

Buena Vista, Rockbridge & Lexington

Preliminary Broadband Findings, Options, and Strategies

August 19, 2008

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Why Invest?

The promised impacts of broadband on communities have yet to be fully realized; widespread access to affordable, high performance broadband services in communities has the potential to transform work life by providing more flexibility and control over when and where work is done. Broadband in every home can help equalize educational opportunities in K12 schools. Giving workers the flexibility to work from home can reduce commuting, relieve wear and tear on local roads, and help improve the green quotient of communities. Studies in the nineties showed that widespread availability of community information and activities (via an information-rich community Web portal and community TV and radio) can actually enhance community life and can encourage higher levels of participation in community activities.

A world class network in the cities of Lexington and Buena Vista and Rockbridge County will provide local businesses with unlimited bandwidth at affordable rates, enabling them to compete aggressively in the Global Knowledge Economy. Residents will have a world of information and opportunities at their fingertips. The children in the two cities and Rockbridge county will be able to access a wide variety of online, media-rich learning resources, and higher education students will be able to study and earn college credit from home. Residents will be able to choose from a rich variety of music, search the Web, and access massive archives of multimedia video and audio programming. Rockbridge, Lexington, and Buena Vista, as a multimedia-rich, future-proofed region, will be able to offer:

- A network infrastructure that offers abundant, affordable bandwidth
- Massive connections to the rest of the world
- New kinds of K12 and higher education distance learning opportunities
- Rich local content from a multitude of sources
- Interoperability and support for a wide variety of information devices, including tablet and laptop computers, HD videoconferencing systems, converged home and business media systems, and support for wireless phones and next generation mobile devices.
- New work from home and business in the home opportunities that will accelerate economic development.

The region, in addition to being able to provide world class service to existing government and large business operations, will be attractive to an emerging new group of businesspeople that typically are well-educated, own their own businesses, and are making choices about where they live based on family needs and interests and the availability of affordable, high performance broadband. This new breed of entrepreneurs place a high value on the superb quality of life in the Rockbridge region, which includes abundant recreational opportunities, easy access to hiking, canoeing, and kayaking, walkable small towns and fine old homes, good schools, and a sense of place.

Businesspeople and their families make decisions to stay in a community or to relocate based on quality of life and the availability of abundant and affordable broadband, because broadband is the enabler of these new Knowledge Economy businesses. Many of these en-

terprises are located in homes, and so the towns, neighborhoods, and rural areas of the two cities and the county must have business class network services. Broadband is reshaping our communities in positive ways--less commuting, less need for high capacity transportation systems, more focus on community and civic life, and more emphasis on personal relationships.

By 2011, the Rockbridge region will be attracting significant numbers of new businesses to the region and creating jobs, because a high performance, affordable broadband infrastructure lowers the cost of doing business.

By 2011, the staff and departments of the Rockbridge region will have access to a high performance wireless and fiber network that enables effective and efficient delivery of government services to citizens and businesses, supports the data and communications needs of first responder public safety, fire, and rescue needs, and distributes a wide variety of community information and community media content to citizens and businesses.

By 2012, every business in the Rockbridge region will have affordable access to a broadband infrastructure with as much bandwidth as needed to successfully compete with any other business located anywhere in the global economy.

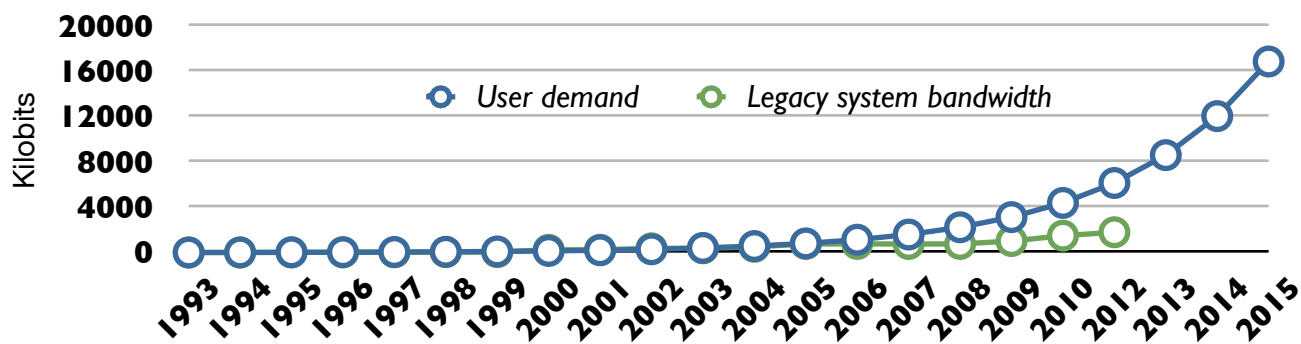
By 2012, every residence in the Rockbridge region will have affordable access to a broadband infrastructure with as much bandwidth as they need to manage their personal affairs, obtain access to world class tele-health and tele-medicine services, keep their homes safe, and have the same level and quality of access to online goods and services as any other community anywhere in the world.

