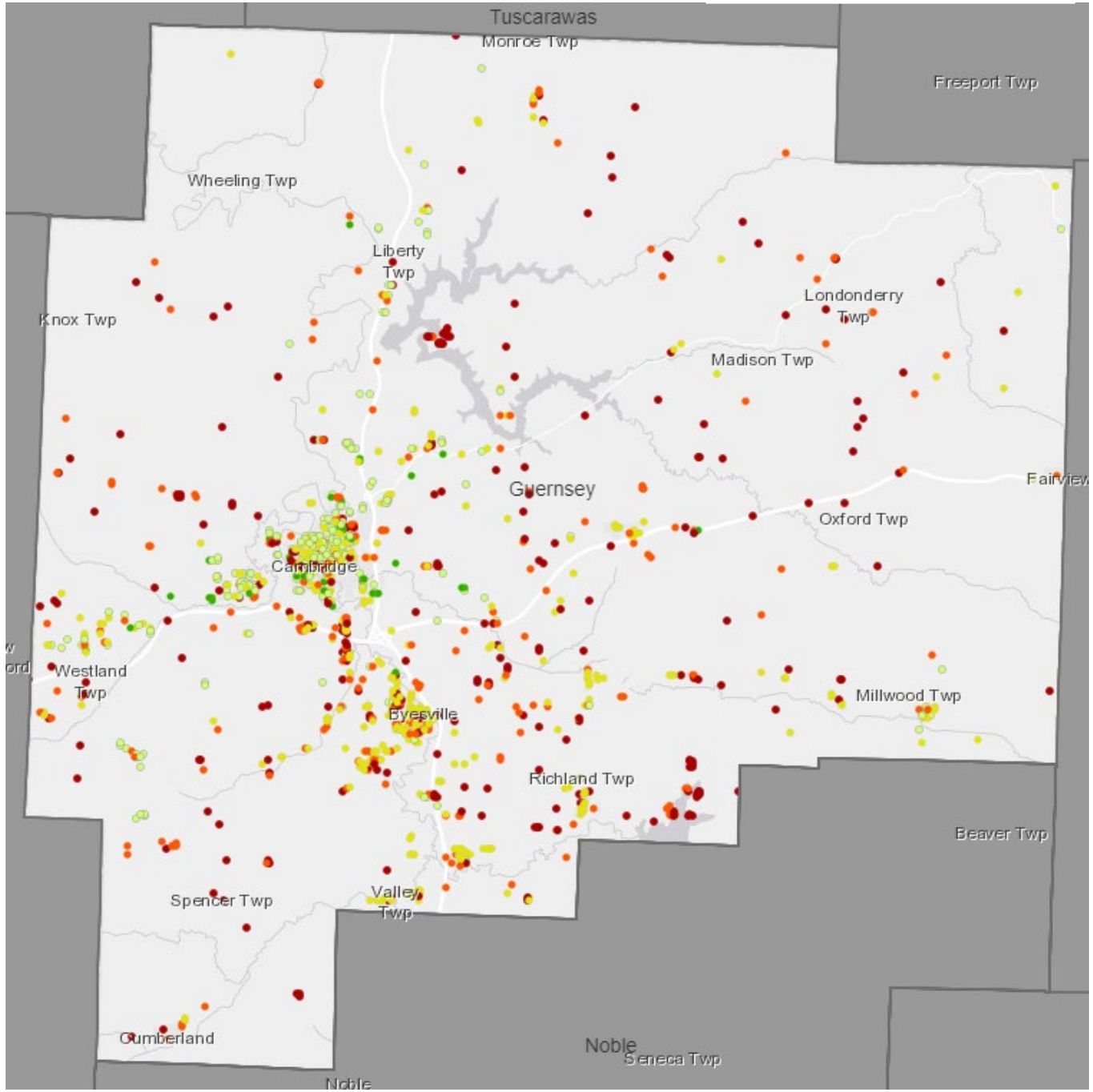
Guernsey County Example

Location Averages

- Below 10/1
- Below 25/3, above 10/1
- Below 50/10, above 25/3
- Below 100/20, above 50/10
- Above 100/20



