



## Vital Communities Broadband as Essential Infrastructure

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## Broadband Study

- ▶ Project goal: Future proof the community by planning for a community-managed telecommunications infrastructure that will attract businesses and create new job opportunities
- ▶ Phase One Objectives
  - ▶ Needs Assessment: What infrastructure is already in place, what is still needed?
  - ▶ Broadband Education: Help the community become tech savvy
  - ▶ Last Mile (First Mile) Connectivity Solutions: How to connect home and businesses, with what technologies and systems
  - ▶ Study of financing using public and private funds

# Broadband: Essential Infrastructure

- ▶ Copper-based technology is inadequate for future economic growth
- ▶ Every community needs fiber *and* wireless
- ▶ Wireless alone is not enough for business
- ▶ Broadband is essential for economic development
- ▶ Easy to build and easy to finance
- ▶ Start small--a few blocks at a time



Broadband is not a number--it is having enough bandwidth to do whatever your business needs to do

## Benefits

- ▶ Increased business activity
- ▶ Vibrant, “connected” communities attracts entrepreneurs
- ▶ Save money through new services, demand aggregation, for gov’t, business, citizens
- ▶ Take control of economic future of the community
  - ▶ Attract increased private investment
  - ▶ Create new markets for businesses
  - ▶ Create jobs, pool of skilled workers

Business relocation is now often based on family needs first--Knowledge Economy businesses may not care about water and sewer capacity

Affordable, high capacity broadband is now the #2 business relocation consideration

# Entrepreneurship and Jobs

- ▶ 75% to 90% of new jobs are created by small businesses, and 99% of all jobs in the economy
- ▶ Microbusinesses increased 17% in four years ('97 - '01) and is likely to continue to increase
  - ▶ Microbusiness is typically 2-5 employees
- ▶ In 2003, self-employed accounted for 31% of growth--a 600% increase

Four Part Economic  
Development  
Strategy  
**Traditional industrial recruitment**

**Recruitment of entrepreneurs  
(who relocate based on family  
needs, not business needs)**

**Help existing businesses grow,  
since these will create most new  
jobs**

**Help local entrepreneurs start new  
businesses**

# Neighborhoods



- ▶ The business district of the future
  - ▶ Telework and telecommuting are two entirely different activities
- ▶ Recent NY Times article indicated that it is families and entrepreneurs that are relocating
- ▶ Does your economic development strategy attract families?
- ▶ Affordable broadband is the enabler
  - ▶ No or expensive broadband is the disabler
- ▶ No difference in infrastructure between neighborhoods and business districts
- ▶ Jet Blue, medical transcription work opportunities

# What has changed?

Where we want to be

	Manufacturing Economy		Knowledge Economy
	Telephone	Cable TV	Varied
Infrastructure	Monopoly control of twisted pair cable to the home or business	Monopoly control of the coaxial copper cable to the home	Multiple delivery systems: copper, fiber cable, wireless, and satellite. No inherent monopoly control.
Access	Monopoly control of the connection to the Telephone Network (PSTN)	Monopoly control of the connection to the cable head end	Open access network provides multiple vendors for an IP address and bandwidth.
Services	Monopoly control of dial tone – the ability to make a telephone call	Monopoly control of the TV signal–ability to watch a TV channel	Choice of service vendors for VoIP, video, audio, Web site hosting, etc.

Distributed ownership of infrastructure protects the community

# Broadband makes the pie bigger for all

- ▶ Community investments in broadband increase opportunities for businesses
- ▶ Current broadband models assume the pie is a fixed size--  
**WRONG!!**
- ▶ For the past five years, broadband has been creating new multi-billion dollar markets and thousands of new jobs and businesses



One Cleveland, a community broadband project, increased Adelphia's commercial broadband business 60% in one year

# Technologies

	WiFi	WiMax	FiOS Passive Optical Network	Fiber Active Optical Network
Bandwidth	< 1 megabit	2-5 megabits	5-30 megabits	1 Gigabit or more if needed
Distance	100 yards	2-4 miles	3000 feet	Three miles
Equipment replacement	2-4 years	2-4 years	7-9 years	7-9 years
Replacement cost	Entire system	Entire system	Equipment only; fiber lasts 30 yrs	Equipment only; fiber lasts 30 yrs
Advantages	Good for mobile access	Good for mobile access	Okay for triple play	Future proof--any application now or in the future. Easy to upgrade incrementally.
Disadvantages	Blocked by trees, walls. Limited distance.	Blocked by trees, walls. Can't handle video.	Bandwidth partitioned by service. Expensive to upgrade. Higher start up costs.	Higher start up costs.

