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    - iii. Technology neutral
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  - c. **Where we are today**
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      1. Rural/Metro population
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    - i. For each of the 8 points from the legislation, how we pay for it, what policy changes are necessary
      1. Identification of the level of broadband service, including connection speeds for sending and receiving data that is reasonably needed by all citizens by 2015. (What's needed for tomorrow—big picture, by functionality and rural/metro considerations. Essentials we want to make sure to provide, no matter what.)
      2. An evaluation and recommendation of the security, vulnerability, and redundancy actions necessary to ensure the reliability of high-speed broadband
      3. A description of economic development opportunities made possible by the wide dissemination of high-speed broadband
      4. An evaluation of how access to high-speed broadband can benefit educational institutions, healthcare institutions, community-based organizations, and government institutions.
  - e. **How are we going to get there?** [A high-level look]
    - i. A description of the policies and actions necessary to achieve the goal including the elimination of obstacles to investment and the identification of areas in the state that currently lack infrastructure necessary to support broadband service
      1. A description of the opportunities for the public and private sectors to cooperate to achieve the goal
      2. A description of what other states have done either by public policy or legislation to increase broadband (Utah grant program, WI tax credit, for example.) Evaluate strategies, collaborations, financing methods, and financial incentives used in other states and countries to support the deployment of high-speed broadband
      3. How we pay for it
        - Estimate of the costs of reaching the broadband goal, including capital costs
        - Identify who will [or should] bear those costs
        - Opportunities to leverage investments
      4. Future scenarios and how to take advantage of them
  - f. **Define broadband by functionality:** define what's needed for each application (e-mail vs. telecommuting, vs. HDTV downloads, etc.) – similar to the California report
3. Comprehensive Policy Recommendations
  - a. **Be sure to cross reference 8 points of legislation**
  - b. **Recommend focus of future legislation**
  - c. **Other recommendations the Governor/Legislature should consider for future study**

1. Executive Summary
2. Chapters of the report
  - a. Statement of Values
    - i. Advancement of State

**Mike O'Connor - Broadband is essential infrastructure**

Mike O'Connor - Broadband is critical infrastructure for Minnesota's 21st century advancement in education, health, public safety, research & innovation, economic diversification and public services. The task force recommends that Minnesota establish an aggressive and forward-looking vision that positions the State for global competitiveness. Mike O'Connor - One needed policy shift is to view broadband as essential infrastructure rather than leaving it to be deployed only when private investors believe they can obtain favorable returns relative to other opportunities for their capital. The task force notes that we do not leave private investors solely responsible for the financing and decisions concerning when and where to deploy other shared infrastructure such as roads, highways, sewers, water and power distribution systems.

Mike O'Connor - Communication is emerging as a fundamental human right. Mike O'Connor - As the nation moves forward in new ways with advanced digital communications, broadband access becomes a fundamental human right. Lack of access to broadband denies people the fundamental human right to communicate. Without broadband, people are further isolated from the new model of economic and civic participation, thus, diminishing antipoverty efforts. Economic distress in Minnesota communities - lack of jobs, inadequate education, poor healthcare, outflow of local talent, etc. - is exacerbated by the inability to communicate. Broadband is no longer a luxury but a vital service necessary to fully participate in the nation's democracy, economy, culture, and society. As the nation moves forward in new ways with advanced digital communications, broadband access becomes a fundamental human right. Acknowledging and protecting this right will provide more resources for rural areas to improve economic conditions and advance with the rest of the nation.

**Mike O'Connor - Local ownership, self reliance, and investment in community.**

Mike O'Connor - Absentee-ownership of broadband infrastructure and service has failed to deliver universal high speed broadband networks. Non-local corporations have sometimes failed to invest in infrastructure because some areas will not offer the level of return available from wealthier, more densely populated markets. Minnesota broadband policies should prioritize local ownership in our communities, thus encouraging self reliance and investment in place. Local ownership would address problems ignored by absentee-owners such as lack of broadband access, slow speeds, limited (if any) provider choice, and aggregation of demand. Communities should be empowered and ultimately held responsible for ensuring they have the networks they need to succeed.

Peg Werner - High-speed broad band access should be available to all Minnesotans at the place of work, in their schools, libraries and hospitals and at their primary residences. Geographic location should not be a barrier to bandwidth

availability, speed of transmission or quality of service. Viewing broadband access as an essential service will improve the quality of life for Minnesotans and the businesses that choose to locate here. High-speed broadband facilities will provide access to essential information and services offered online, to healthcare providers in distant locations, to online educational opportunities, to informational and entertainment materials and resources, and to connections to businesses, customers and suppliers around the world. Not providing broadband access will put Minnesota at a distinct disadvantage as people choose locations to raise their families or to retire and businesses choose locations in which to locate and operate. Treating broadband access as a utility, as part of the common good will move Minnesota forward in the lives of both its businesses and its citizens. In addition to guaranteeing broadband access throughout the state, it is necessary to ensure that access be affordable to everyone. A tiered level of service would offer varying intervals of bandwidth to meet various business and consumer needs. Subsidies to providers in areas where provision of broadband is more expensive and/or less profitable would ensure that broadband can be deployed across the state. Access for those unable to afford even a nominal cost, including hardware, software, broadband access and training, must be provided for by public agencies.

Chris Swanson - Competitive - We should encourage anyone who wants to build the Ultra infrastructure to do so including governmental, private owned and publicly traded entities. Much like the highways that allow anyone with a valid license to navigate them, our networks should allow for competition. FedEx and UPS compete on the same highway with DHL because the highway is available for public use. Competition is good when it comes to delivering Ultra High-Speed services because it keeps prices down, innovation up, and customer service at its best. No private service provider should be forced to have an open network, because they have paid to have that network built out. However, if public funds are used the network should require competition. Although we are not certain how competition should be allowed on each network any entity that builds a voice, data, or video network will be competed against because the Internet allows consumers and businesses to purchase services from anyone in the world. We should avoid monopolies and dualopolies and allow choices of service for those purchasing products. We should also require that all providers, public or private, should clearly define what their fair use policies are. We should discourage caps based on the amount of usage from each connection. Value - Competition on the networks is healthy and should be encouraged for the best in innovation, customer service, and pricing. We should be clear that speed caps or usage caps should be avoided.

ii. Collaboration

**The essence of the Internet is collaboration**

Mike O'Connor - The main tenets of Internet development include building and sustaining an open, interoperable, scalable network of networks that robustly supports a variety of applications and devices. As we look forward to a ubiquitous big broadband environment, these basic philosophies still hold true.

## Peg Werner - **Public/Private Partnership**

In order to accomplish the goal of ultra high-speed broadband deployment throughout the state of Minnesota, both private providers and state government are going to have to approach the project with a true spirit of cooperation. Although local governments may choose to be providers, the role of the state government should be that of administration, education and regulation. The state could demonstrate an immediate interest by facilitating the collection of data necessary to providing accurate detail of broadband services already in place. The private sector could indicate their interest in cooperation by providing the data sought.

The state should minimize its impact on market competition and use legislation to address impediments to availability of access. Through building code modification, tax incentives, standards for broadband access and interoperability requirements, the state can provide leadership to the industry in the initial deployment of the network. . The state should continue its regulatory role with appropriate oversight of the public and private industry providers. The state can also assume a leadership role in providing grants and low-cost loans to those providers building initial connections in unserved/underserved, high-cost service areas of the state. Both the state and the providers can work together to stimulate demand for the services through education and training of the general populace and in promoting economic development in light of the availability of broadband access throughout the state of Minnesota.

### iii. Technology neutral

Mike O'Connor - Our international rivals have built fast, universal networks using both wired and wireless technologies. If we are to regain our position of dominance in the world, it can only be by avoiding the wireless OR wired question and finding a means to provide both. Wired for speed and reliability, wireless for mobility. We acknowledge that one size does not fit all with regard to broadband delivery. A mix of wired and wireless services will probably be required to reach remote and low-density locations. Indeed, experience in many places indicates that perhaps we should focus on mobile broadband as a gateway technology for underserved citizens. Mobile devices are everywhere. They have long surpassed the Internet in number of users, and in some parts of the world, mobile phones now rival television in reach. Access to quality mobile devices and services often determines the socio-economic future of a community. Many people do not have and cannot afford private access to computers or the internet. A principle of openness should include a recognition of the importance of Mobile devices as public access points. Minnesota should require improvements to Internet service that people already have, as well as increasing access to other affordable, quality, mobile devices and services. At the same time we do not wish to see Minnesota allocate resources to promoting or sustaining outdated and obsolete technologies when it is clear that these technologies will not provide the speeds and capabilities we seek for the future and are projected to see declining penetration and market-share (Dataquest).

## Mike O'Connor - **Ultra High-Speed Broadband -- Definition**

Mike O'Connor - Dataquest -- 50 Mbps

Mike O'Connor - Vint Cerf -- "Faster than anything currently available"

Mike O'Connor - New term -- Bandwidth divide -- Dataquest -- "In 2012, 12.4 million households (9% of the regional total) will have broadband of more than 50 Mbps. This means that a "bandwidth divide" will open up in North America, especially compared with some Asia/Pacific countries.

## Chris Swanson - **What does the word Ultra in Minnesota Ultra High-Speed Broadband Taskforce mean?**

What is Ultra-High Speed Broadband? If you look up what the word ultra means at dictionary.com you will find that the definition is going beyond what is usual or ordinary; excessive; extreme. There is a paradigm shift that is occurring in the United States and throughout the world. The importance of information and the movement of data for business, work and play have grown by large percentages each year and continue its growth today. 10-15 years ago many people were not impacted at all by the Internet. Today almost everything we are doing requires some sort of internet connectivity or the use of data to deliver goods and products as well as information. As Minnesotans with a history of innovation and intellectual property, we cannot afford to hurt ourselves economically by not recognizing the importance of Ultra data networks. This paradigm shift constantly reminds us that current bandwidth speeds are not enough for tomorrow's jobs and Minnesota's dominance as the leader in product innovation.

Jack Geller - Through our own research, as well as through provided testimony, it is quite evident that Minnesotans receive and will continue to receive their broadband services through a variety of delivery technologies, both wired and wireless. And while many have suggested that some technologies may be more "future-proof" than others, the Task Force believes that identifying specific delivery technologies in public policy is undesirable. Such recognition may stifle competition and innovation among providers, both public and private. Equally important, is the belief of the Task Force that the role of government is to remain technology neutral; allowing innovation, investment and consumer choice to dictate how Minnesota residents, businesses and communities access broadband services.

### iv. Jack Geller - **Our Shared Values**

This body of work, along with the recommendations presented in this document represents the core consensus values held by all Task Force members. Arriving at such a consensus is never easy, as the composition of the Task Force itself was designed to ensure representation from a wide variety of public and private organizations and constituencies. However, these core consensus values are held by all Task Force members and therefore represent the values of the Task Force itself. They include:

### Jack Geller - **Ubiquity of Service**

Minnesota cannot afford to be the land of the broadband “haves and have-nots.” Rather, Task Force members believe that in the 21st century access to hi-speed Internet connections is a must for all Minnesota communities and residents; rural and urban. Today, economic development opportunities, educational opportunities, access to public services and quality-of-life amenities are increasingly being accessed through these hi-speed Internet connections. Accordingly, we believe that ubiquity of service across all of Minnesota is a must. At the same time, the Task Force recognizes the outstanding work that telecommunications providers across the state have already accomplished in pursuit of this goal. All of the information and data presented to the Task Force through national and state sources, as well as the recent state-supported broadband mapping project suggests that Minnesota is well ahead of many other states and well positioned to make ubiquity a reality.

### Jack Geller - **One Size Does not Fit All**

The Task Force recognizes that Minnesota businesses, governments and residents utilize their broadband connections to meet a variety of needs; each requiring a different optimal connection speed. These needs can range from delivering a simple email message, to transmitting large and complex architectural blueprints, to downloading high-definition video files. Further, we believe that our collective needs will simultaneously both broaden and require increasingly high connection speeds as new and augmented applications continue to emerge and Minnesotans continue to embrace this delivery and service mode. As a result, the Task Force believes that while ubiquity is a must, we must also recognize that the definition of an optimal connection speed is based upon functionality. We believe that while there may be some value in advocating for a policy that defines a statewide minimum connection speed, a policy that identifies a uniform connection speed across Minnesota is not in the best interest of the state.

### Jack Geller - **Supply and Demand Connectivity**

All of the information and data reviewed by the Task Force continues to reinforce the reality that identified inequities in broadband adoption, accessibility and availability across Minnesota are a function of demographic, socio-economic and geographic factors. Therefore, if we address the infrastructure issues alone, we may meet the desired goal of ubiquity in availability, but it will not yield the desired results of widespread adoption and use. Only by simultaneously addressing the issues associated with both the supply and demand side of this issue will we move Minnesota forward.

- b. Where we've been
  - i. The history of it all, for example, how voice telecommunications evolved, how it was subsidized, etc...