By 2012, the Rockbridge region will have a workforce that is able to work full time or part time from home, using the community-managed broadband infrastructure to be connected to their office business systems. Students and workers will be able to study and train from home using the advanced broadband infrastructure to attend classes, learn new skills, and reduce commuting time.

During our meetings and discussions with the Management Team, we have heard a consistent and clear frustration with the current kinds of services, which were described as overpriced and inadequate with respect to capacity. The area's businesses and residents will face a substantial gap in network capacity and performance over the next five years.

While other countries already are seeing congestion in 100 megabit fiber networks to the home and to businesses, the average bandwidth available to most businesses and homes in the U.S. is still hovering around 1 megabit. Numerous data-based analyses have shown a consistent doubling of bandwidth every two years, which means the average home and business in the region will want a minimum of 50 megabit connections by 2015. Only fiber to the home and to the business can provide this, and the legacy copper-based networks have reached their limits and are already saturated--calls for network neutrality and "Internet toll gates" reflect a growing inability of current providers to meet demand.

Bandwidth demand



	Next 2-4 years	Next decade	Twenty years
Small business needs (1-9 employees)	10-25 megabits of bandwidth	100 megabits of bandwidth	Gigabit+ bandwidth
Medium-sized business needs (10-100 employees)	50-100 megabits of bandwidth	Gigabit bandwidth	Multiple gigabit circuits and lightpaths
Large business needs (100-1000+ employees)	Gigabit+ bandwidth	Multiple gigabit connections	Multiple gigabit circuits and lightpaths
Residential needs	25-50 megabits to the household (not to the neighborhood)	100 megabits of bandwidth	Multiple gigabit circuits and lightpaths

Over the next thirty years, the businesses, residents, and institutions in the Rockbridge area will spend, very conservatively, almost \$750 million on telecommunications services (voice, video, and data). This estimate (see the table below) is based on current average expenditures, and does not consider what is expected to be rapid growth in new kinds of services (e.g., tele-medicine, tele-health, IP-based security applications, video on demand, online games, and many other emerging business applications and services). If these future services were included as part of the financial projection, the total spent on telecommunications in the Rockbridge region would probably exceed \$2.5 billion (over 30 years).

The very conservative estimates of expenditures included in table on the next page indicate that there are substantial funds available for investment in a world class, high performance broadband network (the expenditures are not adjusted for inflation or for typical price increases). It would take just 7% of those expenditures to build the world's best network connecting every home and business in the region, and much of that cost would be financed by revenue derived from the users of the network.

Buena Vista, Lexington, Rockbridge 30 Year Telecom Expenditure Analysis

	Low to Middle Income Households	Middle to Upper Income Households	Households with no Internet
Total households	14,439		
Total businesses	1,354		
Percentage of households	40%	40%	20%
Number of households	5,776	5,776	2,888
Average monthly telecom expenditures	Local phone: \$25 Long distance: \$25 Cable/satellite TV: \$45 Dial up Internet: \$20	Local phone: \$25 Long distance: \$25 Cable/satellite TV: \$60 Broadband Internet: \$40	Local phone: \$25 Long distance: \$25 Cable/satellite TV: \$45
Annual telecom cost/household	\$1,380	\$1,800	\$1,140
30 year telecom expenditure	\$239,109,840	\$311,882,400	\$98,762,760
Total residential expenditures	\$649,755,000		
Total telecom expenditures ¹	\$747,218,250		

¹ Business, schools, institutions, and government costs estimated conservatively at 15% of residential expenditures

Service Provider Analysis

Embarq

Embarq offers residential dial-up services as well as residential DSL in some areas of the county. DSL services are limited based upon distance, outside plant age, and outside plant configuration. The main distance limitation for DSL is roughly 18,000 feet from a Central Office location which has DSL equipment (Digital Subscriber Line Access Module or DSLAM). The distance limitation is an outside plant limitation and therefore depending on outside plant routes the physical distance can be much shorter.

