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Items from Grose/Joselyn/Evans document not included in baseline report document:

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While the U.S. definition of broadband as 4/1 Mbps is embarrassingly low, Latvia and The Czech Republic now outrank the U.S., with Sweden moving into 8<sup>th</sup> place. The list is headed by South Korea, Japan and Hong Kong. Worse yet, U.S. consumers don't just have slower speeds than many other industrialized countries, they also pay more for their connections, according to Bloomberg News.

Country/Region	Q1 '13 Avg. Mbps	QoQ Change	YoY Change
- Global	3.1	4.0%	17%
1 South Korea	14.2	1.5%	-10%
2 Japan	11.7	3.9%	6.8%
3 Hong Kong	10.9	9.0%	16%
4 Switzerland	10.1	6.1%	24%
5 Netherlands	9.9	10%	12%
6 Latvia	9.8	4.5%	12%
7 Czech Republic	9.6	9.1%	34%
8 Sweden	8.9	10.8%	32%
9 United States	8.6	7.4%	27%
10 Denmark	8.2	13%	17%

Figure 11: Average Measured Connection Speed by Country/Region

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With regard to the third state broadband leadership goal of the state being in the top 15 when compared to countries globally for broadband penetration (penetration defined as household adoption rate), the Task Force has not yet identified a valid resource for measuring where Minnesota ranks internationally. The Task Force believes this is an important goal even if finding a viable measurement is difficult. That said, by international standards, the United States as a whole ranks 9th in average measured connection speed and 10th for broadband adoption, defined as 4 Mbps according to Akamai's report tracking worldwide broadband growth from Q2 2013.

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Reordered and revised recommendations (see next to last page of this document)

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Without a significant state funding source, it is unlikely that these initiatives will stimulate the investment necessary for Minnesota to enjoy the benefits of meeting the broadband goal of 10 – 20 Mbps download and 5 – 10 Mbps upload. Other states have created and funded aggressive broadband deployment and adoption programs that are positively affecting broadband investment and uses. Minnesota needs such a funding mechanism. It is clear that the 25% of Minnesota currently not meeting the state broadband standard is comprised of markets that would not return adequate ROI for private investment alone.

In addition, while the task force has adopted a technology-neutral approach, serious policy discussions are needed around the appropriateness of including cellular broadband services as a current technology solution that counts in meeting the state broadband goal. Affordability, relatively low data caps and different patterns and options for use between mobile and fixed devices are items of concern. The expansion of 4G cellular wireless service accounts for much of Minnesota's progress toward the state broadband goal, yet for broadband users consuming an average amount of monthly bandwidth, this technology quickly becomes unaffordable for many Minnesotans.

Finally, in the years since the state broadband goal of 10 – 20 Mbps was established in statute, broadband technology has rapidly advanced. Networks for education and health care now commonly operate at Gigabit speeds. Entire communities have Gb connections available to the home; including some here in Minnesota. Google Fiber is moving toward providing Gb residential services for less than \$100 per month. Other national, headline-grabbing initiatives, including Gig U and US Ignite, are pushing deployment and application development in targeted communities. While the 10-20 Mbps goal continues to be a challenge statewide, there is increased need to create and implement strategies that will stimulate more advanced networks in targeted areas.

Systematic broadband adoption and utilization efforts would have significant ROI for the State of Minnesota – for low-income populations, for small and medium-size businesses and for our largest education, health care and government institutions. By increasing the sophistication of use by the whole spectrum of users, Minnesota will have higher incomes, thriving businesses and innovative delivery of critical services. Especially in rural areas, efforts must be made to make access to training, coaching and people-oriented tech networking more accessible and commonplace.

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Much of this progress can be attributed to the recent deployment of 4G cellular service in rural parts of Minnesota. While we have included 4G service in this analysis, serious policy consideration should be given as to the appropriateness of including this service due to relatively high data use charges and/or data caps.

p. 16—(Note: Maps of terrestrial only are now included.)

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Note the impact of the inclusion of mobile wireless on the maps on the next three pages. In addition, these maps indicate broadband availability at the “up to” advertised speeds as submitted by the Internet Service Providers. The Task Force heard through public testimony that advertised speeds are not always available in practice.

