Advanced Broadband Studies

A look at business case modeling and feasibility for FTTH broadband connectivity in selected Kansas Communities

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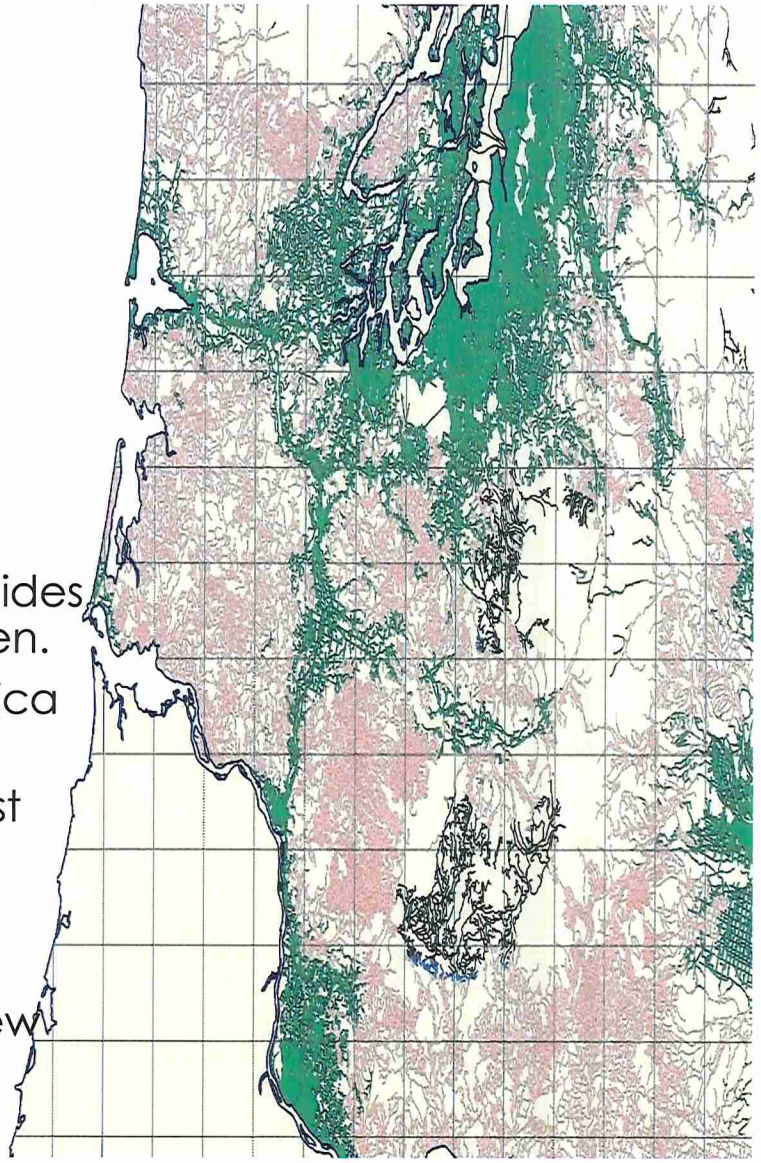
Introduction

- CostQuest Associates
  - Known for Economic/Network Models for Telecommunications
  - Independent – No policy objectives, advises all sides (industry, government). Agnostic and data-driven.
  - FCC – National Broadband Plan, Connect America Fund
  - States – Alabama, California, Idaho, Kansas, West Virginia, Wisconsin, Wyoming
  - Providers – AT&T, Verizon, Comcast, Frontier, T-Mobile and many others
  - Foreign Governments – Australia, Hong Kong, New Zealand



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What were we tasked with?

Feasibility – A BUSINESS CASE for full fiber deployment in selected communities

Selected Pilot Communities:

- Fort Scott
- Dodge City
- Topeka

And, Top Broadband Markets:

- Wichita
- Lawrence
- Manhattan
- Overland Park

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What are we modeling? What Kansas City has.

- Fiber-to-the-premises (homes and businesses) across entire city
- 1Gbit/s Internet Service, TV and other services
- Model looks at neighborhoods (for larger cities)

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What's in the model?

