



## Reports to the Legislature

- Status of Investments in  
Advanced Telecommunications  
Infrastructure in Wisconsin
- Universal Service Fund



PUBLIC SERVICE COMMISSION OF WISCONSIN

# Status of Investments in Advanced Telecommunications Infrastructure in Wisconsin

Year 2006

## Universal Service Fund Fiscal Years 2006 - 2007

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Docket 05-ST-115

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# To the Reader:

These two reports fulfill the requirements of Wis. Stat. §§ 196.196(5)(f) and 196.218(5r). The infrastructure report includes text, graphs, and maps that document investments and technology deployment across the state. As mandated, the infrastructure report specifically contains information on the progress made in the areas of distance learning, libraries, health care, opportunities for persons with disabilities and other persons in the home, and the deployment of Integrated Services Digital Network (ISDN). Appendix A of the report contains Geographic Information Systems (GIS) maps showing geographic locations of specific infrastructure elements and services. The E911 section has been updated and includes a reference map.

The Universal Service Fund (USF) report illustrates USF programs and expenditures for fiscal years 2006-2007. The report documents expenditures by program and provides maps for grant recipient locations.

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# Forward

April 2008

We are pleased to send you these two reports:

- The Public Service Commission's seventh biennial report on telecommunications infrastructure in Wisconsin is submitted as required by Wis. Stat. § 196.196(5)(f). The report includes text and maps that document the progress of investments in advanced telecommunications infrastructure. The report also contains information on the infrastructure and comments on distance learning, library services, health care and opportunities for persons with disabilities and other persons in the home and deployment of Integrated Services Digital Network (ISDN) as required by the statute, along with information on the E911 Wireless Grant Program.
- The Universal Service Fund report is also being filed in compliance with Wis. Stat. § 196.218(5r) and contains information on programs funded by the Universal Service Fund.

This report provides a picture as to what telecommunications technologies exist in the state and where they are deployed. The report also provides information on the state Universal Service Fund. Because of the continued and ongoing evolution in the communications industry, the Commission will continue to report on and review critical issues in the telecommunications industry and will identify concerns and topics that may pose important policy questions in the future.

Sincerely,

Daniel R. Ebert  
Chairperson

Mark Meyer  
Commissioner

Lauren Azar  
Commissioner



# Executive Summary

The Public Service Commission has prepared this publication that includes two reports:

The seventh biennial report to the Legislature is required under Wis. Stat. § 196.196(5)(f). The report contains updated information and reviews new services and technologies related to the deployment of and investment in telecommunications infrastructure throughout the state. This infrastructure report generally looks at deployment as of the end of 2006. This report also comments on the use of advanced telecommunications infrastructure for distance learning, libraries and access to health care and contains a section updating Wireless E911 grant activities.

The Universal Service Fund (USF) report (Part 5 herein) is being filed in compliance with Wis. Stat. § 196.218(5r) and contains information on programs funded by the state USF. A brief description of the federal USF is also included.

The appendix of the report contains appendices A-D that provide maps, information on the infrastructure report preparation, details on USF grants and alternative regulation plans. Appendix A contains Geographic Information Systems (GIS) maps that show the geographic location of various infrastructure elements and services in the state, along with USF grant recipient locations.

Since 1994, when the legislation passed that created these reporting requirements, technologies and provider makeup continue to change, transforming and altering the telecommunications landscape. Consequently, some issues have arisen that alter the concerns about infrastructure or universal service that existed in 1994. In this report, the Commission notes these changes and identifies some concerns that should be considered as the industry further evolves.

## Advanced Infrastructure for Designated Purposes

Wis. Stat. § 196.196(5)(f)1.a.-d. requires reporting on the use of infrastructure for distance learning, interconnection to libraries, access to health care, assistance to persons with disabilities and ISDN. Based on the tracking of these items, since 1993 Wisconsin Act 496 (Act 496) was passed, the Commission notes that progress has taken place. The Commission recommends future reporting on specific infrastructure uses only when issues on availability or deployment exist. Evidence suggests that the telecommunications network is no longer a significant limiting factor to providing service such as distance learning, interconnection of libraries, access to health care and services to persons with disabilities, although in some areas of the state the availability of broadband for these entities is still limited. Rather than infrastructure, the most significant limiting factor for providing services mentioned is cost, for both providers and customers, and the development of equipment that will allow individuals in the home to more effectively use the telecommunications infrastructure.

The State of Wisconsin's Technology for Education Achievement (TEACH) initiative has been very successful and made resources available to provide two-way full motion video to nearly all K-12 school districts and technical colleges.

The Internet continues to be the medium of choice for distance education programs in higher education. With more reliance on the Internet there have been requests for increases in high-speed Internet capacity. Nearly all libraries have access to the Internet with access continuing to grow. One library has established a full-motion video-conferencing facility for distance education. Capacity constraints are increasing as the demand for high-speed service grows. Development of wide area networks between libraries has been a major benefit to the expansion of the automated circulation process.

In health care, there is an increased use of existing high-speed networks between hospitals and clinics; however, the number of dedicated high-speed telehealth networks remains limited.

Studies that track the use of telemedicine have not mentioned that the telecommunications infrastructure is a problem. Instead, they continue to mention factors related to cost and slow adoption, licensing and lack of standards. Meeting the goal of delivering medical service to individual premises requires increased investment along with increased usage to create economies of scale to pay for the networks.

For individuals with disabilities, the focus remains on the development of assistive technologies that enable the more effective use of telecommunications infrastructure. The changes in technology make it difficult to assure that all devices and programs that use the telecommunications network are accessible to persons with disabilities.

Both incumbent providers and newer competitive companies have invested in infrastructure in Wisconsin to provide service to education and health care providers.

## Infrastructure Deployment

This section documents the status of infrastructure mainly of Incumbent Local Exchange Carriers (ILECs) and Competitive Local Exchange Carriers (CLECs). Wis. Stat. § 196.196(5)(f)1.e. and f. requires reporting on Integrated Services Digital Network (ISDN) deployment and other infrastructure investments identified by the Commission. Although the statute requires reporting of deployment of ISDN, new technologies such as Digital Subscriber Line (DSL), Fiber to the Premises (FTTP), and Voice over Internet Protocol (VoIP) are superseding ISDN deployment.<sup>1</sup>

Tables, figures, and maps throughout the report reflect data reported by providers. The report shows progress in ILEC switching, outside plant and advanced services.

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<sup>1</sup> The Commission recommends the specific reference to ISDN in Wis. Stat. § 196.196(5)(f)1.e. be replaced with a more generic reference to technologies.

Switching information is shown based on the regulated side of the network, although more switches exist on the deregulated side of the network.

Outside plant includes copper, fiber, and other electronic equipment. Fiber optic facilities continue to grow in the state with a number of fiber facilities replacing legacy copper networks using Fiber in the Feeder and Fiber to the Premises (FTTP) designs. In addition to the ILECs, CLECs and CATV providers also have deployed fiber facilities in communities across the state.

Deployment of advanced services, including DSL technology that offers high-speed connections over copper lines, continues to expand with a number of ILECs across the state offering DSL to 100 percent of all customers within their service areas. In addition, Digital Loop Carrier (DLC) deployment often involves further fiber deployment and brings advanced services closer to the customer.

Competition continues to evolve. There were 161 CLECs certified to provide service at year-end 2006, although less than half of these companies were actively providing service. CLEC services range from local service to high-speed Internet to dark fiber. A number of CLECs have deployed networks of fiber facilities across the state and a number of local municipalities have also been certified as competitive telecommunications providers. ILECs and CLECs are impacted by competition from cable companies, wireless services and VoIP type services. Both ILEC and CLEC access line losses may be attributed in part to the continued growth and marketing of the VoIP, wireless, and CATV providers.

Broadband technology deployment continues to grow with the main providers of broadband service being ILECs, CLECs, CATV, and wireless providers. The definition of the speed of broadband has always been in debate. Both the Federal Communications Commission (FCC) and Federal USDA Rural Development Agency (RDA) under the Rural Development Utilities Program (RDUP) are looking at revising the definition of broadband as increased speeds of service offered to customers become more common. The FCC is considering the collection of data based on a range of speed definitions to allow for greater differentiation among high-speed services.

Many companies have invested in fiber and provide innovative services; examples of this deployment can be found across the state. In addition, a state program was recently launched to assist in broadband deployment; this is the "Internet Equipment Tax Credit and Exemption Program" administered by the Department of Commerce. Nine companies were granted tax credits and exemptions in this program to help spur broadband deployment in rural Wisconsin.

The data in the Infrastructure Report covers mainly ILEC and CLEC infrastructure; CATV provider information is shown where available. Minimal information is available on wireless and satellite technologies, which are a growing part of the broadband footprint in the state. Despite the problems faced with data collection, it is useful to track ILEC and CLEC investments in infrastructure and deployments of technologies. Documenting trends and changes in the industries provides information that can be useful for regulatory decisions and legislative directives.

A number of states have undertaken statewide broadband inventories. The Commission recommends that the legislature consider completing an inventory of this type for Wisconsin. Such an inventory would benefit consumers and give the Legislature information to serve as a basis for determining broadband policy for the State of Wisconsin.

## E911 Wireless Grant Program

Another enhancement to infrastructure and improvement of service to citizens of Wisconsin is the implementation of a wireless 911 system. 2003 Wisconsin Act 48 created the three-year grant program, administered by the Commission, under which local governments and wireless telecommunications service providers are reimbursed for certain costs associated with establishing an enhanced wireless 911 system. Enhanced 911 service routes a wireless 911 call over a dedicated network, independent of the public switched network, and automatically reports the name and telephone number corresponding to the calling party's wireless telephone to the call-taker at the public safety answering point. Most importantly, the enhanced wireless 911 service also reports the location of the calling party by geographic grid coordinates. Grants were awarded to 68 counties and 8 wireless carriers. Wireless E911 service, with its location identifying capabilities, is now implemented in 59 counties. An E911 status map is provided in Appendix A of this report.

## Universal Service Fund

1993 Wisconsin Act 496 established the USF to ensure all state residents have access to essential and advanced telecommunications services (Wis. Stat. § 196.218). The fund not only assists customers in areas of the state that have relatively high costs for telecommunications services, low-income customers, and customers with disabilities, it also assists in the deployment of the advanced service capabilities of a modern telecommunications infrastructure throughout the state. Programs under the broad umbrella of the USF consist of technology and consumer-oriented programs managed by the Commission, and some technology and education-oriented programs that direct funding to other state government entities. This report focuses on the Commission portion of the USF.

Although the Commission develops the overall policy and procedures for the telecommunications-related portions of the USF, and manages and operates several of the programs, it is required under state statute to contract with a private firm to administer the fund. The USF Council, also established by Act 496, advises the Commission on the administration of the USF and on proposed rule changes. Although 2007 WI Act 20 removed the \$6.0 million budget appropriation cap for the Commission portions of the USF in 2007, the USF budget for FY07 and FY08 remains at \$6.0 million for each year. Telecommunications providers fund the USF by assessments on providers' gross intrastate operating revenues as reported to the Commission.

Nine Commission programs (see Wis. Admin. Code ch. PSC 160) are currently funded by the USF. These are:

- Telecommunications Equipment Purchase Program (TEPP)
- Two-line Voice or Speech Carryover
- High Rate Ceiling Credits
- Lifeline Program
- Link-Up Program
- Newline for the Blind (this is a DPI established and managed program)
- Nonprofit Groups – Access Programs or Projects
- Medical Telecommunications Equipment Program
- Public Interest Payphones

Tables and figures included in Part 5, and maps and tables in Appendices A and C summarize the expenditures and grant details for the fund.

Beyond the Commission-administered USF, there are some federal USF programs that also serve to support universal service for customers in Wisconsin. The FCC is in the process of reviewing the rules for the USF. The Commission will monitor these changes and provide comments when appropriate.

The Commission recommends that the existing requirement for an annual USF report be changed to a biennial reporting requirement and that future USF reports be combined (as was this one) with the biennial Infrastructure Report.

## Conclusions and Recommendations

These reports will continue to document the status of existing infrastructure, trends and advances in technologies and USF program statistics. The Commission will continue to monitor changes in the industry and alert the Legislature to concerns and new issues as they are identified. In addition, the Commission will point out concerns that may arise with reporting and data collection caused by the divergent state of regulation and oversight of the telecommunications landscape.

Previous infrastructure reports proposed changes to Wis. Stat. § 196.196(5)(f)1.a.-f. to remove some of the current statute language on ISDN and include, rather, a more neutral reporting requirement on changing technologies. These recommended changes made here again, will help make the report more flexible.

There has been progress in both fiber and broadband network deployment across the state. Wisconsin has a robust network of fiber backbone facilities in place along with a number of FTTP designs and wireless networks in place. These and other fiber networks are used extensively and invested in by all types of network providers. Consumers are seeing the benefit of having these advanced services in place. It remains important to track where broadband service is available and to

identify providers and the types of services they are offering. The Commission recommends that the Legislature consider completing an inventory of broadband deployment and capabilities for Wisconsin.

Data is collected from ILECs and CLECs through company-filed annual reports and data requests. Data is also requested from CATV providers. It remains difficult to collect data and identify those providers not under Commission jurisdiction and, as a result, it is not possible to give a complete picture of the infrastructure present and the services available throughout the State of Wisconsin. As in the past, the Commission recommends statutory changes to permit better infrastructure tracking. With the information that could be obtained, the data in this report provides a baseline for infrastructure and services throughout the state.

In addition, consumers must be kept informed of their responsibilities and have a resource for help when problems arise with their communications services. The Commission will continue to prepare and make available information so that consumers have resources they need and materials that can inform them of how they may be affected by new technologies.

### **Recommendations**

The Commission recommends the following items be addressed by the Legislature:

- 1) A change to Wis. Stat. § 196.196(5)f. reporting requirements, including replacement of the specific ISDN mandate with a more neutral technology reference.
- 2) Completion of a broadband inventory for the state of Wisconsin.
- 3) Establishment of statutory authority under Wis. Stat. § 196.25 to allow the Commission to collect data from CATV, wireless and VoIP providers so that the Legislature and the public have complete and relevant information covering all areas of the communications industry. In addition, a provision should be added to assess a penalty or other form of redress where providers do not respond to data requests as required under Wis. Stat. § 196.25(3).
- 4) A change of the annual USF reporting requirement to a biennial requirement so that future USF reports and infrastructure reports can be jointly prepared and filed.

The Commission appreciates the opportunity to provide this information to the Legislature and will continue to provide the Legislature with updates and new developments on both infrastructure and universal service fund matters.

