Live at the Speed of Light

Open Access Networks: Keeping Minnesota Communities Competitive

Blandin Foundation Broadband Initiative

The Broadband Initiative

Blandin Foundation launched its Broadband Initiative in 2003 to increase the economic vitality of rural communities through the exploration and use of new communications technologies, specifically high-speed networks that enable broadband connectivity. Developed with input from its Broadband Strategy Board, the goals of the Foundation's Broadband Initiative are to:

- Increase awareness about the value of broadband
- Increase business and residential use of broadband in rural communities
- Increase public and private investment in rural broadband capacity

Members of the Broadband Initiative Strategy Board are:

Danna Asche
Cook County

Kevin Beyer
Federated Telephone Co-op

Steve Downer
Minnesota Municipal Utilities Association

Dennis Egan
Cook Hill Girard

Gary Evans
Hiawatha Broadband Communications

Burl Haar
Minnesota Public Utilities Commission

Al Juhnke
Minnesota House of Representatives

Steve Kelley
Mackal, Crounse & Moore PLC

Eric Lampland
Lookout Point Communications

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North Region Health Alliance

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Richard Nordvold
Nordvold Consulting

Mike O'Conner
O'Conner Company of St. Paul

John Scanlan
BlueCross BlueShield of Minnesota

Greg Vandal
Sauk Rapids School District

Bob Vose
Counsel, Kennedy & Graven

Broadband
A Blandin Foundation Initiative
Keeping Communities Competitive

The mission of the Blandin Foundation is to strengthen communities in rural Minnesota, especially the Grand Rapids area.

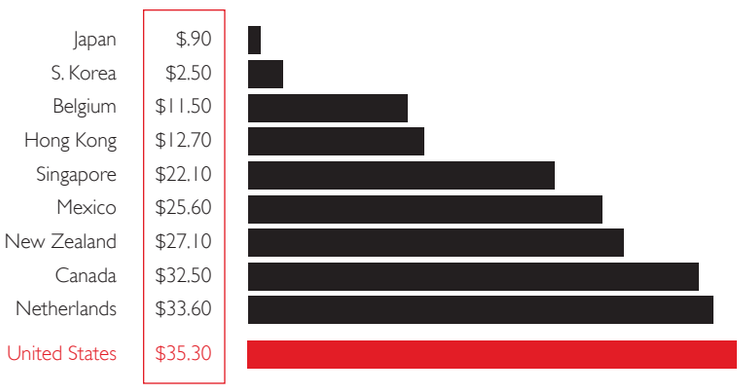
Blandin Broadband Initiative Vision

To ensure a high quality of life and a globally competitive future for its citizens, businesses and communities, Minnesota is committed to making the necessary investment to become a world leader in the universal deployment and use of ultra high-speed next generation broadband.

The challenge of thriving and surviving in a high-speed economy

Nationally and internationally, high-speed broadband access to the Internet is increasingly recognized as a significant contributor to economic growth. Studies show that broadband enhances economic performance in real and measurable ways. Communities with broadband consistently demonstrate higher growth in employment, business start-ups and high-tech businesses[1]. Broadband access to the Internet can improve the delivery of health care, education, job training, public safety and other vital services while increasing democratic and civic participation. Simply put, broadband has become critical to ensuring the future economic, social and cultural development of communities everywhere.

Relative Broadband Cost Per Megabit



Yet despite being the birthplace of the computer and the Internet, our nation as a whole – and rural places in particular – continue to fall behind in our ability to bring the benefits of broadband to our homes, workplaces and communities.[2] Looking at penetration rates and cost further clarifies this point. While penetration rates of households in the US range towards 49 percent, Europe rates range from 60 to 80 percent and in Asia rates range toward 90 percent. In some Asian and European countries, households have high-speed connections that are twenty times faster than ours for half the cost[3].

Today the question facing many rural communities has changed from "Do we need broadband?" to "How can we ensure that broadband delivers the most good to the greatest number of people?"

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[1] MIT/Carnegie Mellon, Measuring Broadband's Impact, retrieved from http://cfp.mit.edu/groups/broadband/docs/2006/Measuring_bb_econ_impact-final.pdf, April 2007.