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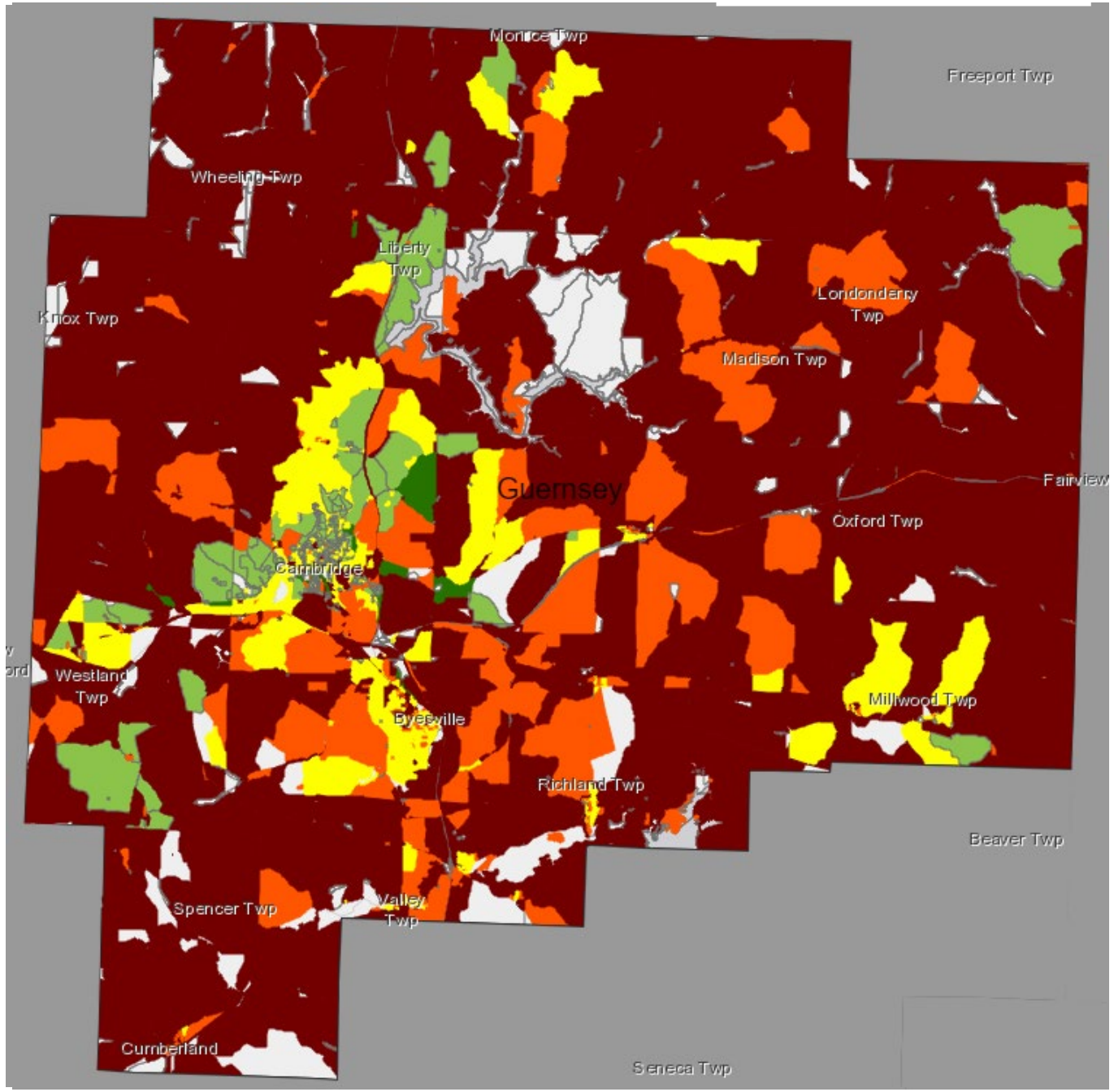
Guernsey County Example

- Below 25/3
- Charter in RDOF* Phase 1
- Existing Middle Mile



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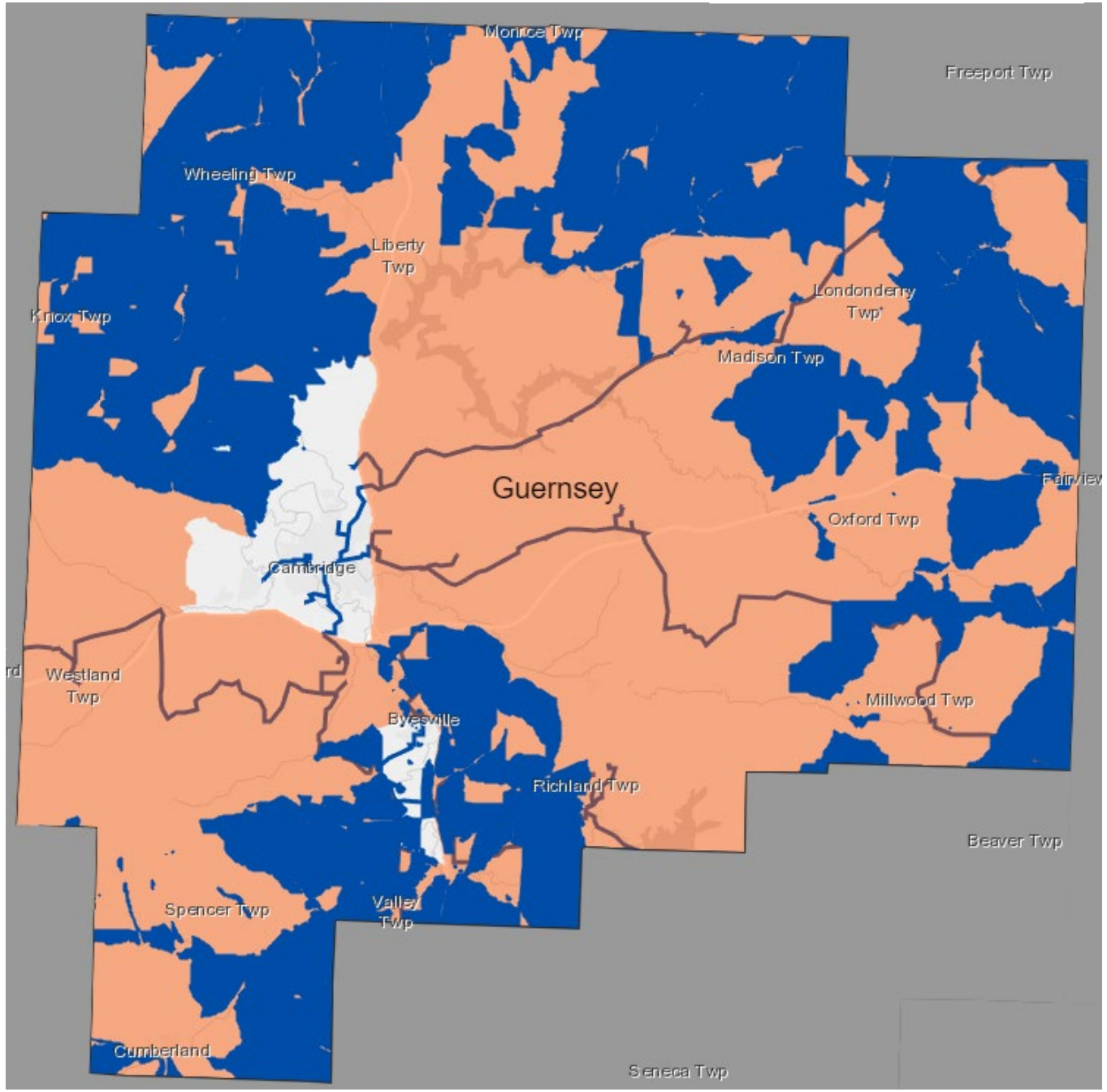
Guernsey County Example