# Introduction

## Preface

This is the seventh in a series of reports on telecommunication infrastructure in Wisconsin. In 1994 when these reports were mandated in the 1993 Wisconsin Act 496, the Act focused on industry changes and technologies that were state-of-the-art at the time. Change continues on the communications landscape. New providers have entered the scene. Existing providers have merged with other companies and formed new entities. With these company changes have come technology changes. Wireless and cable providers now are viable competitors to wireline providers in many areas. Customers can now obtain voice, video, and data services and in some cases, cellular service all in one bundle of services from one provider. VoIP is more common as all providers explore ways to enhance and improve communications services.

Changes are also evidenced by the replacement of legacy copper networks with fiber networks. Fiber facilities are built further into the network with fiber to the node or even FTTP designs. New switches that provide a media gateway of voice, video, and data in one communications stream are replacing traditional circuit switches. Wireless networks are being deployed to provide broadband services, and VoIP-type voice services exist throughout the state.

Many providers, using their own facilities, or through partnerships with other companies, have expanded the infrastructure footprint in the state. Regulatory changes at the Federal level continue to impact providers and their service offerings in Wisconsin and throughout the United States. As inter-carrier compensation, further deregulation, universal service programs, and consumer protection issues are discussed, the Commission continues to monitor and track these issues as they affect policies on a state level.

Broadband service remains a current issue of debate. Definitions abound as to what speed constitutes broadband service. There are many providers who offer 3, 6, and 10 Mbps service to customers. WiMAX wireless systems are being deployed that give customers high-speed Internet access along with digital phone service and can be subscribed to in place of wireline-based DSL service offerings. Symmetric upload and download speeds are becoming more common.

Consumer reliance on and demand for broadband is very evident in the state today. In Wisconsin, even many rural areas have excellent broadband coverage. The availability of broadband service provides many economic advantages to communities and can blur the line between rural and urban service areas. There remains; however, pockets of areas that appear to have minimal or no

broadband service availability in the state. Even when broadband is available it may not be offered at prices that customers prefer. How these areas are identified and what criteria should be used to determine broadband availability are issues that are currently being debated.

There is also continued debate on the amount of regulation that is appropriate, and on what and who should be regulated. Consumer protection, viable competition, technology deployment, and universal service protections are concerns that face regulators on all levels.

The Commission is serious about its obligation to monitor and document infrastructure deployment, service availability, and universal service and keep the Legislature informed of the progress being made and the changes taking place.<sup>2</sup> The Infrastructure and USF Reports will continue to evolve as changes in technology and infrastructure deployment takes place as the definition of universal service changes. The Commission will continue to alert the Legislature to advancements, concerns and new issues in the telecommunications landscape as they arise. This will be done where appropriate through direct reporting of services offered and infrastructure in place. It will also include a broader look at the industry issues in general and how they will affect the providers and consumers of communications services.

## Report Layout

This document is formatted in general like earlier reports and is divided into seven parts. The infrastructure portions of this report generally reflect year-end information for 2006. A further detailed description of the report preparation is contained in Appendix B.

**Part 1:** Provides a preface, introduction and general information for the reports.

**Part 2:** Includes an update on information related to the use of advanced telecommunications infrastructure for designated purposes, such as schools, libraries, health care, and persons with disabilities.

**Part 3:** Covers the progress of the deployment of infrastructure for advanced telecommunications services by ILEC and CLEC providers with historical data through year-end 2006 and includes material on broadband deployment. Some information is also included for CATV providers.

**Part 4:** Provides an overview of the Wireless E911 Grant program, administered by the Commission along with a map showing the stages of deployment.

**Part 5:** Describes the Universal Service Fund and includes tables showing grant recipients and grant amounts, along with maps of USF grant recipient locations.

**Part 6:** Notes conclusions, and recommendations.

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<sup>2</sup> In February 2008, the Commission opened its docket 5-II-1777, *Investigation into the Level of Regulation for Telecommunications Providers*. In this docket, the Commission intends “to comprehensively explore – in a timely manner – the state of the telecommunications industry in this state” and to address changes in rules, statutes or policies that may be appropriate to reflect changes in the market.

**Part 7:** Contains four appendices:

- Appendix A: GIS maps showing geographical reference.
- Appendix B: Information on the general preparation of the reports.
- Appendix C: Lists the details of the Universal Service Fund programs and expenditures.
- Appendix D: Lists the ILECs operating under alternative regulation.



## Use of Advanced Infrastructure for Designated Purposes

This section of the report provides information on the progress made in the use of advanced telecommunications infrastructure for distance learning, interconnection of libraries, access to health care, assistance to persons with disabilities, and the deployment of ISDN, as required by Wis. Stat. § 196.196(5)(f)1. After tracking the use of what was considered to be advanced telecommunications infrastructure over the years since 1993 Wisconsin Act 496 was passed, the Commission notes that progress has taken place in these areas. The Commission recommends future reporting on these specific infrastructure uses only when issues on availability or deployment exist.<sup>3</sup> The evidence suggests that the telecommunications network is no longer a significant limiting factor for the use of telecommunications to provide services such as distance learning, interconnection of libraries, access to health care and services to persons with disabilities. The primary exception to this conclusion is that there are some areas of the state where the availability of broadband for home-based access to education, health care, and employment to persons with disabilities is still limited. Rather than infrastructure, the most significant limiting factors for providing the services mentioned above remain the ability of some customers to pay for services, the ability of advanced service providers to recover their costs for providing services, and the development of equipment that will allow individuals in the home to effectively use the telecommunications infrastructure.

### Wis. Stat. § 196.196(5)(f):

1. Before January 1, 1996, and biennially thereafter, the Commission shall submit a report to the joint committee on information policy and technology describing the status of investments in advanced telecommunications infrastructure in this state. The report shall include information on the progress made in all of the following areas:
  - a. Distance learning, including the number of schools and other educational institutions connected to distance learning networks.
  - b. Interconnection of libraries, including the number of libraries with video conferencing and network access capabilities.
  - c. Access to health care.
  - d. Education, health care and employment opportunities for the disabled and other persons in the home.
  - e. Integrated services digital network deployment.
  - f. Other infrastructure investments identified by the Commission.

<sup>3</sup> Specifically Wis. Stat. § 196.196(5)(f)1.a-d. The Commission also recommends modification of Wis. Stat. § 196.196(5)(f)1.e. relative to ISDN.

The Commission finds that trends mentioned in earlier reports on the use of advanced telecommunications services are ongoing and that the general conclusions remain valid. For the last report see <http://psc.wi.gov/utilityinfo/tele/infrastructureCompetitive/infrastructure-index.htm>.

Resources including facilities provided through discounted rates are made available through the Technology for Educational Achievement (TEACH) program, and USF grants have made it possible to provide two-way full-motion video distance learning to nearly all K-12 school districts and technical colleges. Over the past two years, more schools have been added to existing networks, additional distance education classes are being offered, and the enrollment of students has increased.

A network diagram of BadgerNet, the Wisconsin Department of Administration's distance education video network, is at [http://www.doa.state.wi.us/docs\\_view2.asp?docid=4938](http://www.doa.state.wi.us/docs_view2.asp?docid=4938). A map of distance education systems is at <http://www.uwex.edu/disted/waden/resources/bnet.pdf>. More details of Wisconsin's distance education networks are on the website of the Wisconsin Association of Distance Education Networks (WADEN): <http://www.uwex.edu/disted/waden/network.cfm>.

The Internet has become the medium of choice for distance education programs in higher education, so there is less reliance on dedicated high-speed networks linking schools. With more reliance on the Internet there have been requests for increases in high-speed Internet capacity.

Nearly all libraries have access to the Internet and the number of libraries with high-speed dedicated access continues to grow. However, only one library has had the resources to establish a full-motion video conferencing facility for distance education. At least 120 libraries are experiencing capacity constraints as the demand for services provided over high-speed lines continues to grow.<sup>4</sup> Broadband access to the Internet through libraries has been most useful in rural libraries where Internet access has the lowest penetration and is the most expensive. As a result, some libraries have had to place restrictions on the types of activities, such as interactive gaming, that require the most capacity.

A major benefit from the development of wide area networks between libraries has been the expansion of the shared integrated library system with an automated circulation process that made possible the increased sharing of resources between libraries. Since 2001, Wisconsin has ranked #1 in the country in per capita interlibrary loaning of materials.<sup>5</sup>

In health care, there has been increased use of existing high-capacity networks between hospitals and clinics; however, the number of these dedicated high-speed telehealth networks remains limited. More resources are being used for the development of monitoring equipment that can be used in the home, connected through the telephone network or through the Internet to health care providers.

Studies that track the use of telemedicine have not mentioned that telecommunications infrastructure is a problem. Instead, they continue to mention factors such as reluctance of

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<sup>4</sup> See the July 24, 2007, comments submitted to the Commission by Robert Boucher of the Department of Public Instruction., and the paper, "2008 E-rate Application Cycle and Bandwidth Options," (November 2007) available on the DPI website. <http://dpi.wi.gov/pld/pdf/bandwidthoptions.pdf>.

<sup>5</sup> Ibid.

insurance companies and Medicare and Medicaid programs to pay for telemedicine, inertia by doctors and health care providers in adopting telecommunications in their practices, licensing issues between states, and the lack of standards for digitizing medical images and for maintaining patient privacy. Even where infrastructure has been deployed by the telecommunications companies, the cost to use the advanced technology limits its use by the medical community. The ultimate goal of delivering medical services to individual premises, as opposed to hospitals and clinics, will require not only increased investment to bring faster services into the outlying areas of the network but increased usage that creates the economies of scale needed to pay for the network. Delivering services to individual premises also will require an investment in more fiber in the distribution system of telecommunications networks.

For individuals with disabilities, the focus remains on the development of assistive technologies that enable the use of the telecommunications infrastructure, such as improving access to computers, web pages and Internet connections. There has not been a focus on the use of high-speed telecommunications networks. It has been difficult for organizations promoting the use of advanced technologies to improve the lives of persons with disabilities to keep up with the rapid changes in technology to make sure that the devices and programs that connect through the telecommunications network are accessible to persons with disabilities.

The growth of broadband Internet to the home does hold out the promise that more services will be available through the Internet mitigating the need to physically travel to sites for employment, health care or other services. The use of broadband for these purposes is not well documented because it is small scale, well dispersed, and difficult to track.

Over the past few years, there has been a significant investment in infrastructure by new telecommunications providers that is being used to provide services to education and health care providers. Investment by new companies leads to more aggressive and innovative marketing of services that use telecommunications because new companies do not have a base of existing customers to help recover the investment, and this marketing increases the services over which the costs can be recovered. Even though many companies that entered the Wisconsin telecommunications market after 1994 have not survived, their network investments, as well as those of incumbent providers, remain available to support advanced services.

The importance of marketing as a tool to spur new uses of the telecommunications infrastructure is illustrated in Norlight's program to help customers obtain subsidies from the USF and other government programs. With these subsidies, the Rural Wisconsin Health Cooperative (RWHC) was able to establish an ATM/Relay data network connecting 29 independent rural hospitals in central and southern Wisconsin. A map of the network can be found at the RWHC website: <http://www.rwhc.com/services/datadiagram.aspx>. Norlight has one of the few CLEC fiber networks that connect areas outside of Wisconsin's urban areas. The RWHC network is notable because earlier health care telecommunications networks were limited to hospitals and clinics within the same company or government agency, and these tend to be the larger health care providers. Another unique feature of the RWHC network is that it is an open network where entities that are not members can use its facilities.

The RWHC network has been used by health care providers much the same way that other health care networks used their early telecommunications networks, for data transfer and back-up, for continuing education, and for consultation between medical personnel. Actual telemedicine was initially limited to teleradiology, with other uses such as telepsychology gradually added. Over the past two years, the telemedicine networks mentioned in previous infrastructure reports continue to add sites and find new users. These include the Marshfield Clinic network, the La Crosse Medical Health Science Consortium, Affinity Health System in the Fox Valley, the Mayo Clinic network in the Eau Claire area, Aurora Health Care in eastern and southern Wisconsin as well as the Veterans Administration networks.

The RWHC expressed some concern that even if their members had the funding, higher bandwidth over fiber would not be an option for some rural hospitals and clinics because the fiber has not been installed in certain areas. This same frustration has led some local municipalities to form CLECs and install their own fiber networks connecting government offices and major employers. See <http://www.wibuilder.com/telecommunications/high-speed.html>.

## Infrastructure Deployment

This section of the report documents the status of infrastructure deployment based on year-end 2006 data.<sup>6</sup> The section concentrates on ILEC and CLEC infrastructure, although some CATV data is also provided.

Under Wis. Stat. § 196.196(5)(f), the Legislature directed the Commission to report on the progress of infrastructure deployment that included ISDN along with other infrastructure investments identified by the Commission. While ISDN remains available as a service, the trend of migration to newer technologies such as DSL, VoIP and FTTP supersedes the ISDN deployment. There is more focus on fiber and broadband deployment in all areas of Wisconsin.

**ILECs** are the traditional local exchange companies that have provided telephone service for decades throughout the state.

**CLECs** are competitive providers of telecommunications services that are entering many Wisconsin markets to offer customers a choice of services, including local telephone service.

**CATV** providers have made television services available throughout the state for many years. Many CATV providers also offer access to the Internet through their provision of broadband service via a cable modem and voice services using Internet protocol.

This section provides information on ILEC switching, ILEC outside plant, ILEC advanced services, CLEC infrastructure, and broadband deployment. Tables and figures, along with the GIS maps in Appendix A, give a picture of the location and types of infrastructure throughout the state.<sup>7</sup>

### ILEC Switching

Wisconsin has had 100 percent digital switching since 1998 and companies continue to invest in switching equipment as a necessary component of the network.

Figure 3-1 indicates ILEC switching information for year-end 2006. This figure shows switch deployment on the regulated side of the network. It therefore does not capture all the existing switches in the state. For example, packet switching, as reported on the regulated side of

<sup>6</sup> Earlier infrastructure reports included many detailed descriptions of individual technologies, including the pros and cons of their deployment. Readers who would like that detail can refer to the March 2006 report available on the Commission website at: <http://psc.wi.gov/utilityinfo/tele/infrastructureCompetitive/infrastructure-index.htm>. This site also provides links to copies of previous reports.

<sup>7</sup> As in previous reports, this information reflects data as reported by the companies in their annual reports to the Commission and in the responses to the data request collected by the Commission staff in the third quarter of 2007.

the network, shows slight growth. However, Wisconsin communication providers have significantly more packet switches in place in the state; these switches are often on the deregulated side of the network. These additional packet switches are used to handle traffic to the outside world and increased high-speed Internet traffic, including VoIP traffic. Because these packet switches exist on the deregulated side of the network, they are not reported in a regulated ILECs' annual reports to the Commission. Infra Map 1, in Appendix A, shows the geographic locations of the packet switches as reported on the regulated side of the ILEC network.