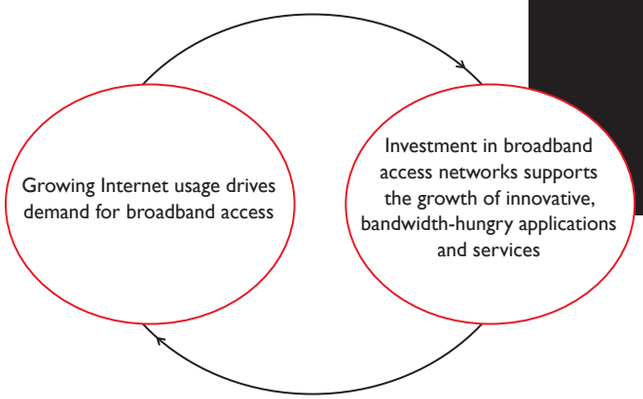
[2] See Florida, Richard, The Flight of the Creative Class, 2006

[3] Statement of Daniel K. Inouye, Hearing: Communications, Broadband and Competitiveness: How Does the U.S. Measure Up? Tuesday, April 4, 2007, retrieved from http://commerce.senate.gov/public/index.cfm?FuseAction=Hearings.Statement&Statement_ID=243, April 2007.

"Taking advantage of the opportunities provided by broadband access can enhance many areas of individual and economic activity,"

- OECD Secretary General Donald Johnston

The Need for Speed



It takes 3 – 5 years to do a build or significant upgrade

When it comes to the Internet, speed matters. Businesses must have ready access to high speed connectivity in order to support the continued development of the services and applications that enable them to remain competitive in the global economy. In turn, high-speed networks stimulate innovation and entrepreneurial development by:

- Attracting technology-based employers
- Supporting "creative workers" who often hold higher paying jobs
- Enhancing the efficiency and productivity of local government
- Improving the competitiveness of local businesses in a global marketplace
- Increasing the ability of smaller communities to attract and retain young people
- Expanding the opportunities for education beyond any boundaries of geography
- Encouraging the development and use of new services.

[4] See "Speed Matters: Affordable High-speed Internet for All," A communications workers of America Policy Paper, October, 2006.

The Need for Speed

Many larger institutions—including universities, hospitals and businesses—have deployed their own networks capable of delivering very high speeds in order to maintain their competitive edge. They often have no other choice. Most local networks still adhere to the Federal Communications Commission's (FCC) definition of broadband (200 kilobits per second [Kbps] in one direction) that was set a decade ago when the dial-up modem was the dominant Internet access technology.[5] These speeds fall woefully short of today's business realities and international standards that hover around 50 megabits per second (Mbps) in both directions.

While traditional broadband infrastructure technologies like DSL, coaxial cable, and wireless are improving and delivering more speed, their physical limitations are holding back the growth of emerging high-bandwidth applications. Fiber-optic cable is the only infrastructure solution available today capable of reliably delivering the very high speeds and symmetrical service required to support the burgeoning information economy.[6] In Northern Europe and the Pacific Rim, this "future proof" technology already is delivering synchronous service at speeds in excess of 50Mbps at a lower cost than we currently pay in the U.S. for slower speeds.[7] Reasons include:

- Higher-density populations and housing construction (e.g. Japan, Korea)
- Public subsidies and investment (Korea, Singapore, Sweden)
- Higher usage rates
- The advantage of late entry, which enabled leapfrogging of early deployment infrastructure

[5] Telcom Watch, Experts Urge FCC to Update Broadband Definition, Map Penetration, retrieved from http://www.publicintegrity.org/telecom/telecomwatch.aspx?eid=2728, April 2007.

[6] While new compression technologies continue to expand the capability of copper wire infrastructure, its ability to support the bandwidth needs of next generation applications remains in doubt.

[7] Unlike traditional networks, fiber has virtually unlimited capacity, which positions this technology to accommodate "bandwidth hungry" emerging technologies. For this reason, fiber is often referred to as "Future-Proof."

Relative Broadband Speeds (megabits per second)

Type	Optimal Speed (Mbps)		Common Service		Primary Issues
	Download	Upload	Down	Up	
Dial up (V.90)	.056	.336	Varies	Varies	Wire quality
xDSL					
ADSL	.256 to 8	.064 to 1.02	3	.256	Length of copper wire portion, marketing
ADSL2+	.256 to 24	.064 to 3.5	18	2	
VDSL2+	12 to 250	12 to 250	30	10	
Cable (DOCSIS)					
Version 1.0	38	10	3	1	Number of users per coax loop, marketing
Version 2.0	40	30	8	2	
Version 3.0	160	120	n/a	n/a	
Wireless					
WiFi (802.11b)	11	11	2	1	Legacy support and interference from buildings, trees, etc.
WiMax (802.16e)	70	70	3	1.5	
EVDO Rev.A (cell)	3.1	1.8	1.5	.5	
Fiber					
EPON (802.3ah)	5.6 to 1000	5.6 to 1000	10	10	Marketing
GPON	2400	1200	30	30	

