

Clackamas Broadband Exchange (CBX) Business Plan

1. Executive Summary

The CBX, a Clackamas County enterprise within the Technology Services Department, has seen steady growth in the past 4 years since its formation. This growth has given CBX a network footprint that serves 260 locations which include both public and private sectors as well as telecom providers. Today's current fiber plant encompasses approximately 275 route miles and 34,045 Fiber miles. This dark fiber is providing a great service to its customers and an even greater benefit to the County as a whole.

As the CBX maintains a steady economic growth model within the County it must keep expenses in check if sustainability is to continue. This business plan also outlines a few strategies to minimize future expenses and risks while increasing revenue. While it is difficult to know how future conditions will affect the CBX, it is safe to assume that if expenses are kept low and current customers are maintained long term that sustainability will be achieved while we grow the enterprise.

2. Organizational History

In 2000, Clackamas County commissioned a Communications Needs Assessment and Feasibility Study as a means to better understand the County's communications status and requirements.

The study revealed that the County was in need of access to affordable, high-speed communications infrastructure and services. Several unique challenges were identified that would have to be resolved:

- The vast size of the County (roughly 1,900 square miles)

- The high percentage of rural areas (roughly 90% or 1,650 square miles)

- Seventeen incorporated cities over a large area, many with less than 5,000 citizens

- Over 20 individual communications companies, many with small service territories

- No cohesive plan to provide modern, state-of-the-art communications to the County as a whole

In 2009, Clackamas County applied for an American Recovery and Reinvestment Act of 2009 (ARRA) grant under the Broadband Technology Opportunities Program (BTOP) administered by the National Telecommunications and Information Administration (NTIA).

In 2010, Clackamas County was awarded a BTOP grant for \$7.8 million — the largest such recipient in Oregon — to develop the Clackamas Broadband Exchange (CBX). In addition, the County pledged an additional \$3.3 million in resources for a total project of \$11.1 million.

Construction occurred between March 2011 and October 2013 for the infrastructure planned in the BTOP Grant. Additional construction and expansion also occurred as additional funding and partners became available to increase the scope of the initial project.

Since October 2013 the CBX project has successfully converted to a self-sustaining utility service for the County with revenue based on affordable rates for public and private agencies utilizing the fiber infrastructure. CBX is proud of the fact that the project was able to come in on budget and exceed the original scope with more customers and infrastructure than planned. This funding provides not only for ongoing program expenses, but contingency for repairs and capital for ongoing expansion to new agencies, underserved regions and new service opportunities.

The CBX currently maintains a staff of 2 and contracts with local communications companies for call center and emergency response to fiber breaks. This process helped the CBX realize one of its stated goals as to providing jobs through local economic development.

3. Future Objectives

Operate in a sustainable growth mode within Clackamas County as a priority and areas adjacent to or outside Clackamas County as a secondary market.

Stimulate economic growth through partnerships with other service providers, businesses and public sector agencies.

Maintain a balanced budget through controlled growth and service offerings.

Pursue risk and expense minimization strategies.

Expand our portfolio of products and services as demand increases.

Seek partnerships to expand services including possible ISP options.

4. Mission

With the successful completion of the grant phase of construction, CBX has been offering dark fiber and has continued to expand the fiber plant. The ongoing challenge of developing self-sufficient operations while maintaining a sustainable model dedicated to broadband services throughout the County will greatly enhance our economic development.

While the initial goal of establishing a large public network has been accomplished, proving significant savings and opportunities to the whole County, there are still many sites and agencies desiring to be connected. CBX will continue to find ways to expand the public network and increase its services.

With several regional telecommunication providers now utilizing CBX to expand their services, the goal of providing a backbone for new services is developing. CBX is currently in negotiations with several additional providers to build upon this success and develop new opportunities including new construction service areas.

One of the greatest challenges for CBX is in the partnering with other agencies and businesses in the development of economic opportunities for Clackamas County. CBX (in concert with other agencies) is already coordinating with potential new businesses and industries to locate to Clackamas County and utilize CBX as a crucial service related to their business. CBX is developing partnerships with local telecommunications providers to design, construct and market broadband solutions for data-centric industries. This is new territory for Clackamas County as such partnerships develop to expand economic opportunities on multiple levels and services.