- Below 25/3
- Charter in RDOF* Phase 1
- Existing Middle Mile



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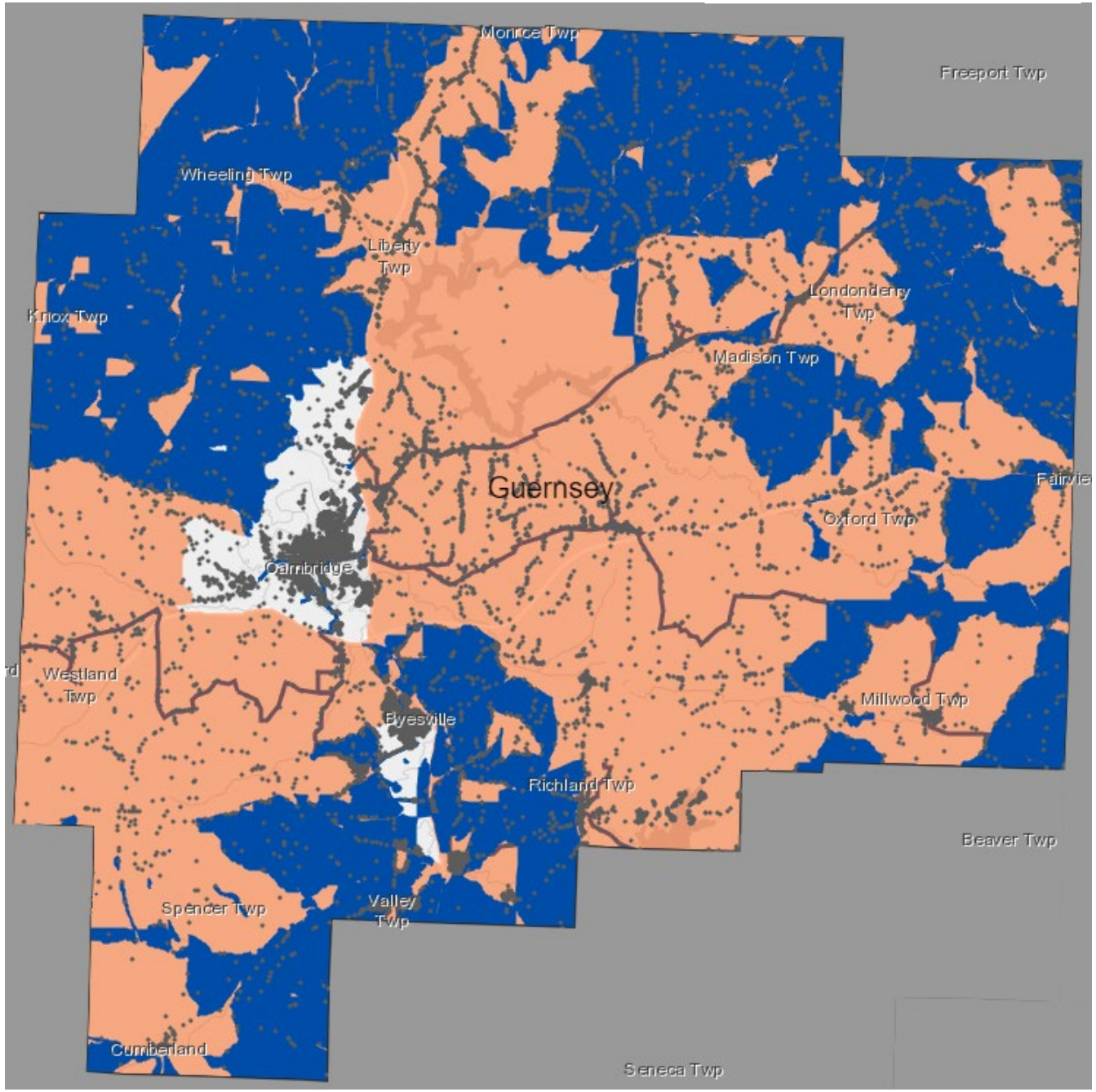
Guernsey County Example