Data compiled by Eric Lampland, Lookout Point Communications, May, 2007

Current broadband policy has left America - and rural Minnesota - behind

Today no federal strategy is in place to close the broadband gap between America and our global competitors. Absent a federal approach, the quality and cost competitiveness of service varies greatly, depending on location. In 2000, the United States as a whole ranked fourth in broadband Internet usage. With a short stop-over at 12th, today we are ranked 15th.[8] The Bush Administration set a goal of universal broadband access by 2007 but defined "broadband" as 200Kbps, a standard far below international norms. 2007 has arrived and it remains unclear how the Administration plans to deliver on the goal of assuring affordable broadband access to those who most need it.[9]

Absent any federal effort to address this broadband gap, the task of redressing America's alarming decline in broadband competitiveness has largely been left up to incumbent service providers who have few incentives to invest in major upgrades to broadband infrastructure because:

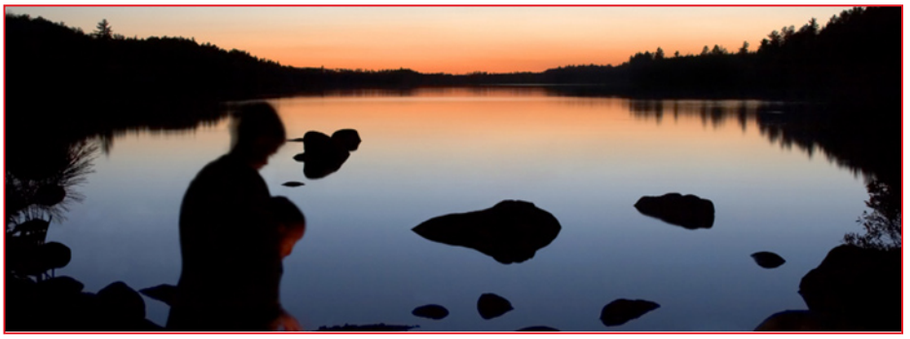
- A limited number of customers are demanding higher bandwidth. As with the chicken and egg dilemma, they are not familiar with high bandwidth-dependent applications that cannot be deployed effectively over existing networks, and
- Providers generally can continue to get a higher return from existing infrastructure than they would from investing in new fiber optic networks.[10]

[8] Organisation for Economic Co-operation and Development, OECD Factbook 2007, retrieved from http://www.oecd.org, April 2007.

[9] Rep. John Dingell (D-Mich.) "Affordable broadband for everyone" Feb 6, 2007, retrieved from http://thehill.com/thehill/export/TheHill/News/Frontpage/020607/sf_dingell.html

[10] There are a few notable exceptions to this stagnation in U.S. broadband infrastructure improvement (relative to global standards):

- Verizon has begun a major fiber-to-the-home (FTTH) deployment in its largest markets; no rural areas are on deck to receive these investments.
- Minnesota telephone cooperatives, frequently publicly financed by low interest loans from the federal Rural Utility Service and subsidized by the Universal Service Fund, have installed FTTH in 15 small Minnesota communities.
- In Minnesota, a few municipalities, like Windom, Minn., have financed and developed complete municipal telecommunications utilities that provide voice, video and data services.