Embarq offers many business services including leased line, Business DSL, and limited fiber connections to businesses in the county. Based upon information provided during the study, the management team was able to provide the following list of known locations where Embarq is offering DSL services: Lexington, Buena Vista, Natural Bridge, Glasgow, Riverside (not confirmed). There may be other areas within the county where DSL services are offered.

Verizon

Verizon Communications offers residential voice and dial-up services in and around Goshen and Fairfield. Verizon offers many business services including leased line, Business DSL, and limited fiber connections to businesses in the county.

Comcast Cable

Comcast provides cable TV services throughout the county, and offers triple play (voice, video, and Internet) in Lexington.

Rockbridge Global Village / VGCS

Rockbridge Global Village is a regional provider of Internet and VoIP services. Internet access methods include DSL in the Lexington and Buena Vista areas, dial up throughout the county, and ISDN in some limited areas. The firm also offers business class Internet services and VoIP telephone services.

BARC

BARC has attended one of the Management Team meetings, and the electric coop has been experimenting with BPL (Broadband over Power Lines), but the firm has not yet deployed the service anywhere in its territory. BPL is a copper-based service with relatively low bandwidth capacity (typically well below 1 megabit).

RevNet

RevNet is a Roanoke area service provider that offers dial up Internet in the county and has local exchange numbers (a long distance call is not required).

EarthLink

EarthLink provides local exchange phone numbers in the area for dial up access.

nTelos

nTelos offers both residential and business services in the Rockbridge area. DSL is bundled with a voice service that is available in Lexington as well as outside of the city limits if the outside plant distance is within range. Business Services offered by nTelos include business DSL and Fiber ethernet services. These services are limited to areas adjacent to areas where nTelos currently has fiber in the region.

ShenTel/ValleyNet

ValleyNet is a regional fiber consortium with a POP (Point of Presence) in Lexington. ValleyNet offers a wide range of high capacity circuits (DS1, DS3, OC3, OC12, and up). While ValleyNet does not market business and residential services in the Rockbridge area, the ValleyNet POP is important because it provides redundant fiber routes out of the region to the north and to the south.

Satellite Broadband

Satellite broadband is available to anyone in the continental US who has a clear view of the southern sky. This would include most of Rockbridge County with the exception of folks living on the north slope of high ridges. Both Hughes and Blue Sky offer services. Satellite broadband is expensive; typical prices range from \$200 to \$500 for equipment plus a monthly fee of \$60 to \$80. Satellite broadband is capable of some light Web browsing and e-mail. The satellite broadband providers do have a limited capacity and therefore implement “Fair Access Policies” or FAPs which limit bandwidth for individual users once they have exceeded a 24 hour quota. FAPs usually limit bandwidth down to 64 kilobits per second (dial-up speeds) after a user has exceeded 150MB in a 24 hour period. Residential satellite broadband packages are usually not suitable for any kind of home-based business (e.g. even an eBay seller is likely to be frustrated with satellite because of the limited upload capacity).

Network Requirements

The Rockbridge regional network should have certain characteristics to ensure that it will have the desired community and economic development impact.

Unlimited Bandwidth

Within the region

Businesses within the region should have as much bandwidth as they need to do whatever it is they need to compete globally. Fiber to every premise is needed to support the business class services being requested by commercial and retail businesses in the area. Unlike roads, water, and sewer systems, fiber capacity can be increased incrementally as needed without incurring additional construction costs, making it a reliable and secure investment. Steady increases in work from home opportunities and home-based businesses require fiber in residential areas, not just commercial and retail areas of the city. Wireless access may be the primary method of access for some businesses and residents until the fiber deployment is well advanced. Long term, wireless will be used primarily for mobile access to the Internet and access to business information while away from the office.

Outside the region

Compared to some other areas of Virginia where there has been substantial state investment in inter-community and inter-region fiber routes, western Virginia remains at a disadvantage. Fortunately, ValleyNet, a major fiber long haul provider, has a POP (Point of Presence) in Lexington and can provide fiber circuits in and out of the county (to the north and to the south). This provides some redundancy for the region, which is very important from an economic development perspective. Additional fiber routes out to the east and to the west would be very desirable, and should be included as part of any long range broadband investments.