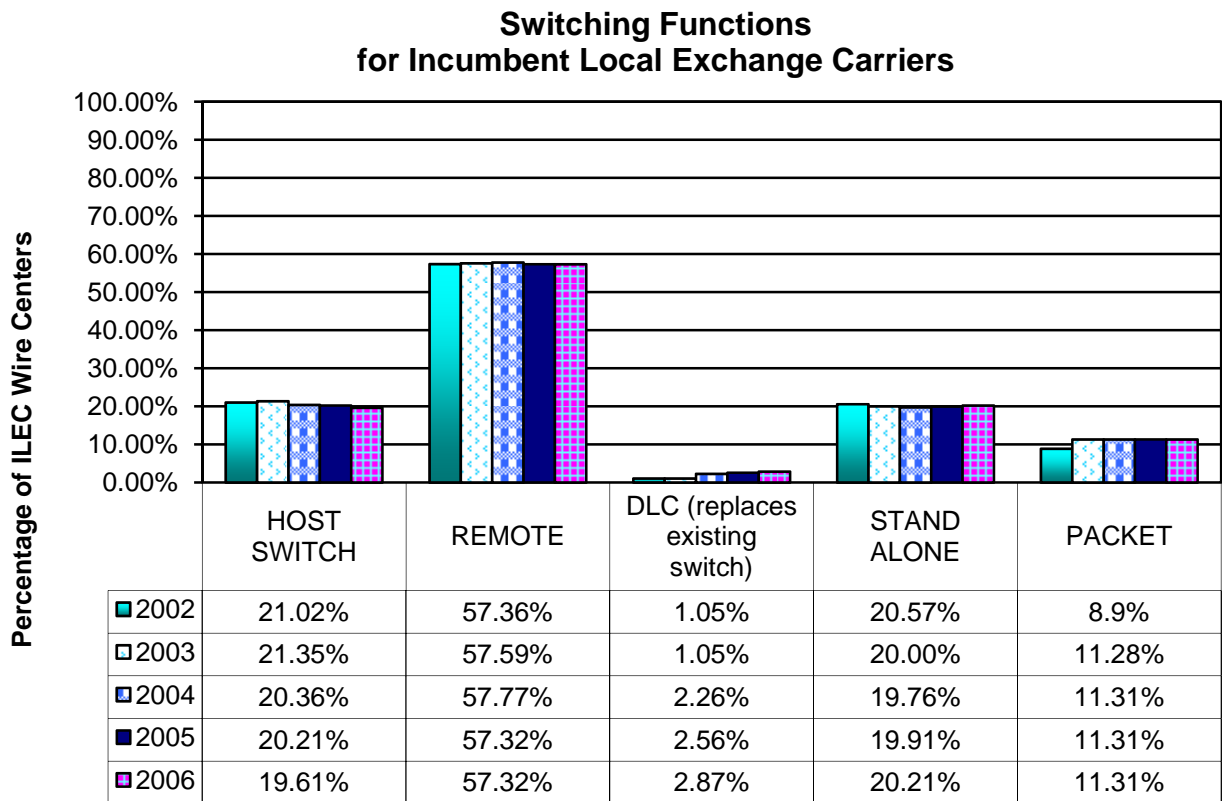


Figure 3-1

January 2008

Source: PSC ILEC Annual Reports

## ILEC Outside Plant

Outside plant (OSP) includes copper cables, fiber cables, Digital Loop Carriers (DLC) and other electronic equipment physically located outside of the central office building. Fiber facilities are increasingly replacing legacy copper cables as providers use more fiber in the feeder and deploy FTTP designs. FTTP information is covered in more detail in the broadband portion of this section and on Infra Map 10 in Appendix A.

For report purposes, the following definitions apply:

**Feeder Fiber:** Fiber originating in the central office and terminating at an intermediate distribution point such as a digital service area (DSA).

**Fiber in the Loop:** The distribution portion of a fiber facility from the DSA to the customer drop wire.

**Fiber to the Premises (FTTP):** Fiber originating from the serving central office and terminating on the customer premises.

Fiber deployment data is shown in Figure 3-2 and Table A. Fiber is deployed throughout all counties in the state. In addition to increases in the use of fiber in the feeder and fiber in the loop, Passive Optical Networks (PON) provide an all-fiber connection to locations further into the network. This PON deployment often includes FTTP applications. ILECs have added FTTP in a number of areas. CLECs and CATV providers are also adding fiber facilities in a number of communities throughout the state.

### Fiber Facilities within the ILEC Exchanges

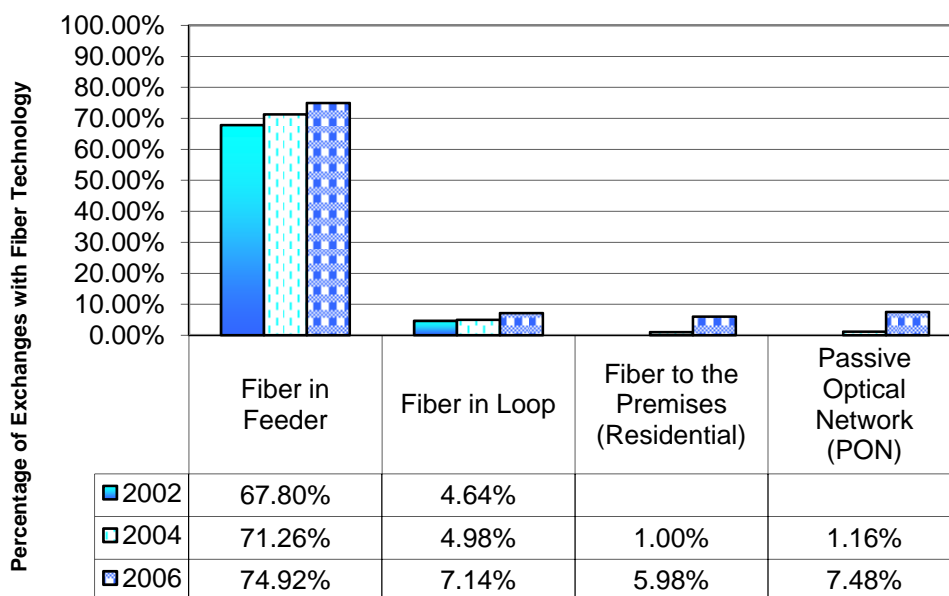


Figure 3-2 January 2008 Source: PSC ILEC Annual Reports and ILEC Data Request

Table 3-A provides a historical picture of total ILEC fiber miles reported in the state. This fiber is deployed as inter-office fiber, fiber in the feeder, fiber in the loop and FTTP.

<b>ILEC Fiber Deployment</b>	
Year	Total Fiber Miles in Place
2006	20,465
2005	19,553
2004	18,902
2003	17,946
2002	16,847
2001	16,084
2000	14,133

Table 3-A January 2008 Source: PSC ILEC Annual Reports

Both large and small companies continue to deploy fiber as part of their network upgrades. Vernon Telephone Cooperative, TDS (in the city of Monroe), and Bloomer Telephone Company are examples of smaller ILECs deploying FTTP in exchange locations. In many areas of the state, these types of fiber facilities are replacing legacy copper networks and providing increased bandwidth, thus enabling state-of-the-art voice, video, and data services.

### **ILEC Advanced Services**

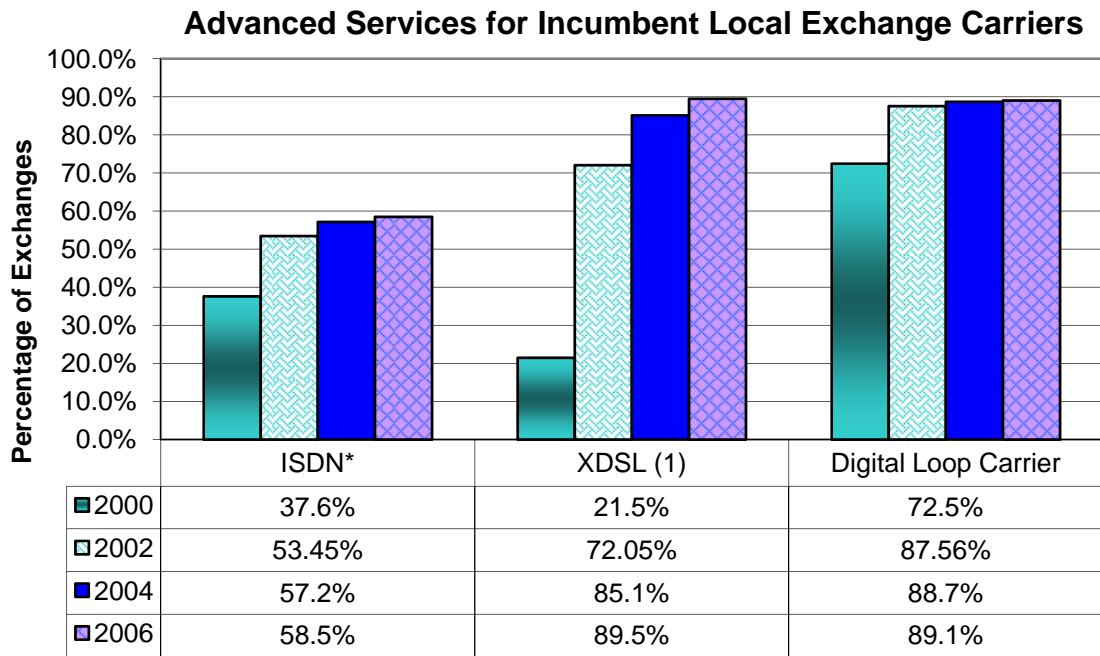
Figure 3-3 shows the growth in deployment of some ILEC advanced services including ISDN and DSL.

Wis. Stat. § 196.196(5)(f)1.e. specifically requires reporting of ISDN deployment. Infra Map 2, in Appendix A, indicates the geographic location of exchanges with ISDN in place.<sup>8</sup>

DSL continues to grow, with a number of ILECs making DSL available for purchase to 100 percent of their customers. More information on DSL is provided under the broadband deployment discussion further on in this text. Infra Map 6, in Appendix A, also gives more information on the location of areas where DSL is offered.

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<sup>8</sup> Under recommended changes to this statute, specific references to ISDN would be modified with a more generic reference to technologies.



\*Indicates information by percentage of wire centers.

(1) Percentage of wire centers does not include AT&T exchanges; DSL in AT&T exchanges is offered under AADS, an AT&T CLEC subsidiary.

Figure 3-3      January 2008      Source: PSC ILEC Annual Reports and ILEC Data Request

Digital Loop Carrier (DLC) is also shown on Figure 3-3, and while not strictly an advanced service, the companies that deploy DLC often install high bandwidth fiber optic facilities from the central office to the DLC and bring a wide range of services to customers served off the DLC equipment.

Figure 3-4 includes an indication of further advanced services including SONET deployment that provides high-speed transmission over fiber optic lines. This figure includes information on SONET ring applications. Infra Map 3, in Appendix A, indicates the geographic locations of exchanges with SONET in place. The figure also provides information on the deployment of Wave Division Multiplexing (WDM), often used in larger high traffic areas, which provides for increased data carrying capacity on fiber optic lines by operating at multiple wavelengths. The advantage of WDM use is increased capacity without the need for additional fiber deployment.

**Incumbent Local Exchange Carrier Advanced Services:  
Additional Items**

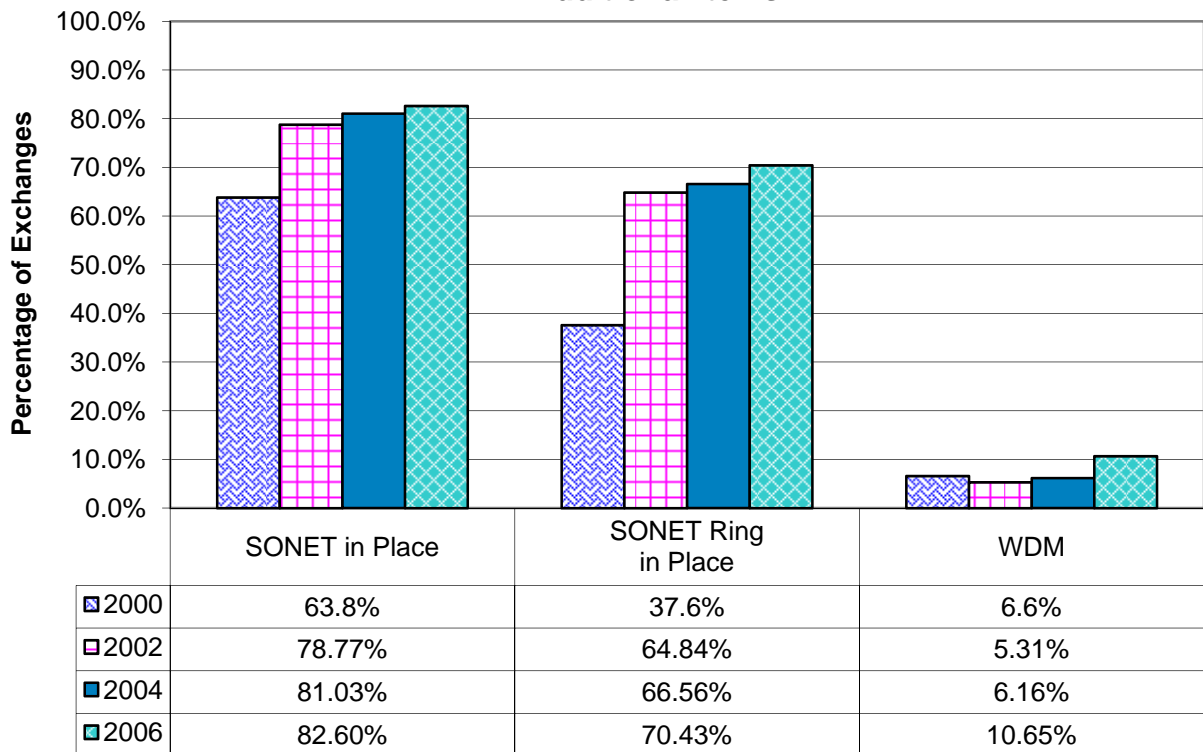


Figure 3-4

January 2008

Source: PSC ILEC Data Request

Table 3-B indicates the annual ILEC capital investments reported in annual reports filed with the Commission. These expenditures cover all types of infrastructure deployment discussed in the ILEC portion of this report.