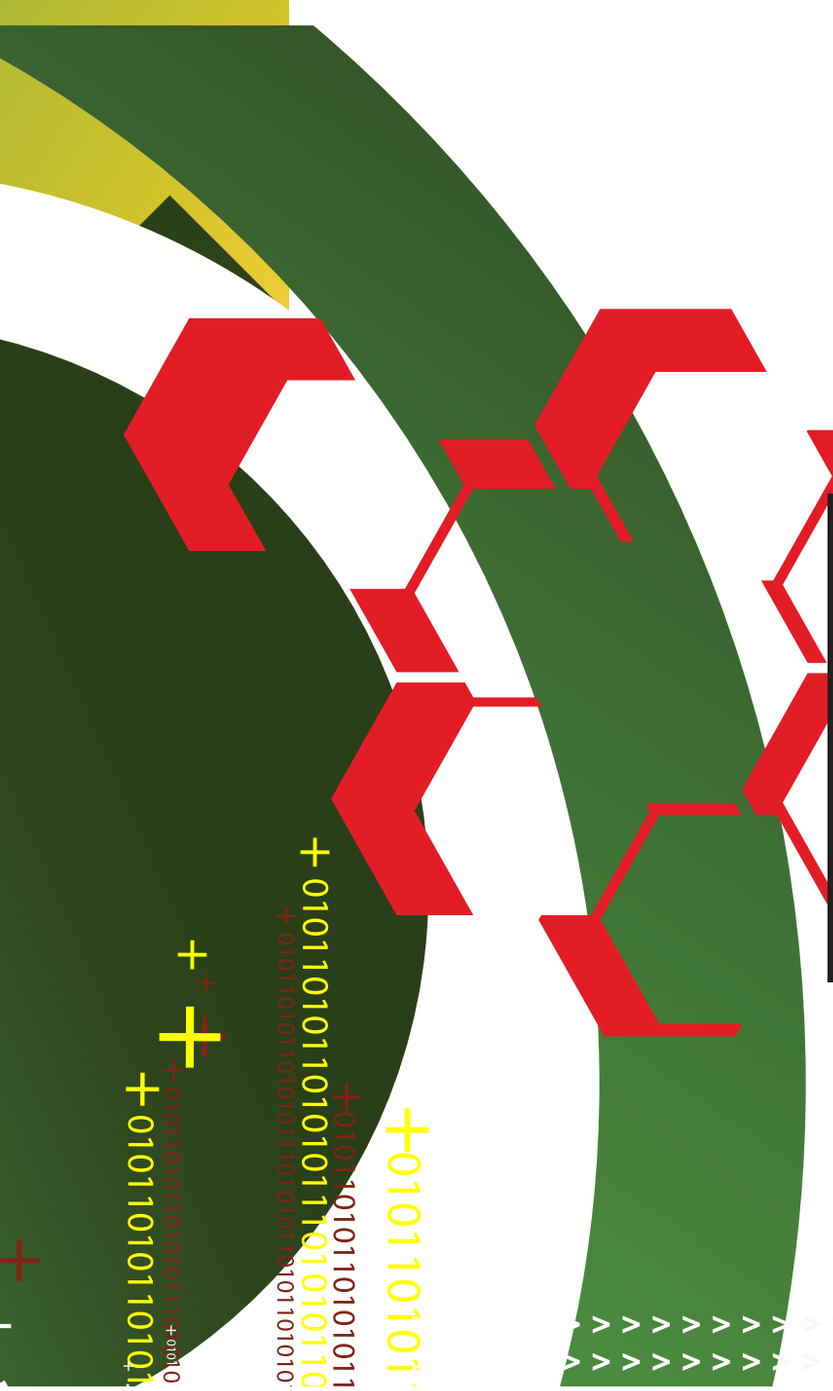
At $1,500 – 4,000 per household, getting fiber-optic cable to the home is expensive.[11] Incumbent providers enjoy little additional revenue from these deployments in spite of the higher value delivered to their customers. Consequently, most of the limited new fiber-to-the-home (FTTH) deployments in the United States serve high-income, densely populated areas, like Verizon's largest urban market areas, or benefit from some kind of public investment. Here in Minnesota, FTTH deployments include the compact regional centers of Morris and Windom.

Clearly, relying on market forces alone will not close America's growing "broadband gap," particularly in rural areas, where low population densities present an especially challenging business case for incumbent providers who must attend to their bottom line.

The relevant policy question is: "How can we most effectively structure public investment, and stimulate private investment, to ensure that Minnesota's communities – especially our rural communities – have the telecommunication infrastructure needed to survive and thrive in the global economy?"

[11] Costs vary due to city density, central office equipment and customer premises equipment. These costs are only true for connected households, which are determined by the penetration rate. Simply "passing" a household costs much less.

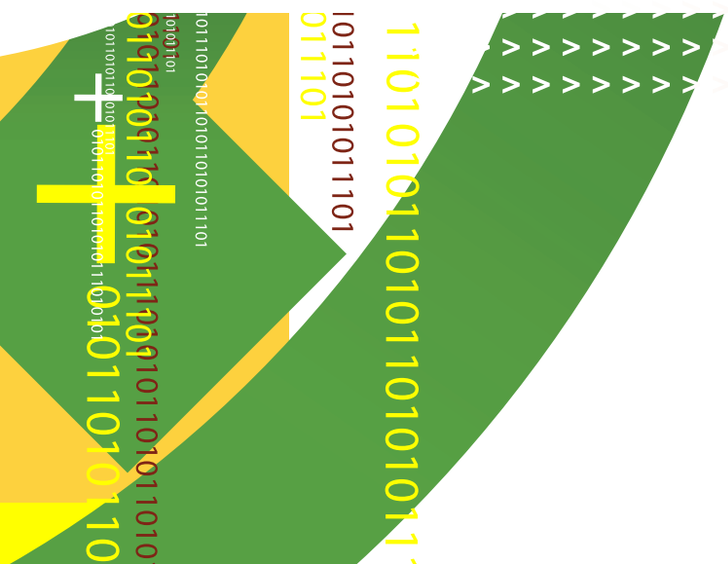
Open Access Networks



Open Access Networks are similar to air travel, where airlines pay airport authorities a fee for using the airports, or ground shipping, where trucking companies pay governmental entities license fees for using local roads.