#### Diane, JoAnne, Brent and Mike - **Introduction**

Diane, JoAnne, Brent and Mike - This chapter tries to answer the question "Where have we been?" when it comes to broadband in the state of Minnesota. Quoting the words of George Santayana, who wrote "Those who cannot remember the past

are condemned to repeat it" we believe that it's very important to understand the technology and initiatives that have preceded our work as a Task Force. Minnesota was once at the center of the computer industry. Control Data, Sperry, Univac, Honeywell and others had their headquarters in the state and formed the core of a vibrant technology community that was eventually eclipsed by the arrival of ever-smaller computers and the arrival of the Internet. While Minnesota is now in the middle of the pack when it comes to most aspects of information technology, the state was an early leader in developing Internet-based applications such as Gopher and POP-3 email protocol. Understanding this technical and business history may help frame the discussion as we look forward to the future of the state in the (now) worldwide information society. We have also collected a number of reports produced by predecessors to this task force. The question "what should we do about broadband in Minnesota?" has been asked and answered a number of times before and we have tried to summarize all of those reports in this chapter. Again, the results are mixed. The state was early into the discussion (the first major broadband report was issued by the Minnesota Citizens League in 1989), but subsequent policy-actions and results do not appear to have had major impact. Several themes are repeated in most of the reports we reviewed. Several themes are repeated in most of the reports we reviewed. Planning -- address the lack of a widely-accepted broadband plan Collaboration -- reduce the silo mentality and behavior of stakeholders Leadership -- support leaders in the community, legislature and administration to advance the work

Diane, JoAnne, Brent and Mike - Conditions today are not materially different from when these reports were written. We intend this history to enable the Task Force to address these issues in a way that does not consign this report to the same dusty shelves that we found these reports on. This chapter has been organized into five sections: 1. State Milestones, 2. Technology Catalysts, 3. National Drivers, 4. In-State Broadband Initiatives, and 5. Municipal Broadband Initiatives. Each section will chronologically document events that have taken place at the state and national levels. These events were taken into consideration by the Task Force in the preparation of this report.

#### Diane, JoAnne, Brent, and Mike - **State Milestones**

1988 MRNet formed as an academic/commercial collaborative statewide service -- MRNet was originally formed in 1988 as an unincorporated association during the early NSFNet days. However, Minnesota was distinctive in that most state and regional networks were based on major Universities. Here, though the UofM was a key participant, the organization was a collaboration of higher ed (UofM, MSUS and 10 private colleges) and major technology businesses (3M, Cray, Control Data, Honeywell, Unisys et. al.). This made it much easier for statewide networking involving a variety of organizations (Higher Ed, K12, city/county/state govt, business, independent ISPs) to grow. MRNet's structure as a nonprofit gave it easier entry to partner with UofM and MSUS to create a joint state network. It gave businesses a legal vehicle to obtain Internet access because MRNet was not a part of the University as in other states. When the commercial Internet began growing in 1993 and 1994, MRNet was easily able to accommodate that without difficulty.

1988 First Internet service to the state -- Connection via 56K point to point line to the NSFNet Backbone hub at University of Illinois Urbana-Champaign

1989 -- First NSF funding for higher ed connectivity. Much of the Higher Eds got connectivity early funded from grants from NSF with MRNet as the sponsoring organization. Nearly \$1 million in Federal funds was brought into the state over the 1989-1994 period to build Internet infrastructure and access in metro and rural areas. This included funds to connect 10 private colleges, funds for MRNet to expand staff and outstate hubs in St Cloud, Rochester and Moorhead, funds for the multi-state Rural Datafication project which enabled additional outstate dialup hubs in Northfield, Two Harbors/Silver Bay, Grand Marais, Detroit Lakes, International Falls, Lake City and Faribault in 1994.

1990 Roles of the University and MSUS and their networks -- MRNet was able to build up a statewide network connecting many outstate educational orgs because of the combined infrastructure of UofM lines to UMD and Rochester and MSUS lines to Mankato, St Cloud, Moorhead and Bemidji. Primary beneficiaries were the State Universities and private colleges. A few outstate ISPs also hooked in at the remote hub sites.

1991 -- MRNet connection to the Internet backbone upgraded to a T1 connection to the NSFNet Backbone hub at University of Illinois Urbana-Champaign

1992 -- Launched joint MRNET/UofM connection to CICNet Chicago via multi-T1  
1992-1995

1993 -- The first statewide dialup service, InforMNs (Internet for Minnesota Schools) was deployed. This provided a single dialup account for each school building in the state. The project was a partnership among MRNet, TIES and the Minnesota Dept of Education with \$400,000/year funding from the Legislature, their first Internet funding initiative. This dialup system was distinctive in that it was a comprehensive project providing access, well-written instructional documentation and training for people in each school building to use the service. This was nationally unique.

1994 -- Arrival of independent ISPs. In 1994, the first independent ISPs popped into existence, using the low cost and ubiquitous presence of MRNet's infrastructure. This infrastructure provided a core around which many independent ISPs were able to quickly form across the state with a neutral core operator to give them national access. This lowered the expense for many areas around the state since it was expensive to bring the national carriers' access outside the Twin Cities.

1995 -- Launched joint MRNet/UofM connection to MCI Chicago via 45Mb DS3  
1995

Diane, JoAnne, Brent and Mike - 1995 -- Growth of the commercial Internet - the transition from R&D to commercial use (NSF NAP/RA/vBNS solicitation et al). The NSFNet research and education backbone was finally shut down in April 25 1995. All the regional networks had switched to a handful of national commercial backbones which peered with each other at specific interchange sites for interconnectivity. Many of the regional networks formed commercial operations. Because of MRNet's independence, this was easy to do in 1995 as commercial access exploded in 1994-1996.

Diane, JoAnne, Brent and Mike - 1994 -- Independent Telco entry into rural Internet. In 1994 and 1995, MEANS Telcom and its membership of independent phone companies initiated a statewide Internet initiative that consisted of a MEANS-built frame relay network. This provided a wide area of access in the northern and western rural areas of the state to the vast majority of small towns.

1998 -- MNET initiated. In the late '90s, the state government started building a statewide backbone to provide access to remote agency offices and city/county governments. MNET rapidly extended access to the public sector all over the state.

1996 -- Independent ISPs (Visi and gofast.net) add non-MRNet DS3 connections to national backbone networks

1997 -- gofast.net (local ISP) and Continental Cablevision (Roseville) collaborate on first Internet access delivered over cable in the state. This was a hybrid network in which downstream access was delivered over cable and upstream was delivered over ISDN.

1997 -- gofast.net (local ISP) delivers first wireless Internet access. This was a hybrid network in which downstream access was delivered over microwave (in the ITFS band) from an antenna on the IDS building and upstream was delivered over ISDN.

1998 -- Local ISPs Visi and gofast.net deliver first DSL Internet access. Using raw-copper pairs from the telco, gofast.net delivered 5 mBit/second symmetrical DSL in downtown St Paul for \$40/month.

#### Diane, JoAnne, Brent and Mike - **Technology catalysts**

1990 -- IBM introduced the RS/6000 AIX-based workstation in 1990. This was a Unix-based system designed for business departmental use. What this system did was to legitimize the Unix workstation in business environments, since it came from IBM, the trusted name in business computing. Businesses started buying them and giving them to their IT departments to figure them out. It was perceived they would have a significant role in the businesses data processing regime. The IT staff went looking for Unix information and found that it was all on the Internet, which was based on Unix. Therefore, outfits like IDS, and others (non-technology companies) started connecting to the Internet in significant numbers increasing its growth. 1990 -- The Gopher protocol and original Gopher viewer application were first developed at the University of Minnesota in the early 1990's as part of the drive to make use of the Internet to enable the simple sharing of documents with people who could be located in institutions on opposite sides of the country or even the world, and to have those documents organized so that similar / related pages would be easily accessible. The value of the Gopher system was enhanced by the development of two systems known as Veronica and Jughead which allowed a user to search across resources stored in Gopher file hierarchies on a global basis. As for the naming of the system, the University of Minnesota sports teams were called the 'Golden Gophers' and the sports mascot was thus a large gopher, it has been said that the protocol was named in honor of the mascot, and also as in an assistant who's sent to 'go for' things. 1993 -- First release of the Mosaic browser for the World Wide Web protocol. 1993 -- US West launches a statewide frame relay service. This eventually was priced on a distance-insensitive uniform basis

statewide. This enabled many outstate organizations to be connected to the MRNet outstate hubs in Moorhead, St Cloud, Duluth, Rochester at prices comparable to those in the Twin Cities. Many organizations took advantage of this and MRNet alone, at one point, represented 2% of US West's entire 14 state frame relay service capacity.

#### Diane, JoAnne, Brent, and Mike - **National Drivers**

1986 -- NSFNET went online in 1986 and connected the supercomputer centers at 56,000 bits per second—the speed of a typical computer modem today. In a short time, the network became congested and, by 1988, its links were upgraded to 1.5 megabits per second. A variety of regional research and education networks, supported in part by NSF, were connected to the NSFNET backbone, thus extending the Internet's reach throughout the United States. 1993 -- NSF begins transition to commercial providers. Commercial firms noted the popularity and effectiveness of the growing Internet and built their own networks. The proliferation of private suppliers led to an NSF solicitation in 1993 that outlined a new Internet architecture that largely remains in place today. From that solicitation, NSF awarded contracts in 1995 for three network access points, to provide connections between commercial networks, and one routing arbiter, to ensure an orderly exchange of traffic across the Internet. In addition, NSF signed a cooperative agreement to establish the next-generation very-high-performance Backbone Network Service. A more prominent milestone was the decommissioning of the NSFNET backbone in April 1995. In the years following NSFNET, NSF helped navigate the road to a self-governing and commercially viable Internet during a period of remarkable growth. The most visible, and most contentious, component of the Internet transition was the registration of domain names. Domain name registration associates a human-readable character string (such as "nsf.gov") with Internet Protocol (IP) addresses, which computers use to locate one another 1996 -- Telecommunications Act of 1996 opens up the landscape for the growth of CLECs and competitive providers 1999 -- Major telco and cable entry into Internet service (AT&T, Sprint, MCI, Baby Bells, Cox, Time Warner et al) 2003 -- FCC ruling exempting the Telcos from the requirement to share broadband network elements

#### Diane, JoAnne, Brent, and Mike - **In-State Broadband Initiatives**

1989 -- Citizen's League Report: "Wiring Minnesota: New State Goals for Telecommunications [www.urbanusers.com/clreport.pdf](http://www.urbanusers.com/clreport.pdf) for the report

The report recognized the importance of being able to access and share information to economic development, education, healthcare, and government. The report encouraged the state to set a goal for adopting an advanced, broadband network throughout the state by 2005, set up a joint legislative commission to coordinate activities within state government, and instruct executive branch agencies on how to achieve state telecommunications goals. The report also set goals for the Public Utilities Commission to evaluate proposals from telephone companies on upgrades to their networks, to allow companies to earn higher rates of return on investments that carry more risk, adopt new depreciation standards to major equipment items to match up with technological lives and to set standards for switching equipment and other facilities to stimulate investment.

1990 -- The Minnesota Telefutures Study Group -- established by the Public Utilities Commission (PUC).

[www.urbanusers.com/Reports/MTSG%20Final%20Report.pdf](http://www.urbanusers.com/Reports/MTSG%20Final%20Report.pdf)

[www.urbanusers.com/reports/19May1994PUC%20Order%20on%20MTSG%20Report.pdf](http://www.urbanusers.com/reports/19May1994PUC%20Order%20on%20MTSG%20Report.pdf) for the PUC order that resulted from that report.

The Study Group reported back to the PUC on November 19, 1993 with short term, intermediate and long term recommendations. The PUC adopted the short term recommendations of eliminating two-party service, to submit a plan to offer full digital switching and full digital interoffice facilities by 1/1/98, to provide all customers with touchtone with no separate charge, to require all providers to offer first generation custom calling services, and to move up the deadline by which interLATA equal access must be offered. Intermediate goals adopted included requiring ubiquitous SS7 trunk signalling for call set up and to file plans for SS7 deployment or request an extension. The PUC also directed the telephone companies to provide their customers with information on ISDN features and availability. With regard to the long term issues, the PUC determined that ISDN deployment and the wireless communications infrastructure development and deployment should be left to market demand. With regard to broadband deployment, the PUC declined to make a determination on any of the scenarios presented by the Study Group (build it and they will come, market demand/deployment or industry/public joint action). Instead the PUC solicited comments on how it could establish a tracking mechanism for broadband to track the advancement of the infrastructure. However, the PUC never acted to implement a tracking mechanism, probably because it had no regulatory oversight over many of the broadband infrastructure providers.

1993 -- LNM, TAG, TARP, and RLTA [www.urbanusers.com/reports/HistoryOfK-12.pdf](http://www.urbanusers.com/reports/HistoryOfK-12.pdf) for a brief history

The Learning Network of Minnesota (LNM) was established in 1993 by the Minnesota Legislature to provide a statewide, high-speed telecommunications highway designed to enable higher education institutions to provide courses through distance learning. In 1995, the LNM was expanded to establish links to connect K-12 public schools and public libraries with the existing higher education network. Using high-speed telecommunications lines, the LNM collaboration provides access and delivery of information resources to students and public library customers such as: • Internet access; • Distance learning opportunities to learners through the use of interactive television (ITV) and on-line learning technology; • A transport system for the state to send and receive data electronically from K-12 schools and public libraries, and; • Access to MnLINK, the Minnesota Library Information Network.

In 1995, the expansion of the higher education telecommunications network to include links for K-123 schools and public libraries was supported by initial appropriations totaling \$15.5 million in noncompetitive telecommunications access grants for FY1996-FY1997 biennium. These appropriations were intended to bring telecommunications access to the "door" of the school district or regional public library system. The school districts and public libraries were then expected to provide the local area networks needed to link individual buildings and connect to the Learning Network of Minnesota.

