

A Chicken in Every Pot and Broadband to Every Loon: Are Ubiquitous Broadband Connections Necessary for Prosperity in Rural Minnesota?

Katie Johnson

It's the 4th of July. My toes are buried in the sand on the shores of one of northern Minnesota's beautiful lakes and I'm spending the week doing all-American things with my family: grilling burgers, waterskiing, and lighting fireworks. And thanks to today's technology, I'm checking e-mail and weather forecasts on my Treo™ phone.

My tech-savvy brother-in-law is along on this trip, and he dug his toes into the sand next to me as he asked what I was doing "working" on my vacation. Explaining that this was good, "quiet" writing time for an article on the future of broadband from a rural telecommunications industry perspective, he quickly responded, "It is the future, don't you think?" He works from his home near Fergus Falls selling GPS technology to golf courses nationwide, so from his perspective broadband at his rural home is necessary for him to succeed. He asked, "How can anyone survive, much less thrive, in today's marketplace without it?"

Most people would agree. The benefits of broadband to students, businesses, tourism, agriculture, healthcare, economic development and even retirees are easy to quantify. But when the rubber meets the super-highway, issues of infrastructure costs, consumer demand, market-based competition and government's role in regulation make the future outlook for ubiquitous broadband fuzzy at best.

According to the Rural Broadband Coalition, "While the Internet is changing the world economy, technology experts say, 'large parts of rural America are losing out on jobs, economic development and civic participation' because of inadequate access to the Internet."¹ Can Greater Minnesota afford to miss out on these opportunities?

The invention of more bandwidth-intensive applications will continue to drive the consumption of broadband access. But will consumption and demand ever equal the cost of providing service

to the state's rural areas? Doubtful. If not, how can we ensure access to every user who wants and needs to use the current and future inventions of broadband?

From a rural telecommunications industry perspective, this article is an examination of a few questions that may lead us to some middle ground ... or least a glimpse of it.

1. Can and should broadband access be available ubiquitously across the state?
2. What will the real broadband needs of rural Minnesotans be in the future?
3. What type of technology and infrastructure can best meet those future needs?
4. How can/should the access network be paid for?

1. Can and should broadband access be available ubiquitously across the state?

When you live in a rural area, there are tradeoffs you willingly accept, trading some aspects of "city life" for the benefits of living out-state. But should access to broadband be part of this trade-off?

Most of us who live here don't think so. While some of our metro citizens may be inclined to disagree when asked whether their money should support "universal service," they're also the first to complain when their smart-phone or laptop can't connect during a trip to the lake. Because we all share the natural resources of this great state, let's put aside the rural vs. urban argument early. Even though it's impossible to say location is irrelevant when it comes to access, the goal is to make it as irrelevant as possible in terms of benefits to everyone.

Another factor quickly becoming irrelevant is cost. Until after World War II, only the affluent (and chicken farmers) could manage the proverbial Sunday chicken. Today, thanks to modern production methods, almost anyone can afford this versatile fowl – a so-called "chicken in every pot" like Herbert Hoover once promised. Broadband prices have taken a similar path. While prices were significantly higher than dial-up even just a couple years ago, many Internet providers now offer 256k connections at dial-up rates thanks in large part to video deployment within their networks. Affluence is no longer a pre-requisite where broadband service is available.

However, the factor that remains a fundamental obstacle from a rural perspective is how to physically get service to everyone, and whether or not we really need to. The rural independent telephone companies in Minnesota, who serve half of the land

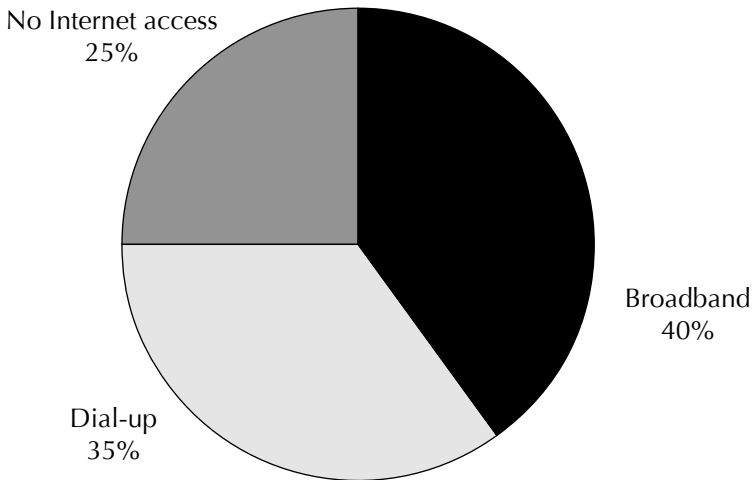


Figure 1: National rural broadband penetration rates.