Imagine the inefficiency if every airline built its own airport, or if DHL, Federal Express and the U.S. Postal Service all built their own roads over which to deliver.

A New Option



Open Access Networks - A New Option

The challenge we face in the U.S. of how to finance increased broadband capacity is not unique. Many of our global competitors, especially in Northern Europe, have similar economic and demographic characteristics and similar incumbent monopoly or duopoly (telephone and cable television) service providers who resist new models that bring increased competition.

Policy makers in many of these countries recognize that increasing broadband capacity is critical to future economic success. They view telecommunications infrastructure as similar to other public infrastructure, like roads, water and electricity, and are exploring innovative investment models. [12]

Direct public subsidies to individual service providers (like the Rural Utility Service funds) are not necessarily the best option, however. While such subsidies can accelerate infrastructure deployment, they do nothing to increase competition, which traditionally reduces costs to consumers and improves services. In fact, direct subsidies and private ownership of infrastructure exacerbate the problems that result from a monopoly.

"Open Access Networks" (OAN) have emerged abroad as an innovative solution that holds the potential to provide real benefits for Minnesota, especially rural places committed to establishing a future for themselves in the digital economy.[13]

OANs are public-private partnership-based alternatives to the currently dominant model in the U.S. of incumbent owned and operated, closed networks. Their key features include:

- Community-centric service based on geographic proximity
- Corporate governance culture and structure that places emphasis on serving the "common good"
- Open access to providers of services including, the "triple play" of voice, video and data
- Full benefits of OANs are realized through synchronous ultra high-speed fiber deployment.

[12] For example, all 15 members of the European Union adopted national broadband strategies by 2003. Since their accession to the EU, Poland, Hungary, Slovenia, Czech Republic and Lithuania have adopted national policies as well. See Speed Matters – Affordable High Speed Internet for All, a communications Workers of America Policy Paper, October, 2006.

[13] Open Access Networks (both fiber and wireless) currently are deployed in Sweden, the Netherlands, Germany, Austria, Denmark, France, Ghana, Brazil, the United States, Canada, Nepal, Philippines, Macedonia, and India. However, such networks, especially those deployed over fiber optic cable, remain a relatively new phenomenon; the World Bank estimates there are fewer than 50 such networks worldwide.

"The main driver for the development of Open Access Networks is the fundamental belief in the importance of ubiquitous and affordable broadband access to the economic and social development of the community."

- The World Bank

OANs are owned and controlled independently of any service or content that runs over them. This allows anyone connected to the network to take or provide content or service from or to anyone they choose.

Private companies use the network to provide retail services such as voice (telephone), video (television), data (Internet), or others (home security, back up data storage, remote monitoring, etc.) and pay the network owner a license or lease fee to deliver their services. Open Access Networks reduce the cost of entry new service providers must pay, while facilitating competition by allowing multiple service providers to compete over a single network.

Not only do OANs lend themselves to cross-sector collaboration, their corporate governance structure helps ensure that they deliver the greatest benefit to the most people. Open Access Networks are intentionally structured to ensure that the benefit and value of broadband is passed on to end users to a far greater extent than closed public and private sector-operated systems. As noted in a World Bank study, "the main driver for the development of OANs is the fundamental belief in the importance of ubiquitous and affordable broadband access to the economic and social development of the community."

While the OAN structure is a departure from business as usual, there are two compelling reasons for current providers to begin embracing this option: 1) the required infrastructure investment is made by someone else, which doesn't add additional cost on providers that already carry the burden of legacy infrastructures and 2) they can focus their much needed skills and knowledge on what they do best – innovate new solutions that meet their customers' needs.

OAN ownership can come in different forms. Publicly owned Open Access Networks are owned entirely by public entities. The public owner can be a country, a state, a municipality (or combination of municipalities) or a municipal subdivision, like a municipal utility. Some OANs are owned by public-private partnerships. A FTTH open network currently under construction in Amsterdam is owned partly by a large private real estate company.

Examples of Open Access Networks

Primary drivers for public sector involvement in broadband infrastructure development vary, but according to the World Bank[14], the most often cited reasons include to:

- Improve the availability and affordability of broadband Internet services
- Lower the cost of providing municipal services
- Increase government efficiency and productivity
- Promote local economic development and competitiveness (including specialty niche service providers that can operate on the networks, i.e. telemedicine, video conferencing, data backup, home security, etc.).
- Redress "digital divide" concerns and promote quality of life and quality of place.