- **Feasibility/Profitability:** The Advanced Broadband Study estimates the costs and potential profitability and ultimately the viability of the network
- **10-Year Business Case:** The Study looks at deployment costs and the costs to maintain the network over 10 years
- **Designed Network:** The underlying geospatial/mapping model determines an efficient routing and architecture of the network
- **Tested Demand Assumptions:** The underlying cost model's use of an extensive demand and demographic database provides the ability to understand potential take rates, costs and the revenue flows related to the network plan to understand the economics of each area

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What are the assumptions for this business model?
Too many to list, but…think Google Fiber

The Rate Plans:
Residential
1Gbit/s Internet Service - $70/mo
1Gbit/s Internet Service + TV - $120/mo
Low Speed Internet (5/1 Mbit/s) – FREE

Business
1Gbit/s Internet Service - $100/mo
1Gbit/s Internet Service + TV - $150/mo
Low Speed Internet (5/1 Mbit/s) – FREE

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What are the key drivers of a successful business case?

Take Rate

What predicts a high take rate? Income, educational attainment are key.

Costs

What drives costs? Density and distance are key.

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Other parameters – the list goes on (can all be changed)

				Revenue		Take Rates	
	Length of Study	Average Useful Life of Assets	Assumed Provider Size	Residential Rate Plans	Business Rate Plans	Residential Rate Plans	Business Rate Plans
Input Used	10 years	20.5 years	Large	120/70/8.99	150/100/8.99	40/45/15	10/80/10
Comments	Can adjust the period	Standard for typical deployment	Large carrier w/ good buying power and brand awareness	Video Bundled/High Speed/Low Speed	Video Bundled/High Speed/Low Speed	Video Bundled/High Speed/Low Speed - The take rates vary by neighborhood and are driven by income and	Video Bundled/High Speed/Low Speed - The take rates vary by neighborhood and are driven by income and

Other Key Inputs/Parameters

Depreciation, cost of money and income taxes
Revenue
Customer Prem equipment -- (Modem, Set top, remote, etc)
Structure Sharing -- Sharing of feeder and distribution cable on same structure
Fiber -- Drop Material Prices/ft
Fiber -- Fiber Cable Material Prices/Ft
Fiber -- Material Prices for Termination of Fiber on Panel in Node Location
Eqpt Material Prices and Capacities -- ONT
Eqpt Material Prices and Capacities-- Fiber Splitter
Eqpt Material Prices, Labor and Capacities -- Fiber Drop Terminal
Equipment Material Prices and Capacities -- OLT
Labor Rates
Miscellaneous Loadings
Buildings -- Free Building Space
Buildings -- Land and Building CAPEX
Fiber -- Cable placement and splicing hours
OPEX Factors – Operating Expense factors
Plant Mix - Mix of Aerial, Buried and Underground plant
Structure -- structure (incl Buried) Sharing with other Parties
Installation Expenses -- Data Only
Installation Expenses -- Video / High Speed Data
Conduit -- Underground conduit/duct/innerduct placement hours for owned conduit systems
Excavation costs -- Buried Excavation Hours
Excavation costs -- Underground Excavation Hours
Poles – Pole Placement Hours for owned poles
Conduit -- CAPEX if conduit is rented
Conduit -- UG Material prices for conduit, duct/innerduct, manholes if conduit is owned
Poles – CAPEX for attaching cable to non-owned pole
Poles – Pole/Anchor/Guy Material Prices if owned poles
Conduit -- Duct Rental Rates
Pole/Conduit -- Mix of Free vs Non-Free
Poles – Attachment Rates
% Customers Choosing each offering: LowData, HighData, Video&HighData
CircuitPowerFactor
SwitchPowerFactor
UseRegionalCostAdjustment
FLEC to Book Capex adjustment
AssumedAreaDensity
AssumedCompanySize
Poles
Conduit
CarrierType
Company
Length of Study
DiscountFactor

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Topline Results – Initial Deployment Costs

	City	Initial Investment (CapEx)	
Pilot Cities	Fort Scott	$	4,744,590
	Dodge City	$	11,707,311
	Topeka	$	62,155,367
Top Business Case Cities	Lawrence	$	43,656,812
	Manhattan	$	20,755,533
	Overland Park	$	100,835,018
	Wichita	$	168,229,409