CBX has become financially self-sufficient, relying totally on generated revenue from the lease of dark fiber, both by connection and in complete fiber strands. CBX maintains an annual review of the program costs, construction opportunities and contingency requirements to constantly tune the rates to maintain CBX funding while providing the most cost effective rates possible. The challenge is to maintain construction funding for expanding services and contingency to maintain services while balancing the need to hold rates at a minimum.

5. Keys to Success

Maintain current customer relationships.

Promote the CBX to other service providers.

Look for and capitalize on new service opportunities including ISP services, network services, CCTV camera services and other technical enterprises which will encourage economic development within Clackamas County.

Provide the capital to build redundancies into the CBX.

Build reserves for future expansion and incentive opportunities.

Keep expenses flat unless revenues increase.

Limit liabilities and risks within the CBX.

Maintain a high level of availability, reliability and technical support.

6. Goals

CBX has several primary ongoing goals:

Provide low cost, high speed broadband connectivity to public agencies such as schools, law enforcement, fire & safety, governmental agencies, libraries, utilities, etc.

Provide access to Internet Service through local ISP's or potentially becoming an ISP itself.

Provide dark fiber backbone infrastructure, especially in previously underserved regions, for utilization by telecommunication providers, or the CBX itself, to expand and enhance services throughout Clackamas County increasing services and reducing costs to providers.

Continue self-sufficient status and continue to grow fiber utility for the County.

Provide efficient communication infrastructure and save valuable tax dollars.

Continue to grow a portfolio of products/services offered through the CBX Enterprise using a controlled continual growth methodology enhancing high services levels and economic growth.

7. Potential Threats to Success

Loss of current customers.

Competition from other providers causing CBX to lower its rates.

Threats of law suits from large commercial providers.

Loss of partnerships with other agencies/providers.

Unforeseen catastrophic losses.

The selling off of assets of the CBX.

Loss of sustainability due to rapid expansion with failed or negative return projects.

Internal roadblocks within the County processes and operations.

In-ability to keep up with customer requirements and technology.

Lack of support from the County Administration.

8. Past Accomplishments/Current Status

CBX has accomplished a lot since 2013.

- The enterprise has built a community network that provides a large fiber ring throughout rural Clackamas County.
- A separate fiber spur up highway 26 to Zig Zag.
- A fiber link into the city of Wilsonville.
- An urban fiber ring through Milwaukie, Gladstone and extensions into the City of Lake Oswego.

Current CBX Coverage Map Attached

CBX has established a revenue stream that exceeds operating expenses. The network currently serves 260 locations. While there is BCC approval to extend the CBX into adjoining Counties, those opportunities have been slow to proceed due to current staffing resources of the CBX and policy guidance.

Currently the CBX is focusing on maintaining its current customer base and finalizing major fiber projects within the County. Due to the rapid expansion of the CBX and limited staffing, this has

caused the enterprise to lose out on some opportunities as the workload has been overwhelming and the need to uphold a high level of service is imperative to the success of the CBX. To help remedy this situation we have been able to hire another full time staff member from a local utility to help with the expansion. With this new knowledge base and support we will become more efficient with our business processes experience and knowledge resources.

CBX will also be doing a Market Study Analysis to provide valuable potential business information for expansion and services.

Of a special note is that we have recently gained connectivity to the Regional Central Fiber Hub (The Pittock) in downtown Portland. This connectivity is quite desirable for local telecoms and is now an essential component for the growth of the CBX.

9. Economic Development

We now no longer ask, "Is broadband good for our community or region?" because there is a growing, almost universal recognition – and significant evidence – that broadband is critical for economic vitality and community well-being. In many economies, the availability of broadband is a minimum condition for economic competitiveness, and this need is particularly acute for rural and remote economies within Clackamas County.

The CBX is clearly a tool that will initiate and encourage job growth and business expansion.

Proliferation of broadband access and utilization will be a core part of Clackamas County's CBX regional economic development goals. We will promote initiatives designed to provide availability and use of broadband technology as a cornerstone of community building, business, critical communication support, and talent development.

Broadband access will be one of our priorities, highlighting the need to improve, maintain and finance broadband infrastructure in support of economic development and a globally competitive Clackamas County economy.

We should be now asking, "How much benefit does broadband bring to citizens, businesses, and communities?" and focusing on "How can we maximize those benefits?"