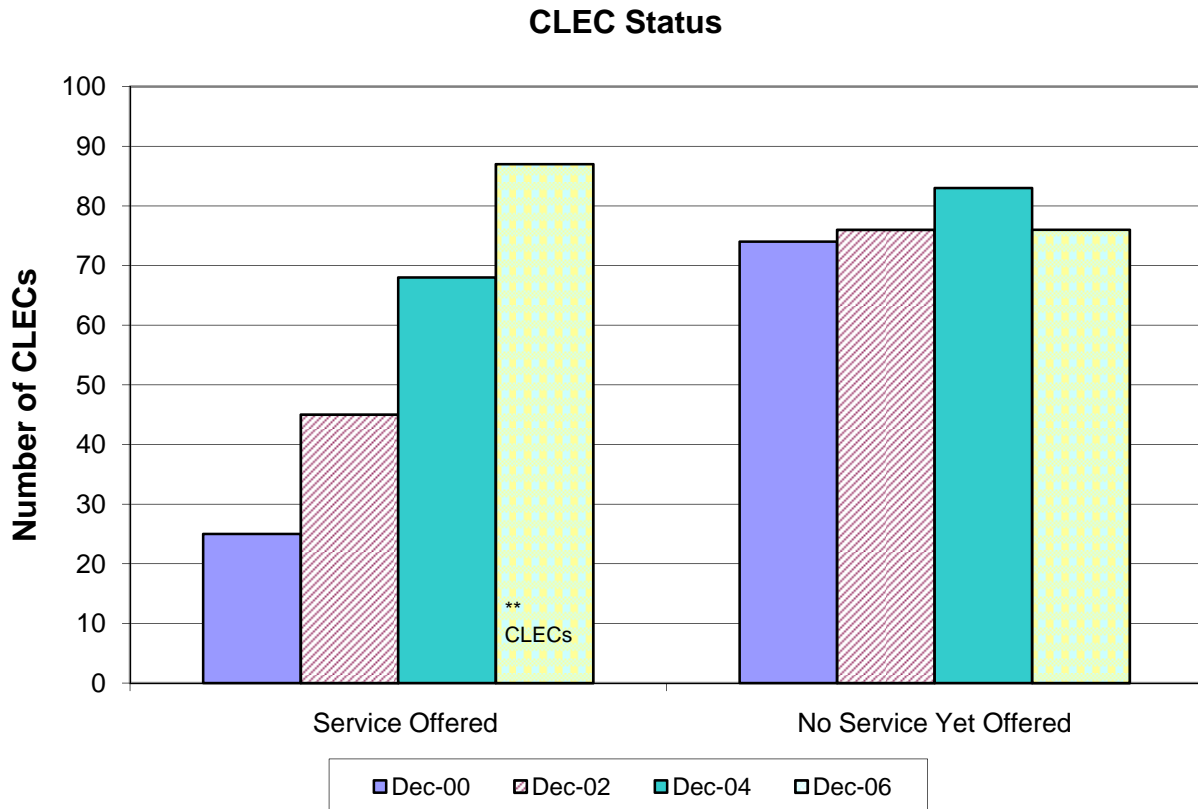
Total ILEC Plant Additions		
Year	Plant in Dollars	Change from Previous Year
2006	\$346,822,000	8.35%
2005	\$320,088,000	7.41%
2004	\$298,010,000	11.99%
2003	\$266,103,000	-42.14%
2002	\$459,944,118	-31.87%
2001	\$675,075,438	20.70%
2000	\$559,306,926	7.67%
1999	\$519,487,322	16.24%
1998	\$446,899,834	19.36%
1997	\$374,403,187	-4.26%
1996	\$391,080,104	10.13%
1995	\$355,114,857	20.18%
1994	\$295,488,914	-6.07%
1993	\$314,575,622	3.70%
1992	\$303,348,717	

Table 3-B January 2008 Source: PSC ILEC Annual Reports

Note that plant additions do fluctuate from year-to-year depending on the infrastructure requirements of the companies. For example, large expenditures for switching or fiber deployment may drive up cost for an individual year. In addition, companies have become more efficient as some technologies have been improved or become less costly.

## Competitive Local Exchange Carrier Infrastructure

Competition in the telecommunications industry continues to evolve in Wisconsin. At year-end 2006, an estimated 161 CLECs were certified to provide service in Wisconsin, although not all of these companies certified are actively providing service. Approximately 87 CLECs reported offering various types of services from high speed internet lines to dark fiber service; 33 of those reported offering some type of local service.



\*\* 33 CLECs offer some type of basic local service, business or residential or both.

Figure 3-5      January 2008      Source: PSC CLEC Annual Reports

Figure 3-5 is a snapshot of CLEC service updated to year-end 2006. Like many ILECs, the CLECs that offer local service often bundle their services into packages that include local, long distance, and advanced services, such as three-way calling and call waiting. Some CLECs have infrastructure in place, form partnerships with other providers and/or use ILEC lines or switches to serve their customers. A number of providers offer wholesale services and dark fiber to other network providers. Figure 3-6 indicates the type of services offered and the number of CLECs that reported offering these services.

### CLEC Data as of Year End 2006

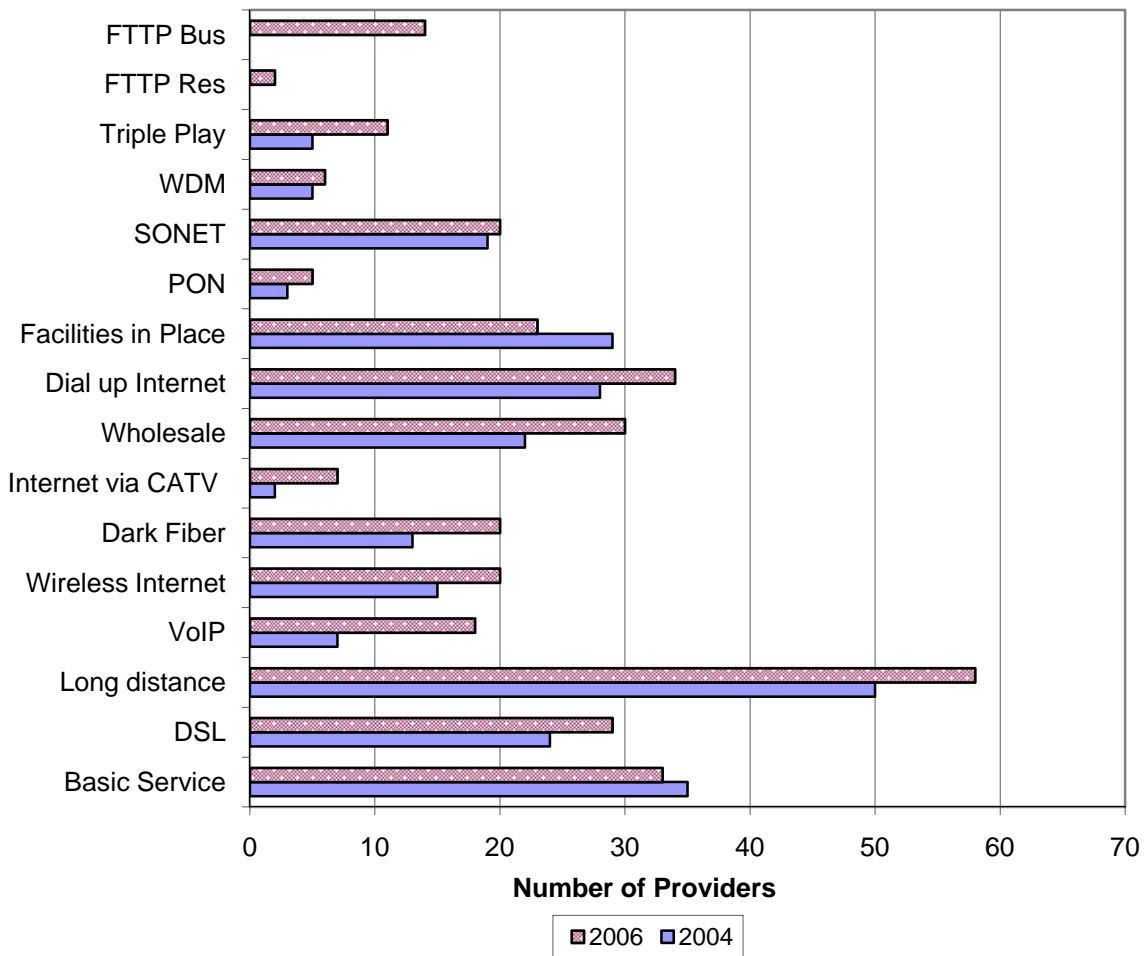


Figure 3-6

January 2008

Source: PSC CLEC Annual Reports

Table 3-C indicates the CLEC-reported additions to plant for each year from 2001 to 2006.

<b>Reported Investments by CLECs</b>	
<b>Year</b>	<b>Additions to Plant</b>
2006	\$65,396,000
2005	\$98,917,000
2004	\$77,336,700
2003	\$61,711,989
2002	\$67,731,081
2001	\$99,763,868

Table 3-C      January 2008      Source: PSC CLEC Annual Report

Although figures for CLEC fiber deployment are not readily available, a number of CLECs, including Norlight, WITS, and Midwest Fiber Networks, have deployed a network of fiber facilities throughout the state.

CLEC service areas were compiled by referencing ILEC exchange areas or zip codes. Infra Map 4 in, Appendix A, indicating ILEC regulation, provides a picture of the geographic areas open to competition within the state,<sup>9</sup> and Infra Map 5, in Appendix A, indicates where these CLECs report that service is available. As noted previously, the CLECs may not offer service to the entire ILEC service or zip code area.

Many municipalities are also certified as CLECs and can provide telecommunications services. Table 3-D updates information on municipalities that reported offering service at the end of 2006. The services offered by these entities include local service, dark fiber, and wireless Internet. In addition, the municipal CLECs often provide service to city offices and schools in their communities.

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<sup>9</sup> Generally, those areas shown as under price regulation or alternative regulation are open to entry by competitors.

Utility ID	Municipal CLEC
3320	MANITOWOC PUBLIC UTILITIES
3420	MARSHFIELD ELECTRIC AND WATER DEPT
3560	MENASHA ELECTRIC & WATER UTILITIES
4360	OCONTO FALLS WATER AND LIGHT COMM
4970	REEDSBURG UTILITY COMMISSION
5070	RICHLAND CENTER ELECTRIC UTILITY
5350	SHAWANO MUNICIPAL UTILITIES
5990	TWO RIVERS WATER & LIGHT UTILITY
2720	VILLAGE OF JACKSON WATER UTILITY
3636	CITY OF WAUPACA
180	ANTIGO WATER UTILITY
350	BANGOR MUNICIPAL UTILITY
740	BRODHEAD WATER AND LIGHT COMMISSION
1200	CLINTONVILLE WATER & ELECTRIC UTY
1300	COLUMBUS WATER AND LIGHT DEPT
1580	DEFOREST MUNICIPAL WATER UTILITY
1980	FENNIMORE WATER AND LIGHT
2650	HUSTISFORD UTILITIES
2770	JOHNSON CREEK WATER UTILITY
2800	KAUKAUNA UTILITIES
3000	LAKE MILLS LIGHT AND WATER DEPT
4130	NEW LONDON ELECTRIC & WATER UTILITY
4340	OCONOMOWOC CITY OF UTILITIES
4740	PLYMOUTH UTILITIES
5110	RIVER FALLS MUNICIPAL UTILITY
5745	STOUGHTON MUNICIPAL UTILITIES
5780	STURGEON BAY UTILITIES
5810	SUN PRAIRIE WATER & LIGHT COMMISSION
6220	WATERLOO WATER AND LIGHT COMM
6290	WAUPUN PUBLIC UTILITIES
<b>Bold text indicates those municipalities offering service as of year-end 2006.</b>	

Table 3-D

January 2008

Source: PSC File

CLECs and ILECs both offer advanced technologies in various areas of the state. These services include FTTP, some wireless technology for voice, broadband, and triple play offerings of voice, video, and data service. Both ILECs and CLECs note that they are impacted by competition from cable companies, wireless service, and the newer VoIP type services.

Figure 3-7 is a snapshot of ILEC and CLEC lines reported through year-end 2006.

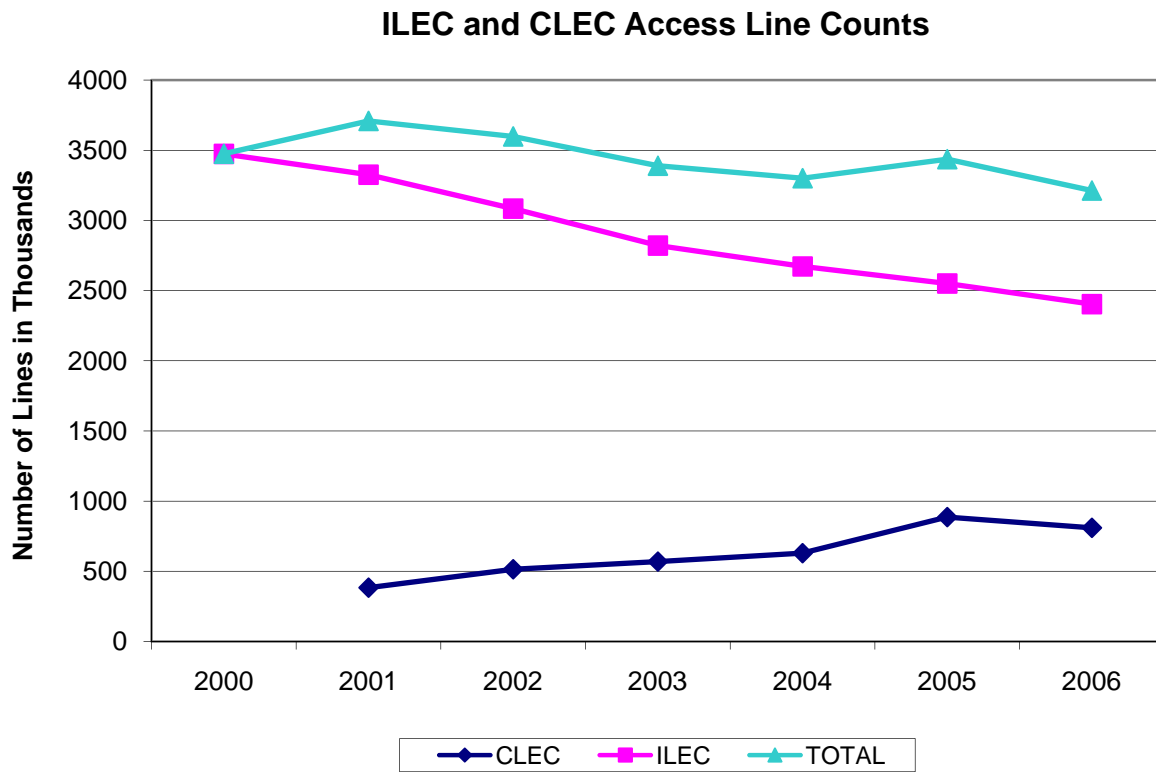


Figure 3-7

January 2008

Source: PSC Annual Reports

Figure 3-7 shows trends for ILEC and CLEC lines since 2000. Part of the downturn in ILEC access lines may be attributed to VoIP, wireless, and CATV providers as they continue their marketing assault against land-line service providers and win customers away from the incumbent, and even the competitive, land-line providers. CATV companies (unless operating as CLECs) and VoIP providers are not certified nor regulated by the Commission, therefore service line numbers are not required to be reported to the Commission.

