

Broadband 101 and the Economics of Broadband Investments

LEGISLATIVE COUNCIL RURAL BROADBAND STUDY COMMITTEE

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BROADBAND 101 OVERVIEW

- BROADBAND 101 OVERVIEW
- SELECT BROADBAND OPTIONS
- WISCONSIN BROADBAND PENETRATION
- ECONOMICS OF BROADBAND INVESTMENTS



BROADBAND 101 OVERVIEW

BROADBAND IS A WIDE BANDWIDTH DATA TRANSMISSION WITH AN ABILITY TO SIMULTANEOUSLY TRANSPORT MULTIPLE SIGNALS AND TRAFFIC TYPES.



BROADBAND 101 OVERVIEW

THE MEDIUM CAN BE COAXIAL CABLE,
OPTICAL FIBER, RADIO OR TWISTED PAIR.

BROADBAND IS HIGH-SPEED INTERNET
ACCESS THAT IS ALWAYS ON AND FASTER
THAN TRADITIONAL DIAL-UP ACCESS.



BROADBAND 101 OVERVIEW

- BROADBAND, AS DEFINED BY THE FCC:

- 2008: 768KBPS

- 2010: 4MBPS/1MBPS

- 2015: 25MBPS/3MBPS*

*CAFII REQUIREMENT = 10MBPS/1MBPS



BROADBAND 101 OVERVIEW

- PRACTICAL APPLICATIONS:
 - NETFLIX: 3MBPS FOR SD; 5MBPS FOR HD; 25MBPS FOR ULTRA HD
 - SKYPE: 1.5MBPS FOR HD; 4MBPS FOR GROUP VIDEO W/ 5 PEOPLE
 - TELECOMMUTING: 5MBPS - 10MBPS



SELECT BROADBAND OPTIONS

- DIGITAL SUBSCRIBER LINE (DSL)
- FIBER TO THE X (FTTH, FTTP, FTTB)
- FIXED WIRELESS
- SATELLITE



SELECT BROADBAND OPTIONS

- DIGITAL SUBSCRIBER LINE (DSL)
 - FIBER, ELECTRONICS AND COPPER WIRE
 - DISTANCE SENSITIVE TECHNOLOGY
 - HDSL, ADSL, ADSL2, ADSL2+, VDSL, VDSL2



SELECT BROADBAND OPTIONS

- HDSL & ADSL: 1.5MBPS
- ADSL2: 12MBPS
- ADSL2+: 24MBPS
- VDSL: 52MBPS
- VDSL2: 100MBPS



SELECT BROADBAND OPTIONS

- FIBER TO THE HOME/PREMISE/BUILDING
 - 1GBPS, 10GBPS UP TO 100GBPS
 - TOP SPEEDS BASED ON NETWORK ARCHITECTURE AND ELECTRONICS
 - PASSIVE OPTICAL NETWORK (PON)
 - ACTIVE OPTICAL NETWORK (AON)