Symmetric Bandwidth

Upstream and downstream data capacity of the broadband network should be equal. Most current broadband systems restrict upstream data capacity to a fraction of the downstream capacity--upstream capacity is often only 10% of downstream capacity. These limits restrict economic development, entrepreneurial activities, and work from home opportunities. Our meetings and interviews with large and small businesses across the United States indicate that symmetric bandwidth is now considered a business requirement. Companies as diverse as major corporations and small one person start ups are both citing symmetric bandwidth as essential to support business activities from the home, including casual nights and weekend access, full time work from home employee situations, and home-based businesses.

Widespread Availability

High performance network connections should be available at every business and residential premise in the city. Work from home programs and the diversity of other business access from the home indicates that if a desired outcome of the broadband investments is

economic development, then universal access is extremely important, since it will not be possible to predict with any certainty in what parts of the region new business activity will take place. Retail areas, office buildings, and residential areas of the two cities and the rural areas of the county will all eventually need the same kind access to bandwidth and services.

Affordability

Discussions with the Management Team indicate that the high cost of existing business class services is a deterrent to growth and to business innovation. It is more efficient from both network and financial perspectives to build a single, shared, very high performance network than to have several competing legacy, copper-based networks that are each maintained at significant cost. Regional investments in basic infrastructure will allow service providers to offer services at lower cost because their capital expenses have been reduced substantially while increasing their access to a much larger, aggregated market.

Support for a Wide Range of Services Beyond “Triple Play”

Telecommunications services has undergone a massive transformation in the past fifteen years, and that change will continue for at least an additional ten years as all services formerly delivered over narrow bandwidth analog networks (i.e. the traditional “triple play” of Internet, TV and telephone) are delivered over wide band digital networks. Many new services (e.g. YouTube, iTunes Music Store, VoIP phone services) were not anticipated or predicted by most industry pundits just ten years ago. Newly emerging high bandwidth services include a wide range of telemedicine and telehealth services, new kinds of online entertainment options, and many more kinds of business and ecommerce services. Any telecom infrastructure investments undertaken by the authority must be capable of supporting a wide range of future services that are going to emerge but cannot be predicted precisely.

Competitive Marketplace

A world class broadband infrastructure will lower costs for service providers offering services on the network and will increase competition among providers. This will increase the kind and type of service offerings while keeping prices lower than those in communities without a competitive marketplace for telecom and broadband services. This will make the region more competitive from an economic development perspective and help to retain existing businesses and jobs and also help to attract new jobs and businesses to the region.

Limited Government Involvement

The local governments should limit their involvement to providing appropriate support to the broadband authority. The authority will provide the basic infrastructure; services provided to businesses and residents should be offered by private sector service providers. Incumbent providers as well as other interested firms should all be invited to use this “open access” authority infrastructure to sell current services and new, innovative services both to existing customers and to new customers. This approach will keep elected and appointed officials out of the business of providing telecom services directly to the public. Communi-

ties where the local government has chosen a “municipal retail” approach, where residents and businesses buy telecom services (e.g. telephone, Internet, TV) directly from the local government have often been sued by incumbent providers on the grounds that public funds should not be used to compete directly with the private sector.

While these communities have often won in court, such cases often take years to resolve at great legal expense. Financially, these network projects then face difficulties because the local government then must market the new network directly against the incumbent providers, who usually cut prices and engage in a price war with the local government. The open access approach avoids these difficulties by creating a market environment where service providers compete against each other instead of competing against local government.

Case Studies

Danville, Virginia

The City of Danville, Virginia is operating an open access, open services network (www.ndanville.net) focused on creating the right kind of economic development incentives and accompanying infrastructure that will help retain existing businesses and help attract new ones. Danville has a City-owned electric utility, and the growing fiber network is being managed as part of the electric utility operations. Using a multi-phase approach, the City first hooked up government offices and local schools in 2004, and in 2006 began planning for extending the high performance all fiber network to local businesses and residents throughout the electric service area, which includes a large part of very rural Pittsylvania county. The first businesses began to get hooked up in late 2007, and Danville expects to have fiber to every parcel in its business parks before the end of 2008. The city-county business incubator was one of the first locations to receive the fiber services. The City has begun doing advanced planning for taking fiber to some of its residential neighborhoods. The City is not selling any services to businesses or residents; all services are offered by private sector service providers that use the network and pay the City for the use of the network via a revenue sharing agreement.