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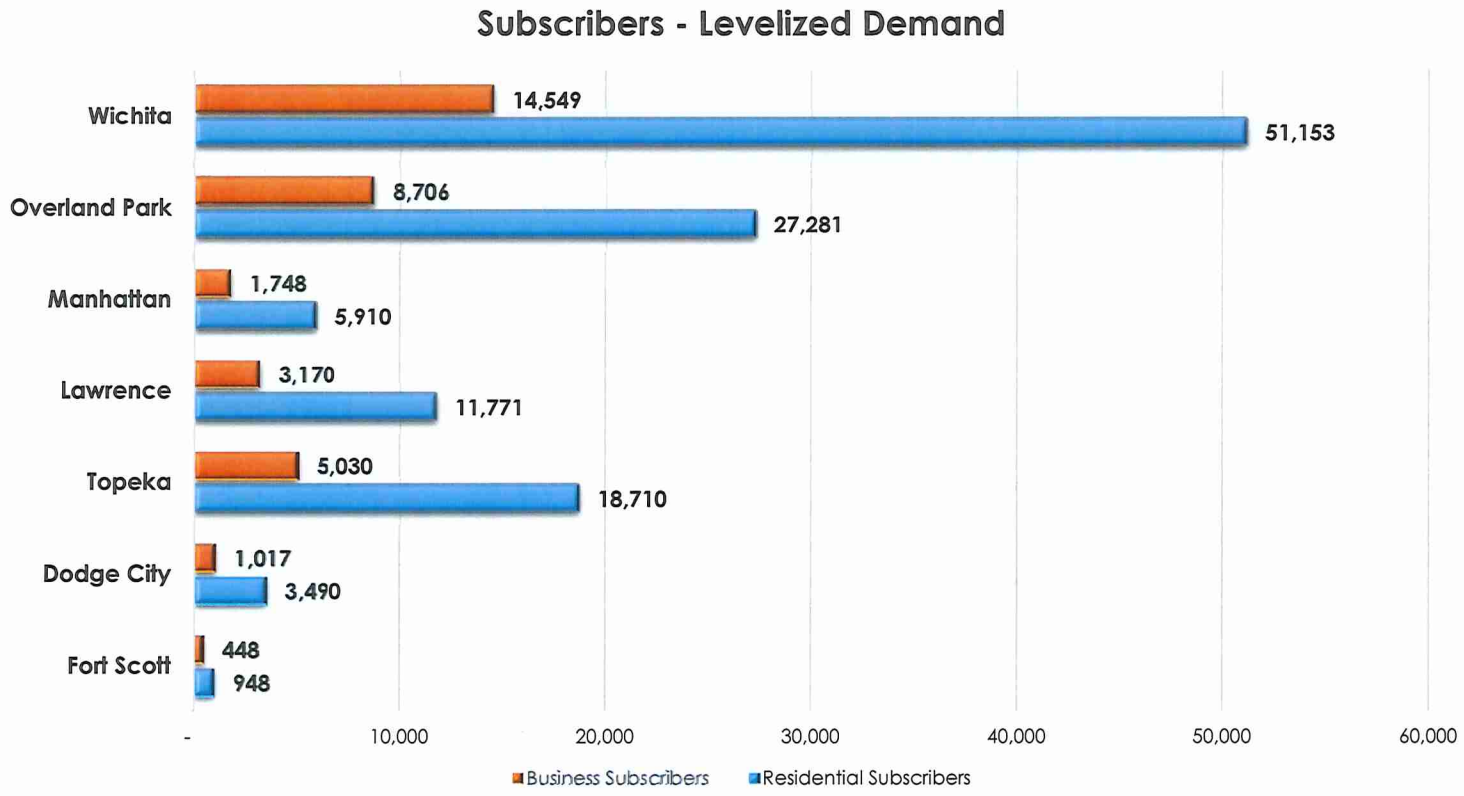
Topline Results – Demand (Customers)