mass of the state, have made significant investments to deploy broadband to some of the most remote corners of the state. Even seasonal cabins on remote islands of Lake of the Woods have access to broadband Internet. According to the Minnesota Association for Rural Telecommunications (MART), since 2000, Minnesota's rural independent telephone companies have invested more than \$300 million in new technology. Over 90% of access lines served by these companies have broadband, high-speed Internet available to them.² Nationally, 40% of rural customers subscribe to broadband connections³ and in Minnesota the percentage is right on the national track, coming in at 39.7%.⁴ According to the Center for Rural Policy and Development's *2006 Minnesota Internet Survey*, the remaining 60% is split between 35% who have dial up and 25% who have no Internet access at all. One-half of that group is expected to come on-line or upgrade to broadband in the coming year.⁵

Of those who don't have broadband access, only 22% of rural Minnesotans cite availability as the reason. Cost and "don't use often enough to warrant additional costs" are the top two reasons. Those customers will migrate as costs continue to lower and applications continue to advance.

As FCC Commissioner Robert McDowell recently noted, consumer demand will force network operators to provide fatter and faster pipes. But according to McDowell:

Consumers don't buy fat pipes; they buy applications and content that requires fat pipes. As consumer demand for more bandwidth-intensive applications and content increases, so does the incentive for network owners to provide more bandwidth, provided the market is competitive and unencumbered by unnecessary regulation.⁶

The rural telecommunications industry agrees. However, demand alone won't change the fact that there are some remote customers who will remain a challenge to reach with broadband for the foreseeable future.

This brings us back to the 22%. This is equal to about 192,000 Minnesota households who don't have broadband because they do not have access to it. MART members are diligently working to reduce that number each year. But Minnesota will soon be at a point where communities that are not viable for competition and are served by larger, regional carriers who do not invest as readily in rural areas will be the last of the have-nots. Rural providers believe 700 MHz and other wireless technologies are on the horizon as feasible solutions for these areas, but lack of equipment and standards will require more time for them to materialize.

As nearly every aspect of daily life plays out on the Web, people who use dial-up will be left out. I witnessed this firsthand when a friend who lives in a rural serving area of a large regional telephone carrier came to me desperate to use the computer connection at my home to apply for college and student loans. The dial-up connection available at their home simply couldn't handle it. Left out or disadvantaged when trying to apply for college isn't a standard Minnesota should accept for some of its rural residents.

So, is it realistic to expect broadband access ubiquitously across the state? The numbers arguably say "yes." Looking solely at demand for services due to new and advancing applications, all indications are that nearly everyone everywhere will have a reasonable need for broadband access.

2. What will the real broadband needs of rural Minnesotans be in the future?

Future expectations are for high-speed connections to allow consumers to bypass their cable systems and someday click on an NBC, HBO or Fox Sports Web site and watch their favorite shows or teams in high-definition whenever they want. Someday, people will routinely have open video connections to their relatives' homes, allowing them to sit in their own living rooms and chat.

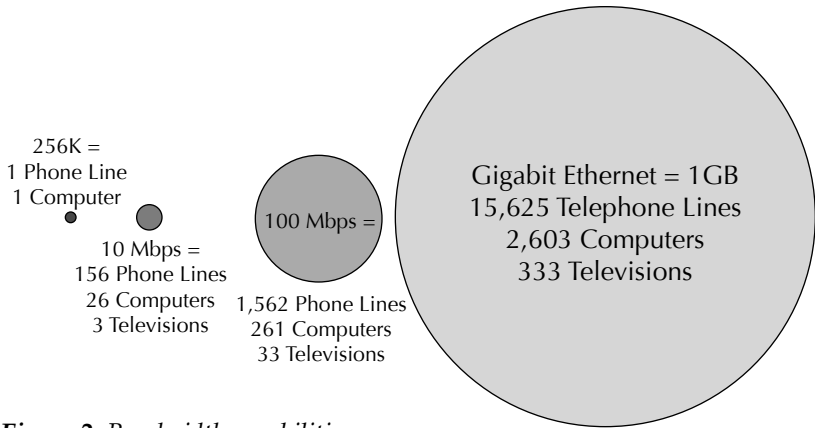


Figure 2: Bandwidth capabilities.