The Wired Road

The Wired Road is an open access, open service network jointly owned and managed by Carroll and Grayson counties and the City of Galax (Virginia). The three localities formed a regional broadband authority and began construction in September of 2007. The first institutional customers were added to the network (Carroll County Public Schools, Carroll County, Crossroads Institute) in March of 2008. Residential and business customers will be offered services in summer, 2008. The Wired Road is not selling any services to businesses or residents; all services are offered by private sector service providers that use the network and pay the Authority for the use of the network via a revenue sharing agreement. The three governments see the network investments as a way of differentiating the region and providing a valuable economic development marketing tool. The Wired Road is being designed as an integrated fiber and wireless network, with fiber in the three major towns and all business parks, and wireless services as the initial offering in under-served rural areas where many residents are still on dial up. The long term vision is to provide fiber to every home and business that requests it.

West Point, Virginia

The Town of West Point has begun investing in fiber infrastructure by installing fiber alongside a water main extension; construction began in the spring of 2008. The fiber line will provide fiber access in the new business park in the community, and the fiber design includes taking fiber to a new eighty home residential development planned for the community. The Town is engaged in advanced planning to extend the fiber to the Main Street area as well as surrounding residential areas of the community.

Vint Hill Economic Development Authority

Vint Hill is a 695 acre mixed use office park in Fauquier County that has begun deploying fiber and telecom duct for tenant use. The EDA's first fiber investments were made in the spring of 2008 to help a tenant win a major contract with the Federal government that required fiber connectivity across the park and to the tenant building. At the same time, fiber was installed to help a local wireless service provider purchase lower cost Internet service to improve availability of wireless Internet access both in the park and in the surrounding area. The EDA has made improvements and upgrades to a tower located in the business park and made the tower available to private sector wireless providers.

Ripton Broadband Coop

Coops are a great ownership and governance model because they firmly vest the enterprise in the community—every subscriber is also a shareholder in the enterprise, and shareholder/members are able to vote and select board members. The Ripton Broadband Coop serves customers in rural Vermont via wireless, using an open access, open service model. Two service providers are selling services on the network. Coops have some unique advantages because membership fees can be used to help fund the initial development of the network. The Ripton Coop assesses a \$200 membership fee and collects an additional \$150 for customer premise equipment. For more information, visit www.ripton-coop.net.

Oklahoma City Government Network

The government of Oklahoma City, Oklahoma has installed a WiFi wireless network for public safety use. The wide area network covers 555 square miles and was funded from a public safety sales tax and city capital improvement funds. The city installed 1,200 wireless access points on utility poles, street lights, and other structures around the city. The network gives first responders, police, fire, and rescue personnel wide area access to city databases and the Internet. Local police have found the access extremely useful, as they can get access from patrol cars almost anywhere in the city. Public safety uses include getting detailed maps for use in search and rescue operations, photographs of suspects or victims, and information on hazardous materials to assist during a haz-mat clean up operation. On a per access point basis, the system cost about \$5,000 per node.

Network Business Model Options

Private Sector Only

The “leave it to the private sector” model has obvious shortcomings, which is why so many communities are now beginning to consider telecom as essential public infrastructure. Private sector firms have a primary responsibility to preserve and enhance shareholder value. They do not make operational and service area deployment decisions based on community and economic development needs. For many communities, this has meant that broadband services have lagged well behind the rest of the world and places those communities at a competitive disadvantage when trying to attract or retain businesses.

The private sector model requires overbuilding, which means that each service provider must build its own network end to end to serve customers. This leads to completely duplicated networks, which increases costs and makes it more difficult for these firms to make a business case for enhanced services in many areas. This business model is a fundamental weakness, because these private networks are not only expensive, but typically underutilized. Residential networks are only used heavily in late afternoon and evenings, and are virtually unused overnight and during the work day. Business networks that are only used heavily during work hours typically have very low utilization for the other two-thirds of the day. School and education networks are used only 8 to 12 hours per day, and are empty the rest of the time.

Community broadband projects overcome this fundamental weakness and substantially reduce the operating cost of networks by using a shared model, rather than a private model.