## Broadband Deployment

Broadband service is commonly considered as a faster, higher bandwidth service than is historically associated with voice traffic in the telecommunications system. It is a measure of how much or how fast information can be transmitted. Broadband technology deployment continues to grow in the state with the main providers being ILECs, CLECs, wireless, and CATV providers.<sup>10</sup>

For this report, broadband is defined as transmission in both directions – to the Internet and from the Internet – at a data-transmission speed of 200 Kbps or greater.

Definitions of broadband have always been in debate. This report uses the definition of broadband as transmission speeds of 200 Kbps or higher in both directions. This is the same definition used by the USDA Rural Development Utilities Program (RDUP) (formerly the Rural Utility Service). The FCC data for broadband is also collected based on “high-speed lines” with a transmission speed of at least 200 Kbps in one direction. Both the FCC and RDUP are looking at revising the speed reference in their definitions of broadband as increased speeds of 1 to 6 Mbps and higher become more common. Recently, the FCC discussed collecting broadband data by speed classification.<sup>11</sup> These proposed classifications are:

- First generation data @200 kbps to 768 kbps
- Basic broadband Tier 1 @768 kbps to 1.5 Mbps
- Broadband Tier 2 @ 1.5 Mbps to 3 Mbps
- Broadband Tier 3 @ 3 Mbps to 6 Mbps
- Broadband Tier 4 @ 6 Mbps to 10 Mbps
- Broadband Tier 5 @ 10 Mbps to 25 Mbps
- Broadband Tier 6 @ 25 Mbps to 100 Mbps
- Broadband Tier 7 @ speeds greater than 100 Mbps

The FCC noted that these speed classifications would allow for greater differentiation among higher speed services.

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<sup>10</sup> This report generally addresses infrastructure at the end of 2006. In 2007, wireless broadband has become a more visible entrant to the market especially under RDUP Broadband loan applications. The Commission does not regulate wireless and has very limited data on that market segment. Satellite service providers, also unregulated, have also advertised broadband service offerings more heavily in the state.

<sup>11</sup> Notice of Proposed Rulemaking, *In the Matter of Development of Nationwide Broadband Data to Evaluate Reasonable and timely Deployment of Advanced Service to All Americans, Improvement of Wireless Broadband Subscriber Data, and Development of Data on Interconnect Voice over Internet Protocol (VoIP) Subscriber Data*, WC Docket No. 07-38, FCC 07-17, 22 F.C.C.R. 7760, 22 FCC Rcd. 7760 (F.C.C. Apr 16, 2007)

Broadband service is provided by a number of technologies. The most common technologies are listed below in Table 3-E. These technologies can be used to provide voice, video and/or data type services.

Type	Technology and Use
Digital Subscriber Line (DSL)	Copper wire based facilities used by ILECs and CLECs, in urban and rural areas
Cable TV Systems (with cable modems)	Hybrid fiber/coaxial cable facilities used by CATV systems in urban and rural areas
Direct Broadcast Satellite (DBS)	Satellite signals used in rural areas where other broadband access is not available
Fixed and Mobile Wireless including WiMax	Radio signals in urban and rural applications
Fiber-To-The-Premises (FTTP)	All fiber facilities used in construction to new developments and business parks

Table 3-E

January 2008

Source: PSC Staff

RDUP has made a number of broadband loans in 2006, and into 2007, that provide broadband access using wireless technology and FTTP applications. RDUP has also proposed rules so that loan applicants must serve low-cost, high-density areas as well as high-cost, low-density areas. Recently, TDS announced a WiMax deployment to the city of Madison that will supply residential users with up to 6 Mbps upstream and 3 Mbps downstream. This service will compete with existing cable and satellite offerings.

FCC data for year-end 2006 indicates just over 1,250,000 high-speed connections were in service in Wisconsin. Close to 600,000 of these are high-speed connections provided by the cable companies. Figure 3-8 below indicates the percentage of broadband customers in Wisconsin served by the different industry types. Mobile wireless lines are shown in this figure although these were not included in past reports. The mobile wireless data addition somewhat changes the distribution of broadband shares shown on earlier reports.

**Market Share Percentage of Broadband Connections by Provider Type**

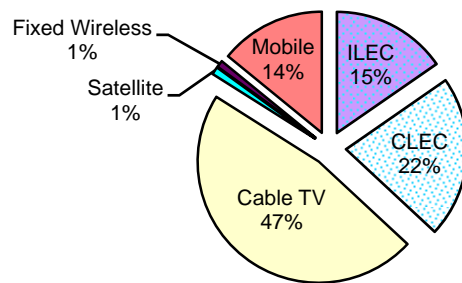


Figure 3-8

January 2008

Source: FCC 477 Report

A number of both ILEC and CLEC facilities-based providers in Wisconsin offer broadband Internet service in areas across the state via an affiliated wireless provider. The wireless broadband Internet service offering often covers areas that are not otherwise served or are underserved with broadband services. This type of service offering gives customers the availability of broadband Internet service and/or an alternative provider for this service. In addition to the broadband Internet service, voice service is sometimes made available and bundled in a package with wireless broadband Internet service.

Wireless providers offer service with flexible connections and affordable rates. Wireless technology has some challenges, depending on the technology used. This includes lack of or interruption in line-of-sight signals, multi-path signals that can cause fading, fluctuations in the signal strength, and electrical interference that can cause static and noise on the calls. Despite these challenges, wireless companies do contribute to the overall infrastructure placed in the state and to the increased availability of and choices for broadband offerings for consumers.

Satellite service is another option giving customers the opportunity to purchase service that provides a wide choice of programming options and digital broadband Internet access. This satellite service, like wireless service, offers flexibility for installation and can, in theory, bring service into any home where compatible equipment is in place.

Many providers offer voice service using Internet protocol, commonly known as VoIP. VoIP<sup>12</sup> refers to the transmission of voice using Internet protocol via a packetized switching network and make use of the backbone networks that are present throughout the state.

DSL technology is used in many areas to provide broadband service. Table 3-F indicates that the majority of access lines in the state are in exchanges with a DSL offering. DSL is dependent on the distance of the customer location from the central office or from more remotely located DSL facilities. Therefore, even if DSL is offered within an exchange, it would not necessarily be available to all customers in the exchange – for instance, those living far from the ILEC central office.

	<b>2002</b>	<b>2004</b>	<b>2006</b>
Total ILEC Access Lines, Dec. 2004	3,134,913	2,710,636	2,400,910
ILEC Access Lines in areas where DSL is offered	2,662,955	2,610,678	2,321,476
ILEC Access Lines in areas where DSL is not offered	471,958	99,958	79,434

Table 3-F

January 2008

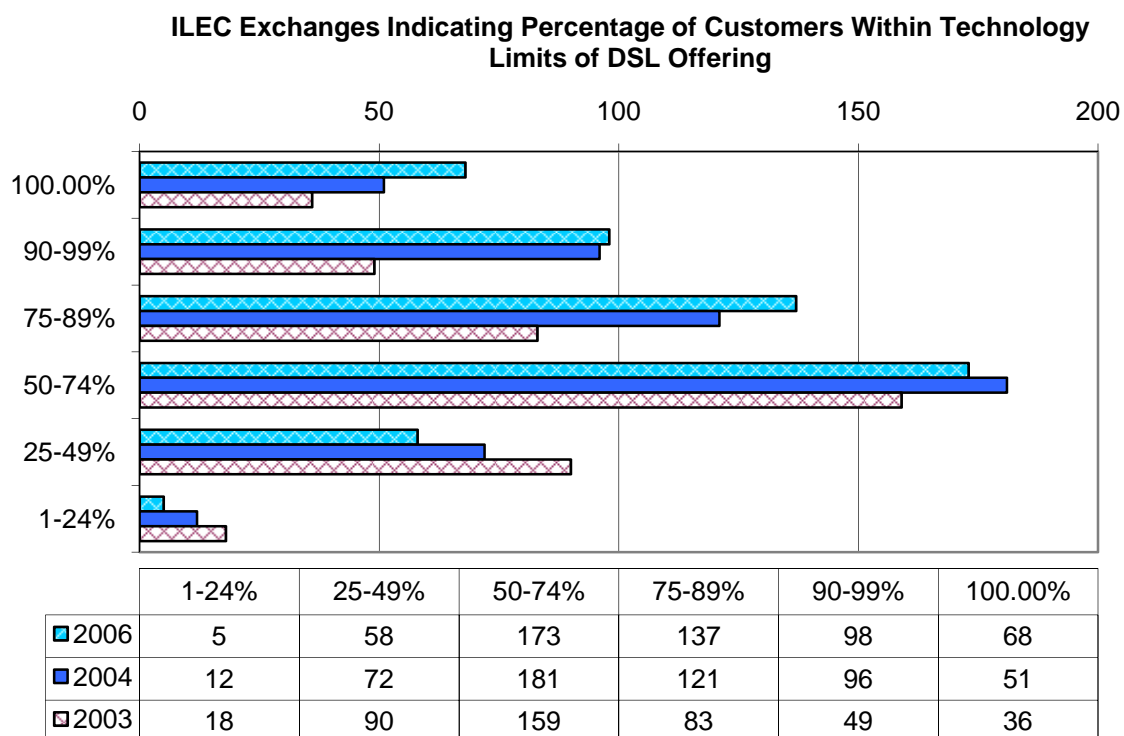
Source: PSC 2006 Annual Report

Infra Maps 6 through 8, in Appendix A, indicate areas where broadband service offerings are reported by ILECs, CLECs, and CATV providers. The maps are based on either ILEC exchange areas or area zip codes. Infra Map 6 shows the location of exchanges that reported offering DSL, including those that have 100 percent availability of DSL to all customers within the exchange. Those CATV providers that offer high-speed Internet are shown on Infra Map 7. Infra Map 8 is a combined map of ILECs, CLECs, and CATV providers. As noted earlier, broadband service may be available in an area; however, not all potential customers in that area necessarily have access to

<sup>12</sup> Although VoIP is offered by a number of different providers, some using private networks and some using the public Internet, VoIP service referred to in this report is used in a generic context.

the service offerings, especially those furthest from the central office. This is true for ILEC, CLEC, and CATV provider offerings. Wireless service can augment the broadband service offerings however, wireless service also has its limitations as terrain and type of equipment can affect where service is available.

In order to evaluate what percentage of customers have access to DSL, the ILECs were asked what percentage of their customers within each exchange area are within the technology limits of DSL or a similar broadband offering. Figure 3-9 shows an overall view of the ILEC provided responses on this issue.



Note: the percentages in the figure include AT&T exchanges.

Figure 3-9

January 2008

Source: PSC Data Request

“Triple play” is another advanced service offering being deployed to meet customer needs. Triple play service, that is voice, video, and data in one package, is offered to consumers by both ILEC and CLEC providers. Infra Map 9, in Appendix A, indicates the areas where ILECs reported offering triple play service. Triple play offerings often are provided at package prices that are less than the sum of the individual service rates. Companies who offer triple play packages often provide the different elements of the service through agreements with subsidiary companies. For instance, some large ILECs offer voice and data, along with video service through a Direct TV partnership.

A number of ILECs and CLECs have, or have planned for, infrastructure that includes fiber additions, FTTP or fixed wireless installations to provide for further deployment of high-speed services. These networks make high-speed and advanced services available to more customers and bring the services much closer to the customers' doors. Infra Map 10 indicates areas where ILECs reported FTTP in place or in progress. Some further examples of advanced infrastructure deployment are:

- Bloomer Telephone Company located in Chippewa County has recently completed construction of an FTTP design in the Bloomer exchange. Using RDUP loan funds, Bloomer Telephone Company has constructed roughly 93 miles of fiber within its serving area that will provide customers with high-speed access. Cutover of customers to the new fiber facilities began in late 2007.
- Vernon Telephone Cooperative and its CLEC affiliate, Vernon Communications, are using fiber to provide innovative services to their existing customers and digital TV to a neighboring community.
- Amery Telcom, Inc., has begun installation of state-of-the-art switches to serve existing customers in its exchanges. These switches are linked with a fiber ring and using Ethernet technology will continue to bring and improve the speed and efficiency of these high speed service offerings to all the customers that it serves.
- The Reedsburg Utility Commission became a CLEC in 2000. Since 2003, Reedsburg has offered a variety of services, including high-speed symmetrical Internet (1,5, and 10 Mbps), Cable TV (basic, extended basic, digital, HDTV), and telephone (POTS local and long distance, Centrex, PBX, TI, etc.) to residential and business customers.

A recently approved state program has also assisted in broadband deployment. Under an "Internet Equipment Tax Credit and Exemption Program," administered by the state Department of Commerce, nine telecommunications companies were granted a total of \$7.5 million in sales tax exemption and tax credits to help expand broadband access. The companies awarded these tax credits are:

Amery Telcom, Inc.  
 AT&T  
 CenturyTel, Inc.  
 DiscoverNet of Wisconsin LLC  
 Door Peninsula Internet, Inc.  
 Lakeland Communications  
 Midwest Fiber Networks  
 Northern Net Exposure  
 TDS Telecommunications Corp.

The Commerce Department reported that these businesses will invest more than \$80 million in broadband equipment in 63 counties in the State of Wisconsin.

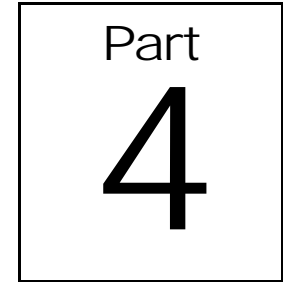
As noted previously, the data in this report documents infrastructure for ILECs, CLECs, and, when possible, CATV providers. Minimal information is available on wireless and satellite technologies which are a growing part of the broadband footprint in the state. In addition, providers that offer voice service using Internet Protocol (IP) based technology and the number of customers subscribing to this type of service are difficult to track. While availability of this type of technology may benefit some consumers, it is often difficult to determine what companies offer this service in the state, where they offer service, and what numbers of customers they serve.

Despite the problems faced with data collection, it is still useful to track ILEC and CLEC reported investments in infrastructure. These companies have installed a network of switches, cables, and fibers that serve customers throughout the state. Following these investments provides an overview of what technologies are being used, and are planned, and what services are being offered to customers. For example, in the 2006 annual reports, two ILECs and 18 CLECs reported VoIP technology is in use. It is expected this trend to VoIP-based technologies and services will continue. Documenting this technology trend and various other elements of the changes in the industry does assist in providing information that can be used as a basis for regulatory decisions and legislative directives.