With Economic Development being one of the primary drivers for the formation of Clackamas County Broadband this plan recommends the creation of programs to support Economic Development through the CBX. This may entail developing a program offering incentives to bring new business into the County.

If economically feasible this could be done by offering the service provider initial free or discounted services to new businesses. These economic development incentives can be offered via a free or reduced extension of services providing access, as well as discounted services over a period of time to new businesses. While maintaining required revenue levels to support CBX operations.

How does the CBX promote Clackamas County Economic Development?

Access, Adoption, and Utilization are not the same concepts. Just because people have access to broadband infrastructure does not mean people are connected to the network. Just because people have adopted broadband does not mean they are using the available Internet-enabled solutions that increases their productivity and business competitiveness. It is not just about investing in broadband infrastructure, but driving utilization. Not only is driving utilization critical to network sustainability, it is foundational to realizing full economic and community benefits from the network. CBX needs to partner with cities, local businesses, telecom providers and public agencies to drive innovation and growth in the utilization of CBX to promote new and enhanced opportunities.

CBX is essential infrastructure for effective participation in the economy for urban and rural areas alike, with adoption driven by personalizing the value of broadband to individual businesses, organizations and households.

Investments in broadband infrastructure will strengthen the regional economies by improving skills, competitiveness, and service delivery, thus enhancing the local business environment.

Maximum returns on the CBX investments will require looking beyond the supply-side to make sure that each step of the process is addressed with a holistic planning approach. This is accomplished by building access, encouraging adoption, and tracking utilization, focusing on the demand-side of broadband and understanding how individual businesses, organizations and households are using and evolving their use of the network.

Broadband infrastructure is essential for the effective participation of businesses and organizations in today's economy.

Some examples include:

- Education – Bring dynamic resources into the classroom while enabling seamless partnering among teachers, students and parents.
- Health Care – Create shared services that reduce operating costs and provide patients with a broader spectrum of enhanced services, including remote routine in-home consultations, diagnostics, administration, scheduling, and electronic patient records.
- Public Safety and Emergency Response – Connect response teams with vital information that improves coordinated, timely reaction to accidents and disasters, and offering citizens access to the information and tools they need to make decisions and seek support.
- Citizen and Social Services – Extend service reach and quality via online services to save time and public money while improving overall efficiency through services like smart grid technology and platforms to communicate and collaborate.
- Economic and Workforce Development – Improve regional competitiveness through efficient business practices and models that increase revenues, reduce costs and improve customer service by being online to allow businesses to be anywhere and serve customers everywhere.

- Rural and Regional Development – Attract and retain innovative businesses to allow the local economy to become more competitive, diverse, resilient, and resistant to economic shocks, as well as provide well-paying, high-quality jobs.
- Transportation – Utilization of traffic monitoring and control devices to monitor, predict and adjust traffic to minimize traffic flow, improve safety and reduce emissions.

10. Strategy and Implementation Options

There are several strategies that the CBX will need to continue to focus on. The strategies include services, partnerships and economic development. These areas of focus are seen as key drivers to maintain sustainability and growth. The CBX will maintain current services as well as begin to look at potentially providing new services that can be operated in a sustainable manner. Several business options are highlighted below:

Dark Fiber Option –

The CBX offers Dark Fiber transport over its backbone. The CBX will continue to grow this footprint increasing opportunities for all wishing to reach urban and regional customers.

The charges for this connectivity are as follows:

Current CBX Dark Fiber Rate Schedule attached:

ISP Options –

To insure continued economic development offering internet services via an ISP is one option that the CBX must consider to remain sustainable and meet future missions and goals of the County BCC. Offering these services to public agencies, County businesses and to the home is a concept that is outlined below:

Public Agencies Offerings

Pros:

- Existing agency relationships
- Open to long-term contracts
- Financially reliable
- Minimal network support and liability
- Savings to tax payers
- Very secure connections

Cons:

- Potential competition with Clackamas ESD & other ISP partners
- Limited client base in Clackamas County depending on build out & potentially long ROI.
- Lowest cost to market entry

Costs:

- Network upgrades, minimal, ROI 5 years or less
- Fiber construction

Feasibility:

Providing Internet access to public entities requires minimum upfront investment by the County to start offering services. To conserve fiber assets, using DWDM on the core routes versus home run fiber or remote switches would maximize existing fiber for minimal cost. We already have a solid customer base and experience.