The resulting Telecommunications Access Grant (TAG) program for K-12 schools and public libraries included a requirement that school districts and public libraries apply in groups of at least ten school districts in order to be eligible to receive funding. In order to provide for improved coordination of funding distribution, delivery of services, and economies of scale available through cooperative purchasing, school districts and public libraries voluntarily organized themselves into eight telecommunications access clusters or regions, throughout the state.

The TAG program was continued with funding appropriated for the FY1998-FY1999 biennium. In FY2000, the Legislature declined to continue funding the ongoing costs of telecommunications access for schools through the TAG program. A limited amount of TAG funding was provided in FY2000 to purchase equipment for sites that had not previously connected to the Learning Network of Minnesota, but no further funding for recurring telecommunications access costs was provided for schools. Public Libraries were provided with ongoing telecommunications funding through the newly established Regional Library Telecommunications Aid (RLTA) program.

1995 Shared Vision for Minnesota.

[www.urbanusers.com/reports/RuralTelecommTFReport1995%20part%204.pdf](http://www.urbanusers.com/reports/RuralTelecommTFReport1995%20part%204.pdf) for the report.

In 1995, a report of outcomes from the "Telecommunications for Rural Minnesota" was released after the conference held in St. Cloud in June of that year. The participants represented business, communities, education, healthcare, non-profits and telecommunications providers. They identified the following problems: a lack of focused, informed leadership; access to telecommunications resources; and lack of knowledge and understanding about telecommunications, information resources and the implications in our lives. They went on to identify the following solutions: gaining knowledge and understanding to make informed decisions at all levels; leadership to champion the vision; and access should be universal and affordable to all communities and citizens.

This was a time when there were still a few parts of the state that had trouble faxing documents as well as no access to a local number for Internet connections. About 75% of the state had dial up Internet connection availability. The participants determined that regulatory barriers and market based resource provision created inequities, particularly in areas of the state where telecommunications could do the most to improve healthcare, education and commerce opportunities.

1999 -- The Ventura Administration issues its Telecommunications Strategic Plan. [www.utilityregulation.com/content/reports/MNstrategicplan.pdf](http://www.utilityregulation.com/content/reports/MNstrategicplan.pdf) for the report

This plan was compiled by four state agencies: Minnesota Planning, the Department of Commerce, the Department of Administration and the Department of Trade and Economic Development. The work team provided a comprehensive set of maps updating information on the status of the infrastructure in Minnesota. The plan also included a complete overhaul of all telecommunications and cable television statutes. While it generated much debate, over three legislative sessions (2000, 2001 and 2002) the proposal was too contentious to generate support.

2000 -- Regional Library Telecommunications Aid (RLTA) program launched. Funding for this program was also provided in FY2001, which included a base amount and a one-time increase for the purchase and installation of equipment for upgrading lines. Funding for FY2002 was for the base amount to cover telecommunications line lease and maintenance only.

2001 -- The Legislature provides funding for school district and public library telecommunications access through separate funding streams.

For school districts, funding was appropriated for ongoing telecommunications access and maintenance through a \$5 adjusted marginal cost per pupil (AMCPU) increase in operating capital revenue, and a supplemental entitlement program known as Telecommunications Access Revenue Program (TARP). Any district whose ongoing telecommunications costs associated with line leases, interactive television, Internet access, and ongoing wide area network maintenance exceeded the additional \$5 per AMCPU in operating capital revenue could submit projected costs to CFL for up to on 1.544 Mbs data or video link per elementary, middle, and secondary school. School districts could also claim costs associated with cooperative agreements relating to delivery of telecommunications access. The \$5 per AMCPU in operating capital revenue and the supplemental TARP program were also provided to school districts in FY2002.

2001 -- Center for Rural Policy and Development launches their Annual Telecommunications Survey [www.mnsu.edu/ruralmn/research.php](http://www.mnsu.edu/ruralmn/research.php) for copies of their reports.

Since 2001, the Center has conducted an annual survey of Greater Minnesota to look at the adoption of computer and Internet technology. Beginning in 2005, the survey was expanded to include the seven county Twin Cities metropolitan area. The reports can be found at the Center's website at [www.ruralmn.org](http://www.ruralmn.org). Some broad statements that can be made from the survey results include: if you don't have a computer, you likely won't be connected to the Internet as computers are the primary method of connecting today; if you didn't have a computer in 2008 you likely won't have one in 2009; and the gap in Internet connection between rural Minnesota and the Twin Cities metropolitan area exists but it is shrinking. (There will continue to be a gap because the rural homes are less likely to have a computer/Internet connection due to a higher percentage of the population age 65 and older, fewer school age children, a lower income level, and availability of broadband service.) The survey also found that early on, those with broadband and those with dial-up connections used the Internet for similar purposes. However, that has changed. Today, subscribers with a broadband connection are much more likely to work from home, download music and videos, look for employment online, take an online class or earn income in some way other than through regular employment.

2003 -- Blandin Foundation launches their - Broadband Initiative Click [HERE](http://broadband.blandinfoundation.org/) for the web site

The Blandin Foundation's Broadband Initiative began in 2003 as the Foundation recognized that the rapid deployment and accelerated use of broadband would provide a valuable boost to economic vitality across rural Minnesota. To date, the results are as follows:

Supported ongoing policy discussion and relationship building at the Strategy Board level, including the adoption of a Broadband Vision with supporting Principles

Approved 39 community-driven broadband market development and implementation grants in 33 communities that positively impacted broadband adoption

An initial \$352,500 investment by Blandin Foundation has leveraged an additional grant from the state of Minnesota for \$250,000 plus at least \$627,300 in matching funds from the communities for total new investment in broadband capacity of over \$1,229,800

Built community leadership capacity through conferences, videoconferences and webinars, web resources and onsite technical assistance

Stimulated, through grantmaking, investments in FTTP networks and telehealth and distance education broadband-based applications

Diane, JoAnne, Brent, and Mike - **Municipal Broadband Initiatives**

2004 -- Eagan Technology Task Force completes their initial report [www.ci.eagan.mn.us/upload/images/webmaster/report.pdf](http://www.ci.eagan.mn.us/upload/images/webmaster/report.pdf) for the report 2007 -- St Paul Broadband Advisory Committee completes their report -- [www.stpaul.gov/DocumentView.asp?DID=3821](http://www.stpaul.gov/DocumentView.asp?DID=3821) for the final report

ii. How we got to where we are today

Dick Sjoberg - **Minnesota's current leadership position with respect to broadband deployment and availability has resulted from adherence to the following principles:**

Dick Sjoberg - a. **Demand Should Drive Investment.** As the Connected Nations inventory mapping for Minnesota shows, market forces have worked well in developing Minnesota's broadband infrastructure. However, there is little macro level research regarding levels of demand for broadband service in Minnesota. To the extent empirical evidence pertaining to demand exists, the data indicates there is not yet sufficient demand to support mass-market deployment of broadband speeds over 50 Mbps. The only conclusion that can be fairly drawn given the data available to the Task Force is that where adequate demand exists for broadband services, the private sector has delivered. The Task Force defines "adequate demand" to mean markets in which broadband service suppliers are providing services and earning a reasonable return on investment for doing so. The Connected Nations map and inventory has shown that in certain discrete areas, the cost of providing service is too high, and/or the demand for service too small, to justify construction of facilities to serve those customers. In these areas, the market has behaved rationally. It is in these "unserved" areas where government intervention or assistance can help.

Dick Sjoberg - **The lack of demand for broadband service is usually not caused by a lack of availability.** A paper by the Technology Policy Institute (TPI) cites a 2007 study by Parks Associates finding that 29% of U.S. households are

not planning to subscribe to a broadband service. Of those not planning to subscribe to broadband, only 3% said it was because Internet was not available to them. Seven percent (7%) of those not planning to subscribe cited affordability as the reason. Fourteen percent (14%) of those not planning to subscribe said they could not afford a computer. Forty-four percent (44%) said they did not want to have anything to do with the Internet. TPI concludes that from a policy perspective, spending a lot of public money on infrastructure will not affect household penetrations rates. Instead, policy makers should consider targeting subsidies at low-income consumers who would subscribe if they could afford the service. Programs designed to provide computers to low-income populations through public libraries or "community technology centers" also make sense.

\*\*\*Make sure footnotes get added \*\*\*

S. Walsten, "Understanding International Broadband Comparisons," at p. 12 (Technology Policy Institute May 2008)(herein "TPI Report"). Id. Id. at 12 (Figure 5). Id. Id. Id. at 13.

Dick Sjoberg - b. **Consumer Choice.** Most residential and business consumers have several different choices among broadband providers in Minnesota. According to the FCC, there are 98 broadband service providers in Minnesota, many of them acting in competition with each other. The market share between DSL, cable, and other broadband platforms is fairly evenly split according to the FCC. The degree of choice available in the business market is probably much greater than it is in the residential market. The task force has collected very little data on the Minnesota broadband business market.

Dick Sjoberg - c. **Acknowledging That Price is a Function of Cost.** Intermodal competition is resulting in price competition as well. Despite this good news, more competitors in the market will not always result in lower prices for consumers. One fundamental economic concept that policy makers tend to ignore is that price is a function of economic cost. The cable and telecommunications industry has invested billions of dollars in plant and equipment over the past ten years in order to provide broadband services. Build-out requirements at the local franchise level have required cable operators to offer service to everyone in the cable operator's franchised area. Cable operators will not provide service at a price that falls below the economic cost of providing the service.

- c. Where we are today
  - i. Mapping Project
    - 1. Unserved areas shown & defined
    - 2. Underserved areas shown & defined

John Stanoch - **Mapping**: In February of this year, Connected Nation presented web-based maps of broadband availability in Minnesota that display broadband service in a searchable and verifiable format. Connected Nation's work is scheduled to be final this summer. As a result of this work, Minnesota has taken an important first-step in identifying unserved households. The Broadband Task Force and the State of Minnesota should build on this foundation and support a second phase of mapping that further refines the data compiled by Connected Nation. A complete understanding of the availability or lack of availability of broadband in specific areas of our state is essential to an informed discussion of broadband policy in Minnesota and an efficient utilization of public dollars to support broadband deployment and promotion.

- ii. Where competitors are today
  - 1. Surrounding states

JoAnne Johnson - None of Minnesota's bordering states (North Dakota, South Dakota, Iowa and Wisconsin) have published reports from groups such as ours, but there are numerous other states that have done so and we have reviewed them all with an eye to finding good practices we might emulate to our state's benefit. Many states in the 25 we reviewed recommend mapping and inventory of infrastructure as their first step. Minnesota is one of only a few states that have accomplished that task and are ready to move on.

- 2. Leaders in the US

Mike O'Connor - **Lafayette, Louisiana**

*In 2009 started providing retail telecommunication services to residential and smaller business customers, at 20% less than the standard competitor. But the vision is to provide much more than basic TV and phone services. The city provides triple play for \$85. For \$138 you get 250 channels (including HD) and 30MB up and down Internet. Customers can build their own bundle. E.g., unlimited long distance for \$31. Five cents a minute to reach much of the world. They also provide 100Mbps for peer-to-peer within their network for free.*

Mike O'Connor - **UTOPIA**

*15Mbps/15Mbps plan at \$40/mo or 50Mbps/50Mbps for \$55/mo from either MSTAR or XMission over UTOPIA infrastructure.*

Mike O'Connor - **Loma Linda, CA**

*\* 5 Mbps - \$29.95 per Month*

*\* 10 Mbps - \$49.95 per Month*

*\* 15 Mbps - \$99.95 per Month*

Mike O'Connor - **Seattle, WA (Highlands Fiber Network)**

*Tech Guru - 20Mbps/20Mbps*

\$94.90 per month for download speeds up to 20Mbps and upload speeds up to 20Mbps.