Or connections to their lake homes allowing monitoring and remote access to everything from the heat to the coffee maker. For business settings, small wireless sensors will send constant streams of data to people monitoring conditions from miles away. Think of the possibilities. Doctors could oversee a diabetic child's condition even if the patient was at summer camp. Tele-mental health — the provision of mental health services from a distance using telecommunications technologies — has the potential to help surmount the challenge of mental health professional shortages by delivering services to primary care clinics, hospital emergency rooms, community mental health centers, schools, churches, nursing homes, jails, and state and federal prisons. These are real possibilities for the future and they represent real bandwidth needs. But how much, how soon?

Recent talk about legislation mandating one-gigabit (Gb) service to all Minnesotans by 2015 raises the question of how much is enough? A gigabit is most likely over the top for any time in the foreseeable future. Even early adopters of applications like those mentioned above don't begin to approach needs for a "gig" of bandwidth, not to mention the substantial cost implications. Including everything from infrastructure investment to customer premise equipment, the Minnesota Telecom Alliance (MTA) and MART have researched this topic and calculate cost predictions of over \$10 billion to ramp every Minnesotan up to a one Gb connection. Even Herbert Hoover would have a hard time making that a promise.

The word "mandate" is what concerns the rural industry when it comes to broadband legislation. Rural providers have proven time

and again that they can and will respond to their customers. They continue to increase bandwidth when their customers demand it. In fact, virtually every one of Minnesota's independent telecom companies is providing at least one megabit (Mb) of bandwidth for data — that's at a minimum three times faster than the fastest speeds available just a few years ago, and in some cases it has gone up 20 to 30 fold. Almost three-quarters of customers served by MART companies are provided broadband service over fiber within the local exchange network. One-third of MART companies are providing many of their customers broadband service with fiber all the way to their home or business, and this is anticipated to jump to one-half by the end of the 2008 construction season.⁷

Delivery of video services over the telecom infrastructure is the major driver behind bandwidth increases for much of our rural landscape. For today's video applications "enough" bandwidth isn't a gigabit, but it is more than traditional data applications would call for. About 22 Mb to the home is a minimum requirement for delivery of the "triple play" of television, data and voice. Add video on demand and high-definition TV along with the possibility of wireless applications, and 100 Mb isn't unrealistic for the future. The market forces of video, whether by traditional cable television delivery or via web sites, will continue to drive bandwidth delivery to rural and metro homes alike. The delivery mechanisms to offer these bundles of services are the basis for rural providers' future planning and deployment.

It's worth noting these future applications will drive some real customer premise needs as well: wiring within a home, computers, TVs, routers, modems, set tops, wireless networks. All of these will factor into the customer experience of broadband utilization. Consumers and contractors alike will need education for wiring and purchasing in this new generation of communications and entertainment.

3. What type of technology and infrastructure can best meet future needs?

Myriad competing technologies are able to provide the bandwidth required to deliver broadband services, from fiber, copper, and coax to wireless and satellite. It can be tempting to use technology as a goal, but it is more useful to look at it as a strategy to meet a defined need. Each technology has its limitations in terms of bandwidth, reliability, cost or coverage. Choosing which will best meet an area of need depends on the type of user being served, the

Technology	Advantages	Disadvantages
Fiber - FTTx	Highest Bandwidth Quality Signal Reliability Security Dedicated Connections	Standards (user interfaces) Cost Proprietary Networks
Copper/ xDSL	Utilizes existing lines Dedicated Connections	Distance Sensitive Speed/Bandwidth limits Age degradation
Wireless	Cost Ease of Deployment Mobility standards	Terrain & foliage limits Proprietary Networks CPE & Interface standards not developed Shared Connections
Coax	Utilizes existing lines	Shared connections
Satellite	Ubiquity	Lower speeds than DSL, Coax & Fiber Weather interference

Table 1: *Technology comparison.*

type of services or applications desired, required bandwidth and the geographic density of the customer base.

Without delving into a long debate on the merits and demerits of each, it is safe to say no single technology will serve the full set of rural Minnesota consumer needs. Table 1 offers a brief comparison for overview purposes. However, one would be remiss not to mention that fiber offers almost infinite bandwidth relative to the other technologies and is becoming economically more palatable. The ultimate bandwidth capability, high reliability, security, and low operation costs of fiber-to-the-home systems coupled with the new affordability of both fiber and equipment is driving further deployment of fiber in more and more markets. That's good news for all Minnesotans.

4. How can or should the access network be paid for?

A study by the Broadband Working Group at MIT's Communication Futures Program found that among 22,390 ZIP codes, communities with broadband access recorded greater growth in jobs, businesses, and property values. The report said communities with broadband access experienced an additional

1% to 1.4% in their job growth rate between 1998 and 2002. Those communities also saw an added 0.5% to 1.2% growth rate in the number of businesses. Housing rents, measured as a proxy for property values, were more than 6% higher in 2000 in communities where broadband was available by 1999.⁸

With that in mind, can we afford to build systems for ubiquitous access? Or can we afford not to? Will market forces be enough to fund this ubiquitous access? Due to vast expanses of remote and often rugged or wet topography, we all know the short answer is “no.”