# Broadband is just like roads

	Roads	Broadband
<b>History</b>	Roads originally built by the private sector	Telecom originally built by the private sector
<b>Infrastructure</b>	Roads built for the common good of all in the community, including businesses	Digital roads built for the common good of all in the community, including businesses
<b>Access</b>	Access to the road system provided by property owners and developers	Access to the digital road system provided by property owners and developers
<b>Services</b>	Government maintains roads, but does not own the businesses that use roads	Government maintains digital roads, but does not own the businesses that use digital roads
<b>Fees</b>	There are no "road connection" fees. Anyone can use roads. Fees are proportional to use.	Broadband connections are free. Fees for services pay for use of the digital road.

# What is broadband?

Why are we limiting our communities to what a third party says they need?

**Broadband is as much bandwidth as you need to do whatever it is you want to do**

- ▶ Minimum 100 megabits/second of sustained throughput with option of gigabit speeds for business
  - ▶ Three channels of HDTV (18-20 megabits/channel)
  - ▶ Voice telephone (multiple lines)
  - ▶ Radio, music and video downloads
  - ▶ Web surfing
  - ▶ Outgoing data--business servers, video streaming, videoconferencing
- ▶ Other countries well ahead of the United States
  - ▶ Korea's target is 155 megabits to the home
  - ▶ 100 megabit fiber connections are \$60/month in Japan



**Abundant, inexpensive services from many providers**

**Massive connection to the rest of the world**

**Businesses can reach new markets and create jobs**

**A knowledgeable and engaged citizenry**

**A wide variety of devices, including video, distributed media centers (computers), PDAs, wireless handheld phones, and tablet computing devices**

## Copper vs. Fiber

Characteristics	Copper	Fiber
Technology	Based on one hundred year old technology (DSL) or fifty year old technology (cable modems)	Active fiber systems use electronics designed specifically for high bandwidth applications and services.
Quality of Service	The quality and age of the copper cable affects service.	Fiber provides high reliability end to end.
Distance limitations	Dependent upon the distance from telephone switches. Higher speed DSL services are limited to as little as a few hundred feet.	Fiber signals can travel many miles.
Capacity	Copper has very low capacity and has trouble delivering even a single channel of HD TV unless the subscriber is very close to network distribution points.	Off the shelf fiber systems can deliver several channels of HD TV today, and can be upgraded easily.

# Wireless vs. Fiber

Characteristics	Wireless	Fiber
Mobility	Wireless provides excellent mobile services to portable devices like phones, PDAs, and laptops.	No mobility.
Capacity	Limited capacity. Vendors use very large, theoretical capacity when discussing wireless products. Actual capacity is often 1/10 of vendor claims.	Actual capacity of active fiber systems is usually about 90% of published capacity. PON capacity is calculated by dividing published capacity by the number of users on a single splitter.
Cost	Lower initial cost, but total life cycle cost over 30-40 years is higher than fiber.	Higher initial cost, but total life cycle cost of 30-40 years is lower than wireless.
Utility	Wireless services are needed for our mobile phones, PDAs, and laptops.	Fiber services are needed to power high bandwidth services like video, telemedicine, business applications, and home security.

# Open vs. Closed Systems

Characteristics	Closed	Open
Service provider selection	Gatekeeper/network owners pick providers	Customers pick providers
Competition	Very limited. One provider for each class of service.	Service providers compete for customers.
Choice	Very limited. A single provider for voice, video, and data (triple play).	Many kinds of services, not just triple play, with multiple providers in many categories.
Pricing	Little or no competition keeps prices high. Encourages cartel-like pricing.	Competition forces providers to compete by keeping prices as low as possible.
Customer service	Lack of competition means service providers have little incentive to offer good service.	Competition forces providers to offer good customer service.
Business risk	High. Network operator must sign long term contracts with service providers. If a provider does not work out, it is difficult to change providers.	Low. No need for long term contracts. If a provider does not work out, there are other providers already offering similar services.
Local business opportunities	None. Big companies usually get the three contracts.	Unlimited. Anyone with a good idea can become a service provider inexpensively.
Revenue Potential	Limited by fixed margins on just three services.	Unlimited. Wide variety of services with different profit margins does not cap revenue.

## Muni Triple Play vs. Open Service Network

Characteristics	Muni Triple Play	Open Service Network
Marketing	Marketing is much more difficult because limited competition keeps prices high and limited service options provide little incentive to switch.	Marketing is much easier. Service providers compete with each other, and market aggressively to gain new customers.
Take Rates	Low. The service offerings and prices are not much different from what residents and businesses have now.	Much higher. Competition and a wide variety of services with lower costs encourage residents and businesses to switch.
Broadband Literacy	Take rates rely heavily on broadband savvy customers, because the only "new" service is Internet access. If someone does not have a strong desire for broadband, they often do not switch to the new network	Take rates are not dependent on broadband savvy customers. Wide variety of services with attractive, lower prices provides incentives for customers to switch, even if they are uninterested in Internet access.

