

SUCCESSFULLY BRINGING FTTP TECHNOLOGY TO YOUR COMMUNITY

June 28, 2017

WHAT WE'RE GOING TO ACCOMPLISH TODAY

- ◉ Trying to have a three day seminar in 75 minutes...just the strategic big picture with key milestone details
- ◉ Why do you and your constituents really want ultra high speed internet? Do you need it? How much speed is enough?
- ◉ What are the options, development steps and costs to bring ultra high speed internet to your town
- ◉ What are Santa Cruz and Mount Shasta/Weed/Dunsmuir currently doing

DEFINITION OF TERMS

- ◉ DSL: Internet service via telephone lines
- ◉ Fiber: Internet service through optical cable
- ◉ FTTP: Fiber to the premises
- ◉ Copper: Traditional phone lines...line resistance/loss
- ◉ Cable: Typically copper coaxial cable
- ◉ First Mile: Network operators (ATT, Sprint, Next Level, etc) main data trunk line
- ◉ Middle Mile: Links first to last mile
- ◉ Last Mile: Cable, telephone or fiber links to home or business
- ◉ 1000 kilobytes = 1 megabyte 1000 megabytes = 1 gigabyte
- ◉ ISP: Internet service provider (eg: Comcast, ATT, etc.)
- ◉ Anchor Service Provider: Company that is an ISP and may maintain and operate the fiber network for the City
- ◉ Advertised speed vs. actual at home speed

DO YOU NEED ULTRA HIGH SPEED?

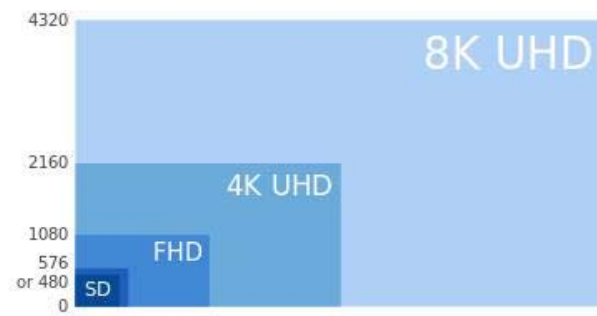
Fundamental Infrastructure Changes That Affect How Towns Thrive...or Don't

- ◉ Railroads in the late 1800's
- ◉ Electricity in the early 1900's
- ◉ Freeways in the mid 1900's
- ◉ "Information freeways" in the early 2000's

Think about information infrastructure being as key to your towns development as water and sewer infrastructure

WHY YOU WILL NEED HIGHER SPEED

- ◉ TV standard definition (SD), vs. high definition (HD) vs. 4K vs. 8K ultra high definition (UHD)
- ◉ 4K already here...8K in 3 years!
- ◉ 8K is 16 times the data of HD



WHAT'S COMING IN THE VIDEO WORLD

- ◉ "...for a player with 20/20 vision, they will have something that is close to perfect for their visual system." AMD (8K chip maker) in 2014
- ◉ NHK Japan is aggressively testing 8K in the TV broadcasting environment. Public tests began with the 2016 World Cup Soccer Tournament in 2016, with the eventual goal to provide 8K broadcasting feeds for the 2020 Tokyo Summer Olympics
- ◉ Samsung and Sharp have both shown 8K TV prototypes at CES in past four years
- ◉ 8K resolution is effectively 16 times more detailed (more data) than 1080p (HDTV)
- ◉ 8K video and audio stream at 350Mbps uncompressed...for one piece of equipment

WHAT'S ALREADY IN THE AVERAGE HOME?

- ◉ In the US, there are currently an average of 7.8 internet connected devices per home!
- ◉ Think about the speed needed to handle many connected devices on line at the same time.
- ◉ Just like thinking about a main water line to your home when many people using the water at the same time.

VIDEO DRIVES THE INTERNET AND THE NECESSARY SPEED TO PARTICIPATE

- ◉ What percentage of ALL internet traffic in the US during peak periods is JUST Netflix?

34%

WHY BRING HIGH SPEED TO YOUR CITY

- ◉ Economic development initiatives
 - Bring good paying full time jobs to town that need gigabit per second communication speeds
 - Stop job loss to other towns that have affordable internet access speeds that you do not
- ◉ Improved education and library services
 - Public and charter schools, colleges, on-line schools
- ◉ Make_very high speed internet affordable
 - Provide much higher speed at existing price points to citizenry...nationally competitive rates
 - Provide up to 1000Mps speed to entire town
- ◉ Leverage existing infrastructure already in/near town
- ◉ Take control of critical infrastructure destiny

WHAT WERE OUR SIMPLE OBJECTIVES

- ◉ FTTP to every home and business
- ◉ Nationally competitive prices
- ◉ No caps or throttling on individual account monthly data usage

WHY DO CITIES NEED TO BE INVOLVED

Why Don't We Just Let The Free Markets Handle This?