SELECT BROADBAND OPTIONS

• TDS DSL AND FTTH



<p>1Gig Fiber Internet</p> <p>up to 1Gbps</p> <p>Max Download: 1Gbps Max Upload: 400Mbps Includes: FRFF unlimited Remote PG Support Requires a TDS TV Bundle More Details</p> <p>Check Availability ></p>	<p>Extreme300 Fiber Internet</p> <p>up to 300 Mbps</p> <p>Max Download: 300Mbps Max Upload: 120Mbps Includes: FRFF unlimited Remote PG Support Requires a TDS TV Bundle More Details</p> <p>Check Availability ></p>	<p>Extreme100 Fiber Internet</p> <p>up to 100 Mbps</p> <p>Max Download: 100Mbps Max Upload: 40Mbps Requires a TDS TV Bundle More Details</p> <p>Check Availability ></p>	<p>Extreme50 Fiber Internet</p> <p>up to 50 Mbps</p> <p>Max Download: 60Mbps Max Upload: 20Mbps More Details</p> <p>Check Availability ></p>	<p>Mach Internet</p> <p>up to 25 Mbps</p> <p>Download Range: 18Mbps to 25Mbps Upload Range: 2Mbps to 5Mbps More Details</p> <p>Check Availability ></p>	<p>Extreme25 Fiber Internet</p> <p>up to 25 Mbps</p> <p>Max Download: 25Mbps Max Upload: 10Mbps More Details</p> <p>Check Availability ></p>
			<p>Turbo Internet</p> <p>up to 15 Mbps</p> <p>Download Range: 6Mbps to 15Mbps Max Upload: 768Kbps (2Mbps if delivered over fiber) More Details</p> <p>Check Availability ></p>	<p>Express Internet</p> <p>up to 5 Mbps</p> <p>Download Range: 56Kbps to 5Mbps Max Upload: 512Kbps More Details</p> <p>Check Availability ></p>	<p>Lite Internet</p> <p>up to 1 Mbps</p> <p>Download Range: 56Kbps to 1Mbps Max Upload: 512Kbps More Details</p> <p>Check Availability ></p>



SELECT BROADBAND OPTIONS

- DSL AND FTTH
- TRADITIONAL TELEPHONE COMPANIES



Wisconsin Telephone Exchange Boundaries June 2011



For Map Orders Contact:
Public Service Commission of Wisconsin
Telecommunications Division
610 North Whitney Way
Madison, WI 53711
608-267-1204
colfer.kiora@wisconsin.gov



Holding Company, Independent Company, or Cooperative

AT&T	Migera Telephone Company	Under 10,000 lines or less than 3 each
Alliance Communications	Night TeleServices	West Wisconsin Telecom Co-op
CenturyLink	Richard-Grant Telephone Co-op	Water Bodies
Cheyenne Telephone Co-op	Oskola	County Line
Frontier Communications of WI	Telephone and Data Systems Inc.	Open Territory
Lakeland Communications, Inc.	Tri-County Telephone Co-op	Unassigned Territory (U.T.)
Marquette-Adams Co-op	Under 10,000 lines or less than 3 each	Switcher Area
Maack Telecomm	Larkin Telephone Company	
Nelson Telephone Co-op	Vernon Telephone Co-op	



SELECT BROADBAND OPTIONS

- FIXED WIRELESS INTERNET
 - FIBER, TOWERS (STRUCTURE) AND ANTENNA
 - DATA CAPS FOR SOME PLANS
 - LICENSED AND UNLICENSED SPECTRUM:
1 MBPS – 1 GBPS



SELECT BROADBAND OPTIONS

- BUGTUSSEL FIXED WIRELESS INTERNET



Basic
Speeds up to 768Kbps

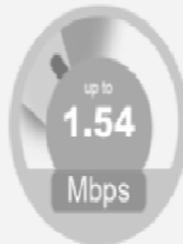


up to
768
Kbps

\$34.99/mo

Choose

Advanced
Speeds up to 1.54Mbps

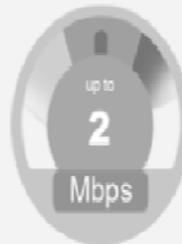


up to
1.54
Mbps

\$44.99/mo

Choose

Lightning
Speeds up to 2Mbps



up to
2
Mbps

\$54.99/mo

Choose

Executive
Speeds up to 4Mbps



up to
4
Mbps

Available in select areas

\$64.99/mo

Choose



SELECT BROADBAND OPTIONS

● NORTHWOODS CONNECT FIXED WIRELESS

Economy Plan

Our most economical package. Perfect for browsing the web, checking email, and watching videos. Features unlimited data, 4Mbps download/1Mbps upload speeds.

\$28.99/mo

(plus \$4.99 modem rental & taxes)

[CHECK AVAILABILITY](#)

Family Favorite

Ideal for families or heavy users that need a faster connection. Features unlimited data and 12Mbps download/2Mbps upload speeds.