Municipal Retail

Also known as Muni (Municipal) Triple Play. Local government builds the network and sells services in direct competition with the private sector, offering only traditional “triple play” voice, video, and broadband. Muni triple play systems are usually closed systems that offer little choice to customers. Muni triple play systems compete directly with the private sector, and tend to have very low take rates. Opponents of community broadband often cite the low take rates of muni triple play projects to “prove” that community broadband is a poor investment. But the low take rates only show that muni triple play business models are not financially viable over the long term.

The two key issues with this model are:

- It requires local government officials and leaders to sign long term contracts (typically 5 to nine years) with the providers whose services will be resold over the network. This means that those local leaders must have a high degree of confidence that they can accurately predict, seven to nine years out, what level and quality of services the businesses and residents of the community will require. While contracts can be renegotiated as needs change, prices are likely to rise during that renegotiation.
- This model does place the local government in direct competition with incumbent providers. This not only tends to keep take rates low, which threatens financial viability,

but adoption of this model also encourages lawsuits from the incumbents (Bristol, Virginia, Lafayette, Louisiana, Geneva, Illinois, and Monticello, Minnesota are examples of communities that were sued after selecting the muni retail model).

Municipal Wholesale

Local government builds the network and provides access to service providers, who must use Layer 2 Virtual Private Networks (VPNs). Services must be provisioned individually for each subscriber. Not a true open access model because of system complexity. Muni wholesale is also confusingly called “open access” by some parties. Muni wholesale systems may have some competition for some service categories, but the technical complexity of these systems (technically, most “open access” systems are managed at what is called Layer 2. The limitations of Layer 2 open access tend to keep the cost of providing services high, compared to a true open services network that provides fully automated, end to end provisioning of services.

Problems with the wholesale approach include:

- Each service provider must have their own service provisioning system, which raises the cost of market entry and increases the cost of all services (because the service provisioning and support software must be duplicated by every provider). This can limit the number of providers to a few bigger ones that already have such systems or can afford to build or purchase them.
- The Layer 2 provisioning by each provider increases the technical complexity of debugging network issues and resolving customer service problems.

The Utopia network in Utah, the country’s biggest community fiber effort, had difficulty with its initial Layer 2 network architecture and is converting to an open services model that will use a Layer 3 open services model.

Open Infrastructure

In this model, local government limits investments primarily to passive infrastructure, which can include duct, dark fiber, handholes, splice cabinets, colocation facilities, and wireless towers. Each service provider that wishes to use the fiber infrastructure must provision their own electronics end to end. Some of the issues that must be considered with this model:

- The requirement to provide electronics raises the cost of market entry for service providers. It can also limit competition, as the first service provider who spends the money to install electronics in a business area or residential area may “capture” a large portion of the available market, making it more difficult for the next service provider to justify the expense of trying to compete. However, the availability of the fiber can still give some customers options, especially business customers in retail areas and business parks, where there is more incentive for providers to compete aggressively.
- The fiber design for the network must be done carefully to avoid both running out of fiber and to ensure that there is enough fiber to support competition. Fiber capacity

must be overbuilt in the last mile (first mile) portion of the network to ensure there is enough fiber cable to support multiple providers. Fiber cable cost has decreased substantially, so this is not as much of an issue as it once was.

- Splice cabinets and locations for equipment cabinets and colocation facilities must also be considered carefully to make it easy for providers to install equipment. If the authority provisions cabinets, it makes it much easier for service providers to compete, because finding locations for equipment cabinets is a major time and cost factor when entering a new market area.

Open Network

Customer aggregation is a key advantage to a shared, community-owned telecommunications infrastructure. By building an integrated fiber and wireless system to every home and business, the community maximizes the market potential for private providers who want to sell services. The community investment allows these businesses to reach more customers than any single company could reach on its own. Some of the outcomes are:

- More customers -- When a community builds the transport layer of a digital road system (the roadway), each provider has a much lower cost of infrastructure needed to enter a market. In smaller towns and regions, this is a critical difference. Community investments allow more companies to profitably offer services in smaller markets than a firm could do on its own.
- Lower costs -- When a firm can reach more customers via a community broadband system, lower costs of service usually results. Typical reductions in cost in open access systems are usually on the order of 15%, and are frequently much more than that. It is not unusual to see the cost of telephone service decline by 40% or more.

Services aggregation occurs when communities build open networks, meaning that any qualified service provider can offer services using the community digital roadway. In this business model, there are usually several service providers competing for customers in each category of services (e.g. voice telephone service, TV, Internet access).