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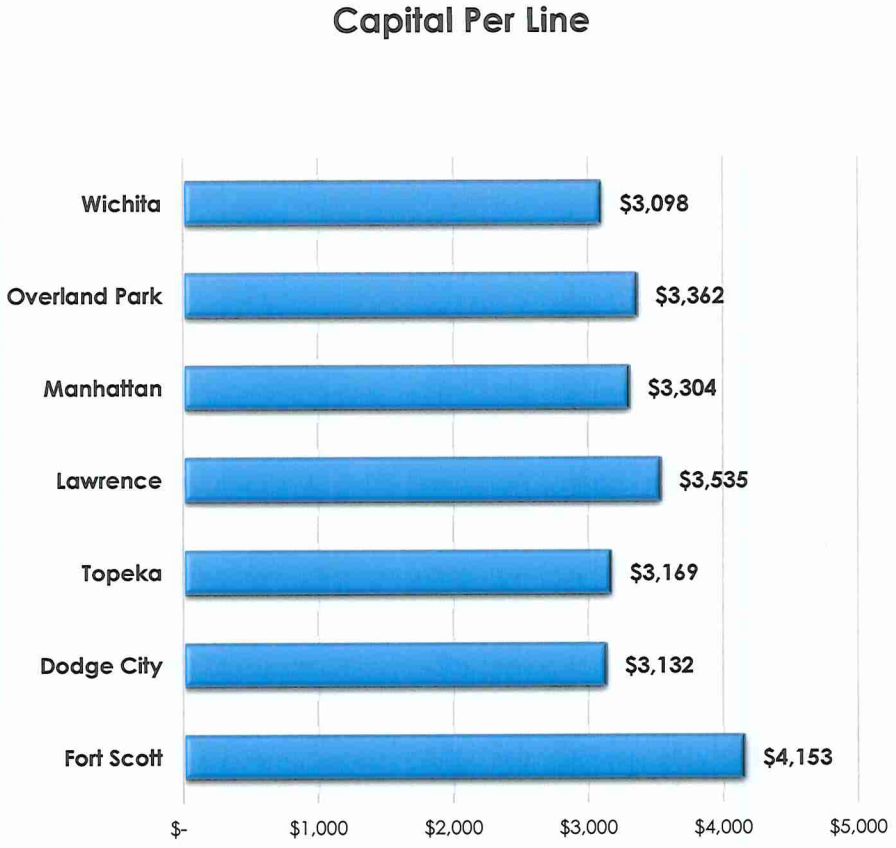

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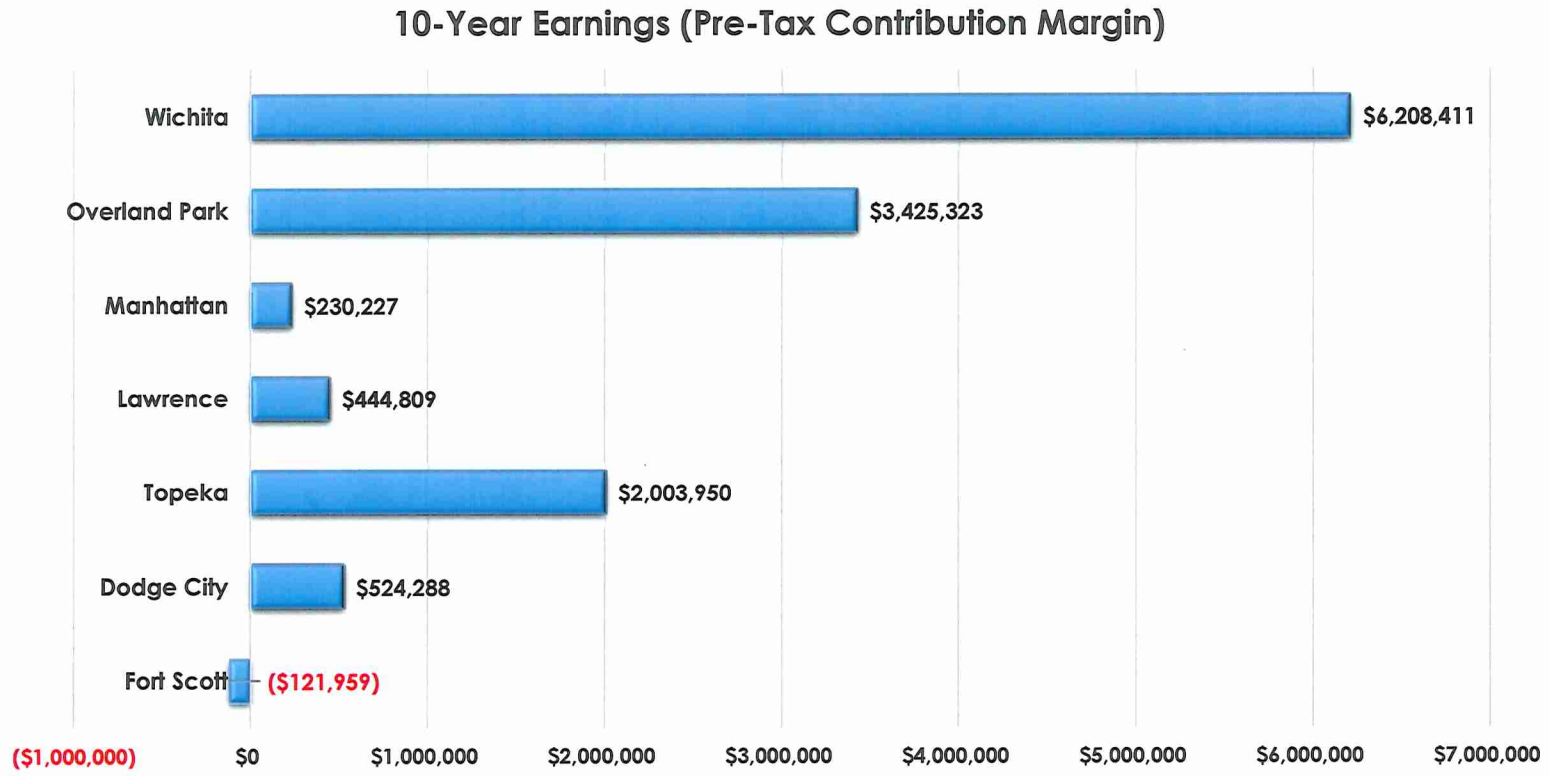
Topline Results – Annual Earnings