\$78.99/mo

(plus \$4.99 modem rental & taxes)

[CHECK AVAILABILITY](#)

Enhanced Plan

Ideal for intermediate users and those who wish to stream video. Features unlimited data, 8Mbps download/1.5Mbps upload speeds.

\$58.99/mo

(plus \$4.99 modem rental & taxes)

[CHECK AVAILABILITY](#)

Business Plans

Looking to support your entire business or need an affordable redundant backup link to keep your critical business systems running? Speeds up to 500Mbps available!

Northwoods

)) CONNECT ((

High-Speed Internet



SELECT BROADBAND OPTIONS

• VERIZON FIXED WIRELESS INTERNET

4G LTE Internet INSTALLED

Introducing a high speed Internet service that harnesses the power of the Verizon 4G LTE Network to give you a lightning fast Internet connection in your home.

LTE is a trademark of ETSI.



Ditch Your Low-Speed Internet

LTE Internet (Installed)* is a residential Internet solution that uses Verizon's 4G LTE network to bring reliable, high-speed Internet service to customers with limited broadband options.



Features

- Fast Internet access with average speeds of **5-12 Mbps download** and **2-5 Mbps upload**
- Wi-Fi connectivity for up to 20 devices
- Wired (Ethernet) connectivity for up to 4 devices
- Up to 5 email accounts included



Get the Right Amount of Data

Use the Data Calculator to estimate how much data you and your family will use.

[Access Data Calculator](#)



*LTE Internet (Installed) is data only 4G LTE service, and cannot be used on the 3G Network

SELECT BROADBAND OPTIONS

- SIGNAL FIXED WIRELESS INTERNET

INTERNET FOR YOU



HOME INTERNET ACCESS RURAL PLANS

High Speed Internet access packages for those in rural areas, where broadband provider options are limited. Signal extends its network to the rural counties.

	5 MBPS	10 MBPS	15 MBPS	25 MBPS	50 MBPS
FEATURES					
24 month agreement	\$65 PER MONTH	\$75 PER MONTH	\$85 PER MONTH	\$150 PER MONTH	\$200 PER MONTH
unlimited data	ONL USLR	ONL OR TWO USLRS	1 WO USLRS	FAMILY	FAMILY PLUS
reliable streaming	SINGLE DEVICE ONLINE BROWSING	ONE VIDEO STREAM OR ONE DEVICE	ONE VIDEO STREAM MULTIPLE DEVICES	TWO VIDEO STREAMS OR SUPER HD	MULTIPLE STREAMS MULTIPLE DEVICES
\$200 set up fee	5 MBPS DOWNLOAD	10 MBPS DOWNLOAD	15 MBPS DOWNLOAD	25 MBPS DOWNLOAD	50 MBPS DOWNLOAD
	1 MBPS UPLOAD	1 MBPS UPLOAD	1 MBPS UPLOAD	2 MBPS UPLOAD	2 MBPS UPLOAD
	SIGN UP	SIGN UP	SIGN UP	SIGN UP	SIGN UP