As companies who are based in rural Minnesota, deeply rooted in their local communities and committed to delivering telecommunications services to fellow Minnesotans each and every day, the rural telecommunications industry believes “no” isn’t a sufficient answer. These companies are seasoned experts at finding ways to ensure that all consumers have access to affordable telecommunications services and the latest technologies — no matter where they live — because they live there, too. As providers experience the loss of more and more customers on the traditional POTS (Plain Old Telephone Service) network, the broadband pipe is essential to both the consumer and the provider. The broadband pipe delivers the possibility for retention and profitability of the rural network. Simply put, it is the future of the network. And the integrity of the network is vital to everyone — Voice Over Internet Protocol (VOIP), wireless, and virtually every telecommunications application old or new utilizes the network in place today. It’s fundamental to maintain this state-of-the-art network.

As mentioned earlier, market-forces alone simply will not fund maintenance or build-out of a network capable of providing broadband access to the remaining remote and un-served parts of our state. So collectively, as consumers, providers, businesses, non-profits, and government agencies, how can we make it a reality? To see progress, at least three items are needed: collaboration, market-based competition, and common-sense regulation.

While collaboration and competition in the private sector may sound counter-intuitive, they are in large part the reason we have the level of connectivity available today in rural Minnesota. But let’s be clear from the start – it’s not about collaboration within individual sectors. Collaboration is necessary amongst a wide array of entities. Among private-sector providers, for instance. This state has a vast fiber optic network of over 15,000 miles⁹ and impressive regional-optical networks thanks to collaboration between dozens of local exchange carriers. Another example of collaboration is

between government and the private sector. Instead of government competing against local companies who have invested heavily in infrastructure, people and real estate, consumers win when governments collaborate with the private sector to provide needed services whenever possible.

Common sense regulation may be even more counter-intuitive than the previous statement, but it is essential. The Federal Universal Service Fund (USF) was built on the principle of ensuring reliable access to affordable telecommunications services for millions of U.S. consumers in high-cost to serve areas. This type of regulation was built on common sense and has served our country well for decades. However, some not-so-common sense decisions are threatening its integrity and viability. Since 1999, USF payments to second, third and even fourth telecommunications providers in the same geographic area increased by an average of 185% annually, from \$500,000 to \$820 million.¹⁰ This exploding growth is due to provisions that allow wireless providers to collect from the fund on the "identical support rule." This means regardless of their own cost to serve a customer, wireless providers in an area receive USF money based on the often-higher cost of the original wire-line telephone provider, who may also be providing service to that customer. So now two companies are drawing money from the USF for providing service to the same customer, and one of them is drawing at inflated costs. This is not-so-common sense.

While not-so-common sense regulation can be extremely detrimental, commonsense regulation from both the state and federal level can be beneficial to consumers and can help put us back on track for ubiquitous, reliable access to affordable telecommunications services.

Some argue that broadband service should not be added as part of the Universal Service obligation. Considering that video is one of the major drivers of broadband deployment, should the right to digital television be an entitlement that state or federal government should fund for all residents? Not if they're using common sense. However, applying common sense, there should be a way to separate the broadband delivery mechanism from the content that rides on the broadband connection. Then it can make sense to include broadband as part of the USF funding obligation.

It's also important to recognize there is no longer a cable television industry *and* a telephone industry. These industries have merged. They provide the same services. Rules for entry and operation in the merged marketplace, where both traditional telephone companies and cable television companies are providing

the same types of services, should be fair and absent of unreasonable barriers to entry. Inconsistent rules only impede the achievement of enhanced competition and accelerated broadband deployment.

Several states are moving broadband development up on their priority list of policy initiatives. California is one such state. Acknowledging that state industry rules were

[a] “legal straitjacket from a by-gone era, in 2006 the California PUC enacted the Uniform Regulatory Framework (URF), granting more freedom to incumbent telephone carriers to respond to market forces, invest, and innovate. Continuing to regulate landline telephone companies as if they were still monopolies with an iron grip on the communications market is a policy mistake that may cost states billions in lost capital expenditures and infrastructure upgrades.”¹¹

Telecom providers are often hesitant to endorse government programs or approaches to industry issues, but unless private-sector providers and governments can work together and truly focus on the un-served, these pockets of our state will continue to lag behind and become the have-nots of this century.