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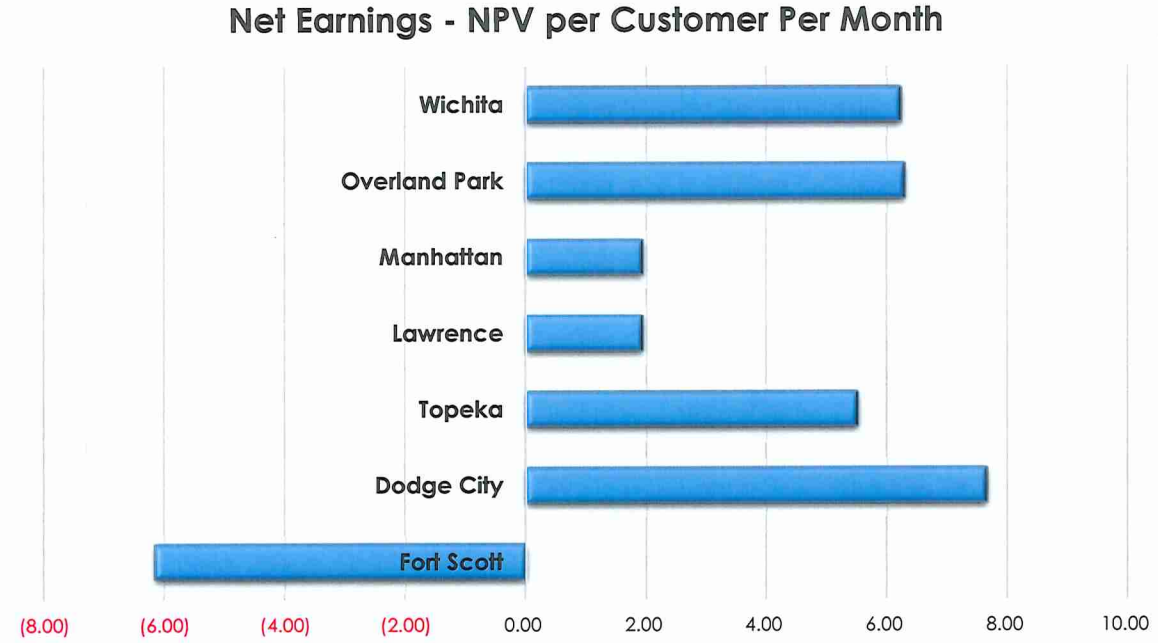
Topline Results – Earnings



	Pilot Cities			Top Business Case Cities			
	Fort Scott	Dodge City	Topeka	Lawrence	Manhattan	Overland Park	Wichita
NPV per Customer Per Month	**(6.16)**	**7.65**	**5.52**	**1.93**	**1.93**	**6.30**	**6.23**

Net Present Value - What one can expect to earn (cash flow), pre-tax, for each customer monthly for the 10-year business case

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Topline Results – Business Case Summary