A number of states have undertaken statewide inventories of broadband service offerings. Connect Kentucky, one of the most well-known studies,<sup>13</sup> was completed as a public-private effort and resulted in a county-by-county strategic plan for broadband advancement. The state of California recently completed a broadband mapping project to document the availability and speed of broadband offerings in the state. A California task force will further study the data and provide recommendations on funding and resources to further broadband deployment and adoption. The Commission recommends that the Legislature consider a mandate for the undertaking of this type of broadband inventory in Wisconsin. Although Wisconsin has excellent broadband coverage in many rural areas, more detailed data collection could document all types of providers that are offering broadband services here and provide a more complete picture of broadband capabilities in the state. This type of inventory would benefit consumers and give the Legislature information which could serve as a basis for determining a broadband policy for the State of Wisconsin.

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<sup>13</sup> Information on Connect Kentucky study can be found at: <http://www.connectkentucky.org>.



## Wireless E911 Grant Program

Another example of an enhancement to infrastructure and the improvement of service to Wisconsin citizens is the implementation of an enhanced wireless 911 system. In 2005, the Commission implemented a three-year grant program created by 2003 Wisconsin Act 48 to reimburse local governments and wireless telecommunications service providers for certain costs they will incur to establish this enhanced wireless 911 service (E911). Enhanced wireless 911 service routes a wireless 911 call over a dedicated network, independent of the public switched network, and automatically reports the name and telephone number corresponding to the calling party's wireless telephone to the call taker at the public safety answering point. Most importantly, the enhanced wireless 911 service also reports the location of the calling party by geographic grid coordinates.

As of January 2008, the 911 Fund has disbursed \$23,764,266.29 in grants to 68 counties and 8 wireless carriers. As a result of these grants, the wireless E911 service has now been implemented in 59 counties. The funds for these grants are obtained through a monthly surcharge on wireless telephone service billed in Wisconsin. The Commission recently reduced that surcharge to \$0.43, effective January 1, 2008. Under Act 48, the wireless E911 grant program will expire on April 1, 2009. Appendix A, Map E911-1, indicates the implementation status by county for the E911 wireless grants.

Further Q & A's regarding the Wireless E911 program is also available on the PSC web site at: <http://psc.wi.gov/consumerinfo/faq%27s/tele/teleFAQ-index.htm>.



## Universal Service Fund

**Background and History:** The Wisconsin Universal Service Fund (USF) was established under 1993 Wisconsin Act 496 to ensure that all state residents have access to essential and advanced telecommunications services. As part of the change in telecommunications regulation, the Act included explicit requirements for universal service. Universal service can be defined as getting and keeping people on the network, making certain that all customers, including customer groups with specific needs, have access to affordable telecommunications services, and providing access to advanced service capabilities. Act 496 required the Commission to establish a Universal Service Fund, appoint a USF Council, and promulgate rules on universal service including definitions of essential services and advanced service capabilities.<sup>14</sup>

The first universal service rules (Wis. Admin. Code ch. PSC 160) were approved in 1996. The rules were subsequently revised in 2000 and are currently in the process of being revised again.

The purpose of the USF is to provide funds for programs to: (1) assist customers in areas of the state that have relatively high costs of telecommunications services, low-income customers, and disabled customers in obtaining affordable access to a basic set of essential telecommunications services; and (2) assist in the deployment of advanced service capabilities of a modern telecommunications infrastructure throughout the state.

As provided in Wis. Stat. § 196.218(3), telecommunications providers in the state are required to contribute to the Universal Service Fund. Assessments are based on the providers' gross intrastate operating revenues as reported in their annual report to the Commission and the budget level approved in the state budget process. The assessment rate is a monthly rate and is adjusted annually. State tax dollars do not contribute to the Universal Service Fund.

Programs included under the broad umbrella of the USF consist of technology and consumer-oriented programs managed by the Commission and technology and education-oriented programs that direct funding to other state government entities. These latter programs include the Technology for Educational Achievement Program (TEACH) administered by the Department of Administration; the University of Wisconsin, which receives funding for BadgerNet services; and the Department of Public Instruction (DPI), which receives funding for library services, BadgerLink and

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<sup>14</sup>This USF report is submitted in compliance with Wis. Stat. § 196.218(5r).

Newline for the Blind. While these programs receive USF funding,<sup>15</sup> the Commission has no administrative authority over these programs. For purposes of this report, reference to the USF generally refers to the Commission portion of the USF.

**Administration:** While the Commission develops the overall policy and procedures for the USF and manages and operates several of the programs, it is required by statute to contract with a private firm to administer the fund.<sup>16</sup> Responsibilities under that contract include sending USF assessment bills to providers, sending reimbursements to participants in the USF programs, and administering some of the USF programs under PSC direction.

The USF Council advises the Commission on the administration of the USF and on proposed rule changes. Currently, the Council is comprised of 13 members with 6 representing the telecommunications industry and 7 representing consumer groups. By statute, the majority of the Council members must be representatives from consumer groups. The Council met four times over FY06 and FY07 and discussed budget issues, program direction, and draft rule changes.

**Budget:** Initially, the USF was funded at \$8.0 million per year for FY98 to FY00. 2001 Wisconsin Act 16 capped the amount that telecommunications providers could be assessed for the Commission portion of the USF at \$6.0 million for FY05 and thereafter for each fiscal year. In 2007 Wisconsin Act 20, the Legislature removed the \$6.0 million budget appropriation cap for the USF. The appropriation for FY08 and FY09 remains at \$6.0 million for each year.

The expenditures over the past three fiscal years have remained fairly steady—between \$5.5 million and \$6 million. Because the budget appropriation remains at \$6.0 million, this trend is expected to continue for FY08 and FY09.

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<sup>15</sup> Recent appropriations for these non-Commission USF programs were as follows:

	FY05	FY06	FY07
TEACH	\$17,262,000	\$17,267,900	\$17,267,900
UW System	\$1,054,800	\$1,054,800	\$1,054,800
DPI	\$4,055,400	\$6,216,300	\$6,254,300

<sup>16</sup> The currently-retained administrator of the USF is Wipfli, LLP.

Figure 5-1 shows USF expenditures since 2000.

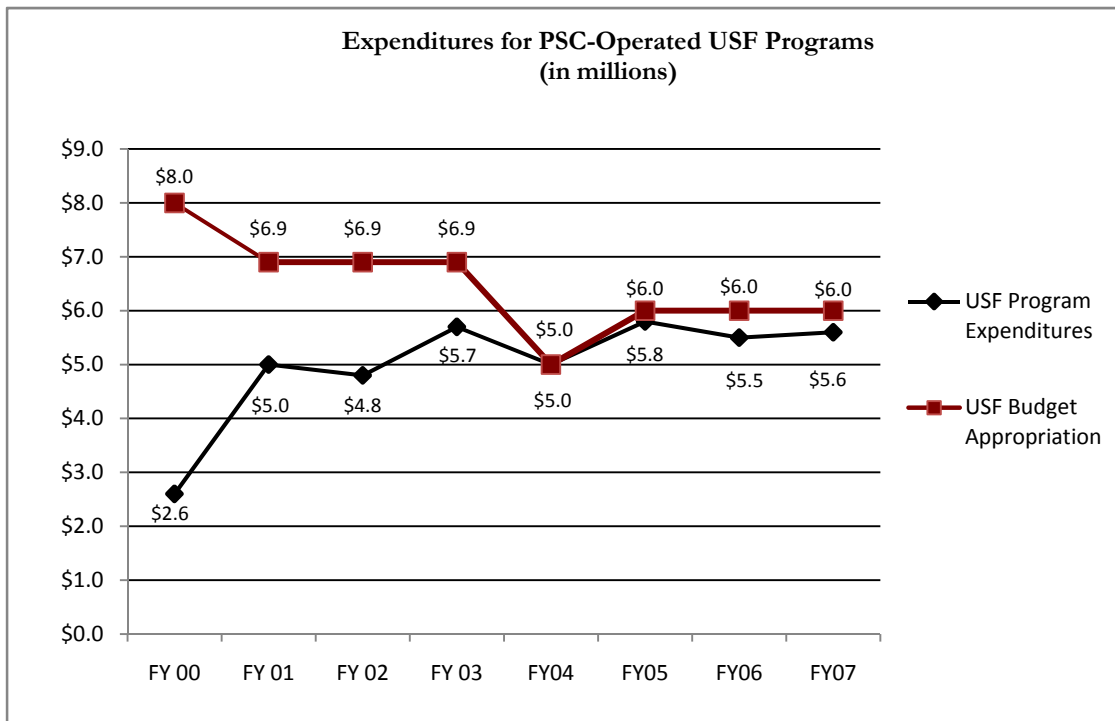


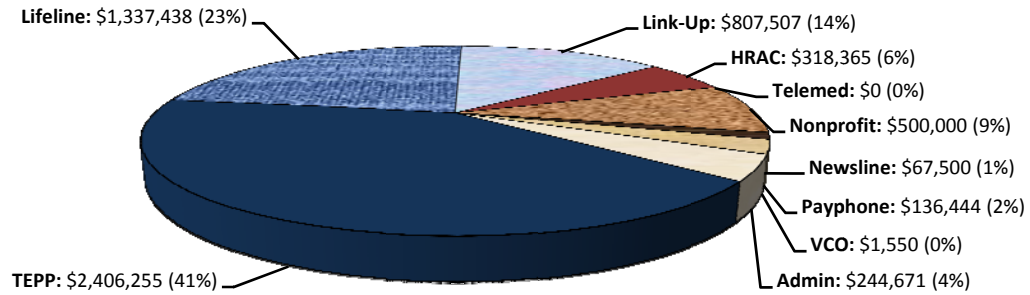
Figure 5-1

January 2008

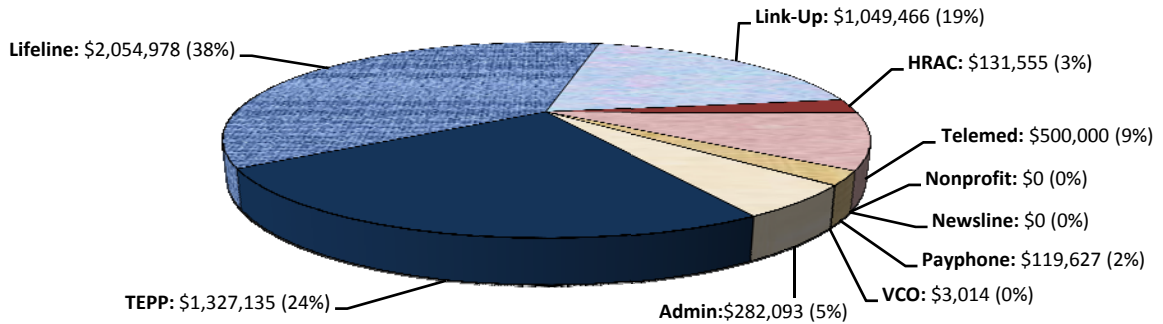
Source: PSC Staff

**USF Programs:** Nine Commission programs were funded by the USF to assist in providing telecommunications access to low-income households, disabled individuals and to households in high cost areas of the state and to provide grants to hospitals and clinics for advanced telecommunications equipment. Expenditures for the various USF programs for FY05, FY06, and FY07 are depicted in Figure 5-2. As of FY08, the Newline for the Blind program will no longer be funded by the Commission USF budget, but will instead be directly funded under the DPI USF programs. The budget summaries also include funding for administrative costs for the USF programs. Administrative costs comprised about 5 percent of the USF budget for both FY06 and FY07. Comparisons of expenditures for Commission USF programs over the past three years are shown in Figure 5-2 and Figure 5-3.

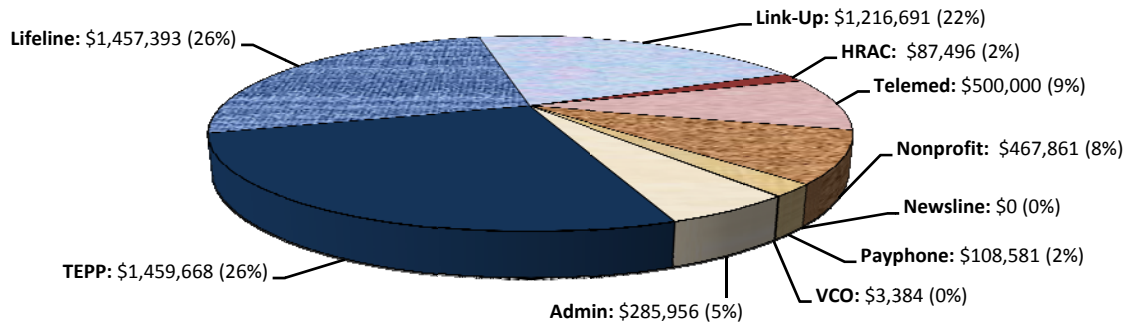
**FY 2005 USF EXPENDITURES - \$5,819,730**  
 (Total Appropriation \$6,000,000)



**FY 2006 USF EXPENDITURES - \$5,467,868**  
 (Total Appropriation \$6,000,000)



**FY 2007 USF EXPENDITURES - \$5,587,030**  
 (Total Appropriation \$6,000,000)



<b>TEPP:</b> Telecommunications Equipment Purchase Program	<b>Nonprofit:</b> Nonprofit Access Grants
<b>Lifeline:</b> Lifeline	<b>Newsline:</b> Newsline for the Blind
<b>Link-Up:</b> Link-Up	<b>Payphone:</b> Public Interest Payphone
<b>HRAC:</b> High Rate Assistance Credit	<b>VCO:</b> Two Line Speech or Voice Carry Over
<b>Telemed:</b> Telemedicine Equipment Grants	<b>Admin:</b> Administration