Open Access Networks are deployed throughout the world[15], and new OANs are being developed now in Vienna, Austria; Brisbane, Australia; and Amsterdam, Netherlands. One of the oldest and most impressive examples is Maler Energy City Network in Vasteras, Sweden.

In 2000, Vasteras, Sweden (population 130,000) decided to build an open-access fiber-optic network. The network was built by the public power utility, which created a subsidiary, Malarergi Stadsnat, or MalarNet (MSN). This network has become a model for many other Open Access Networks.

MSN currently has 40,000 household connections and 2,000 business customers. More than 25 service providers sell over 85 different services on their network that go far beyond conventional voice, video and data services, including: distance education, financial services, remote alarm and video camera services, gaming and application hosting. MSN expects to connect to 50,000 customers in 2007. In the past two years, almost 600 new companies have been established in Vasteras. While not all new jobs can be directly correlated to the network, the appearance of MSN created a major shift in the perception of Vasteras within Sweden and the world.

[14] World Bank, Study on Open Access Networks for Communities and Municipalities, retrieved from http://www.infodev.org/en/Publication.130.html, April 2007.

[15] The largest open network in the US is the Utah Open Infrastructure Agency, which serves 14 cities in Utah. www.utopianet.org

Due to competition created by the open network, Vasteras residents pay almost 60 percent less for their services than they paid before the network was built. MSN charges each customer for the cost of connecting the home to the network, including the cost of the fiber optic cable. The local banks have agreed to finance this cost and add it to the owner's mortgage payment.

MSN has also created a unique pricing system that fosters the growth of new businesses operating on the network. Instead of the new business paying a high installation and access cost, MSN works out an arrangement with the service provider to pay a flat fee per subscriber or share in the revenue that the new business receives. This reduces the upfront cost and risk that are typically significant barriers for new business entrants.

With MalarNet you can:

1. Use an integrated community portal to switch service providers with a single click

2. Receive a video consultation from your doctor

3. Receive a remote call (with video) of an intruder at your home

4. After being notified that your parent hasn't taken their medication from their electronic pillbox, you call them over their television to give them a reminder.

5. Start a new Internet based service with automated back office internet operations support services (billing, access technology, customer support).

For more information, see www.malarnetcity.se/texter/read.php?id=99317.

Examples of Open Access Networks, cont.

Utah Open Infrastructure Agency (UTOPIA)
Utah, USA

Fourteen cities have created a FTTH OAN across a 325 mile corridor in Utah. The project will eventually serve approximately 140,000 homes and businesses within their region. They currently have four private companies that provide voice, video and/or data services over the network. MStar, a triple play provider, currently offers a $90-$120 package that includes unlimited local and long distance phone calling, 15 megabits per second (both up and download speeds) Internet service and different digital television services. It is difficult to compare this rate to services in Minnesota because symmetrical 15 megabit service is not available, but even with slower broadband service, a triple play typically ranges from $150 to $200 per month. UTOPIA service is now available to approximately 25,000 homes and businesses in six communities.

The UTOPIA network was funded by a revenue bond issued by the 14 communities. In addition to the project revenues that are pledged towards bond payments, the communities have provided a limited additional pledge of a portion of their sales tax revenue if that is needed. More Utah communities have asked to join the network and expansion plans are being developed. UTOPIA is now the largest FTTH OAN in the United States.

For more information, see www.utopianet.org.

Open Access Networks in Minnesota

While a number of Minnesota communities have fiber-to-the-home deployments, currently there are no operating Open Access Networks in Minnesota. This may soon change. Twelve communities and Boise Forte and Nett Lake Indian Reservations on the Iron Range of Northeastern Minnesota have entered into a joint powers agreement (JPA) to explore the feasibility of creating an OAN, called Iron Range Community FiberNet. An initial feasibility study has been completed by DynamicCity, the developer and operator of the UTOPIA open network in Utah (see Examples of Open Access Networks). Initial projections show that a substantial public infrastructure subsidy in upfront capital costs will be necessary to launch the project. The need for public investment is due to:

- Low density communities (high infrastructure cost per subscriber)
- High interconnection costs between communities due to large geographic area
- Higher than average percentage of elderly and lower income residents who traditionally are less likely to subscribe to broadband services.

Even in this unfavorable market environment, cost models based on very conservative utilization rates project that the deployed project eventually will cash flow to the point of operational self-sufficiency.