### 3. Leaders worldwide

John Gibbs - With a relatively light regulatory touch, some of Minnesota's broadband achievements over the past ten (10) years include the Connected Nation preliminary report that concludes 92% of Minnesota households have access to broadband. Connected Nation expects their final report to show that 94% of Minnesota households have access to broadband services. Applying this data to the Organization for Economic Co-operation and Development (OECD) broadband report, which ranks countries' broadband penetration each year, Minnesota not only leads the country with respect to broadband penetration, it leads the world. Additionally, the average download speed in Minnesota is 6.5 Mbps, higher than any other state studied by Connected Nation. Minnesota has several broadband providers providing services that far exceed the national average for download speeds and 55% of adult Americans have broadband access at home. According to Crandall & Jackson's estimates back in 2001, the U.S. is well on track to add \$500 billion in added productivity to the American economy by 2025. Broadband connections in U.S. are growing at a rate of 17% per year and broadband prices are declining. There are no less than eight (8) different modes of broadband technology identified in the FCC's Fifth Report. Where cable operators are able to provide cable television service, high-speed data service is available to 96% of those customers. In Minnesota, where cable operators are able to provide cable television service, high-speed data service is available to 94% of those customers. Where telephone companies offer telephone service, DSL service is available to 82% of those customers. In Minnesota, where telephone companies offer telephone service, DSL is available to 85% of those customers. Comcast is offering 50 x 5 Mbps service to customers in Minneapolis/St. Paul. DOCSIS 3.0 is already being tested in labs to provide download speeds of up to 320 Mbps. Just 9 years ago, Minnesota policy makers were calling for "speed standards" of 256 Kbps. Each month cable operators deliver over 418 Terabytes of voice, video and data content into each subscriber's home. Also, WiMAX services are coming. In May 2008, six (6) of the largest telecommunications/IT companies in the country announced a joint venture, called Clearwire. "The partnership of such fundamentally different companies underscores the convergence of Internet, entertainment and telecommunications services. The wireless network of the future is expected to be fast enough - rivaling speeds that cable customers have in their homes today - to allow delivery not just of text and simple Web pages, but of video and advertising." Wireless technologies could be the key to serving the unserved. The national market for high-speed lines (as defined by the FCC) is competitively split between cable (34.1%), DSL (27.3%), and other technologies (36.2%). The U.S. is ranked 4th in the World Economic Forum's Networked Readiness Index, a much broader picture (compared to OECD rankings) of how countries leverage investment in information, communications, and technology infrastructure taking into account both economic and demographic factors. There are 98 providers of high-speed data service in Minnesota. \*\*\*Need to make sure these footnotes get added back in\*\*\* J. Horrigan, "Home Broadband Adoption 2008," Pew Internet & American Life Project (July 2008)(herein the "Pew Internet Study, at i. R. Crandall and C. Jackson, The \$500 Billion Opportunity: The Potential

Economic Benefit of Widespread Diffusion of Broadband Internet Access, p. 4, Figure 2 (Criterion Economics, LLC July 2001). Pew Internet Study, at i. Id. at ii. In re Inquiry Concerning the Deployment of Advanced Telecommunications Capability to All Americans in a Reasonable and Timely Fashion, and Possible Steps to Accelerate Such Deployment Pursuant to Section 706 of the Telecommunications Act of 1996, GN Docket No. 07-45, pp. 5-13 (2008)(herein "Fifth Report"). High-Speed Services for Internet Access: Status as of June 30, 2007, Industry Analysis and Technology Division, p. 3 (March 2008)(herein "FCC 2008 Broadband Status Report"). Id. Id. Id. See DOCSIS 3.0 Cable's Game Changer? p. 2 (Wachovia Equity Research)(herein "Wachovia Research). D. Diers, "Cable TV Report: DOCSIS 3.0," Presentation to Minnesota Broadband Task Force (December 19, 2008). M. Richtel, "Technology Group Plans Wireless Offering," New York Times (May 7, 2008). FCC 2008 Broadband Status Report, Chart 3. World Economic Forum, "The Global Technology Report 2007-2008," at p. 4 (2008). FCC 2008 Broadband Status Report, Table 8.

- iii. Demographics
  - 1. Rural/Metro population
  - 2. Per capita income
  - 3. Household income
- d. Where we want to be
  - i. For each of the 8 points from the legislation, how we pay for it, what policy changes are necessary
    - 1. Identification of the level of broadband service, including connection speeds for sending and receiving data that is reasonably needed by all citizens by 2015. (What's needed for tomorrow-big picture, by functionality and rural/metro considerations? Essentials we want to make sure to provide, no matter what.)

**Mike O'Connor - Ultra High-Speed Broadband -- Definition**

*Mike O'Connor - Dataquest -- 50 mBps*

*Mike O'Connor - Vint Cerf -- "Faster than anything currently available"*

*Mike O'Connor - New term -- Bandwidth divide -- Dataquest -- "In 2012, 12.4 million households (9% of the regional total) will have broadband of more than 50 Mbps. This means that a "bandwidth divide" will open up in North America, especially compared with some Asia/Pacific countries.*

**Mike O'Connor - Ultra High-Speed Broadband -- Goals**

*Mike O'Connor - Increase availability to 100% of state residents/businesses by 2015*

*Mike O'Connor - Ensure fair and affordable pricing*

*Mike O'Connor - Increase adoption and use*

*Mike O'Connor - Increase technology literacy*

**Mike O'Connor - Increase service-provider participation in deployment and adoption initiatives**

**Mike O'Connor - Increase end-user satisfaction**

*Vijay Sethi - **Ubiquity of Service** : The goal of the Ultra High Speed Broadband Initiative for Minnesota must be to ensure that ALL Minnesotans have ready and affordable access to quality broadband in their homes at speeds and capacity necessary for the delivery of basic services such as education, research and development health, business and commerce, government, sports, entertainment etc. The Ultra High Speed Broadband needs to be recognized as a common good that is available to all users regardless of their income levels or geographic locations (i.e. metro vs. rural). The minimum acceptable standards for speed and capacity must be able to accommodate the phenomenal growth in the internet traffic in the coming years. Based on the information presented so far, extending the fiber to every home and business appears to be the only way to address the burgeoning bandwidth demands of the future.*

*JoAnne Johnson - Our priorities turn out to be very similar to other states that have been proactively creating councils, roundtables and task forces. Evolving goals from discussing these within our own task force meetings led to these basic break points:*

**JoAnne Johnson - Expand availability while increasing speeds**

**JoAnne Johnson - Ensure affordability while increasing use**

JoAnne Johnson - Enact policy changes and implement initiatives that provide leadership, encourage deployment and create stimulus for greater use of the technologies.

**Rick King - Ubiquity**

All users in Minnesota, including both business and residential, should have access to tiered broadband services with the minimum of 5 Mb delivered through wireless, satellite, copper or fiber.

**Rick King - Cost-effectiveness**

Consumer adoption will be greatly impacted by the cost of tiered services. It will be important for us to ensure lower tiers of service are available by themselves or in packages that are affordable for all income brackets.

**Tom Garrison - Affordability**

This task force finds that United States citizens pay, on average, more per megabit of service than citizens in most other industrialized nations of the world. The U.S. currently ranks no higher than 15th on most international measures of price per megabit of service. It is recommended Minnesota establish a data-driven Affordability Index and annually publish the results of which providers have the most affordable broadband services. Further

the state should consider broadband access vouchers to defray the cost of broadband services for those who cannot afford it. These vouchers could be paid for either by legislative appropriation or based on a nominal per-subscriber fee assessed to all providers in the state.

***Barbara Gervais - The State of Minnesota must be a leader to attract new and expand current economic development.***

***Barbara Gervais - We must think ahead and beyond what is available today to be ready for tomorrow.***

***John Stanoch - Focus on Unserved Areas:***

John Stanoch - The highest priority of the Broadband Task Force should be to bring high speed Internet service to residents and businesses in Minnesota where it is currently unavailable. Expanding broadband access to previously unserved areas will increase the number of Minnesotans using broadband and increase demand for services provided over the Internet. It is inappropriate at this time to focus limited government resources and initiatives on those areas where high speed Internet is available from existing providers. Areas currently lacking a broadband connection tend to be high-cost service areas. Provider incentives are an important way to encourage deployment in high cost areas. Some options to consider include:

- A grant or matching grants program for some portion of the build in a high cost areas. The State of Idaho, for example, provided \$5,000,000 in state grants to eligible providers who deployed broadband service in unserved areas. As one option, a state agency in Minnesota such as the Department of Commerce could be asked to create a technology neutral competitive broadband grant process for unserved areas.
- Tax incentives for broadband deployment.

***John Stanoch - Increase Market Demand***

In addition to addressing availability of broadband services, there is also a need to address demand. A presentation to the Task Force by Dr. Jack Geller indicated that approximately 30% of Minnesotans do not have a home computer and therefore have no reason to purchase a broadband product. Studies conducted by the Center for Rural Policy Development report that:

- Computer ownership and Internet connectivity throughout Minnesota are relatively flat, or at best modestly increasing.
- Approximately 90% of broadband users are satisfied with the speed of their Internet connection.

***Peg Werner - Provision of Service***

Broadband access in Minnesota should be accomplished first by leveraging of the current infrastructure. All types of broadband technology could be extended from their current locations to cover all regions of the state. Because bandwidth requirements for businesses and residences will vary and because increased bandwidth capability may become essential quickly, the network should be designed with a clear plan to the future. A tiered level of service is desired, but these levels should also be built with ease of flexibility so that services can be increased quickly and without significant further costs. Tiered levels of 3mbs, 10mbs and 100mbs might be a suggested starting place. If technology neutrality is desired, a single high capacity connection could be constructed that would be accessible to multiple providers. Ultimately, market competition, including public entities, for telco, cable, and wireless to each location would be ideal.

Chris Swanson - Ubiquitous - We need to allow for Ultra High-Speed to reach each and every home and business in Minnesota. Some people believe this is too large of an undertaking. I refuse to believe the innovative and sharp minds in Minnesota cannot get ubiquitous Ultra high-speed broadband to every home and business. If the mindset of Minnesotans had been that innovation was not that important then the global leader 3-M would never have survived in Minnesota. Instead the company flourishes because of a can-do attitude. In order for the Internet to be a powerful tool we need the ability for the same connectivity speeds if you are in downtown St. Paul or in Cook County, MN. As Commissioner McElroy stated in our February meeting "a scientist that wanted to use the high-speed internet to develop a thermo-nuclear widget should be able to do this at his cabin anywhere in Minnesota." If we don't do anything different than what we do today the digital divide will get larger for outstate communities and especially rural Minnesota. We have too many places in our rural areas that need Ultra High-Speed broadband. Value- Minnesota needs to be a leader with high speed broadband. We need to push for ultra high speed to every home and business in the state of Minnesota.

Mike O'Connor - **Extend broadband coverage to underserved and unserved areas**

### **Underserved**

Mike O'Connor - As the goal for broadband availability in Minnesota must be no less than that of telephone or electricity connectivity, underserved populations must include any population where broadband access is not universal. If any household or business is unable to access broadband at a reasonable price, that population is underserved. In evaluating these populations, Minnesota should not consider current-generation satellite or cellular coverage as "served." These technologies do not offer adequate speeds to allow users access to the modern Internet.

Dick Sjoberg - Underserved area is a geographic area where no households have access to at least one provider of Internet Access with current generation broadband transmission speeds, e.g. at least 3 Mbps downstream and 768 kbps upstream. Satellite broadband service, which is

available throughout the country, should not be considered in applying this definition.

Barbara Gervais - Defining underserved and unserved - Unserved is easy; those without access to broadband. Underserved needs a definition that includes an adequate broadband speed not just for today but for the future.

### **Unserved**

Mike O'Connor - "Unserved" is a more extreme example of underserved. Unserved is a population wherein more than 20% of the households and/or businesses lack broadband access at a reasonable price, or are underserved. In many rural areas, population centers may have access while those outside political boundaries do not. Setting an "unserved" bar too high would result in unnecessarily increasing the cost of building a network that would only go after those without service. A bar at 20% makes networks more feasible, by allowing the network owner to incorporate adjacent communities with greater densities, which are likely to already have service.

Dick Sjoberg - Unserved is a geographic area where no provider offers Internet access service at transmission speeds of more than 768 kbps in at least one direction. Satellite broadband service, which is available throughout the country, should not be considered in applying this definition.

### **Mike O'Connor - Projected market -- bandwidth**

- *Connections by bandwidth -- From Dataquest/Gartner*
- See attachment(s): [Connections by bandwidth.wmf](#)
- *Market share by bandwidth -- From Dataquest/Gartner*
- See attachment(s): [Market share by bandwidth.wmf](#)
- *Connections by modality and bandwidth -- From Dataquest/Gartner*
- See attachment(s): [Connections by modality and bandwidth.wmf](#)
- *Worldwide speeds -- 2007 and 2012 - From Dataquest/Gartner*
- See attachment(s): [Worldwide speeds 2012.wmf](#), [Worldwide speeds 2007.wmf](#)

### **Mike O'Connor - Speed comes first, demand will follow**

*Mike O'Connor - History has shown that "speed comes first" and that once people have access to higher speed connections they will figure out new applications that will use them. These new applications; e.g. Skype (Internet telephony), Youtube (video distribution), online collaboration and remote backup over the Internet will in turn drive consumer demand for high-speed connections.*

### **Vijay Sethi - Need for accurate broadband mapping**

*Vijay Sethi - An up-to-date and accurate broadband map is essential in the identification of the unserved and the underserved areas of the state. The recently completed Connect Minnesota initiative, applied 756kbps as the threshold for determining the broadband availability across Minnesota. Following the Connect Minnesota presentation at the Task Force meeting*

*questions arose regarding the availability of broadband in areas that were depicted on their maps as having access. In my opinion it is important that the Task Force first establish the minimum standard for across the State. And if the established threshold is quite a bit higher than 756kbps, as I would expect it to be, perhaps a new statewide broadband access map needs to be generated. I am not sure if the current contract with Connect Minnesota has provisions for any modifications. If not, perhaps another avenue and/or methodology can be explored. In any case, I do believe that an accurate delineation of unserved and underserved areas of our state is necessary. If it cannot be accomplished through the current state contract with Connect Minnesota, it needs to be included as a recommendation in the Task Force report to the legislature.*

JoAnne Johnson - When discussing speeds of broadband, most states have concluded there is a need to scale those speed rates to different applications, with the overall goal of having enough bandwidth to accomplish an activity in a reasonable timeframe. California's report contains an excellent chart of these differentials that other states have also emulated.

#### **Rick King - Tiered Offerings**

*Providers should offer three or four price levels dependent on applications. Consumers could self-select what level they want. For instance:*

- *Power User - 100 Mb or more*
- *Home Business - 40-50 Mb*
- *General Home User - 10-20 Mb*
- *Lite, Casual User - 5-10 Mb*

Steve Cawley - High-speed broadband service offerings should be made available to all citizens of Minnesota no matter where they live, work or play. Rural citizens have the same right to speed and quality as metro citizens. Particular effort is required to ensure that any rural/metro broadband divide is eliminated in the future.