- More choice-- A natural outcome of more services is more choice for purchasers of services. Instead of a single monopoly provider of telephone or television, customers can pick and choose among a variety of service plans at various price points.
- More competition -- When more services are available, there is more competition for customers, which requires that service providers sell services for the lowest possible price, and also creates incentives to provide excellent service to customers. Compare this to a monopoly environment where there is no competition and hence little pressure for a company to provide good service--customers have no other service options.
- More services -- When there is a wider choice of services on the community system, there is more opportunity to use more services. This is, in part, what makes open service provider networks financially sound investments for communities: Open systems create a bigger market for telecom services, and thereby creates more revenue flowing through a community revenue sharing plan.

Organizational Options

Government Ownership

Many communities in the United States have municipal entities that offer services to the general public. The most common services are water and sewer, and are administered operationally either as a department of the government or as an authority. Typical water and sewer authorities are quasi-public entities that operate independently of direct local government oversight but operate as a nonprofit.

Also common are municipal electric service operations. Several hundred communities in the U.S. have municipal electric power, and some have moved into the telecommunications arena, largely because it is convenient to do so--the organization already has utility pole access, experienced staff, and equipment like bucket trucks. However, the direct municipal approach is not likely to work for the effort because the local governments have already indicated that they are not interested in owning and administering the system directly.

Government operated networks using the muni retail model attract legislation forbidding localities from offering telecommunications services. Several states, including Pennsylvania, Nebraska, South Carolina, and Virginia, have enacted legislation making municipal telecom services illegal within the state shortly after a municipality or public service company started a data service. The Virginia bill was overturned by the Federal Circuit court in a remarkably brief decision that seems crystal clear:

I find that the broad and unambiguous language of § 253(a) [the Federal Telecom Deregulation Act] makes it clear that Congress did intend for cities to be “entities” within the meaning of the Telecommunications Act. Therefore, § 15.2-1500(B) [the Virginia legislation in question] is in direct conflict with federal law, and is void under the Supremacy Clause. Section 253(a) is a concise mandate that no state “may prohibit or have the effect of prohibiting the ability of any entity to provide any interstate or intrastate telecommunications service.” 47 U.S.C.A. § 253(a) (emphasis added).....Simply put, it strains logic to interpret the term “any entity” in § 253(a) to mean “any entity except for municipalities and other political subdivisions of states.” While it is true that such an interpretation is possible, the Supreme Court has cautioned that “[a] statute can be unambiguous without addressing every interpretive theory offered by a party.”The federal statute, therefore, not only mandates that no state statute “may prohibit” telecommunications competition, but also that no state statute “may have the effect of prohibiting” telecommunications competition. 47 U.S.C.A. § 253(a).

While most communities that have been challenged by lawsuits have eventually won in court, the legal battles usually add years and significant expense to such efforts.

Regional Authority

Regional authorities are widely used for regional projects that require long term oversight and involve participation from more than one local government entity. Virginia has created enabling legislation specifically for broadband authorities, and the ESVBA is chartered under this legislation.

Coop

Cooperative business enterprises as formal entities date from the mid-1800s. The first cooperative was set up in England to serve customers unhappy with local merchants. In the United States, the Grange movement began setting up cooperatives in rural areas to sell needed items to members and to help sell produce and other agricultural products that were produced by members. Today, credit unions are the most common form of coop business in the United States, with more than 65 million people obtaining services from over 12,000 credit unions.

Telephone and electric coops continue to be very common in rural parts of the U.S., and in fact, the majority of telephone companies in the United States are coops, but most have very small numbers of customers--often less than a thousand subscribers. Telephone coops serve more than a million subscribers in thirty-one states. The True Value and Ace Hardware chains are actually buying coops that help keep independent hardware stores competitive with the large chain stores.

The U.S. Department of Agriculture (USDA) provides extensive support for existing coops, and also helps communities start coops. One of their publications lists the principles of the coop:

- User-Benefits Principle -- Some purposes of a coop are to help members get services that might otherwise not be available, to get access to markets, or for other “mutually beneficial” reasons.
- User-Owner Principle -- The users of the cooperative own it.
- User-Control Principle -- The owners of the coop (i.e. members) control the coop through voting (annual meetings, etc), and indirectly by electing a board of directors to manage the enterprise. Large users who make high volume purchases of goods or services may receive additional votes.