With a common goal of statewide broadband access in mind, effective public-private collaboration will focus on maximizing the infrastructure and resources already deployed in our state, expanding the reach and capacity of broadband services offered, and educating consumers on how to capitalize on the benefits of their high-speed connections. On the other hand, effective public-private collaboration will not abandon existing investments or infrastructure and it will not make assumptions regarding preferred technologies or providers.

This collaboration between a public & private “meeting of the minds” may or may not conclude that a state universal service fund or similar mechanism is ideal or even necessary. Such a funding mechanism may be the answer to those un-served pockets of our state, but that determination cannot be made intelligently without a wide-angle look at the entire state and the full slate of providers and services available. This topic must be researched, applying the collective intellectual resources of all stakeholders to develop a common-sense approach to statewide access. It also must look at the balance between the benefits of such a program and the burden involved in successfully administering a program that adequately measures evidence of need, appropriate expenditures and program

compliance.

Government entities have the unique opportunity to be drivers of both access to the network and applications on the network. By acting as an anchor-tenant and utilizing network infrastructure for the bandwidth-heavy applications that governments tend to have, they make access to the public better and more affordable. By offering consumers access to their services via the network for things like on-line licensing, billing and tax payments, they increase demand for broadband.

In addition, governments have the opportunity to foster healthy competition for services by endorsing fair and progressive economic development policies, franchise agreements, rights-of-way usage and other policies. Why not provide state income tax credits to telecommuters and students for broadband costs? This demand-side stimulus has worked well in other areas of public policy. Another stimulus to broadband usage would be to change the State Building Code for residential construction to require wiring capable of broadband delivery.

As concluded by the authors of the February 2007 Pacific Research Institute study of municipal wi-fi networks:

Officials at every level of government should turn their energies towards spurring greater deployment of advanced communications in free-market ways. Major potential policy actions include 1) reducing the red tape of video franchising and repealing state communications laws that hinder private investment, and 2) fostering future innovation and the next generation of telecom technologies.¹²

FCC Commissioner Robert McDowell summed up good broadband policy in a recent commentary, "Broadband Boloney," in *The Wall Street Journal*:

When it comes to broadband policy, let's put aside flawed studies and rankings, and reject the road of regulatory stagnation. In the next few years, we will witness a tremendous explosion of entrepreneurial brilliance in the broadband market, if the government doesn't micromanage. Belief in entrepreneurs and a light regulatory touch *is* the right broadband policy for America.¹³

So, rather than *mandating* ubiquitous access and exorbitant speeds, legislators and policy makers could quit micromanaging and better

spend their time determining how they can “reduce the red tape” and “reject the road of regulatory stagnation” to help provide the tools needed to keep high-cost, un-served areas on pace to receive the same services market forces continue to drive in other parts of the state.

When it comes to paying for statewide broadband access, suffice it say there isn’t a single answer. Collectively, all stakeholders share responsibility in what they can and should do, as well as what they shouldn’t do, to advance the cause.

In Summary

- Ubiquitous access is a desirable goal with quantifiable benefits to the entire state.
- Bandwidth demand will continue to grow with the applications and content that users need to work and play at the speed of life. So far in Minnesota, where broadband is available, bandwidth continues to increase based on demand without government mandates.
- No single technology is the broadband silver bullet. Standards for 700 MHZ and other wireless applications aren’t there yet, but wireless solutions are on the horizon. Fiber-to-the-home is gaining ground thanks to lowering costs. A good assessment of the user being served, the type of services or applications desired, required bandwidth and the geographic density of the customer base is necessary to choose the best technology for a given area.
- The cost of ubiquitous access is daunting. Both the public and private sector have a role in making it a reality by maximizing the resources we have today, remaining technology neutral, collaborating to identify solutions for areas of need, promoting market-based competition and utilizing common-sense regulation.

With those conclusions in mind, where does the rural Minnesota telecom industry stand on making progress toward universal broadband access in our state happen? I believe I can speak for my fellow colleagues in saying we stand ready to continue our commitment to our communities and neighbors. We stand on-pace and often ahead of the curve compared to our metro-based cousins in terms of deployment and services, with no plans to slow down. We stand firmly in support of the benefits of healthy, market-based

competition. And we stand ready to welcome partnerships with any entity who shares a trustworthy, common-sense approach to making the prosperity that broadband helps deliver a reality for all of our residents — even the loons.

Twenty years seems like an eternity in the telecommunications world. But when I dig my toes into the sand on the beach in 2027, I hope my kids are working in jobs I haven't even imagined possible today, and I hope they can take for granted the access we have in every part of our great state to be in constant, instant touch with our world. I hope that because of it, they can choose to live and work in the beauty and serenity of Minnesota lakes country, too.

Endnotes

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