Commercial Business Offerings

Pros:

- Limited network/customer support requirements
- Potential of multiple customers off single service drops
- Medium cost to market entry by the leverage of business zones, parks & plazas
- Willing to pay larger install fees and monthly fees than residential with stable ROI
- Economic development in support of data centric industries

Cons:

- Potential increased load on help desk
- Will require purchase of additional IP addresses once our pool is exhausted
- Blowback from Comcast and other existing carriers
- Potential competition with partners

Costs:

- /20 IP space (4096 address @ \$13/address = \$53,248)
- Network upgrades (\$75-100k)
- Fiber construction
- Additional support costs

Feasibility:

Providing Internet access to commercial entities would also require minimum upfront investment by the County to start offering services. This would be in high density zones already close /on the network.

The small to medium business in Clackamas County would most likely be unable to fund a \$40,000 build to get service. The county would have to be able to provide a small line of credit to cover the cost of the build that the business can then pay back over a set term. Perhaps we limit the scope of our coverage to one mile of existing CBX fiber to limit the cost of builds.

Alternatively, the commercial Internet access could be offered as a partnership with another provider (or providers) – where CBX builds the transport and finances it over a set term and then an existing provider sells the ISP service over the top. While CBX would still have the financial risk of building the laterals, there would be no network hardware, staffing, or legal costs compared to building a new ISP network.

Phase rollout utilizing businesses close to our current connectivity initially then expand as funds allow.

Residential Offerings

Pros:

- Eventual Internet Connectivity to all homes in Clackamas County

Cons:

- Extremely expensive to build out
- Long ROI if any
- Customers unwilling/unable to front construction cost
- Low monthly service fee
- Extreme increase in customer support load & costs 24/7 help desk.
- Most cost effective areas to build have existing broadband – underserved areas would cost more.
- Will require large purchase of addition IP address space prior to building network
- Legal issues from Comcast/Century Link/et al

Costs:

- 145,790 homes in Clackamas County @ average price of \$3,000/home to pass = \$437.4M
- Remote cabinets with power and remote network switches
- Modems (\$200+/unit)
- Customer support agents
- Network upgrades
- More IP space

- Fighting lawsuits from Comcast and Century Link
- Potential additional fiber route charges from PGE
- Support staff, locations, vans, equipment, contingency, etc.
- Increased franchise fees
- ISP costs

Feasibility:

Residential Internet access would be a massive undertaking with extremely long return on investment. There is not enough fiber on the ring for a home run fiber network, so remote cabinets along with power and additional fiber would be required. Rural areas need bandwidth the most and are mostly aerial fiber plant, but, also have the greatest distance between customers, thus a higher cost per customer. There is also the potential of our current pole attachment partner now wanting to charge us as this is no longer supporting just public agencies. Local telecoms may also want the same deal with pole attachments. Providing services to current underserved locations could potentially be so expensive as to never be fiscally feasible or long ROI.

Overall ISP Implementation Recommendations:

CBX recommends a phased approach including, Clackamas County Public Agencies, Commercial Businesses, and Residential through shared partnerships and CBX enterprise solutions where necessary.

The CBX is already going to public agencies in partnership with Clackamas ESD as our ISP provider. To break away from them and be in competition with serving Public Agencies on our own is possible but would conflict with the initial mission and goals of the CBX.

Going to Commercial Businesses specifically through business parks would seem to be the next logical step. Clackamas ESD does not currently provide ISP services to these locations. By providing dark fiber and internet access to these locations throughout the County would stimulate economic growth through attracting new business to the County. By doing this it will attract new population growth which in turn will stimulate population growth and the need for residential internet connectivity. This connectivity could in most cases be accomplished with one fiber link servicing multiple businesses in that cluster.

Residential connectivity is an offering that requires the most up front funding, long term support costs and development and most likely cost prohibitive for a single entity. The ROI of doing this may not be cost beneficial for a single developer (CBX) unless partnerships can be sustained. One option would be for other cities within the County to take on the burden of the last mile build outs within their city limits such as the City of Sandy has done utilizing the CBX dark fiber backbone.