Because cooperatives are user-managed, control of the enterprise is vested in the community or region where the users reside. Cooperatives also return excess earnings to its members; these refunds are called patronage refunds, and are typically computed at the end of the fiscal year. The expenses and income of the coop are calculated for the year, and any excess is returned to members, based on the percentage paid in by each member (e.g. a member that paid in 1% of total earnings would get a refund of 1% of any excess earnings).

Most cooperatives do not pay dividends on capital. This helps keep outsiders from taking control of the company, which would result in the community losing control over the quality of services and direction of the enterprise.

Coops are organized in part based on the territory they serve, and there are several classifications that may be relevant for community broadband efforts. A local coop serves a relatively small area that may be a single county and/or a radius of ten to thirty miles. A super local coop serves two or more counties. A regional coop may have a service area of several counties up to an entire state (or multiple states). For projects that involve several local government entities that are already trading services like local public safety dispatch, a super local coop may be the most appropriate designation.

Most local and super local coops use the centralized governance structure, which means that individuals and businesses represent the bulk of members.

Cooperatives offer one or more of three kinds of services:

- Marketing coops help sell products or services produced by members.
- Purchasing coops buy products and services on behalf of members.
- Service cooperatives provide services to members, and service coops include the credit unions, the electric coops, and the telephone coops.

Equity is typically raised for coops by direct investment from members. In return for an investment, members receive a membership certificate. The member may also receive shares of stock if the cooperative issues stock (some do, and some do not). Once a member has invested, they gain the right to vote in elections. As an example, if the local governments made a large initial investment in the cooperative, they could gain substantial influence in the affairs of the organization by gaining multiple shares and increased voting rights. Property owners (residential property owners and business property owners) who paid an initial connection or pass-by fee would also gain shares in the business, so every property owner that pays the connection fee gains ownership in the enterprise--an important selling point when encouraging property owners to, quite literally, invest in the project.

Although cooperatives are typically constrained by both Federal and state laws to do a majority of business with members, in most cases, cooperatives are able to do business with nonmembers up to some percentage of business income that can be as high as 49 percent. Note that this may be affected by the underlying legal incorporation of the cooperative--if incorporated as a 501(c)(12), the IRS requires that 85% of income must come from members for the purpose of meeting ordinary expenses.

Non-profit

There are various kinds of nonprofit businesses. The most common is the 501(c)(3), which is limited to strictly charitable efforts--in other words, a 501(c)(3) cannot, according to IRS rules, operate as a nonprofit business that provides services to the general public. However, one or more nonprofit businesses may be useful as part of the overall effort.

A 501c3 may be desirable as a mechanism to accept charitable donations, and more importantly, to apply for certain kinds of grants. Once the funds have been received by the 501c3, and the donors have received the tax credit, the nonprofit can, in turn, give or loan

those funds to another organization (e.g. an authority or coop chartered specifically to provide services).

For profit businesses

There are various types of for profit business organizations: individually owned businesses, partnerships, general business corporations, and limited liability companies. None of these are appropriate for the broadband project because:

- Public funds are involved in the development of the system.
- Local control vested in the participating communities is required to protect investments in the project (private, for profit enterprises are not vested in the community). A for-profit enterprise could operate an open, multi-service network, but the community would have little or no control over the venture.

Ad Hoc and Informal Partnerships

Some local governments have deployed duct and/or dark fiber and have made ad hoc arrangements to provide capacity to other institutions like K12 school systems or adjacent local governments. In some cases, they have a policy for leasing duct or fiber to the private sector (the city of Sacramento, California has leased duct for over a decade) but have not developed a comprehensive plan for management and expansion.

Next Steps and Areas of Attention

Vision Statement

Review and modify as needed to meet local goals and objectives. The vision statement should be aligned with local government economic development objectives and regional economic development objectives.

Vision Statement and Handout

Develop a two page tri-fold brochure or handout that articulates the long term goals and benefits of the project. This document can be used immediately to help educate elected and appointed leaders about the project, as a handout to potential business users and anchor tenants, and a publicity piece for residents and other interested parties. Design Nine will provide a draft for review.

Review Network Business Models

Review the network business models discussed in this document and identify one or two for further study (e.g. a DHCD Phase Two effort).

Review Organizational Models

Review the organizational models discussed in this document and identify one or two for further study.