- Below 25/3
- Charter in RDOF* Phase 1
- Existing Middle Mile
- Household



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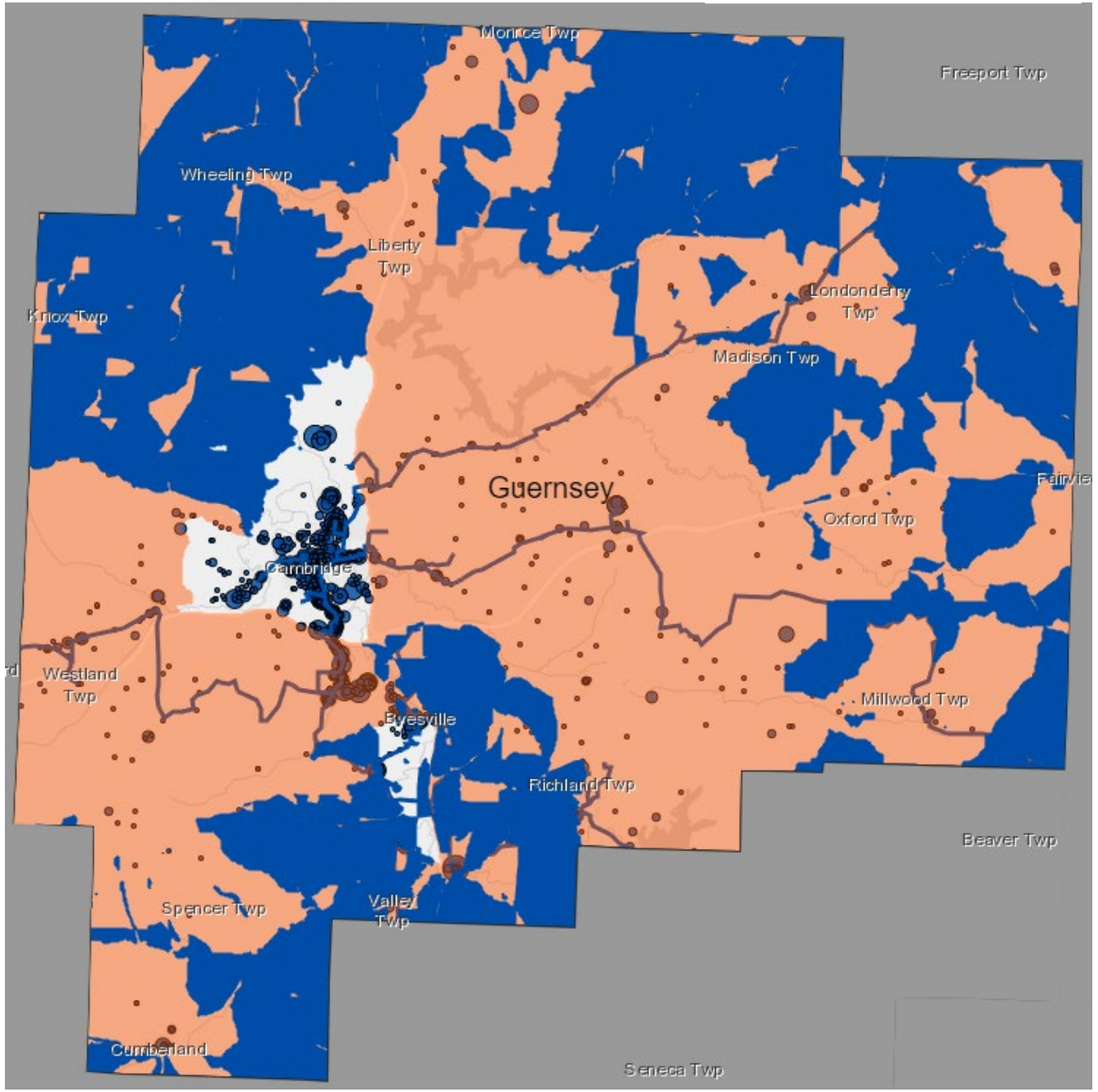
Guernsey County Example

- Below 25/3
- Charter in RDOF* Phase 1
- Existing Middle Mile
- Business*



* Size of dot reflects the type of company and the number of employees

County Profiles – Version 2

https://omegadistrict.org/regionalbroadband/

https://connectingappalachia.org/mapping/county-profiles/

Funding Programs

RDOF Phase 1
RDOF Phase 2
Rural 5G Fund

ReConnect
Community Connect

POWER
Distressed County

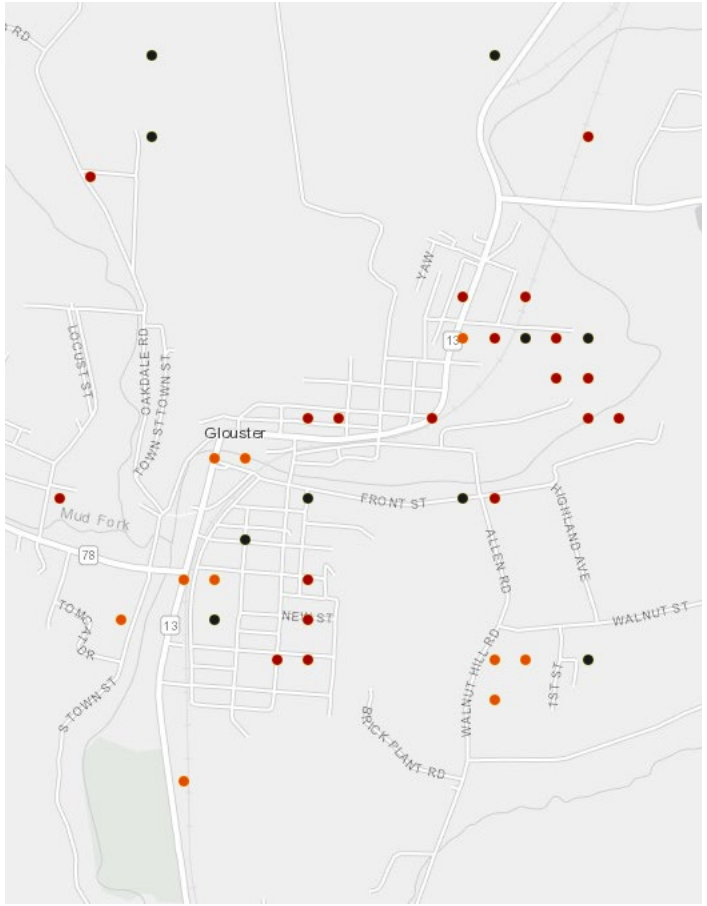
BroadbandOhio
Ohio Residential Broadband Expansion Grant Program