Barriers to Open Access Networks

Cost

As stated earlier, full benefits of OANs are realized through synchronous ultra high-speed fiber deployment. While wireless Open Access Networks are relatively inexpensive[16], they generally do not provide the reliability or capacity requirements of the new applications and services available on the Internet[17]. The cost of fiber optic cable to the home (FTTH) networks is much higher due to the expense of installing a completely new underground or above ground fiber optic infrastructure (See footnote #10).

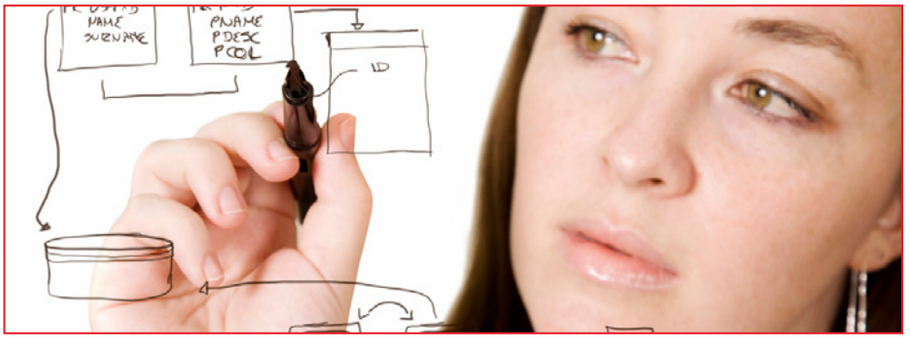
It may be difficult to recover capital investment costs of a FTTH deployment with operating revenues from services delivered over the network, especially in low density, elderly markets. Typically, new networks initially capture 30-40 percent of a market – even if the new services offered are superior to those offered by incumbents'. New services that take advantage of the Open Network infrastructure (see Vasteras, Sweden example) can provide new revenues for the network, but it is difficult to forecast these revenues in a manner secure enough to attract initial infrastructure financing.

Attracting public dollars to FTTH investments can be challenging because they must compete for scarce public resources with other critical needs such as schools, roads, water and sewer services. However, public subsidies that have been made available, including low interest loans and federal Universal Service funds, have been used to help build most FTTH deployments in Minnesota.

As the need for the higher speed that FTTH deployments deliver increases, and the market share of new FTTH deployments increases, it is expected that the need for public subsidies will decrease. Even though cost is a major barrier, Open Access Networks remain a cheaper route to upgrading the speed of local networks with fiber, since multiple retail operators can share this network and eliminate the need for redundant fiber investment.

[16] Wireless networks can cost as low as $300 per subscriber, including transmission tower and equipment and the local receiving equipment.

[17] A case in point is the recent recommendation by St. Paul's Broadband Advisory Board that the city explore fiber instead of wireless technologies, its original charge.



Competition

The vast majority of incumbent voice, video and data service providers are strongly opposed to the emergence of OANs. The reason is easy to understand: Open Access Networks is a disruptive concept. It separates the infrastructure from the delivery of services so whoever controls the pipe controls the customer and can maximize the dollars they try to extract from them. The Internet is pushing us towards a one-pipe world, and incumbent network operators want to own and operate that pipe, limiting competition in the marketplace for communications services. OANs, on the other hand, enable a highly competitive communications marketplace where multiple service providers compete over the same pipe. Simply put, the core and access technologies central to OANs undermine the business models underpinning the incumbent providers.

Most Minnesota communities are served by a duopoly of an incumbent telephone company and a cable television operator, who in many cases have expanded their services to provide the "triple play" of voice, video and data services. These incumbent providers face a serious dilemma because they carry debt from "legacy infrastructure" (often copper wire) and have difficulty generating the return on investment needed to invest in a new FTTH network. New, higher quality infrastructure developed by a new market entrant stiffens their competition.

With the exception of a few Minnesota telephone cooperatives, private telecom service providers usually are reluctant to form partnerships with public entities. The typical response by incumbent service providers to the few new OANs in the U.S. has been to significantly reduce their prices, or to use litigation to delay or weaken a new OAN provider. This response forces public officials to choose between meeting the higher capacity broadband access needs of their constituents and protecting the incumbents, most of whom are valued corporate citizens.

Officials at Qwest, the largest telephone company operating in Minnesota, have indicated that Qwest would not be interested in partnering with or providing retail service on the local open network project in development on the Iron Range. This "stranded investment" option is not an attractive business choice for Qwest. In contrast, the incumbent telephone company in Vasteras, Sweden, home to an award-winning Open Network, recently decided to make its services available over the local open network.

Barriers to Open Access Networks, cont.