SELECT BROADBAND OPTIONS

- SATELLITE INTERNET
 - SATELLITE & RESIDENTIAL DISH
 - TYPICALLY INCLUDE DATA CAPS
 - SPEEDS: 5MBPS TO 15MBPS DOWNLOAD



SELECT BROADBAND OPTIONS

• HUGHESNET SATELLITE INTERNET

HughesNet.  | Gen4 RESIDENTIAL

Choice	Prime Plus	Pro Plus	Max
<p>Your price</p> <p>\$49⁹⁹ /mo</p> <p><small>Offer ends 5/30/18</small></p>	<p>Your price</p> <p>\$59⁹⁹ /mo</p> <p><small>Offer ends 5/30/18</small></p>	<p>Your price</p> <p>\$79⁹⁹ /mo</p> <p><small>Offer ends 5/30/18</small></p>	<p>Your price</p> <p>\$129⁹⁹ /mo</p> <p><small>Offer ends 5/30/18</small></p>
<p>Speeds up to</p> <p>Download Upload</p> <p>5 1 Mbps Mbps</p>	<p>Speeds up to</p> <p>Download Upload</p> <p>10 1 Mbps Mbps</p>	<p>Speeds up to</p> <p>Download Upload</p> <p>10 2 Mbps Mbps</p>	<p>Speeds up to</p> <p>Download Upload</p> <p>15 2 Mbps Mbps</p>
<p>55GB/month of data, including 5GB Anytime allowance PLUS 50GB of Bonus Bytes (2am-8am)!*</p>	<p>60GB/month of data, including 10GB Anytime allowance PLUS 50GB of Bonus Bytes (2am-8am)!*</p>	<p>65GB/month of data, including 15GB Anytime allowance PLUS 50GB of Bonus Bytes (2am-8am)!*</p>	<p>70GB/month of data, including 20GB Anytime allowance PLUS 50GB of Bonus Bytes (2am-8am)!*</p>
<p>Good for one user</p>	<p>Good for multiple users</p>	<p>Good for multiple users</p>	<p>Good for a large group or heavy users</p>
			
<p>Simple web searches</p>	<p>Browsing the web, emailing & sharing photos</p>	<p>Frequent browsing, emailing, social networking, watching video clips and more!</p>	<p>Heavy Internet use, watching movies, downloading music and more!</p>



WI BROADBAND PENETRATION

Wireline

Download Upload

Speed	Percent Population	Nationwide
Dn>3Mbps Up>768kbps	94.2%	94.8%
Download > 3Mbps	94.8%	95.4%
Download > 6Mbps	93.6%	94.2%
Download > 10Mbps	91.4%	92.9%
Download > 25Mbps	86.2%	85.3%
Download > 50Mbps	83.9%	83.2%
Download > 100Mbps	40.2%	64.8%
Download > 1Gbps	0.5%	7.9%

Source API Call



WI BROADBAND PENETRATION

- CAF II TARGETS 230,000 LOCATIONS
- 230,000 IS APPROXIMATELY 8.5% OF WISCONSIN HOMES

Download > 6Mbps	93.6%		94.2%
Download > 10Mbps	91.4%		92.9%
Download > 25Mbps	86.2%		85.3%
Download > 50Mbps	83.9%		83.2%

Demographics

Total area (sq miles)	62,354
Population	5,810,685
Housing Units	2,724,779



WI BROADBAND PENETRATION

inwisconsin.com/select-wisconsin/available-sites/locate-in-Wisconsin



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Businesses



Communities



Heat Maps



Local Layers



Compare



Certified in WI



Gigabit Parks



Add Properties



Help

SEARCH

HEAT MAPS

LAYERS

COMPARE

Find:



Buildings



Sites



Businesses



Communities

Square Feet

MIN SIZE

MAX SIZE

For Sale For Lease

Select Type

Office Industrial Retail Special

MORE FILTERS

SEARCH

Reset Minimize



Tools

My Folder

ECONOMICS OF BROADBAND INVESTMENTS

- FIBER PER MILE: MINIMUM \$20K TO \$30K
- TOWER CONSTRUCTION: \$200K - \$250K
- RURAL HOME PASSED: ~\$2500 w/o
DROP; ~\$1000 DROP



ECONOMICS OF BROADBAND

INVESTMENTS – 2016 PSC GRANTS

- FTTH #1: ~\$3200 PER HOME DOWN TO ~\$2600 PER HOME PASSED WITH GRANT
- FTTH #2: ~\$3400 PER HOME DOWN TO ~\$1900 PER HOME PASSED WITH GRANT
- FTTH #3: ~\$3000 PER HOME DOWN TO ~\$2500 PER HOME PASSED WITH GRANT



ECONOMICS OF BROADBAND INVESTMENTS - VARIABLES

- CUSTOMER SURVEYS
- CUSTOMER CONTRACTS/INCENTIVES
- EASEMENT WAIVERS = ACCOUNT CREDIT
- AID TO CONSTRUCTION = ACCOUNT CREDITS



QUESTIONS?

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