Infrastructure Investment & Jobs Act
@ ~$1.2 to $1.5 B

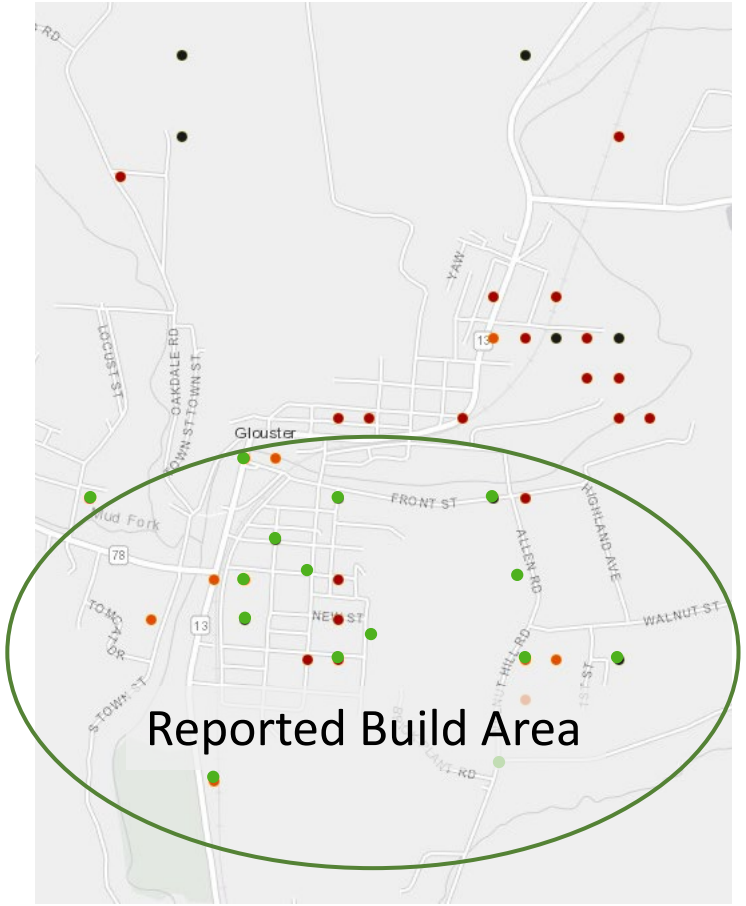
Treasury Capital Projects Fund
@ $270 M

Progress Tracking and Accountability

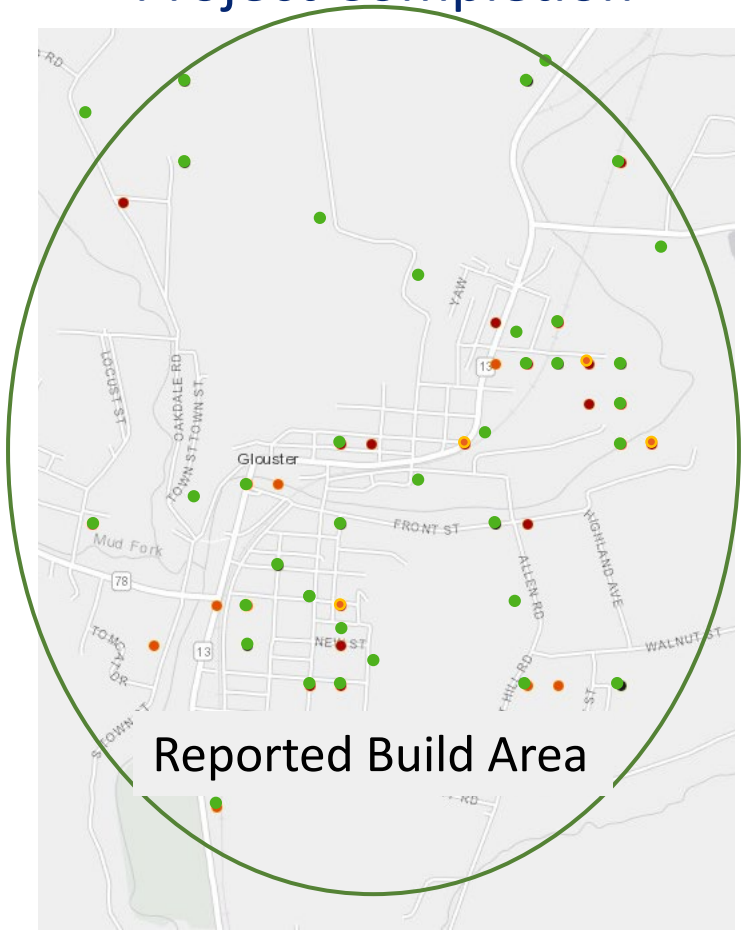
Proposal State



Mid-Project



Project Completion

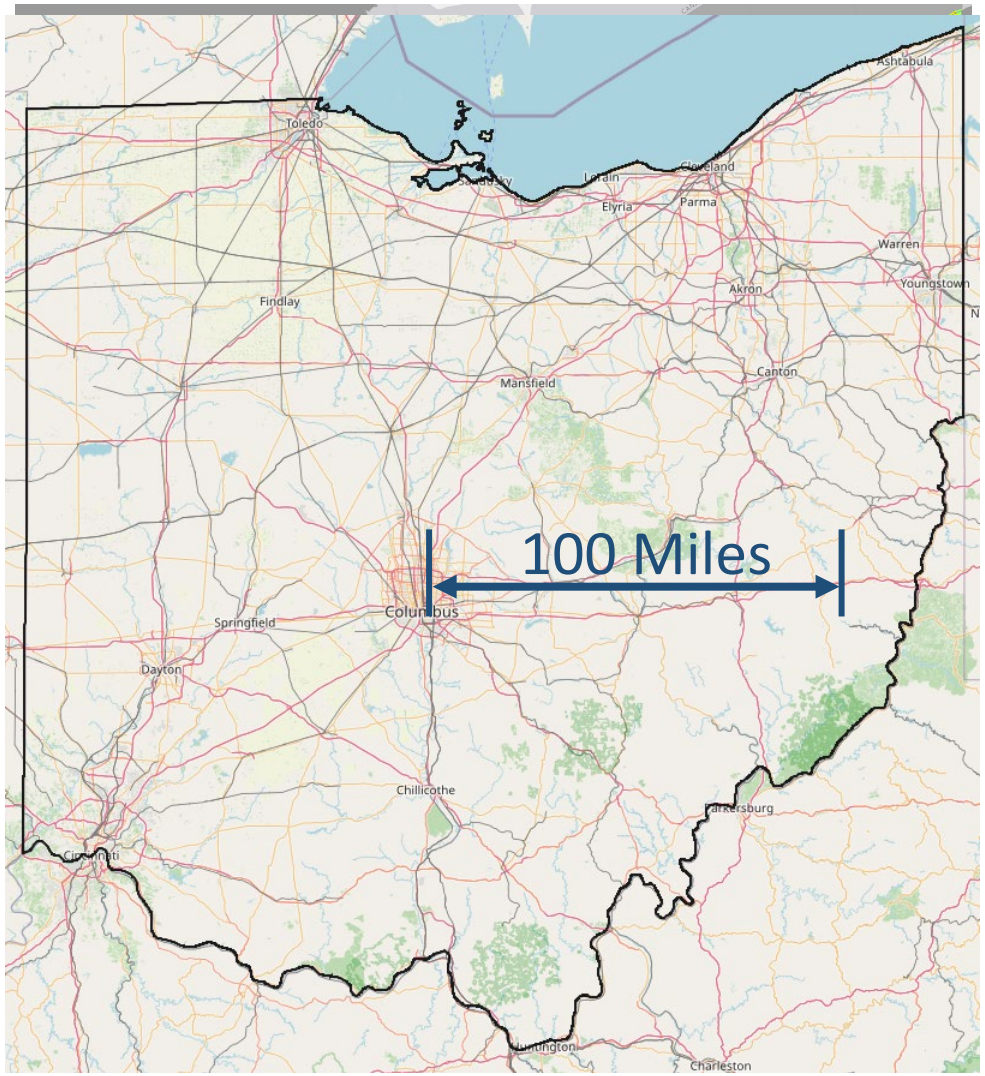


Require verification and inspection before releasing payments to grantees

Delivering Fiber Across Rural Ohio

Total Price Tag	$3+ billion
One-Time Subsidy	**$2+ billion**

One-time subsidy equivalent to building 100-150 miles of highway



Comparable to Ohio's share of:

- Past $100 billion of poorly spent subsidy
- Existing and proposed Federal subsidies

Crucial to spend wisely

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You can help!

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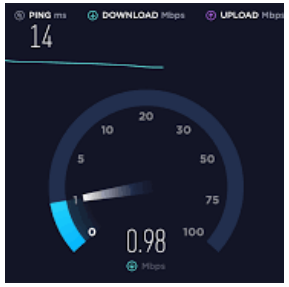
1. **Take the Survey**

   Include the unserved!