Figure 5-2

January 2008

Source: PSC Staff

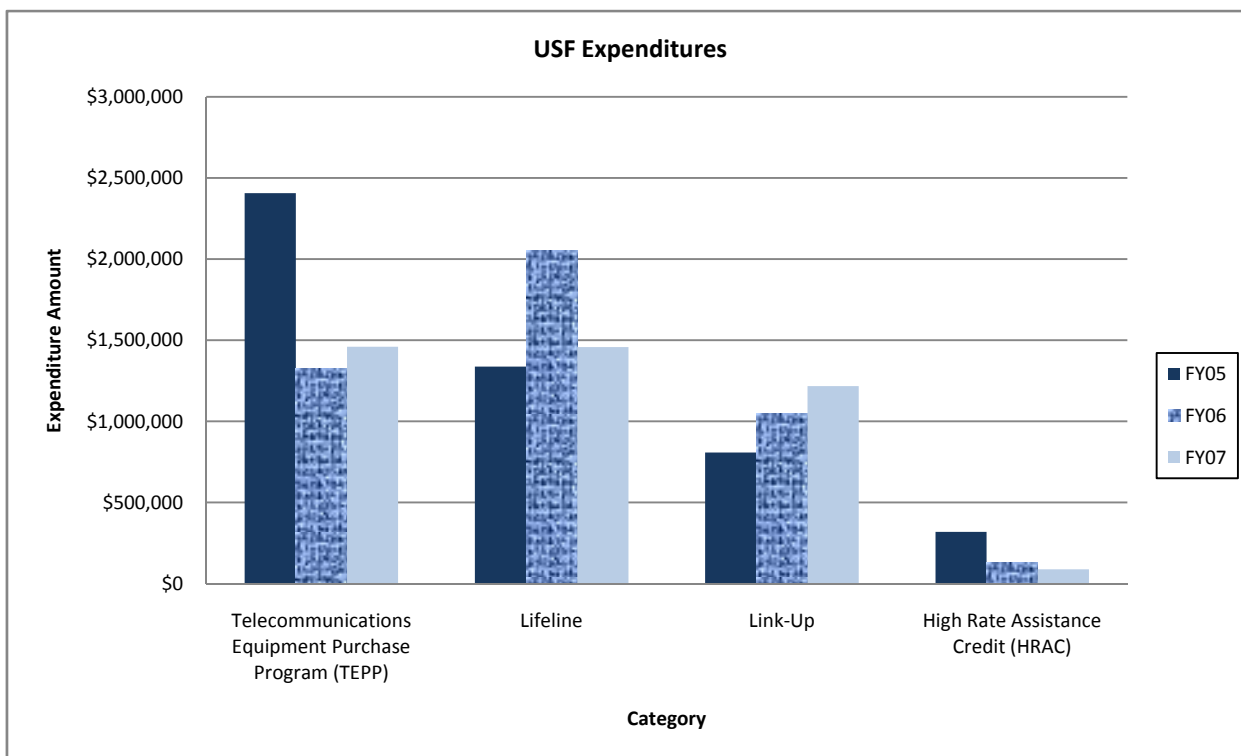


Figure 5-3

January 2008

Source: PSC Staff

Telecommunications Equipment Purchase Program (TEPP): TEPP assists persons with disabilities to purchase certain telecommunications equipment so that they can use the telephone system. Examples of equipment that can be purchased with the vouchers include amplified phones, TTYs,<sup>17</sup> speech amplified phones, and signaling systems. Vouchers are given to the qualifying individuals and these vouchers are used to pay vendors for a portion of the cost of the necessary telecommunications equipment. Voucher values vary for different types of disabilities because the typical equipment needs of persons in different disability categories varies in price. In most cases, the purchaser must make a \$100 co-payment when purchasing the equipment. If the co-payment and voucher are not sufficient to cover the equipment price, the purchaser pays the additional amount. Low-income eligible individuals may qualify for funding to pay the \$100 co-payment.<sup>18</sup> Over the biennium, about \$2.8 million in vouchers were used by over 12,000 disabled individuals to assist them in using the telephone.

Two-line Voice or Speech Carryover: Two-line voice or speech carryover is a service that some persons with hearing or speech impairments use to communicate over the telephone. With carryover service, a TTY or CapTel telephone is used only in one direction for the call when the user is able to either speak or hear, but not both. This very small program reimburses providers that have customers that use two-line voice or speech carryover and require a second line. USF rules

<sup>17</sup> TTYs are electronic typewriter devices that hearing impaired or speech impaired persons use to send or receive typed messages.

<sup>18</sup> The Telecommunications Assistance Program (TAP) may be able to pay the \$100. TAP is a program of the Office for the Deaf and Hard of Hearing (Department of Health & Family Services). TAP is only for persons who are deaf or severely hard of hearing in a low-income household.

allow a customer to get a second line without a service connection charge and without a monthly charge for most of the costs of that second line. Many CapTel phone users use the two-line voice feature which has resulted in increased expenditures for this program. Expenditures for this program have increased from \$1,550 in FY05 to \$3,014 in FY06 and \$3,384 in FY08. Total program costs remain small as compared to other USF programs. Customers who use this carryover service report that it is very valuable.

High Rate Ceiling Credits: The high rate ceiling credit program provides USF payments to local exchange service providers to reimburse them for credits given to customers to keep local rates at affordable levels. Monthly service rates are compared to median household incomes for each county. If the rate that a telecommunications company charges exceeds the threshold established in the rules, the customers only pay the threshold price and the USF pays the company the necessary increment it needs. Adjustments in funding levels for this program are dependent on changes in income levels for the county and changes in local service rates.

The expenditures for this program have varied drastically over the past six years. The peak of expenditures over that period was \$1.5 million and the lowest level of expenditures was \$5,000. The trend for expenditures appears to be down with FY06 expenditures totaling \$131,555 and FY07 expenditures totaling \$87,496. In FY06, 19 telephone exchanges that served over 8,000 residential lines, received USF funding to provide a credit to customers that reduced their monthly rate. In FY07, 15 telephone exchanges that served over 5,000 residential lines, received USF funding to provide a credit to customers that reduced their monthly rate.

Lifeline and Link-Up: The Lifeline and Link-Up programs make telephone service more accessible for low-income Wisconsin residents. Lifeline provides a lower monthly rate for telephone service for low-income consumers. Link-Up requires telecommunications providers to waive service connection charges when low-income consumers establish or move their telephone service. The Lifeline and Link-Up programs are provided jointly by the FCC and the State of Wisconsin. Providers are reimbursed from the USF for rate credits given to Lifeline customers and for the waived charges applicable to Link-Up customers.

In FY06, USF expenditures for the Lifeline program were \$2,055,000; of which, \$554,000 were due to a deferral of expenses from FY05. Lifeline provided lower priced service to over 90,000 low-income customers. In the same year, over \$1 million was spent to provide Link-Up services to almost 30,000 customers enabling them to have telephone connection fees waived. This included \$186,000 in FY05 expenses that was deferred to FY06. The need to defer decisions on payment of FY05 expenses to FY06 was due to the assessment caps placed on the USF. In FY07, \$1,457,000 was expended to provide over 85,000 low-income customers with discounted service through the Lifeline program and over 30,000 customers had telephone service installed under the Link-Up program. Since FY01, Lifeline and Link-Up have experienced some fluctuation in growth; however, the trend appears to be toward increased participation levels.

Newsline for the Blind: Newsline for the Blind enables blind persons to access audio news stories over the telephone. The Department of Public Instruction did not need additional funding from the USF for FY06 and FY07 because it had surplus funding from prior years that it used to fund the program. Blind and physically handicapped users have access to over 200 newspapers

because of this program. The program averages about 2,000 users per year with about 1,200 calls per month. Beginning in FY08, the Commission USF will no longer fund this program. Instead, DPI will receive USF funding directly.

Nonprofit Group – Access Programs or Projects: Nonprofit organizations were awarded \$467,000 in USF grants in FY07. The purpose of these grants is to develop or support programs or projects that facilitate the affordable access to telecommunications and information services. Applicants must be nonprofit organizations and must provide a 50 percent match for the total project cost. The projects must assist in providing telecommunications or information services to low-income or disabled customers, or must assist in deploying advanced telecommunications services.

In FY07, 19 applications were submitted and the Commission-approved 18 grants for a total of \$467,000. Table C1, in Appendix C, provide information on grants that were awarded. USF Map 1 indicates the counties where grant funds were awarded. Examples of projects that received funding include providing Internet access and training to low-income youth, seniors and unemployed adults, providing outreach and assistance to individuals with disabilities in obtaining and installing telecommunications equipment and providing Internet access for applying for food stamps at food pantries. Sufficient dollars were not available in the Universal Service Fund budget to operate this grant program for FY06 because of the \$6.0 million assessment cap then imposed on the USF by Wis. Stat. § 196.218(3)3.a.

Medical Telecommunications Equipment Program: Nonprofit medical clinics and public health agencies can receive grants from the USF to purchase telecommunications equipment. Purchase of medical telecommunications equipment under this grant program must promote technologically advanced medical services, enhance access to medical care in rural areas of the state, or enhance access to medical care to underserved populations or person with disabilities in the state. Applicants for this program must be a nonprofit clinic serving federally designated health professional shortage areas, medically underserved areas, medically underserved populations, or are a public health agency.

In FY06, 37 applications for grants were submitted and the Commission-awarded 15 grants totaling \$500,000. In FY07, 25 applications for grants were submitted and the Commission-approved 19 of the applications, again for a total of \$500,000 in grants. Examples of projects that received funding include teleradiology systems, home health care monitoring equipment, and video conferencing equipment. Tables C2 and C3, in Appendix C, provide information on grants that were awarded. USF Map 2 and USF Map 3 indicate the counties where the grants were awarded.

Public Interest Payphones: This program provides funding for placement of pay telephones when they are needed for the public interest but might not otherwise be provided. Under the PSC rules, when a pay telephone is installed after being designated as a public interest pay telephone, the provider of that telephone may be reimbursed for the costs associated with provision of the service, less any federal universal service support or revenues generated at the pay telephone. About 90 public interest payphones are located throughout the state in schools, parks, libraries, recreation facilities, boat landings, medical clinics, and village halls. Budget expenditures have varied from

year-to-year because of timing of reimbursement requests. About 35 phones have been removed because of extremely low usage or because the locations were no longer appropriate.

**Federal USF Programs:** The information above relates to the state created and funded Wisconsin universal service program. The federal government also has a universal service fund that provides funding through some federal programs to support universal service objectives. Per the Federal Telecommunications Act of 1996, preserving and advancing universal service is a function of both federal and state universal service programs.<sup>19</sup> The previously described state specific programs are funded solely through assessments on Wisconsin intrastate telecommunications revenues. The federal USF programs are funded through national assessments on telecommunications revenues. Funding universal service through national programs maintains the competitiveness of the State of Wisconsin as assessments are no higher in Wisconsin than any other state. In some cases, federal USF programs complement state USF programs (i.e., for low-income customers), and in other instances, the federal USF addresses needs not duplicated by the Wisconsin USF. Many rural companies in Wisconsin have costs that are higher than national average costs and are eligible for federal support under the federal USF programs.

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<sup>19</sup> 47 U.S.C. § 254(b)(5)

The following is a description of the federal universal service support programs and the funding from them that was provided to Wisconsin telecommunications companies in 2005 and 2006.

<b>Federal Universal Service Programs</b>	<b>2005 Amount</b>	<b>2006 Amount</b>
<p><b>Low Income</b> This support is commonly known as Lifeline and Link-Up. It provides discounts that make basic local telephone service affordable for low-income customers. Low income support is administered by the state in a partnership with the federal government. The dollars shown here are the federal contributions to this program.</p>	\$8,900,000	\$9,100,000
<p><b>Rural Health Care</b> This support provides reduced rates to rural health care providers for telecommunications and Internet services so they pay no more than their urban counterparts for the same or similar telecommunications services.</p>	\$1,200,000*	\$2,300,000*
<p><b>Schools and Libraries</b> This support referred to as E-rate support, provides affordable telecommunications and Internet access services to connect schools and libraries to the Internet. This support goes to service providers that provide discounts on eligible services to eligible schools, school districts, libraries, and consortia of these entities.</p>	\$15,600,000*	\$19,300,000*
<p><b>High Cost Loop</b> This support provides financial assistance to rural telephone companies for providing the “last mile of connection” when the cost of this service exceeds 115 percent of the national average cost per loop.</p>	\$39,200,000	\$37,100,000
<p><b>High Cost Model</b> This support provides carriers with support for all intrastate costs per line that exceed two standard deviations of the national average cost per loop.</p>	\$0	\$0
<p><b>Interstate Access Support</b> This support helps price-cap telephone companies recover some of their fixed interstate access charges.</p>	\$400,000	\$300,000
<p><b>Interstate Common Line Support</b> This support helps rate-of-return telephone companies recover some of their fixed interstate access charges.</p>	\$62,300,000	\$66,800,000
<p><b>Local Switching Support</b> This support provides financial assistance designed to reduce the high fixed switching costs for carriers that serve 50,000 loops or fewer.</p>	\$28,400,000	\$30,000,000
<b>Total 2005 and 2006 Federal Support to Wisconsin</b>	<b>\$156,000,000</b>	<b>\$164,900,000</b>

\*Includes only actual disbursements. Additional dollars have been committed but are not included.

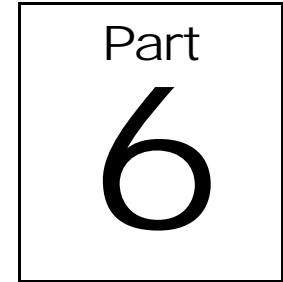
Table 5-A January 2008 Source: Universal Service Administrative Company 2006 Annual Report

The FCC is in the process of reviewing the rules for the Universal Service Fund (and the issue is a topic of interest in Congress). The Commission will continue to monitor these rules and provide comments when appropriate.<sup>20</sup> The Commission also recognizes that universal service concerns are very much intertwined with issues of competition and intercarrier compensation. All these issues carry heavy price tags and require broad and creative thinking on all fronts to assure the maintenance and promotion of competition, the protection of service to consumers, and the creation of a fair, rational and efficient system of compensation among providers.

**Recommendations:** The Commission recommends that the annual USF report requirement be changed to a biennial report. This would remove an additional reporting requirement that does not appear to be essential. Keeping the same timeframe for the USF reporting requirement as the biennial infrastructure report and combining these reports into one publication would be an efficient way for the Legislature and the Commission to keep informed.

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<sup>20</sup> On June 28, 2007, the Commission filed comments urging the Federal-State Joint Board on Universal Service to break the current gridlock on choosing and implementing serious USF reform. The Commission suggested the use of geographically limited pilot and trial programs and shadow billing as reasonable options to break that gridlock.



## Conclusions and Recommendations

The PSCW takes seriously its obligations and welcomes the opportunity to keep the Legislature informed about the status of telecommunications infrastructure and the administration of the USF. These reports will continue to document the status of existing infrastructure and trends, changes, and advances in technology, along with statistics on USF programs. The Commission considers this reporting an important part of its role to assure that infrastructure and programs are in place so that customers have access to reasonably priced and quality communications services.

Both urban and rural providers have seen significant changes and challenges in providing service as technologies evolve, fiber facilities are built further into the network and partnerships are developed between different types of providers. These partnerships, including wireline/wireless, retail/wholesale and triple play relationships give consumers increased access to advanced and bundled services and provide additional service choices for consumers. These changes also alter traditional service provisioning models creating both opportunities and challenges for meeting infrastructure needs and universal service assurances. The Commission will continue to monitor these changes and will alert the Legislature to new issues as they are identified and point out concerns that may arise including problems with collecting and reporting information because of the divergent state of regulation and oversight of the entities that are part of the telecommunications landscape.