Many factors cause delivered speeds to be slower and variable, including network design, age of the network, distance to fibered electronics, provider backhaul capacities and network congestion. The difference between the advertised speed of “up to” and the actual throughput of network connections is clearly demonstrated by the Akamai documented average Minnesota broadband connection speed of 8.4 Mbps.

Consider the impact on the state’s average connection speed of Comcast. Their standard Internet service, offered at an advertised speed of up to 25 Mbps, is subscribed to by to a significant share of the Twin Cities metro region’s residential customers. There is clearly a disconnect between advertised “up to” and delivered speeds that Akamai measures as averaging 8.4 Mbps.

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- 88.08 percent of Minnesota households have access to broadband speed via a fixed connection (cable/DSL/fiber) of at least 10 Mbps download/3 Mbps upload. When wireless connection availability is included in the analysis, 98.91 percent of Minnesota households can access broadband at the 10/3 speeds. The problem with using wireless connections as part of the availability equation is that achieving 10/3 speeds requires 4G connections that are not available in much of Minnesota and where it is available, costs are high. In addition, wireless connectivity is influenced in Minnesota by population density and also is sensitive to terrain issues present in a number of areas of the state. These data also indicate that upload speeds are the larger barrier hindering increased progress toward achieving the state speed goal.
- Broadband at the 4 Mbps/1Mbps speed defined by the Federal Communications Commission in the National Broadband Plan as meeting the minimum threshold for broadband service is available to 99.80 percent of Minnesota households (includes mobile service). Excluding mobile broadband service, 95.95 percent of Minnesota households have access at the 4 Mbps/1 Mbps speed levels. Again, the “up to” advertised speeds, as noted in almost all ISP offerings, cannot be considered a reliable measure.

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It is worth noting that eight of the top ten states for speed availability are located in the northeastern part of the United States. Only Utah (#8) and Washington (#10) are outside of that region. Those eight northeastern states have a combined size of 91,917 square miles which is roughly the same size as Minnesota (86,943 square miles). This comparison provides a good example of the challenges that Minnesota faces in extending broadband to its remaining unserved households. Smaller states, from a square mileage perspective, are going to have a significant advantage when it comes to the deployment and availability of broadband. Minnesota, because of its size and sparsely populated areas, and even

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remote rural locations, will have different challenges than a state such as Connecticut. Though, as in the northeast U.S. region, most Minnesotans live concentrated in metro areas and larger rural Minnesota communities. Massachusetts and New Hampshire each have significant rural areas similar to Minnesota's geography.

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The document puts some SNG information from the body and into a footnote.

p. 47-54

Reordered and re-drafted recommendations (the cut and paste is from p. 7)

- Create an operating fund for the new Office of Broadband Development
- Explicitly include broadband infrastructure in existing DEED and other state funding programs and investigate potential new funding mechanisms for broadband build out as other states have accomplished (page #)
- Direct the Office of Broadband Development to undertake an assessment of the adequacy of the current state broadband goals to support Minnesota's economic development needs as well as rapidly growing use for health, education and business services. Funds should be provided to support an assessment effort.(page #)
- Direct the Office of Broadband Development to develop goals and strategies designed to stimulate the deployment of Gb networks in key economic development areas including college campuses/health care centers and adjacent neighborhoods, business parks and other places as appropriate.
- Restore the sales tax exemption on central office equipment (page #)
- Continue the Connect Minnesota mapping effort for one year (page #)
- Remove Minn. Stat. 237.19 which requires communities that wish to provide municipal phone service to meet a 65% referendum prior to providing that service (or whatever Andy gets agreement on; page #)
- Increase funding for the Telecommunications/Internet Access Equity Aid and the Regional Telecommunications Library Aid programs (page #)
- Establish statewide, uniform cell siting requirements that streamline and encourage the deployment of wireless facilities (page #)

Andy's language

The task force recognizes the need to modernize Chapter 237.19. In reviewing this statute policymakers should:

1. Review the current threshold to determine whether the current supermajority threshold is proper for a governmental unit to establish itself as a competitive local exchange carrier (CLEC);

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2. Recognize that this chapter applies not only to telecommunications, but to other services the network may deliver such as broadband and video;
3. Develop a process, that ensures transparency, for local units of government to follow along with voter approval to finance, operate and own a taxpayer funded telecommunications network that competes with existing wireline and wireless providers;
4. Ensure that both government funded networks and existing private providers compete in a competitively neutral manner.