2. **Perform the Speed Test**

   Whether your service is good or bad

3. **Endorse and Promote the Common Sense Solutions**

ConnectingAppalachia.org

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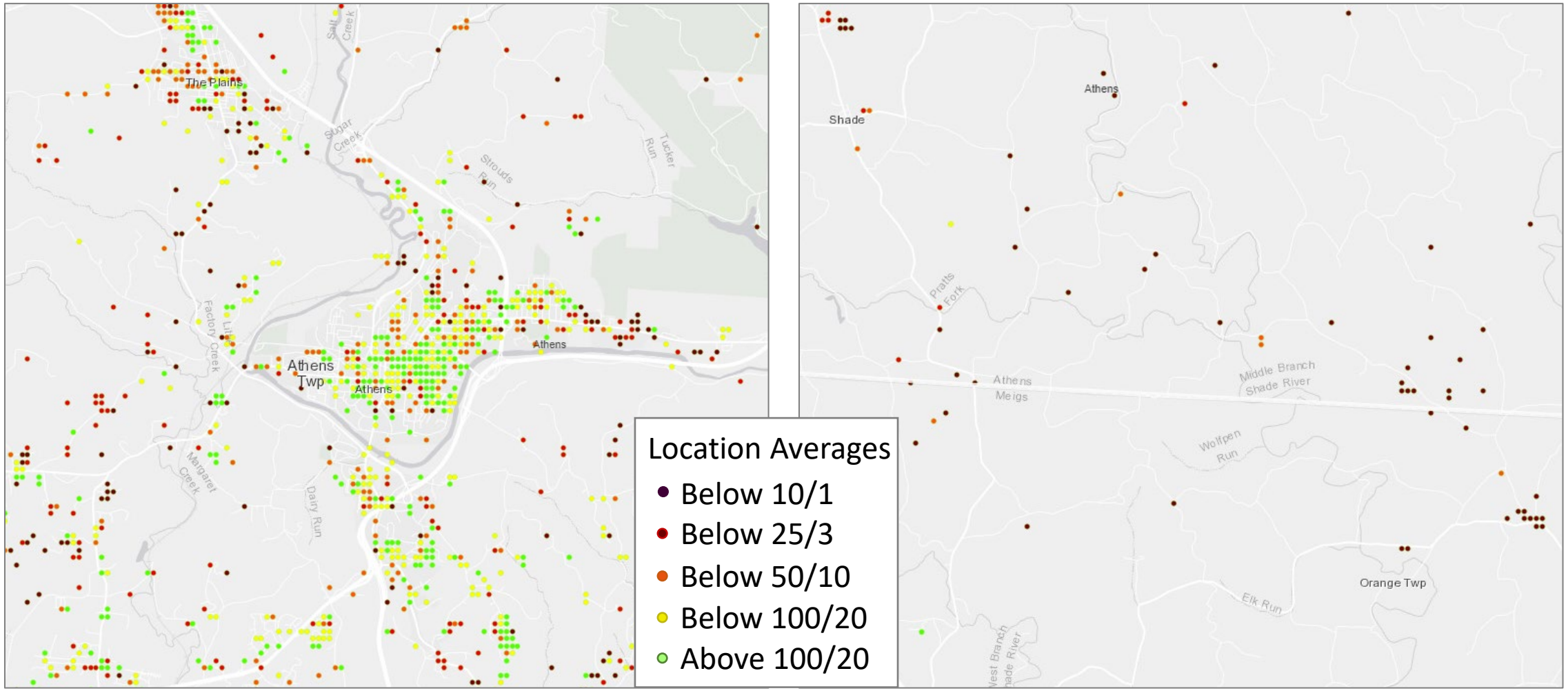
Preponderance of Evidence

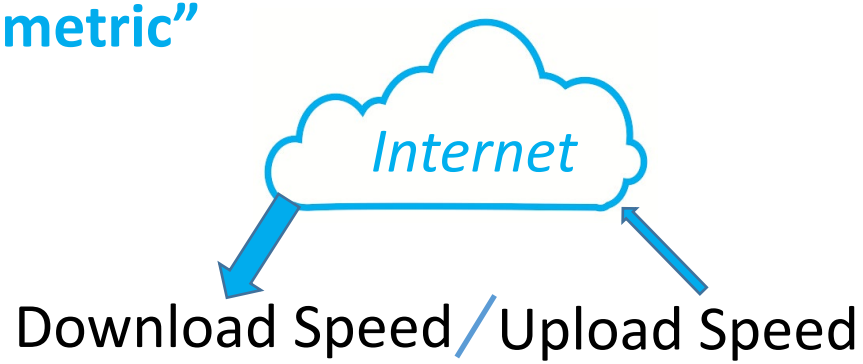
Town

Rural Expanse



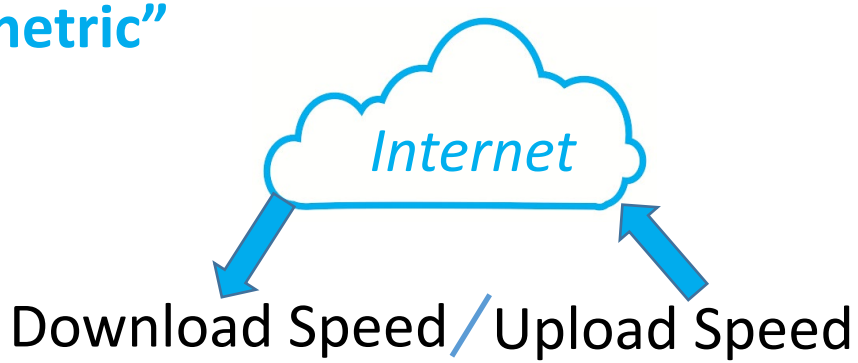
Speeds

"Asymmetric"



- 25/3 = 25 Mbps down/5 Mbps up
- 100/20 = 100 Mbps down/20 Mbps up
- 1000/200 = 1 Gbps down/200 Mbps up

"Symmetric"