Steve Cawley - Internet service providers should be required to support any application a user chooses, within the scope of the law. Broadband service offerings should be fast enough to support all available service offerings that improve access to information, communication, social interaction, education, healthcare, business commerce, and entertainment.

Steve Cawley - By the year 2015 all Minnesota citizens will need to access broadband speeds of at least 100 mbps. Broadband networks must be designed to provide symmetric service (equal download and upload speeds) in order support the full potential of many of the growing applications that will enhance the lives of Minnesota citizens, such as home telehealth, telecommuting, and home based businesses.

## Tom Garrison - **Speed & Connections of Critical Infrastructure**

Tom Garrison - If Minnesota is serious about achieving ultra high speed broadband, we must acknowledge that fiber optic delivery is the only known system today capable of two-way symmetrical transmission. While remaining open to other technical advances that can achieve higher speeds or capacity, our goal by 2015 should be full fiber deployment to every home and business, to every community, in the state. Noting that Minnesota is rated today as 23rd in average Internet speeds, 25th in Unique IP addresses per capita, and 26th in High Broadband IP's per capita (defined as speeds >5Mbps), our goal must be to dramatically improve connections, speeds and affordability of services. To become and remain globally competitive in the emerging knowledge-based economy, and to position our state as a center of innovation and employment, Minnesota's should adopt a goal of always being in the top three states nationwide and among the top five locations in the world in average available Internet speeds. These speeds and connections are both in the national and state interest, and all means necessary must be pursued to achieve them. Broadband must also, therefore, be defined in law as critical infrastructure.

John Gibbs - Any establishment of a singular level of broadband service as a goal for the State must be based on evidence of demand for that level of service on a statewide basis. The Task Force has only an assortment of anecdotal information about demand for broadband, some positive and some negative. There is no evidence that the private sector has over-invested in broadband infrastructure. There is no evidence the private sector has underinvested. Establishing a goal for broadband service that is too high runs the risk of significant stranded investment - in other words, facilities that no one uses. If the goal is set too low, the State runs the risk of significantly underserving populations within the State of Minnesota who cannot obtain access to a basic level of broadband service. Given the lack of any evidence of the levels of broadband service demanded throughout the State, the Task Force recommends that any goal for a base level standard of broadband service in Minnesota be based on a basic level of functionality that the State desires be available to every person in the State. The task force believes this functionality should include the ability to e-mail and surf the web at download speeds of at least 1.544 Mbps.

Chris Swanson - Bandwidth (Speed) - It is critical that we define the amount of data that needs to move from point A to point B in a specific amount of time. We should define what Ultra means in relation to bandwidth speeds, and let's make sure we think beyond the present and what we may need in the year 2015. Currently hardware manufacturers sell hardware that has the ability to deliver 1Gbps speeds. We see internal networks or LAN's that deliver 1Gbps speed. However, the problem arises when we start talking about the current infrastructure used to deliver last mile bandwidth between the central offices/head end and the home or business. The speeds are limited by the current infrastructure used to deliver this last mile connection. The current infrastructure technologies such as phone circuits, DSL and coaxial served a very useful purpose for the growth of the internet and should not be discarded. However, as the demand for data speed increases those technologies are starting to reach maturity and have little room for

speed growth. In fact, many of the incumbent providers have started bringing fiber closer to the premise (home or business) to increase the speed and usage requirements of their networks. This is because fiber is the technology that can deliver 1Gbps speeds today. The incumbents actions proves the last mile solution is the limiting factor that is holding us back from the bandwidth speeds that will be needed in the very near future. As a task force we have been challenged with going beyond the usual and ordinary. We recognize the limitations the current infrastructure creates for us as we try to deliver data the last mile. We further recognize that without setting a high bar we will allow for a larger digital divide and create a situation in which Minnesota will not be competitive in the global economy. We need to encourage technologies that allow for 1Gbps for last mile connectivity. Value -Based on past and current internet and data usage trends we should set the minimum bandwidth speed of 1Gbps connectivity and we should encourage the deployment of technologies that allow for the delivery of 1Gbps connectivity by 2015.

Chris Swanson - Symmetrical - Uploading data as well as downloading data need to be considered as an important value. The internet was built to allow for two way communications and has turned into downloading being weighted heavier than uploading. We do not place enough of a value on the business that is creating the data that we are downloading. When this data is being created or shipped it is being uploaded. There are a growing number of applications which require a symmetric connection in order for the product to work correctly. A growth market such as video applications, require faster symmetrical bandwidth. We cannot afford to stifle innovation, product quality and ability to get product to market because our upload speeds are far slower than our download speeds. Value- Based on the trends of video, data creation and the opportunity for business growth and communication we should value symmetrical connections. A 10% discrepancy between the upload and download speeds should be the maximum difference. Video growth creates a clear need for symmetrical internet connectivity.

Jack Ries/Gopal - By 2015, ultra high-speed broadband capabilities will be required not only to connect public sector locations and communities, but also the citizens and businesses, to have adequate access for e.learning, e.mergency, e.government, and e.conomic development. The drivers for ubiquitous high-speed broadband connection throughout the state of Minnesota for these four areas are many: e.learning: Minnesota's learning institutions planning e.learning applications need security, capacity, availability and world-wide connectivity, which will be a cornerstone requirement for broadband-enabled next generation state information infrastructure. This advanced capability is necessary for the following applications:

- Student web based learning systems
- Data driven decision making systems with a Minnesota orientation
- Instructional management systems for tracking and accountability
- Electronic video streamed and web based curriculum resources
- Student access to educators, counselors, and student services

- Shared interactive television, hybrid online/video, and online courses and instructional resources.
- High-stakes testing and assessment with various data collection devices
- Secure student information storage, transfer, and reporting with common protocols
- Reference, research, and access to information
- Network bandwidth traffic analysis and management
- Library web based resource & information systems
- Cost effective VoIP applications to expand constituent communication
- Internet 2 access and utilization
- Seamless data and video connectivity to higher education, state agencies, cities and counties to allow for exchange, use, and delivery of resources and services.

Jack Ries/Gopal - e.mergency: Minnesota's public safety and emergency response needs broadband for rapidly sharing information between public safety and private entities as well as cyber security, 24X7 availability and fault protection. Broadband is also required to support seamless disaster management between branches and levels of government. e.government: Minnesota's health, welfare and public service delivery needs require high-speed connectivity across all branches and levels of government. In addition to high-speed the state information infrastructure must provide for confidentiality, fault protection, and cost-efficiency. e.economic development: Minnesota's need to stay competitive in a global economy requires citizens and businesses to have cost-effective high-speed broadband connectivity. This is necessary for access to global markets, share and move information between locations, provide employees telecommuting opportunities to lower costs and increase retention to provide a few examples.

Jack Ries/Gopal - It is estimated the public sector will need the following approximate broadband connection speeds for the above applications by 2015:

*e.learning: Expand capacity and connectivity for the Learning Network of Minnesota.*

- 10 Gigabit (1,000 Mbps) network hub at every state higher education institution
- 10 Gigabit network hub or connection to every large K-12 school district with 1 Gigabit to each school building in the district
- One Gigabit connection to all other K-12 school districts with 100 Mbps to each school building in the district
- 100 Mbps connection to every public library
- 10 Gigabit shared connection to Internet 2 for the above
- One Gigabit connection to every Public Television station in Minnesota.

*e. emergency: Expand capacity and connectivity for the Public Safety and Homeland Security Networks of Minnesota.*

- 100 Mbps connection to each of the 63 National Guard armories or training centers
- Multi-megabit connection to every public sector emergency responder facility including sheriff, police and fire, PCA, public health locations in the state

*e. government: Expand the capacity and connectivity for all state, county and city locations.*

- 10 Gigabit network hub to every large county seat
- One Gigabit network hub to every other county seat

2. An evaluation and recommendation of the security, vulnerability, and redundancy actions necessary to ensure the reliability of high-speed broadband

Mike O'Connor - **Provide security at the edge of the network, not the core**

*Mike O'Connor - Leaving aside the issues of infrastructure vulnerability and redundancy we want to highlight that securing the Internet must ultimately be done at the edges of the network. Imposing network security in the core of the Internet a) will not work and b) provides an unacceptable risk of government (or provider) monitoring and invasion of privacy. Thus, it is important to highlight the distinction between protecting the physical infrastructure from attack and securing computers that are attached to the Internet.*

Mike O'Connor - Security is not possible without broadband

Mike O'Connor - Today's applications and operating systems are routinely upgraded on a weekly basis, with daily updates rapidly becoming common. The size of these updates are often on the order of 50 to 100 mBytes each which means that a consumer connected through dialup or other slow connection is often faced with the choice between using their connection or being secure. As botnets and other network-enabled exploits increase, these under-connected under-secured machines pose an increasing threat to the health of the Internet as a whole

Vijay Sethi - Redundancy to insure broadband service reliability: As high speed broadband fiber becomes the medium for the communication of vital functions such as police, dispatch and ambulance services, phone service, telemedicine services etc. a backup system needs to be available in the event of the failure of the primary fiber. This is probably not a major issue in the metro area and other population centers. However, in rural Minnesota a single fiber carrying the vital services to the remote and sparsely populated area of the state without a back-up option creates a major public safety concern.

Steve Cawley - Internet service providers rarely control the end-to-end data transmission between their customer and the Internet application their customer is connecting to. More commonly, the data transmission will pass across two or more Internet service provider networks before it reaches the customer's desired service end-point. As a result, broadband service providers

cannot guarantee the end-to-end quality of a users Internet experience without the full cooperation of other broadband service providers.

Steve Cawley - While state policy cannot address this challenge at a national level it can address the challenge at the state level. State policy should encourage better interconnection (peering) of Minnesota's Internet service providers. State policy should encourage interconnectivity of Minnesota's broadband networks to promote a more robust local economy and better connect our citizens to local government, education, libraries, and healthcare resources. This interconnectivity should include commercial, government, education, and municipal providers.

3. A description of economic development opportunities made possible by the wide dissemination of high-speed broadband

Brent Christensen - Rural Minnesota cities face unique economic development challenges. Often not connected to other cities, rural cities have to expand their base by reaching beyond the city limits. As such, the definition of community extends into adjacent unincorporated areas. Rural Cities serve as the hub of activity for geographical regions. This is particularly true in the agricultural parts of the state.

**Vijay Sethi - Role of Ultra High Speed Broadband in economic development.**

Vijay Sethi - The information reviewed by the Broadband Task Force over the past months clearly illustrates that, in order to stay competitive with other states and with the rest of the world, Minnesota must make a long term commitment to developing and maintaining ultra high speed broadband capability. In today's competitive business environment, availability of high speed broadband infrastructure is key to a community or a state's ability to attract new businesses and industries. Additionally, small towns in rural Minnesota often struggle due to loss of jobs and population to large urban centers. Access to high speed broad capability can help small towns level the playing field by creating opportunities for businesses and jobs and by offering the local residents opportunities to telecommute.

**Mary Ellen Wells - Economic Development and Health Care Opportunities Through High-Speed Broadband**

Mary Ellen Wells - There are many industries and markets that would benefit from the proliferation of High-Speed Broadband to all towns and homes throughout the state. One specific area that would greatly benefit is Health Care. To summarize, within Health Care, there are three key elements to consider with the promise of ultra high-speed broadband service throughout Minnesota.

Mary Ellen Wells - First, Access. Currently, there are many throughout the state who could reap many benefits from having reasonably-priced high speed internet available to their organizations and homes. For example, the lack of and the high cost of high-speed broadband can limit a hospital or senior care center from offering many of the technologies that exist. Individuals who live

outside population centers could have Home Care applications or could telecommute for a wide variety of business functions (Coders, Billers, Transcriptionists). As a result, economic opportunities are thwarted and people must travel great distances to receive care that could be offered closer to home.

Mary Ellen Wells - Second, Quality. We've learned that high-speed broadband provides organizations the opportunity to offer advanced specialty services through telehealth applications such as the eICU, telepsychiatry, and teleradiology. These and other similar applications bring highly trained specialists to communities that cannot otherwise offer these services. As a result, patients are treated earlier in their disease process and also keep patients in their community. Additionally, the proliferation of eHealth records can greatly improve the

Mary Ellen Wells - Third, Cost. Everyone is experiencing the growing cost of health care. As the baby boomers age, health care costs are projected to increase far above what the current model can support. Telehealth services, that require high-speed broadband, can support the changes that are needed in the current health care delivery system. For example, by providing high-speed broadband access to every home, the current health care model can change. Home monitoring and Home health care applications can prevent acute illness that drives costs up. Also, having people leave their homes and communities to seek specialty care is extremely costly. Patients as well as family members must often take time off of work and be away from home when they must travel for care that is not offered locally.

Mary Ellen Wells - Refer to the March 24, 2009 Panel discussion for more detailed information on concepts and applications that utilize High-Speed Broadband.

Robyn West - Access to high-speed broadband has been shown to enhance economic growth and performance. According to the report "Measuring Broadband's Economic Impact" prepared for the US Department of Commerce, Economic Development Administration, "communities in which mass-market broadband was available experienced more rapid growth in employment, the number of business overall, and businesses in IT-intensive sectors, relative to comparable communities without broadband." In addition, the report goes on to state that the effect of broadband availability can also be observed in higher property values.