Regulatory Challenges

The legal infrastructure necessary for OAN deployment is ambiguous and confusing. In Minnesota, municipalities can provide the infrastructure for OANs under their "implied powers" authority, but explicit authority is lacking. The municipal authority to provide retail service (not necessary for an OAN where private entities provide the retail services) is more restrictive. Voice, video and data services were all developed during different times and are regulated differently, even though the technologies are all converging in IP protocols. This regulatory uncertainty undermines the confidence necessary for large FTTH deployments, whether they are public OANs or private closed networks.

Scale

Some communities are too small to attract multiple competitive service providers and may not wish to, or be successful in, combining their efforts with other communities. In such cases, communities may choose either to partner with a single service provider in a closed network or establish a full scale (wholesale and retail) municipal operation.

I Get It! What Can I Do?

Despite the barriers, the fact remains that Open Access Networks hold the potential to provide real benefits for Minnesota, and especially our rural communities that want to be a part of the digital economy of the future.

Most successful efforts to develop the public-private partnerships necessary for Open Access Network deployment have followed a similar developmental path:

1. A local champion convenes local leaders to discuss the problems with existing services and potential solutions. Involvement is needed from the business, health care, education and governmental sectors.

2. Discussions with existing and outside service providers begin. Community leaders need to establish relationships with service providers, consultants, network architects (retained to aide in the evaluation of existing services and guide the feasibility study and funding requirements), and equipment vendors.

3. A market survey is conducted to assess existing services, current demand, price points, etc. Community education about broadband based services will help build demand for existing services and new services.

I Get It!
What Can I Do?, cont.

4. A feasibility study is conducted to identify capital costs, operating revenues and expenses, available technologies and business models (open vs. closed networks).

5. Funding for capital costs that cannot be supported by projected revenues is sought. Business partners are confirmed (Who will operate the network? Who will provide retail voice, video and data services? Who will build the network? Who will govern the network?)

6. Network construction begins.

Virtually every OAN starts from the same spark: a local champion. Strong commitment and entrepreneurship of the individuals driving a project in their home community has proven to be key to their success. Research suggests that most often these local champions are motivated by a desire to:

- Bring their communities into the 21st century
- Address perceived failure on the part of incumbents/private sector to serve their markets adequately
- Improve the lives of citizens in their communities

An enabling policy and regulatory environment that allows private sector led investments through innovative public policies at state and local levels is also key.

How Do I Learn More?

Institute for Self Reliance, Localizing the Internet
www.newrules.org/info/5ways.pdf

Center for Rural Policy Development, 2006
Minnesota Internet Study
http://www.mnsu.edu/ruralmn/newsnotes.php

World Bank, Study on Open Access Networks for Communities and Municipalities
http://www.infodev.org/en/Publication.130.html

MIT/Carnegie Mellon Study, Measuring Broadband's Economic Impact
http://itc.mit.edu/itel/docs/2005/MeasuringBB_EconImpact.pdf

UTOPIA, Utah's Public-Private Fiber-to-the-Premises Initiative White Paper
http://utopianet.org/docs/Utopia_White_Paper.pdf

Speed Matters
Affordable High-speed Internet for All, A Communications Workers of America Policy Paper
http://www.speedmatters.org/

Organization of Economic Cooperation and Development, Recommendation of the Council on Broadband Development.
http://www.oecd.org/document/48/0,2340,en_2649_34225_27374064_1_1_1_1,00.html

Business and Industry Advisory Committee (BIAC represents the major industry and employers' organizations in the 30 OECD countries) The BIAC Broadband Manifesto
www.biac.org.

Ubiquity Ultra high speed broadband needs to be available to everyone in Minnesota, including businesses, institutions, and individuals. While ultimately all Minnesotans will need this service, this goal will necessarily be achieved in stages.

Symmetry Ultra high-speed broadband needs to provide symmetric speeds and facilitate source-to-source communication. More communication in the future will be "two-way" as we work more from our homes.

Affordable Ultra high-speed broadband needs to be available at rates people can afford.

Competition Competition among service providers should be encouraged. Competition increases customer choice and promotes innovation.

World Class We must achieve world class state-of-the-art service based on global standards. We cannot afford just to be better than our neighboring states.

Collaboration The deployment and utilization of ultra high-speed broadband is a challenging goal that can benefit from public and private entities working together.

Neutrality Ultra high-speed broadband policy should be promoted regardless of the technology platform that delivers it. The best technology for delivering ultra high-speed broadband may not yet have even been invented yet.

Interoperability Regardless of the technology used for ultra high-speed delivery, all systems must seamlessly interoperate with all other technologies.

Our Principles

BLANDIN FOUNDATION™
PUBLIC POLICY & ENGAGEMENT

Information Bernadine Joselyn, Director, Public Policy and Engagement
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