- Big cities typically have customer density and competition for those customers; smaller cities frequently don't.
 - In MS/Dunsmuir/Weed above 12 mbps the local cable company has a monopoly
- Clash of city economic development motivation vs. ISP maximize profit motivation
 - Sudden build out/competitive pricing vs. incremental build out/oligopoly pricing

YOUR WAGER

- Are you willing to bet that private companies will handle your cities/citizens critical data infrastructure needs with the right products at the right time, and at the right price?

STEPS, OPTIONS AND COSTS

- ◉ Hire professionals to write a business plan for your city
- ◉ Discuss findings with the City Council members and your constituents
- ◉ Review financing options and legal work
- ◉ Hire professionals for a “blueprint ready” design
- ◉ Put out an RFQ/RFP for an ISP partner
- ◉ Secure a contract with your partner and rollout

STEPS, OPTIONS AND COSTS

- ◉ What is in the “Business Plan”
 - Fiber network design/engineering...best practices
 - ◉ Municipality owns fiber
 - ◉ Municipality guides retail pricing
 - All telecom, utility and municipal legal work
 - All financial projections and funding structures
 - ◉ Municipal revenue lease bond vs. general obligation bond
 - ◉ Explore state and federal grant money
 - ◉ Wholesale pricing from ISP customers paid to City to pay bond
 - Find and manage fiber installation
 - Find “anchor service provider”
 - ◉ Maintains and operates fiber network
 - ◉ Will be an ISP too.

STEPS, OPTIONS AND COSTS

- ◉ Encourage existing providers to upgrade their systems
- ◉ City can fund, install, own and operate the entire infrastructure system...City becomes an ISP
- ◉ City funds the design and fiber installation, and finds an ISP partner (Anchor Service Provider) for maintenance and operation...a Public/Private Partnership

STEPS, OPTIONS AND COSTS

- ◉ Mount Shasta has about 2,370 structures over 33 miles of road to bring fiber to.
- ◉ The rough estimated cost to do all the legal, financing and laying of fiber to pass all structures is \$4.3 million dollars...\$1,815 per structure
- ◉ The cost to bring the fiber to a structure is \$661 per structure
- ◉ If there is a conservative "take rate" of 35%, the additional costs to bring fiber to 830 structures is \$549,000
- ◉ The total cost to the City is about \$4.9 million dollars.

STEPS, OPTIONS AND COSTS

- Bond structure has no payments for the first two yrs.
- Interest payments for the first two years are folded into the remaining 28 years (about \$250,000 total for the 2 years)
- Financing all \$5.2M at 4% for 30 years (actually 28) is a monthly bond payment of about \$25,750
- Financing all \$5.2M at 5% for 30 years (actually 28) is a monthly bond payment of about \$28,800
- Financing all \$5.2M at 5% for 20 years (actually 18) is a monthly bond payment of about \$36,600
- Financing all \$5.2M at 4% for 20 years (actually 18) is a monthly bond payment of about \$33,800
- If the ISP (retail service partner) pays a “wholesale” rate of \$25 per month per subscriber customer, and \$6 per month for the remaining “passing” structures, the Cities revenue is $830 \times \$25$ plus $1,540 \times \$6 = \$20,750$ plus \$9,240 for a total of \$29,990 per mo.

STEPS, OPTIONS AND COSTS

- If the “take rate” of a conservative 35% goes to 42%, the additional costs to bring fiber to 996 structures is \$660,000
- The total cost to the City is about \$5.0 million dollars
- Financing all \$5.3M at 4% for 30 years (actually 28) is a monthly bond payment of about \$26,300
- Financing all \$5.3M at 5% for 30 years (actually 28) is a monthly bond payment of about \$29,400
- Financing all \$5.3M at 5% for 20 years (actually 18) is a monthly bond payment of about \$37,300
- Financing all \$5.3M at 4% for 20 years (actually 18) is a monthly bond payment of about \$34,500
- If the ISP (retail service partner) pays a “wholesale” rate of \$25 per month per subscriber customer, and \$6 per month for the remaining “passing” structures, the Cities revenue is $996 \times \$25$ plus $1,374 \times \$6 = \$24,900$ plus \$8,244 for a total of \$33,144 per mo.

STEPS, OPTIONS AND COSTS

- ◉ As you can see, “take rates” and bond interest rates are key factors in making 100% financing for the project work.

KEY TAKEAWAY SUMMARY

- ◉ Your town needs ultra high speed internet infrastructure
- ◉ The odds are you can bring gigabit a second internet speed to your town without any State or Federal financial help
- ◉ The models to make this happen already exist and have been successful