## Good Enough vs. Future Proof

Characteristics	"Good Enough" System	Future Proof System
Concept	"Many of our residents only have dial-up, so let's just get them something better than that."	"If we are going to invest, let's make sure our residents and businesses have what they need to compete in the world economy."
Cost	Cost per home passed for a "good enough" fiber system is the same as for a "future proof" system.	Cost per home passed for a "future proof" system is the same as for a "good enough" fiber system.
Economic Development Potential	Limited. "Good enough" triple play systems restrict work at home and home-based businesses, and are not attractive to entrepreneurs.	Excellent. World class affordable broadband services attracts entrepreneurs and businesses to a region.
Risk	High. How long will a "good enough" system be good enough? Looking only at what is needed today while making a 30-40 year investment is very risky.	Low, given that costs are virtually equal. Investing in a system that can be easily expanded and upgraded as demand grows protects the initial investment.

# Typical OSPN service profile

- ▶ Basic connectivity to local services is free, including local government services and local education resources
- ▶ Every business and home connected to the network gets free local transport to community and local government services
  - ▶ School children have a free 1 megabit connection to local school services
  - ▶ Displaced workers have a free 1 megabit connection to GED programs and other local distance learning programs
  - ▶ Citizens have free access to government information and services
  - ▶ Citizens have free access to community Web portal, community Web sites
- ▶ Homes that meet needs-based criteria get subsidized 128 kilobit connection to the Internet for basic lifeline email and Web access
  - ▶ This will support a single VoIP telephone line

**Universal access is good policy, helps win public support, and pays the bills**

## Do the math

	Moderate to low income household	Moderate to high income household
Number of households	5000	5000
Typical monthly telecom cost	Local phone: \$25 Long distance: \$25 Cable TV \$45 Dial up Internet: \$20	Local phone: \$25 Long distance: \$25 Cable TV \$55 Broadband Internet: \$40
Total monthly cost	\$115	\$145
Total annual cost	\$1,380.00	\$1,740.00
20 year telecom cost	\$27,600.00	\$34,800.00
20 year regional cost	\$138,000,000.00	\$174,000,000.00
<b>Total 20 year telecom cost</b>	<b>\$312,000,000.00</b>	

**Just 10,000 households will spend over \$300,000,000 on telecom services.....before even adding in business and government/school telecom costs**

**A region of 100,000 households, if you count businesses and government, will spend about....**

**\$3,744,000,000**

# Do the math

	Residential community of 10,000 homes	Mixed region of 100,000 homes
What the community will spend over 20 years on telecom services (old fashioned monopoly service)	\$312,000,000	\$3,744,000,000.00
Savings from using an OSPN system are (conservatively) 15%--put back in the pockets of businesses and residents	\$46,800,000	\$561,600,000.00
What the community will spend on telecom with an OSPN system	\$234,000,000.00	\$3,182,400,000.00
Average revenue share (25%) on \$234,000,000	\$58,500,000.00	\$795,600,000.00
Cost of building an OSPN system in a residential community	\$20,000,000.00	\$275,000,000.00
Cost of borrowing (10%)	\$2,000,000	\$27,500,000.00
Total system cost	\$22,000,000.00	\$302,500,000.00
20 year revenue before expenses	\$36,500,000.00	\$493,100,000.00
Net 20 year revenue after expenses (about 50% of gross revenue)	\$18,250,000.00	\$246,550,000.00

Money that stays in the community to grow businesses and jobs

Money that can be used for community and economic development

# Getting Started

Open Service Provider Networks (OSPN) pay for themselves quickly

- ▶ Downtown rehab projects are a great place to start
- ▶ All services provided by the private sector
  - ▶ Local government does NOT sell services of any kind and does NOT compete with the private sector
  - ▶ All incumbent providers are invited to sell services
- ▶ Focus on Open Service Provider Networks
  - ▶ OSPN broadband systems can generate income for economic development
- ▶ Do a complete financial engineering model before talking to vendors (single biggest mistake is to go to vendors for advice)

# Contact information

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**Community technology news and information**

[www.designnine.com/news/](http://www.designnine.com/news/)

Updated daily and weekly

[www.designnine.com/library/](http://www.designnine.com/library/)

Papers, handouts, and other information on community broadband issues