This phase at that point would also need to be analyzed to see if additional partnerships with Clackamas ESD/CenturyLink or other Telecoms would make sense or if the CBX could sustain a competitive ISP rate to residential customers considering the overall investment of building the last mile fiber infrastructure.

Commercial business offerings and residential offerings will need an additional market study defining specific goals to sustain growth and service levels as well as defining a potential customer base. This will be discussed in further detail in Section 11.

Partnership Options –

The CBX currently partners with other telecom Internet Service Providers which is a great opportunity for the CBX to increase utilization of the dark fiber and generating revenue. With the sales force these ISP's offer they have a much greater opportunity to sell services in Clackamas County than what CBX can currently do on its own. Furthermore, since these ISP's have great insight into the needs of their current customers they can be used to help attract new businesses to Clackamas County.

Partnerships with other public agencies also offers the CBX great opportunities. The CBX is currently partnering with the Clackamas Educational Service District (ESD), the City of Sandy (SandyNet).

The City of Lake Oswego has done a market study and identified a neighborhood that is very pro fiber to the home and surveys indicate those residents are willing to support the cost of such a build thru special assessment. The City has approached the CBX and is very interested in having the CBX build and manage this fiber plant. The exact definition of this partnership is still undefined as to whether the CBX or the City of Lake Oswego would actually become the ISP. The city of West Lynn is also a potential partner that is considering this same enterprise.

If more of the cities and neighborhoods within Clackamas County could work together on projects to get fiber to the home with support and financial help a cost effective fiber to the home enterprise could be achieved. Working together through partnership is a great way to expand economic development within Clackamas County.

Network Support Option –

This option would entail offering Network support over the CBX to other Public Agencies.

CCTV Security Support Option –

This option would entail hosting segregate and archive external agency CCTV footage for video surveillance to other public agencies, CCTV connectivity, viewing and archival storage. Other security services are also a potential service.

Phone Support Option–

This option not feasible at this time.

11. Market Study

Does the CBX have a sustainable market in Clackamas County?

An important aspect of the enterprise is to make sure there is enough business to remain sustainable and provide future growth. To do this we must perform a market study as to the areas of potential market opportunities & acceptance. This will include potential client base and locations, potential issues (SWOT) etc. for the County CBX fiber utility providing certain levels of ISP service to local industries and/or businesses that require high bandwidth internet connectivity. This will be part of this overall business plan to help in an analysis of expanding our current business model to include ISP services.

In Section 12 is a chart showing the speed and cost of the fastest Internet-only plan from all the providers in Clackamas County which will help with determining the marketability of CBX ISP.

Selected Regions for Impact Analysis of the Market Study:

Manufacturing

Professional and Technical Services

Retail Trade

Public Sector

Commercial

Residential

Home Business

Urban

Remote

Education

Marketing

Market Study Attached

12) Return on Investment (ROI)

The Initial Investment: NTIA Federal Grant - \$7, 800,000

Return on this investment has already been realized as it was a grant.

Matching funds -	\$3,300,000	
	(In-kind matching funds	- \$2,300,000)
	(PEG Funds	- \$600,000)
	(General Fund	- \$400,000)

Total Project funding \$11,100,000

There was no return on investment with in-kind matching.

PEG funding which used funds generated from Cable Franchises to the County and allocated to CBX during construction. It is the current plan to pay back the PEG funding from Cable Communications and we anticipates a 10 year payback schedule.

Starting in 2017 the PEG funds will begin to be paid back and once this is done the enterprise plans to pay back the original construction monies used from the General Fund.

It should be noted that the intention of the CBX in the near future is to provide reduced or no charge for services to County agencies for fiber connectivity once the CBX has paid back initial investments and while continuing to grow the enterprise generating revenues to pay all expenses. This includes maintaining an annual reserve which will stimulate growth of the enterprise and allow sufficient reserves to continue to offer low cost connectivity and services.

Reduced costs to the County and other Agencies/Institutions

Clackamas County Agencies - \$97,000/yr.

Sewer Districts - \$27,000/yr.

Currently Connected School Districts - \$253,000/yr. and increasing (estimated to be over 5 million in 20 years)

Lake Oswego School District - \$301,000/yr. for the Lake Oswego School District.

Fire District One - \$130,000/yr.

Clackamas Community College \$25,000/yr.