	Pilot Cities			Top Business Case Cities			
	Fort Scott	Dodge City	Topeka	Lawrence	Manhattan	Overland Park	Wichita
Residential Subscribers	948	3,490	18,710	11,771	5,910	27,281	51,153
Business Subscribers	448	1,017	5,030	3,170	1,748	8,706	14,549
Total Annual Revenue	$ 1,140,544	$ 4,018,467	$ 20,593,682	$ 12,989,997	$ 6,313,182	$ 32,723,190	$ 56,946,691
Total Annual Opex	$ 716,903	$ 2,121,755	$ 11,319,942	$ 7,427,141	$ 3,662,551	$ 17,446,045	$ 31,030,530
Total Annual CapCost	545,600	1,372,425	7,269,791	5,118,047	2,420,403	11,851,823	19,707,750
Annual Contribution Margin (Pre-Tax Contribution Margin)	($121,959)	$524,288	$2,003,950	$444,809	$230,227	$3,425,323	$6,208,411

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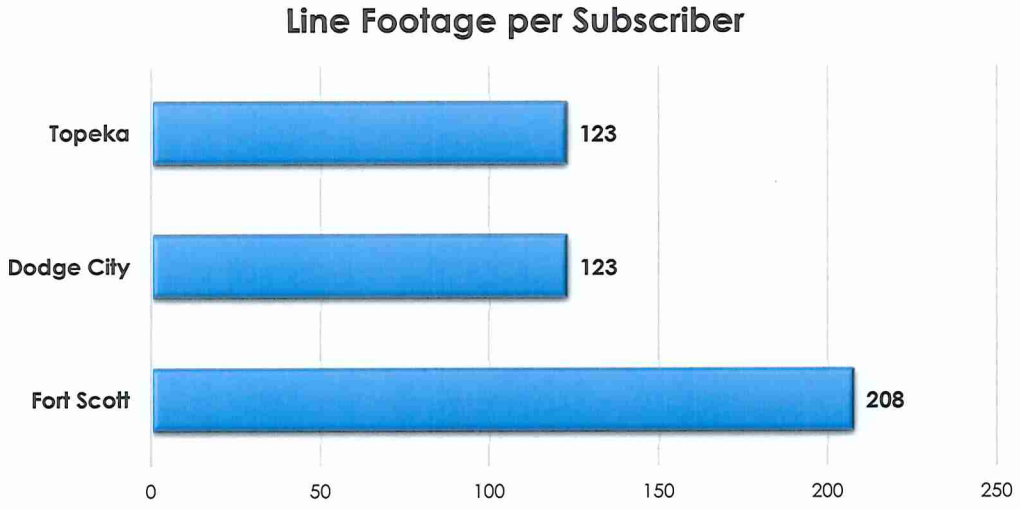
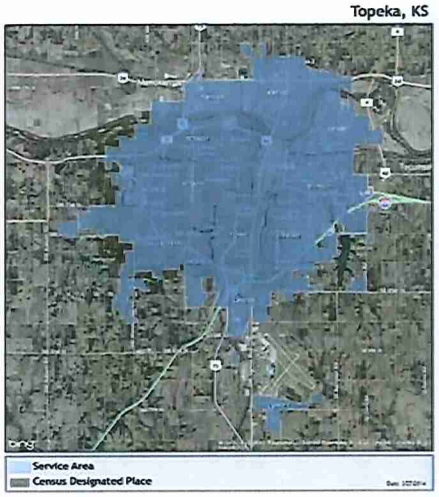
Pilot Cities – Key Drivers
Density and Distance





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Pilot Cities – Key Drivers
Take Rate

Fort Scott

	Baseline	Take Rate for Res Income for 20-40k up by 5%	Take Rate for Res for Income 20-40k up by 10%	Increase BUS Take by 10%	Increase in Take Rate of 10% across board
NPV per Customer Per Month	**(6.16)**	**(5.02)**	**(3.99)**	**(4.04)**	**(1.29)**

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Rural Communities Alternatives

- Fixed Wireless may be HALF as much in initial investment
- Mixed-mode of technologies
  - Build fiber to dense areas, community anchor institutions and to business parks
  - Other last mile solutions to remaining locations until economics work out

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Why do some communities have fiber and other do not?