Robyn West - High-speed broadband affords significant opportunities to encourage economic development. A region well served with high-speed connectivity encourages business growth for companies of all sizes. Cluster development occurs when infrastructure is in place to serve businesses that support or rely on related industry. A good example of cluster development is Medtronic and the multitude of medical supply and medical device businesses that have elected to best meet their business needs by locating in close proximity to a medical industry leader. The availability of high-speed broadband also provides an incentive for small businesses (including home-based businesses) to locate and operate in well served areas to reduce expenses related to travel and traffic congestion.

4. An evaluation of how access to high-speed broadband can benefit educational institutions, healthcare institutions, community-based organizations, and government institutions.

#### Mike O'Connor - **Remote backup**

*Mike O'Connor - Backing up personal files to a remote computer over the Internet provides profound advantages to consumers and businesses. As hard drives continue to expand, the volume of backed-up data is exploding. Symmetrical ultra high speed broadband is the only practical way to enable this capability.*

#### Mike O'Connor - **Cloud Computing**

*Mike O'Connor - A major driver of bandwidth and speed will result from data and computing power moving to remote cloud-computing services such as those provided by Amazon, Google, Microsoft, etc. This application, like remote-backup, will demand more symmetrical broadband speeds as once again "consumers" become "producers" on the Internet.*

#### Mike O'Connor - Low-probability, high-impact events

*Mike O'Connor - We need networks that can support sudden very-high-demand situations. What happens if there is a pandemic, or a 4 foot blizzard and people are confined to their homes for days or weeks (potentially as much as 6 to 10 weeks in the case of a pandemic)? Can our networks handle long periods of extremely high demand (9-5 telecommuting combined with entertainment for the kids that are home from closed schools)?*

Mike O'Connor - Disaster Recovery

*Mike O'Connor - It's often said that the telling part of a disaster is whether the individuals and organizations have prepared in advance. We've seen a number of real disasters this past decade. A disaster is not simply a terrorist attack, a hurricane, or an earthquake. It's also a significant vendor suddenly declaring Chapter 7 bankruptcy. The challenge companies face in Disaster Recovery (DR) planning is that it has traditionally been complex and expensive. Ubiquitous ultra high-speed broadband would make data disaster recovery much more widely available to Minnesota citizens and organizations.*

Mike O'Connor - Distributed Workplace

Mike O'Connor - Broadband is a facilitator of distributed workplaces. It serves to reduce the individual, corporate and social costs associated with bringing the worker to the workplace

Mike O'Connor - Retired and the elderly

Mike O'Connor - Ubiquitous broadband availability supports the ability of the aging workforce, who are retiring in increasing numbers, to continue their interaction with the Internet, which they've been conducting at the workplace due to lack of broadband at home

Vijay Sethi - Role of Ultra High Speed Broadband in the delivery of government services

*Vijay Sethi - In the face of major budget deficits at the state, as well as, at the local government levels, cities and counties are looking to make severe cuts in their operating budgets. A large majority of services provided by Minnesota Counties are either mandated under state and/or federal laws or they are essential to the health and safety of the citizens. Eventually counties and other units of local government will be looking to consolidate these mandated and essential services across the local jurisdictional boundaries to create regional collaborative service delivery mechanisms. Through this regional consolidation the emphasis will continue to be on the seamless delivery of essential and mandated basic services to all the citizens of our state. This trend is likely to continue, and perhaps accelerate in the future years. In this context a reliable ultra high speed broadband capability will be essential at the regional administrative services center, as well as, at the local service delivery points so that the citizens will continue to receive the same high quality of information and services as they do under the current system. In order to avoid duplication in these times of limited resources, perhaps a statewide ultra high speed broadband backbone can be established that will bring ultrahigh broadband capability to the county seats of all 87 Minnesota counties. This backbone, with adequate levels of bandwidth, would be available not only for the basic government services but also for a variety of other services such as telemedicine, distance learning, economic development, business services etc.*

Kim Ross - **For the K-12 Education Section of the report.**

Kim Ross - Section 1 of Article XIII of the Minnesota Constitution states:

Kim Ross - UNIFORM SYSTEM OF PUBLIC SCHOOLS.

Kim Ross - The stability of a republican form of government depending mainly upon the intelligence of the people, it is the duty of the legislature to establish a general and uniform system of public schools. The legislature shall make such provisions by taxation or otherwise as will secure a thorough and efficient system of public schools throughout the state.

***Kim Ross - From SETDA High Speed Broadband Access for All Kids: Breaking Through the Barriers***

Kim Ross - High-speed broadband access and connectivity are vital for economic growth, global competitiveness, education, innovation, and creativity. Ensuring high speed broadband access for all students has become a critical national issue especially when considering preparing our students for work and life in the 21st century. SETDA members and the greater educational community recognize that robust high-speed broadband access in all of our nation's schools will accelerate our teachers' ability to teach and our students' ability to learn. SETDA identifies the key issues facing the educational community relating to robust connectivity and recommends how states and districts can successfully implement highspeed broadband in their schools as well as recommends what stakeholders and policymakers can do to support bringing this critical issue to a national policy level.

***Kim Ross - Key Issues***

Kim Ross - • Schools need high-speed broadband access to effectively create rigorous, technology-infused learning environments

Kim Ross - • Students need affordable, high-speed broadband access at home to extend learning 24/7

Kim Ross - • Teachers need guaranteed, long-term access to high-speed broadband to enrich the curriculum to include technology applications such as videoconferencing and distance learning

Kim Ross • Teachers need high-speed broadband access for professional development, and engaging in professional learning communities as well as accessing new educational resources such as curriculum cadres and education portals

Kim Ross - • Administrators need high-speed broadband access to conduct online assessments and to access data for effective decision making

Kim Ross - • Students need high-speed broadband access in their schools to take advantage of a wide range of new and rich educational tools and resources available for anytime, anywhere learning

Kim Ross - • Students need high-speed broadband access to overcome the digital divide in rural and low socio-economic areas

Kim Ross - From the Learning Network of Minnesota Blue Print for K-12 Education and Public Libraries, April 2009

*Kim Ross - **CONCERNS AND ISSUES***

Kim Ross - While the diverse infrastructure serving K-12 public education, public libraries and higher education facilities is providing workable service, there are concerns relating to future growth and needs. As school districts and libraries experience continuing demands for the availability of expanded educational opportunities and online content, the appetite for high speed bandwidth also grows. Some of the current barriers to network growth include:

Kim Ross - 1. Limited funding for K-12 education and public libraries to sustain high speed network connections. K-12 education currently receives \$3.75 million from the state to help support telecommunications access after E-rate discounts are taken into account. This amount falls far short of actual after E-rate costs, which are closer to \$9 million annually. It also needs to be noted that the current funding between E-rate and the state telecommunications/Internet access equity aid provides limited support to only existing infrastructure and does not support any network growth or response to increased needs. Public libraries currently receive \$2,300,000 each year to assist with after E-rate costs, but again this sustains only the current level of bandwidth and does not provide room for network growth. Both school districts and public libraries also invest heavily in local infrastructure that allows them to use the telecommunications services provided through their regions.

Kim Ross - 2. K-12 school districts and public libraries, particularly those in rural areas, are limited to the existing telecommunications infrastructure provided by service providers and carriers. This means that some areas of the state have seen the benefits of high speed fiber connectivity that is not available in many of the more rural areas of the state. Telecommunications providers need to have a return on investment to bury fiber, which is an expensive enterprise, and rural communities often are not able to provide that level of return.

Kim Ross - 3. K-12 schools and public libraries are often located many miles away from the local telecommunications provider hub, therefore experiencing high transport costs resulting from having to traverse multiple exchanges.

Kim Ross - 4. Bandwidth needs are continually growing in the K-12 and public library community. According to the Public Library Funding and Technology Access Study released by the American Library Association in 2008, 73% of libraries nationwide report that they are the only source of free Internet access in their community. In times of recession, reliance on Internet access at the public library is critical for many citizens as they use library access to employment opportunity information and government services. The State Education Technology Directors Association (SETDA), in their June 2008 report, High-Speed Broadband Access for All Kids: Breaking Through the Barriers, also acknowledges the growing bandwidth needs of teachers and students as online applications for learning grow increasingly interactive and media-rich.

Kim Ross - 5. There is no advocate at the state level for K-12 and public library broadband access. Higher education has these advocates in their system presidents and chief information officers.

*Kim Ross - GOALS*

Kim Ross - 1. K-12 and public libraries continue to need a sustained, adequate funding source that is adequate to current needs and allows room for growth. For K-12, the current \$3.75 million in the state's base budget is not sufficient to support reasonable Internet access and distance learning connectivity. School districts are often working with substandard levels of access to support their core business function - to deliver education opportunities and manage the school. Telecommunications access is now the foundation for delivery of education and library resources. An increased investment in telecommunications access for schools and libraries from the state would provide a huge return on investment in terms of the additional programming and resources that could be provided to students and library customers.

Kim Ross - 2. K-12 public education needs to move beyond current bandwidth limitations supported by the state telecommunications/Internet access equity aid program, which support only a T1 level of service (1.544 Kbps) per school. The SETDA High Speed Broadband Access for All Kids: Breaking Through the Barriers national report recommends the following levels of access for 21st century learning and Minnesota needs to start working in this direction for the next 2-3 years:

- Kim Ross - An external Internet connection to the Internet service provider of at least 10 Mbps per 1,000 students and staff
- Kim Ross - Internal wide area network connections from the district to each school and between schools of at least 100 Mbps per 1,000 students/staff

Kim Ross - SETDA also recommends that a technology rich learning environment in the next 5-7 years should have:

- An external Internet connection to the Internet service provider of at least 100 Mbps per 1,000 students and staff
- Internal wide area network connections from the district to each school and between schools of at least 1 Gbps per 1,000 students and staff

Kim Ross - 3. In the absence of stable, equitable funding, it has been difficult to establish standards for videoconferencing. For example, while most of the telecommunications access clusters are working towards the H.323 videoconferencing standard with quality of service (QOS), it is difficult for us to reach an efficient level of interconnectivity when local funding availability and eligibility for grants varies so widely.

Kim Ross - 4. Telecommunications providers must be provided with incentives to invest in rural communities and to work together in order to provide consistent pricing in broadband services to all areas of the state. This access is critical not only to education and public libraries, but is needed to sustain economic growth and global competitiveness for our state.

Kim Ross - 5. The K-12 education community needs an open network infrastructure that continues to allow interconnectivity, connections with higher education, and access to Internet 2.

Kim Ross - 6. The network structure needs to recognize organizational autonomy and provide flexibility to meet local needs.

Kim Ross - 7. Many students in Minnesota receive courses via interactive television. The Learning Network of Minnesota needs to provide quality of service for video conferencing to ensure these learning experiences are engaging and effective for students.

Kim Ross - 8. There is a need for understanding and advocacy at the state level for high speed bandwidth that meets the needs of schools and public libraries.

Kim Ross - Section needed on online learning.

Robyn West - (The answer below is specific to government institutions.) Today, high-speed broadband is delivered through a fragmented delivery system that often leaves government with limited cost-effective options. Creating cost-effective mechanisms for government to obtain high-speed broadband access would allow governments to make needed improvements for connectivity to and between government facilities, citizens, and businesses. This includes adding or improving capabilities for remote services for citizens, sharing information among governmental agencies, and providing infrastructure for alternative service delivery models (telecommuting, neighborhood service centers, collocation with other units of government).

Robyn West - Specifically, access to high-speed broadband can benefit government institutions by:

- Facilitating the installation of broadband service for state and local governments, local citizen communities and law enforcement agencies;
- Providing the ability to meet the continuing increase in demand for high-speed broadband by business and citizen communities;
- Providing the ability to handle large amounts of data for medical, library and other data-intensive applications;
- Providing for redundancy to ensure the availability of connectivity;
- Providing the potential for connectivity to other governmental units;
- Providing the potential for building broadband services to provide economic development opportunities; and
- Providing opportunities to partner with private providers to improve service to our citizens in underserved and unserved areas.

- e. How are we going to get there? [A high-level look]
  - i. A description of the policies and actions necessary to achieve the goal including the elimination of obstacles to investment and the identification of areas in the state that currently lack infrastructure necessary to support broadband service
    - 1. A description of the opportunities for the public and private sectors to cooperate to achieve the goal

### Mike O'Connor - **Middle Mile**

Mike O'Connor - The state should encourage building middle mile infrastructure in unserved and underserved areas, and ensure that this infrastructure is open and publicly accountable. Scott County Minnesota has entered into a number of innovative partnerships that could serve as a model for this.

### Mike O'Connor - **Ensure that Minnesota is a junction on the Internet backbone, not a station on the line**

Mike O'Connor - Today, the vast majority of MN Internet traffic passes through Chicago. This presents an opportunity to increase reliability, redundancy and capacity. We should launch two initiatives; 1) Develop two additional routes (a Northwest route to Seattle and a Southern route to Kansas City or Omaha) to the Internet backbone and require all providers to use and support those routes. 2) Make sure that Minnesota bits stay in Minnesota by requiring all Minnesota Internet providers peer with each other within the state rather than degrading performance by peering in distant hubs like Chicago.