Local Hospitals Providence - \$45,000/yr.

Cities - Oregon City, West Linn, Lake Oswego, Sandy, Gladstone, Molalla - \$50,000/yr. each.

Sustainable Financial Considerations

Current Local Industry Rates for Internet Services:

Provider	Monthly Fee (non-promotional pricing)
Direct Link (Canby) – 1000Mbps	\$89.95
Molalla Communications (Molalla) – 1000Mbps	\$100.00
Beavercreek Telephone – 15Mbps	Unknown – requires talking to sales agent
Clear Creek Communications – 100Mbps/6Mbps	\$94.45
Colton Tel (Colton) – 75Mbps/25Mbps	\$74.95
Reliance Connects (Estacada/Eagle Creek/Barton) – 100Mbps/50Mbps	\$109.95
SandyNet (Sandy) – 1000Mbps	\$59.95
Wave Broadband (Sandy/Welches) (1000Mbps/10Mbps – limited area)	\$99.95
Frontier FiOS – 150Mbps	\$100.00
Comcast – 250Mbps	(\$69.99/1-year contract)
Century Link – 40Mbps	(\$29.95/1-year contract)
CBX – 1000Mbps	To be determined by Market Study

With exception of Beavercreek Telephone and areas where cable/fiber have yet to reach, most providers in the county now provide reasonable speeds for a relative fair price. The remaining areas likely remain underserved due to extreme costs in outside plant construction.

The above internet speeds and pricing are competitive with other cities and Counties across the nation but the fact remains that in Clackamas County there is still limited internet to no service in rural areas with the urban areas being connected and supported by several carriers.

Nationwide a handful of cities have chosen to create their own municipal broadband services to compete with private broadband providers: Chattanooga, Tennessee, Bristol, Virginia, Lafayette, Louisiana, Cedar Falls, Iowa, and Wilson, North Carolina.

Each city having its own sources of initial revenue either being that they currently owned the local utility and went out for a bond or grant money to build fiber to the home and sometimes both.

All have meet resistance from local telecoms and their own state laws restricting their expansion. The price tag to go fiber to the home has also been quite expensive.

The municipal broadband services in these cities often provides faster speeds using fiber instead of traditional telephone or cable lines, though not always necessarily for cheaper. Other cities have even partnered with Google to roll out high-speed internet.

It's obviously time to investigate mirroring other public agencies across the nation which are bringing financially competitive and sustainable high speed internet to their citizens.

CBX ISP charges will be determined once a Market Study is completed.

13. Current Year CBX Budget & Line of Business FY 2017-18

Program Income	\$ 790,000
Fund Balance	\$ 347,485
(Construction Operations	\$ 256,292)
(Operations Repair	\$ 90,993)
<u>Franchise Fees Reimbursement</u>	<u>\$ 36,000</u>

Total Program Budget \$1,173,485

CBX operates as a self-funded/sustaining program

Many construction projects are customer funded requiring budget amendments

CBX Rate Schedule

	Ring and Mileage Pricing (per month)	
	Ring Fiber	Point to Point
Urban Ring	\$1,500.00*	\$130.00/mile
Rural Ring	\$1,250.00*	\$22.00/mile
Canby Spur		\$22.00/mile
Gov Camp Spur		\$22.00/mile
Wilsonville Spur		\$44.00/mile

	Multi-fiber pricing (per month)	
	Urban Ring Fiber	Rural Ring Fiber
Fibers Pairs 1-2	\$1,500.00*	\$1,250.00*
Fibers Pairs 3-4	\$1,425.00*	\$1,187.00*
Fibers Pairs 5 and up	\$1,350.00*	\$1,125.00*

	Leasing both rings (per month)
Fibers Pairs 1-2	\$2,500.00/fiber*
Fibers Pairs 3-4	\$2,374.00/fiber*
Fibers Pairs 5 and up	\$2,250.00/fiber*

	Rack Space (per month)
Per U	\$40.00**
Per Rack	\$800.00**

Late payment interest	Interest for any payments made after the due date (30 days after receipt of invoice).	1.5% per month, 18% annually.
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* \$75.00 per month for use on any county owned lateral fiber.

** Includes power and A/C. May require lessee to provide capital for construction. Depends upon availability.

Minimum monthly fee of \$255 for any one entity connection.