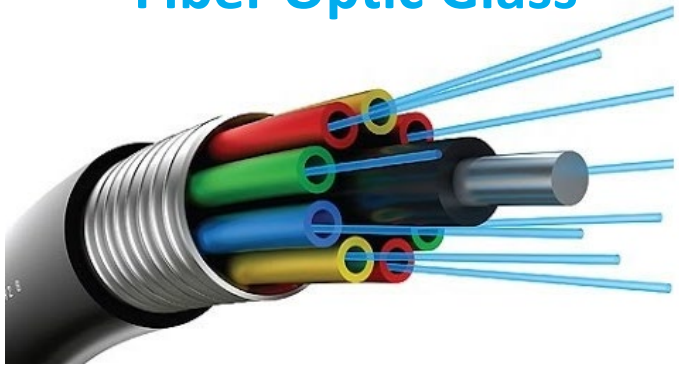
- 25/25 = 25 Mbps down/25 Mbps up
- 100/100 = 100 Mbps down/100 Mbps up
- 1000/1000 = 1 Gbps down/1 Gbps up

1 Mbps = 1 million bits per second

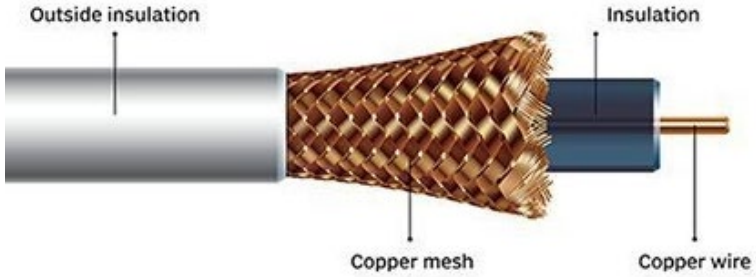
1 Gbps = 1 billion bits per second

Underlying Infrastructure

“Fiber Optic Glass”



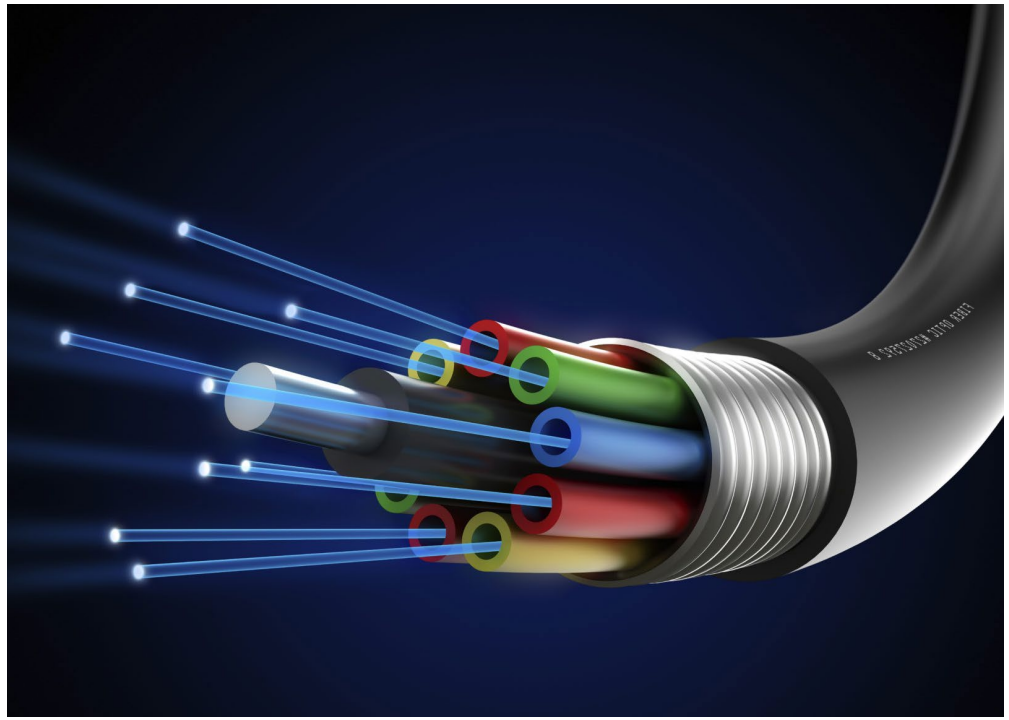
“Coaxial Cable Copper”



“Twisted Pair Copper”

Power of Fiber

- "Single mode" fiber thinner than a human hair
- Lasers transmit long distances between repeaters
- High Performance Configuration Today
  - To the home: **1 billion** bits per second (1 Gbps)
  - In the neighborhood: **10 billion** bits per second (10 Gbps)
  - Across the county: **100 billion** bits per second (100 Gbps)
  - Supporting the region: **4.4 trillion** bits per second (4,400 Gbps) on just two strands of fiber using Dense Wave Division Multiplexing



25 Mbps vs. 1 Gbps

40 times the capacity!

Rural Broadband Myths

Myth #1: ***Fiber-to-the-premise in rural areas is too expensive***

Reality: Profitable fiber networks have been implemented by numerous rural telephone and electric cooperatives. Lifecycle costs for fiber are lower than a series of incremental half-measures.

Myth #2: ***Few rural households will subscribe.***

Reality: Where broadband truly available, subscription rates quickly reach 40% and one third of subscribers opt for the top tier speed offered.

Myth #3: ***Starlink, fixed wireless and 5G will solve the issue***

Reality: Wireless is not an equivalent substitute for wired infrastructure.

- **Low-earth orbit (LEO) satellites fit an important niche but do not offer mass-market capacity and terrain obstructions limit the reach.**
- **Fixed wireless faces speed constraints and terrain limitations.**
- **5G requires last mile fiber networks due to limited reach of small cells.**