### Vijay Sethi - **Role of government in facilitating the ubiquity of Service**

Vijay Sethi - Local, state and federal governments have a critical role to play in achieving ubiquity of ultra high speed broadband service in Minnesota. The private sector business models, based on cost/benefits scenarios, are very effective in serving the needs of the geographic areas - metro as well as rural- with adequate population densities that allow reasonable returns on investments and where the users can afford to pay for the services. There is little incentive for the private companies to serve those areas which do not have the "critical mass" of paying customers. State Local governments can play a major role by 1) Identifying the unserved and underserved areas, 2) serving as the information clearinghouse for available resources and infrastructure , 3) developing collaborative partnerships among public, and private sector participants aimed at maximizing the use of existing infrastructure owned and operated by private and public partners, 4) helping to navigate through the regulatory process and 5) assisting with financial incentives and funding opportunities available at the local, regional, state and federal levels. Additionally, at the state and federal levels, the government's role is to enact policies that encourage public/private partnerships, and to provide financial resources aimed at providing the ultra high speed broadband to the unserved and underserved part of the state as well as financially disadvantaged persons and households.

### Rick King - **Municipal Ownership**

It is the task force's view that municipal ownership of broadband delivery should be a last resort prompted by the unwillingness of existing or new providers to service the area with appropriate minimum speeds and cost efficient prices.

### Rick King - **Open Trenches**

When road work is done across the state, everything should be done to encourage municipal, county or state officials and private providers to bury conduit and/or dark fiber in the open trench. This may call for some form of code modification in order for relevant parties to know when such digging will occur.

### Rick King - **Establishment of continuing authority in the state**

The State should create an on-going commission to identify issues and solutions for ubiquitous broadband adoption in Minnesota. This commission and its members should be appointed by the governor and have regular meetings, staff support and funding. It would be charged with the implementation of the Task Force's report and other outcomes from any federal stimulus money.

Robyn West - The market alone has not provided adequate high-speed broadband. It is difficult and cost prohibitive for either the public or private sectors to be the sole provider of high-speed broadband. By partnering together, public and private sectors can bring greater opportunities for widespread penetration of high-speed broadband to entire communities, including under served and unserved markets. An example of how this could be achieved includes having a government entity fund high-speed broadband infrastructure, allowing private service providers, for a fee, to utilize this infrastructure for their provision of broadband services. This partnership approach can result in providing widespread access to communities while encouraging market competition for the provision of high-speed broadband.

### Tom Garrison - **Role of Government**

Tom Garrison - Just as it does with all other forms of critical infrastructure (roads, bridges, airports, building codes, electrical supply, telephone service, etc.), state government has a vital role to play in terms of setting policy and regulations that are in the public interest and protect public safety. Regarding improving the speeds, availability, and affordability of broadband services, all state barriers to the provision of broadband service by public entities should be removed as long as such provision is the wish of a plurality of that's jurisdiction's citizens. There should be no discrimination between public and private entities in their ability to provide broadband services. Many municipalities will have no interest in the direct provision of service unless the market is unwilling or unable to provide the services communities feel they need to survive and thrive in the global marketplace. The state should recognize that no one size fits all and no singular tactic can achieve the state's broadband goals, without all interested stakeholders-existing providers, new entrants, and communities of interest-being able to pursue their economic future and broadband goals. Municipalities-those closest to their citizens-have an important role to play in convening community broadband conversations and planning with their local business community. Further, municipalities have a crucial role to play in potentially spreading out the cost and speeding up the timetable of broadband improvements by virtue of their bonding authority which can facilitate 20-30 year return on investments, rather than having to meet strict

1-3 year ROI. Policymakers should consider utilizing this powerful tool by explicitly permitting public/private partnerships that further ultra high-speed broadband goals. Policymakers should also reaffirm municipal authority to require conduit installation. Just as cities have an interest in the so-called “last mile” closest to them, the state has an indispensable interest in the necessary “middle mile” connections to its citizens and localities that ensure both security and redundancy in those essential connections, sustain business commerce and jobs, provide e-government functions, and protect vital networks and data from outside vulnerability and attack.

#### Tom Garrison - **State Broadband Advisory Council**

Tom Garrison - The differences between states that move ahead on broadband goals and those which complete reports that only gather dust is a suitable mechanism to implement strategic plans and a demonstrated continuing commitment to such plans. It is essential to Minnesota’s economic future to have an ongoing state body dedicated to implementing its strategic plans for broadband. Lawmakers should create without delay a Minnesota Broadband Advisory Council with membership similar to the Minnesota Ultra High Speed Broadband Task Force, with terms and responsibilities set forth in statute and appropriate funding. At least \_\_\_\_ other states have broadband plans and advisory panels in place today. Many are funding significant investments in broadband, or assisting their states in having a unified approach to gaining federal (stimulus) funding. Membership should be explicitly broadened to correct for two notable omissions in the current task force make-up: large employer high tech businesses, and home-based or small company high-end users of broadband services. Lastly, as technology changes over time or the challenges facing strategic implementation of its broadband plan evolves, the Broadband Advisory Council should, at its discretion, have the ability to fill at least one slot on its panel with a subject matter expert capable of supporting its specific scope of work in any program year. The Broadband Advisory Council duties should include, but not be limited to:

- A required biennial report to the Governor and Legislature on progress towards reaching state broadband goals and, as needed, additional broadband policy recommendations
- Authority to make recommendations on emerging broadband opportunities and such other delegated duties as evaluating and granting funding as deemed appropriate by policymakers (evaluating stimulus funding proposals, etc.)
- Coordinate cooperative efforts and state broadband planning to lower costs and increase efficiencies in pursuit of the state’s broadband goals
- Recommend to responsible authorities improvements to state building and electrical codes in furtherance of ultra high speed broadband deployment and high capacity use.
- Create a best practice definition of the size, number, depth and access spacing for communications conduits and develop a model ordinance/infrastructure design specification for conduit installations that can serve to further broadband deployment.
- Assess network vulnerability threats and the need for critical path redundancy.
- Assess Minnesota’s progress toward meeting its ultra high speed broadband goals

- Coordinate education efforts to raise the level of broadband usage.
  - Create policies that will further broadband deployment including when the trench is open
  - Oversee ongoing state broadband mapping efforts.
2. A description of what other states have done either by public policy or legislation to increase broadband (Utah grant program, WI tax credit, for example.) Evaluate strategies, collaborations, financing methods, and financial incentives used in other states and countries to support the deployment of high-speed broadband

### **Policy changes**

#### *Mike O'Connor* - **Change the definition of broadband speed**

Mike O'Connor - The standards of speed for broadband access must first rest on symmetrical upload and download rates. This technical definition implies that our networks must make it as easy to produce content as it is to consume. The standard of speed in networks should weight the upload speed over the download speed to ensure participation.

Mike O'Connor - The standard of speed is also changing, we should not be locked in a regulatory framework that limits us to obsolete technology. Instead government should promote and fund networks that offer a high quality of service, low-latency networks, and the functionality to meet the service and application needs of our communications future.

Mike O'Connor - The electrical grid is designed to work on the hottest day of the year. Yet many broadband systems become bogged down at peak times, offering the worst performance when the networks are most needed. For this reason, the speed threshold should be specified in terms of peak and non-peak speeds. A network that offers fast speeds only in the middle of the night does not benefit the state as much as one designed to ensure higher quality of service around the clock.

#### *Mike O'Connor* - **Provide public oversight**

#### *Mike O'Connor* - **Provide coordination and leadership**

Mike O'Connor - The task force firmly believes that there will be a significant shift to a more proactive national policy on these matters over the next several years. The election of a new “wired” President and the appointment of broadband-savvy members in a new administration is complemented by increasing concern in Congress and widespread recognition of broadband advancement as a key element of the nation’s economic recovery. In addition to adopting a strong vision, Minnesota must position itself with committed and focused statewide broadband leadership that will be nimble and empowered to lead Minnesota’s internal efforts and leverage federal opportunities. The task force recommends that a permanent Broadband Advancement Authority be established with the tools and authority to take both short-term and long-term actions to continually improve Minnesota’s capacity.

Mike O'Connor - Designate one state agency as lead coordinator for defining and implementing statewide broadband policy to help ensure cohesion, speed, and efficiency.

Mike O'Connor - **Monitor progress with mapping and data collection**

Mike O'Connor - Implement an ongoing program of data collection and mapping to enable Minnesota's policy-makers to monitor progress in achieving the state's broadband goals.

Mike O'Connor - Provide a granular method of defining where broadband service exists. Current methods do not reveal the true availability of broadband to residences and businesses and can lead to poor policy decisions.

Mike O'Connor - All data on available speeds must be made available to the public in a format that can be used to generate similarly-granular overlays with other types of economic and demographic data

Mike O'Connor - Consider modeling efforts on locally-driven broadband data collection projects.

Mike O'Connor - All data on available speeds must be based on actual, not advertised availability, and also be accompanied by cost of service.

Mike O'Connor - **Oversee Internet transport providers as common carriers**

Mike O'Connor - For much of the 20th century, the United States and most other nations found it useful to develop a notion of common carriage for communications and a status known as common carrier for the communications providers themselves. A common carrier must provide a neutral communications platform. IP packets should be delivered between parties regardless of who they are, what is talked about, what the content of their packets are, and so on. As long as each party pays its bills on time, they should be treated by the provider as a legitimate and equal user of the network. As a network of networks, the very architecture of the Internet demands that packets be routed regardless of who the initiator and recipient of the communications are, whether the communication constitutes information or entertainment, the language used, and so on.

Mike O'Connor - Minnesota should require the more strict standard of common carriage on networks serving the state. Common carriage has been applied to canals, roads, bridges, telephone networks and more. The network owner must not be allowed to monopolize the network or it will diminish societal benefit and inhibit innovation. In the event that a competitor wishes to use the network to provide services to a customer, the network owner must offer a wholesale rate no higher than the cost the network owner charges internally for the delivery of its own service.

Mike O'Connor - Ensure that consumer privacy is protected and that providers are prohibited from inspecting the contents of Internet packets without consumer notification and consent (except in the case of law-enforcement).

This includes monitoring for bandwidth-shaping and bandwidth-capping purposes

**Mike O'Connor - Ensure clear service definitions and monitor performance against those definitions**

Mike O'Connor - Require that broadband providers provide very clear definitions of the services they offer (tiered pricing, upload vs download speed and bandwidth caps) as well as independent quality and performance monitoring and verification

Mike O'Connor - Require that broadband providers provide tools by which consumers can verify (and challenge) the information that providers are collecting (e.g.. consumption speed and data volume) along the lines that credit-reporting agencies are required to provide.

Mike O'Connor - Broadband networks should have to meet reliability performance standards. Broadband connections are replacing traditional phone lines but do not offer the same high level of uptime. This is especially true of some wireless networks. Networks should meet some reliability metric as part of the performance standards that will be evaluated as part of the oversight designed to prevent fraud and wasteful use of taxpayer money.

Mike O'Connor - In addition to uptime requirements, Internet providers should be required to meet a threshold of customer service. Many states already have metrics and systems for reporting the time customers spend on hold or waiting for a support call to be answered.

**Mike O'Connor - Rethink the Universal Service Fund**

Mike O'Connor - As we rethink the Universal Service Fund with an eye towards broadband and internet adoption we must develop policies that promote the goal of Universal Access. The focus should be on the human impact rather than the service provider - the opportunity for every person, regardless of their digital skills, geographical and socio-economic situation, to create and to share information useful for their own life plans.

Mike O'Connor - Recently, the Federal-State Joint Board on Universal Service, comprised of state and federal regulators, recommended to the FCC that the USF be divided into three separate programs - one focusing on traditional wired telephone service, one focusing on wireless or "mobility" service, and one focusing on broadband. By law, the FCC is required to act on the Joint Board's recommendation within one year.

**Mike O'Connor - Oversee broadband as a lifeline service**

Mike O'Connor - Broadband is no longer a luxury but a vital service necessary to fully participate in the nation's democracy, economy, culture, and society. Policy makers should define and fund broadband as a lifeline service that must be made available to all residents.

**Mike O'Connor - Acknowledge broadband as essential infrastructure**

Mike O'Connor - One needed policy shift is to view broadband as essential infrastructure rather than leaving it to be deployed only when private investors believe they can obtain favorable returns relative to other opportunities for their capital. The task force notes that we do not leave private investors solely responsible for the financing and decisions concerning when and where to deploy other shared infrastructure such as roads, highways, sewers, water and power distribution systems.

#### Mike O'Connor - **Ensure an open and interconnected Internet**

Mike O'Connor - Consistent standards and network behavior are essential to ensure that broadband networks are widely deployed, open, affordable, and accessible to all consumers. In 2005, the FCC adopted four principles to encourage broadband deployment and to preserve and promote the open and interconnected nature of the public Internet (FCC 05-151). According to these principles, people are entitled to: access the lawful Internet content of their choice; run applications and use services of their choice (subject to the needs of law enforcement); connect their choice of legal devices that do not harm the network; competition among network providers, application and service providers, and content providers. MN should enforce network neutrality laws mandating the equal treatment of all communication consistent with the principles adopted by the FCC.

#### Mike O'Connor - **Ensure privacy**

Mike O'Connor - The freedom to hold opinions without interference is not possible without privacy of information and regulation around the collection and sharing of personal data. All members of the Internet community must be protected from government and corporate surveillance. The right to privacy on the Internet has two equally important aspects:

1. information privacy or data protection, which requires the establishment of rules governing the collection and handling of personal data such as credit information, and medical and government records.
2. privacy of communications, which covers the security and privacy of mail, telephones, e-mail and other forms of communication.