- Core density is a factor
- Some cities have large anchor tenants
- Legacy regulation is a factor

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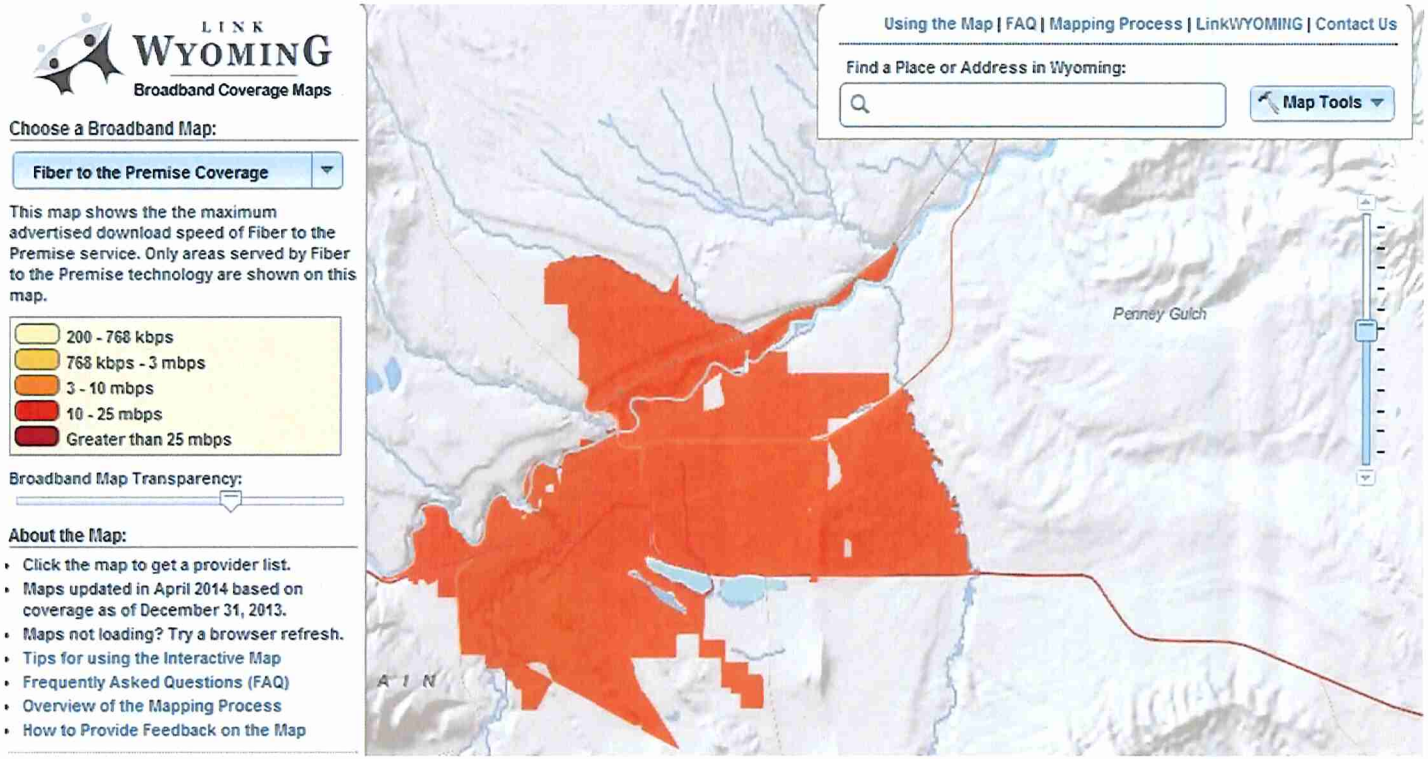
Why do some communities have fiber and other do not?

- Legacy regulation is a factor



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Why do some communities have fiber and others do not?

- Legacy regulation is the biggest factor

	Population	Sq Mi
Fort Scott, Kansas	8,000	5.59
Worland, Wyoming	5,500	4.64

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Why do some communities have fiber and other do not?

- **Legacy regulation is the biggest factor**

Universal Service Funds spent on FTTH by TCT West

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What can be done with the data?

- To develop an understanding of the economic feasibility of a gigabit speed network – City-wide or otherwise.
- To support advocacy to policy makers and stakeholders on the value of such a network.
- To manage procurement of a private partner to deploy or manage the network and business.
- Manage leverage that the city might have – Right-of-way, city assets/equipment, permitting, franchising
- To manage architecture issues and other matters that may serve to expedite build-out.
- Neighborhood demographics, demand and economic data will help to effectively manage deployment and adoption.
- Can be used to advise applications for FCC's Experiments and other programs