#### Mike O'Connor - **Strive for universal access**

Mike O'Connor - National and state policy for broadband and internet adoption must develop policies that promote the goal of Universal Access. The focus must be on the human impact rather than the service provider - the opportunity for every person, regardless of their digital skills, geographical and socio-economic situation, to create and to share information useful for their own life plans.

#### Mike O'Connor - **Significant aspects of Universal Access should include:**

- The ability to access to infrastructure regardless of where you live. Broadband must be widely distributed, and should support bandwidth that will enable people everywhere to use it.

- Affordable access. Broadband infrastructure- including rules, pricing, taxes, etc. should make access affordable for all income levels-to ensure that as many people as possible have access.
- Access in the workplace -especially for those whose primary access is at work.
- Public access. Given that man people will not be able to have private home computers and internet access, a premium should be placed on creating public access points such as telecenters, libraries, community centers, clinics and schools-so that all people can have access within walking distance of where they live or work.
- Access to information that is culturally and linguistically diverse and representative of all of MN's ethnic and racial groups. Additionally, since most internet content and hardware is dominated by the use of Latin script, and given MN's large Hmong, Lao, Vietnamese, and Somali communities- MN should ensure the development of local content in non-Latin languages. Technical development should encourage linguistic diversity on the internet and simplify the exchange of information across languages.

**Mike O'Connor - Require pricing options without cross-subsidies from video or voice services**

Mike O'Connor - Artificially low prices for Internet services distort the market and confound the policy making process. Ultra high speed Internet access is a premium service and should be offered in such a way that providers can make a rate of return, while consumers have the option buy the service without having to buy unwanted video or voice services.

JoAnne Johnson - No single policy or rule change will greatly or immediately affect the states overall broadband standing. What has become apparent is the need for comprehensive thinking-a big picture approach to creating a climate that enables investment and growth while encouraging greater usage and innovation.

John Stanoch - Any discussion of Minnesota broadband policy needs to also address market demand. Policy options include:

- Encourage support for programs and initiatives that increase access to broadband and generate demand and use of broadband.
- Discourage new taxes on broadband and telecommunications services.
- Support investment in public education technology that will benefit students in the classroom and encourage broadband use at home.
- Develop a strategy that will encourage e-government initiatives at all levels of government.

John Stanoch - Eliminate of Barriers to Deployment: Minnesota broadband policy should eliminate barriers to deployment of advanced telecommunications services. For example:

- Limit Right-of-Way fees to the costs of managing the public asset.
- Establish an expedited process to resolve Right-of-Way issues.
- Include the cost of relocating utility facilities in street, highway and other infrastructure projects.
- Eliminate regulatory uncertainty.
- Address Cost-of-entry issues, particularly in low population density areas.

- Eliminate laws and rules that treat broadband providers differently based on the technologically used to deliver telecommunications services.

### **Incentives**

#### **Mike O'Connor - Encourage local ownership**

Mike O'Connor - Incentives should be created to encourage local and public ownership. For example, local providers, Tribal governments, community-based nonprofits, utilities, and co-ops should get incentives to construct, own, improve, maintain, and operate broadband facilities and to provide broadband services.

Mike O'Connor - Coordinate broadband with other aspects of Federal Stimulus

Mike O'Connor - Only dig once -- coordinate construction projects, such as roads and electrical-grid improvements.

Mike O'Connor - Only plan once -- develop coordinated broadband, electric-grid, energy retrofit projects.

Mike O'Connor - Find anchor tenants -- community colleges, health care centers and the like can help justify bigger pipes (power and broadband) for a whole community.

Mike O'Connor - Stimulate demand by increasing digital literacy

#### *Mike O'Connor - Public Education*

Mike O'Connor - Affordable, fast and easy access to the internet can strengthen educational and health services, local business, public participation, access to information, and good governance. Digital knowledge and skills enable people to use and shape the internet to meet their needs. MN's government, community organizations and private sector entities should support and promote free or low-cost training opportunities, and materials related to using internet. Students and community members need to have a shared platform for collaborative learning. MN should fund digital and media literacy as a component of public education. MN should also support education in libraries, YMCAs, and public housing community centers. All education should include basic literacy, media production, and e-commerce (how to start a business online).

Mike O'Connor - Funding should be made available for technology training, production, and adoption in communities historically at the margins of technology such as rural, low-income, immigrant, and communities of color.

Mike O'Connor - Fund technology training, production, and adoption efforts and programs by agencies with a track record of contributing to rural, low-income, immigrant, and communities of color.

Mike O'Connor - Require that an adoption component be required of all broadband projects funded.

## Mike O'Connor - Measure progress

### Mike O'Connor - Metrics

- Increase in availability
- Expand speed in each tier of service
- Increase in adoption and use
- Increase in technology literacy
- Increase in service-provider participation in deployment and adoption initiatives
- Increase in end-user satisfaction
- Encourage accurate/timely data sharing by providers

## Tom Garrison - **Incentives**

Tom Garrison - Where state or federal funding decisions are concerned, funding should be tiered so that public investments give greater support to those projects which stimulate rapid deployment of ultra high speed broadband and high capacity (next generation) networks. Lesser tier support should go to lower bandwidth connectivity. (In other words, networks with delivered speeds to the premise of > 100 Megabits/second, for example, deserve greater support than devoting limited public resources to those with < 10 Megabits/second.) As has been noted by other experts, incentives should not cover the full costs of broadband deployment, but should require significant equity contributions by network owners to encourage responsibility and shared risk in outcomes. Only in extraordinary circumstances, or for the greatest of public benefits, should cost participation be waived. In addition, much in the way highway, railroad or airport infrastructure systems are publicly funded so all stakeholders can benefit from their use, public broadband investments should be geared to open networks over which many competitive providers can ride, rather than closed-end networks serving a single provider. Government and industry should consider funding for programs which increase broadband adoption rates in Minnesota. The legislature should engage in a formal tax policy review to see what appropriate tax breaks or other incentives can be provided to businesses willing to make investments to meet state broadband speed, affordability, connectivity and broadband adoption goals, or who partner with public entities to achieve these goals.

### 3. How we pay for it

- Estimate of the costs of reaching the broadband goal, including capital costs
- Identify who will [or should] bear those costs

Joanne Johnson - Only nine states of the 25 reviewed recommended appropriations. They were either for mapping, citizen education or support of grant programs. The grants addressed both infrastructure and initiatives to increase technical literacy and computer ownership.

- Opportunities to leverage investments

Barbara Gervais - It is my belief that we would not be fulfilling the purpose of our committee if we propose delivery of service via today's infrastructure. It is critical an investment is made to bring service today that will be an acceptable quality of service for tomorrow. Our standards for the speed of broadband should be more than and not just enough for each household in

the state. Speeds today will be obsolete tomorrow. This is an investment and ROI will increase with forward thinking.

Barbara Gervais - Open access is critical in providing to the "last mile". Due to the agricultural nature of our State, many of the rural areas have very little density.

#### 4. Future scenarios and how to take advantage of them

John Gibbs - The United States has made a deliberate policy choice with respect to broadband to rely predominantly on free market enterprise and the private sector to provide broadband services where demand exists. Government should intervene in an appropriate manner when markets fail to serve areas that are not profitable to serve, or those who cannot afford broadband. These problems require relatively modest government responses, not a fundamental philosophic change in policy. Yet, there are obstacles to investment that the State needs to address. There are many reasons why a business or a household is not using broadband services. A small portion of areas in Minnesota lack of physical access to broadband facilities. Any use of public funding to provide broadband access to unserved areas and underserved populations should also operate under a rule that requires the use of the most cost efficient technology. Combinations of technology platforms should be used to achieve Minnesota's broadband goals in the most cost efficient way possible.

John Gibbs - More commonly, issues of affordability in low-income households or a lack of adequate training and computer literacy pose obstacles to broadband adoption. Public funding directed to stimulate demand for broadband services should be targeted at programs that make access more affordable to low-income residents, both in terms of having access to computers as well as having affordable access to broadband. The state should seek and support changes in the federal Lifeline and Link Up USF programs to include broadband services and the purchase of the equipment necessary to connect to the Internet.

- f. Define broadband by functionality: define what's needed for each application (e-mail vs. telecommuting, vs. HDTV downloads, etc.) - similar to the California report

#### 4. Comprehensive Policy Recommendations

- a. Be sure to cross reference 8 points of legislation
- b. Recommend focus of future legislation

Brent Christensen - Affordability is a factor in any discussion about adoption. It can be measured in two ways; what a customer considers reasonable and is willing to pay for a product or service, and the price charged by the producer versus the cost of production and it's relation to similar products or services. Broadband is no different. Because it is relatively new, it is still not in most consumers' budgets or is related to the cost of basic telephone service.

Brent Christensen - The government made a decision in 1934 that basic telephone service was a requirement for every citizen. That same rational can be applied the deployment of broadband. Geography should not be a barrier to broadband access.

Brent Christensen - The 1934 Telecom act also addressed affordability. Because of the importance of broadband access, economic factors must be addressed. Existing low income programs should be expanded to assist low income families with access to broadband. Geography and economics should not be a barrier to access.

Brent Christensen - Since it is not feasible to scrap the existing network and start over, the government should provide economic incentives for providers to build out their networks. Sales tax exemption for broadband equipment purchased and deployed, similar to existing telephone equipment purchases is but one example.

Brent Christensen - Deployment of broadband is only one side of the equation. The state needs to provide incentives for consumers to adopt the technology. Just adding monthly broadband service to the existing list of qualifying tax deductions would be one way to encourage adoption. Another option would be to offer state funded rebates for computer purchases for low income, students, and the elderly.

JoAnne Johnson - Providing grants and tax credits to providers to subsidize the deployment of broadband networks into rural, unserved areas. Idaho provided \$5 million for matching grants that drove new high speed availability to over 55,000 more residents in remote rural areas. Wisconsin offered \$7 million in tax credits to create the same effect in their state. California has an ongoing fund for universal support of high cost areas as well as a grant program for unserved areas. We find little or no evidence of anyone funding competitors, one provider per area is standard, although that provider is not necessarily an incumbent telephone or cable company.

John Stanoch - Economic Development and Education: The Task Force recommends that a contact point with broadband expertise be established in state government. Local economic development or education officials would then have a single point of contact when faced with a lack of broadband availability issue that would harm an economic development or job creation or retention opportunity or pose a limitation on educational access to internet learning.

c. Other recommendations the Governor/Legislature should consider for future study

JoAnne Johnson - Reviewing policy actions we find that several states recommend action to simplify and streamline processes for permitting infrastructure builds, tower siting and right of way disputes and ordinances. With that, several mention reviewing and possibly modernizing utility statutes and regulations to both acknowledge and encourage competition. Several suggest there should be greater information sharing and leveraging of assets within government entities at all levels and that there needs to be some level of consolidated and permanent coordination and leadership, either by a statewide council, board or a state supported advocacy agency.

Barbara Gervais - Broadband should be treated as a utility for Minnesota residents. Available to all citizens of this State. Safety, health, education, economic development and overall quality of life will be greatly improved.

John Gibbs - At its February 6, 2009 Special Meeting, the Task Force collaboratively prioritized the values it believes Minnesota should hold as it moves forward in developing broadband policy. There were three clear values that emerged. First, focus on serving the unserved. Second, focus on sustainability - policy initiatives should focus on solutions that will work long term. Third, focus on economic development. The three

goals stated below are consistent with these three core values expressed by the Task Force.

1. Minnesota should continue to follow the successful policy of non-interference with the private sector, which has invested heavily in broadband infrastructure in Minnesota, making the State the nation's leader in terms of the percentage of the population with access to broadband, as well as the State with the highest average download speeds in the nation.
2. The focus of any government intervention should be on making broadband available to unserved areas and removing other barriers to broadband utilization faced by underserved populations, such as lack of access to computers, or affordability for low-income populations.
3. Minnesota should endeavor to provide at least T-1 level service (1.544 Mbps) to every resident of the State.

#### Dick Sjoberg - **Glossary/Definitions**

Dick Sjoberg - **Broadband** is an advanced communications systems capable of providing high-speed transmissions of services such as voice, video, and data over the Internet and other networks. Transmission is provided by a wide range of technologies including digital subscriber line and fiber optic cable, coaxial cable, wireless technology and satellite. Capable of delivering voice, video, and data simultaneously at rates of 1.544 Mbps or higher. ([www.fcc/broadband](http://www.fcc/broadband))

Dick Sjoberg - **DOCSIS** (Data-over-cable- services-interface-specification) An equipment standard developed by the cable television industry which defines requirements for cable modems and cable modem termination systems that enable broadband Internet access. The advanced version enables Internet speeds in excess of 50Mbps. Comcast is offering 50 x 5 Mbps service to customers in Minneapolis/St. Paul, the fastest speed available of any Comcast market in the country. DOCSIS 3.0 is already being tested in labs to provide download speeds of up to 320 Mbps.

Dick Sjoberg - **Ultra high speed broadband.** The level of broadband service needed in the future subject to supply and demand, technological developments, and economic conditions.

Dick Sjoberg - **Underserved** population is a demographic measurement which describes those consumers who are unable to subscribe to an Internet service because of factors such as the absence of computer ownership, lack of training, income limitations, employment issues or other demonstrable need.