### Infrastructure

#### General

On the specific parameters for which the Legislature has directed reporting, Wisconsin's infrastructure has continued to grow and generally meet consumers' needs. There have been significant advances in fiber deployment and broadband networks across the state. Incumbent and competitive providers have continued to make investments that add to the robustness of Wisconsin's telecommunications infrastructure. New technologies and other provider types also contribute the coverage of the state.

The Commission will continue to work with incumbent and competitive providers in the collection and publishing of relevant data on deployment of infrastructure and new services offered in the state. The Commission will also use FCC data where available to provide some basic information on other types of providers. The results of this work will provide legislators, local communities and consumers with information on the status of infrastructure and the technology changes affecting communications services available in the State of Wisconsin.

The legislative reporting construct for infrastructure issues is now almost a decade and a half old. To make future reports more current, the Commission again recommends changes that cover the reporting requirements under Wis. Stat. § 196.196(5)f. These include eliminating the specific mandate for ISDN reporting and introducing a more neutral platform for technology reporting. These changes will help make the reporting requirements more flexible.

### Broadband

Both urban and rural areas have seen increased rollout of broadband services, many of these riding on advanced fiber networks. Wisconsin has a robust network of fiber backbone facilities in place. These and other fiber networks are used extensively and invested in by all network provider types. Two significant developments in infrastructure are the deployment of Fiber to the Premises (FTTP) and wireless broadband networks in all areas of the state. A number of rural companies have developed extensive FTTP applications. These are in place across the state and consumers are seeing the benefit of these advanced service. In addition, providers have applied for federal RDUP loans to deploy broadband wireless networks. ILECs, CLECs, CATV companies, and broadband Internet providers have also added facilities and increased bandwidth availability. Often, VoIP-based services ride on the new technology offerings. It remains important to track where broadband service is available and what providers offer what types of services.

As referenced in the infrastructure section of this report, a number of states have completed or have proposed a broadband inventory for their state, including Kentucky and California. The Commission recommends that Wisconsin also proceed with taking this type of inventory. This could include collecting data on provider types, locations, data transmission capabilities, and cost of services. It could identify areas that are served with a number of providers and those that are underserved or have no service available. The data the Commission staff has collected to date has been on an exchange basis or on a zip code basis. This information is readily available and gives a general, but not complete, picture of the extent of broadband deployment. The inventory could include information from all providers of broadband service noting the differences between urban and rural locations. This type of inventory would not only give a complete picture of broadband deployment but also assist the Legislature in evaluating if a plan or policy is needed to assure equity access to broadband for all in customers in the state.

### Reporting

The Commission collects data from all ILECs and CLECs, both through annual reports and data requests. Only two of the CLECs did not respond to the data request used for this report.<sup>21</sup> As the Commission has noted in past reports, information from all other providers is not available. Customers served by CATV, wireless, satellite, and independent VoIP providers continue to grow. These providers, along with their supporting infrastructure and investments in Wisconsin, are difficult to document. The Commission staff did request data from CATV providers. Fifty-seven percent of the companies responded; one of the largest CATV providers declined to provide all the information requested. Since the CATV companies, along with wireless companies and VoIP providers, are not under Commission jurisdiction, they are under no obligation to provide data. In the case of VoIP

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<sup>21</sup> These were Globalcom, Inc. and Closecall America.

providers, it is often difficult to identify who, where, and what type VoIP service is offered in the state. Although, the data provided by ILECs and CLECs does provide a baseline for infrastructure and services in the state, this inconsistency in data makes it difficult to give a complete picture of the infrastructure present and the services available throughout the State of Wisconsin. Consequently, as the Commission has done in past Infrastructure Reports, we again recommend statutory changes that will expand the Commission's ability to gather data and to impose penalties on those entities that are not responsive to Commission data requests

### Consumer Protection

As technologies change, consumers increasingly have new choices and options to meet their communications needs. As offerings expand and change, it is important that consumers be kept informed of their responsibilities and have a source of help when problems arise with their communication services. For example, in the case of Fiber to the Premises installations, back-up batteries must be maintained by the customer at these installations. The Commission is working with industry groups and is in the process of preparing information that will link the customer with documents to help explain the inside wire connection to the outside fiber and outline the customers responsibilities for maintaining the battery back-up at the customer's location. This type of information is necessary so that consumers have a resource for information that will document their responsibilities and outline how they may be affected by new technologies. The Commission intends to remain attuned to consumer information needs as infrastructure advances arise.

### Universal Service

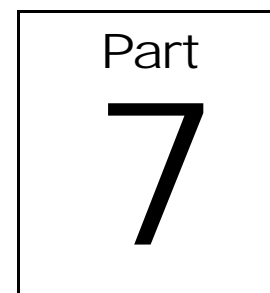
As shown in Part 5 above, the USF is working to fulfill the legislative mandates of assuring the availability of reasonably-priced telecommunications services to selected groups and parts of the state. Monitoring how well the USF meets consumer needs is an ongoing activity of the Commission. The Commission does recommend that the existing statutory requirement in Wis. Stat. § 196.218(5r), which has the Commission file an annual USF report, be modified to requirement for a biennial filing. This change will continue an adequate and sufficient level of USF oversight, but offer administrative advantages by allowing the USF and infrastructure reports to be prepared and filed on a joint basis.

### Recommendations

The Commission recommends the following to the Legislature to further necessary oversight of infrastructure and universal service issues in the state:

- 1) Change Wis. Stat. § 196.196(5)f. reporting requirements, including replacement of the specific ISDN mandate with a more neutral technology reference.
- 2) Complete a broadband inventory for the state of Wisconsin.

- 3) Establish statutory authority under Wis. Stat. § 196.25 to allow the Commission to collect data from CATV, wireless and VoIP providers so that the Legislature and the public have complete and relevant information covering all areas of the communications industry. In addition, a provision should be added to assess a penalty or other form of redress where providers do not respond to data requests as required under Wis. Stat. § 196.25(3).
- 4) Change the annual USF reporting requirement to a biennial requirement so that future USF reports and infrastructure reports can be jointly prepared and filed.



## Appendices

- A Infrastructure and USF Maps
- B Commission Report Preparation
- C Nonprofit and Telemedicine USF Grants
- D Incumbent Local Exchange Companies under Alternative Regulation (Wis. Stat. § 196.195)



# Appendix A

## Reference Maps

Map A: County Boundaries  
Map B: Telephone Exchange Boundaries

## Infrastructure Maps

Infra Map 1: ILEC Packet Switch Availability  
Infra Map 2: ILEC ISDN Availability  
Infra Map 3: ILEC SONET Availability  
Infra Map 4: ILEC Regulation  
Infra Map 5: Competitive Providers Service Location  
Infra Map 6: ILEC and CLEC DSL Service Offerings  
Infra Map 7: CATV Broadband Service Offerings  
Infra Map 8: All Types of Broadband Offerings  
Infra Map 9: ILEC Triple Play Offerings  
Infra Map 10: FTTP Locations

## E911 Map

E911 Map 1: E911 Wireless Status

## Universal Service Fund Maps

USF Map 1: 2007 Nonprofit Grant Locations  
USF Map 2: 2006 Telemedicine Grant Locations  
USF Map 3: 2007 Telemedicine Grant Locations

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# Appendix B

This seventh infrastructure report generally covers a 2006 year-end update of the information provided in previous reports. See the Commission website at <http://psc.wi.gov/utilityinfo/tele/infrastructureCompetitive/infrastructureReport.htm> for copies of previous reports.

A notice in docket 05-ST-115 was issued in June 2007. Comments were received from the Wisconsin State Telecommunications Association (WSTA), the Department of Public Instruction (DPI), and Time Warner Telecom of Wisconsin. WSTA and Time Warner Telecom identified the limitations of the report because data is only collected from a portion of the providers; they also addressed the cost to the providers of providing this information. WSTA and Time Warner Telecom proposed elimination of the report. DPI provided information on libraries' Internet access and integrated library system (ILS).

The information in Part 2 of this report provides comments on the status of the progress made in the use of advanced telecommunications infrastructure for distance learning, interconnection of libraries, access to health care, and assistance to persons with disabilities.

The information in Part 3 covers telecommunications infrastructure deployments throughout the state, including ISDN as specified in the statute. The data was obtained from the 2006 ILEC and CLEC annual reports and the Commission infrastructure data request that was sent to ILEC, CLEC, and CATV providers. A number of companies filed information confidentially and this data was masked herein by using summary data. The data request for the most part reflects year-end 2006 status. All 85 ILECs responded to the data request. Data requests were sent to CLECs who reported local service activity in their 2006 annual report. All but two CLEC providers, Globalcom and Closecall America, responded. CATV companies were also sent a data request and while the majority responded, one large provider declined to provide all the data. While these data requests for ILECs, CLECs, and CATV providers were similar, they were not identical. Each request was tailored for the individual industry.

The ILEC data request focused on exchange level information for ease of utility reporting. The exchange refers to the geographical area defined by the incumbent where all customers have access to the same services at the same rate. Information was collected from all 602 ILEC exchanges. The ILEC annual report collects information by wire centers. 663 wire centers were reported in 2006. A wire center is normally a subset of an exchange, although for most of the exchanges in the state, the wire center and exchange are synonymous. Larger exchanges may be made-up of two or more wire centers. These larger exchanges, such as Milwaukee or Madison, have multiple wire centers within the exchange and can further have multiple switches within an individual wire center.

CLEC annual report data is reported by rate center, service area or zip code. A rate center or service area is similar to an ILEC exchange in that it normally refers to the geographical area where the

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company provides service. CLECs normally report their rate centers using ILEC exchange numbers or using zip code designations.

The information compiled from the ILEC and CLEC annual reports and the ILEC and CLEC data requests were used throughout the report to update data and analyze the information presented.<sup>1</sup> The ILEC annual report information is complete and historically reliable. The CLEC annual report data is much improved in recent years; however, this data is less robust because gaps remain in the data or information was filed incorrectly. Confidentiality is not as much of a problem as it was in the past as there is now automatic confidentiality granted to some information via the Commission's annual report program. Staff reported summary data to protect confidentiality while still providing a picture of the status of the various infrastructure deployments in the state. Missing or unfiled data was substituted when possible with data available from other sources, including summary data from the FCC.<sup>2</sup>

CATV companies are not regulated by the Commission; however, the majority of the companies provided information for this report. A number of those companies filed the information confidentially.

The data and source of the data are indicated for the figures, tables and maps are used throughout the report. Where the data is available, the maps indicate a comparison of data from the 2004 report. The maps reflect company provided corrections to filed data wherever this was available.

The section on USF grants administered by the Commission was compiled from staff records for the grant programs.

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<sup>1</sup> Commission staff estimated a range of 3 percent to 4 percent error rate in the data presented. In some instances, changes in reported results may be due to errors in data submitted previously.

<sup>2</sup> See Federal Communications Commission (FCC) Local Competition and Broadband information filed under Form 477. The reports are available on the FCC home page at: <http://www.fcc.gov/wcb/iatd/comp.html>. For the 2007 report, detailed information was provided to the Commission confidentially.

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# Appendix C

## NONPROFIT ACCESS PROGRAM GRANT AWARDS - FY07

Table C1

Project #	Name and Location of Organization	Grant Dollars Approved	Summary of Project
A07-1	ABC for Health, Inc. - Madison	\$12,250	Educate and inform families of children with disabilities about the availability of Lifeline and LinkUp and other programs for which they are eligible via a webcast using Media Site technology.
A07-2	Adult Learning Center - Milwaukee	\$14,000	Provide internet access and training for low income individuals at Online Learning Computer Lab to do online job searches, online GED coursework, apartment searches, etc.
A07-3	Badger Association of the Blind & Visually Impaired - Milwaukee	\$24,300	Provide internet access and training to individuals who are blind or visually impaired at the association facilities or in the homes of clients.
A07-4	Boys & Girls Club of Greater Milwaukee - Milwaukee	\$43,346	Expand and update the computer technology center at the Pieper Hillside Boys and Girls Club. Improve access to the internet for 1,800 youth and families; provide cyberlab-focused educational programming and internet safety course.
A07-5	Center for Independent Living for Western WI - Menomonie	\$20,000	Provide outreach to individuals in west central WI who are disabled by promoting the TEPP, increasing consumer knowledge of equipment, and increasing consumer acquisition of telecommunications equipment.
A07-6	Community Action Coalition for South Central WI - Madison	\$23,866	Assist low income clients in obtaining or maintaining basic telephone service by providing counseling on financial literacy and financial assistance. Provide education about low-cost internet services.
A07-7	Community Advocates, Inc. - Milwaukee	\$65,000	Assist low income Milwaukee residents in obtaining or maintaining telecommunications services through payment agreements, payment assistance, client advocacy, education about Lifeline services, lower cost options and blocking features.
A07-8	DANEnet - Madison	\$55,188	Provide technical support and staff training at existing community center computer labs (Westside. Vera Ct., Bridge Lakepoint, Kennedy Hts., Wexford Ridge) for low income residents in Dane County.

A07-9	Deaf Unity Deaf Empowerment - Menasha	\$2,400	Purchase video-based interpreting technology to be installed at domestic violence and sexual assault agencies to enable deaf victims to communicate with staff on site.
A07-10	Domestic Abuse Intervention Services - Madison	\$10,000	Purchase a new phone system, funding for a shelter phone, language services to handle non-English speaking victims and equipment to support video relay services.
A07-11	Hunger Task Force - Milwaukee	\$8,740	Provide low income clients with internet access to be able to enroll for food stamps at the neighborhood food pantry.
A07-12	Independence First - Milwaukee	\$32,625	Provide refurbished computers, modems, internet access and training to low income people with disabilities.
A07-13	Independent Living, Inc. - Madison	\$11,209	Improve accessibility of a computer lab for low to moderate income seniors through infrastructure upgrades.
A07-14	Independent Living Resources, Inc. - La Crosse	\$12,000	Provide outreach on availability and assistance and access to specialized telecommunications equipment to individuals with disabilities, service providers and the general public.
A07-15	Midstate Independent Living Consultants, Inc. - Stevens Point	\$22,657	Purchase telecommunications equipment for a "model accessible home," provide copay for speech mobility TEPP recipients and provide outreach and demonstrations on availability of specialized telecommunications equipment.
A07-16	North Country Independent Living - Superior	\$27,500	Provide outreach on availability of financial assistance to obtain assistance and access to specialized telecommunications equipment, provide internet access to low income individuals with disabilities,
A07-17	Options for Independent Living - Green Bay	\$12,180	Assist individuals with disabilities in increasing access to the internet by securing a computer, internet access and specialized telecommunications equipment. Provide TEPP copay for low income speech and mobility impaired vouchers.
A07-18	Society's Assets, Inc. - Racine	\$37,750	Provide outreach and education to individuals with disabilities of the available specialized telecommunications equipment and provide co-pay for low income individuals with disabilities.
A07-19	Urban League of Greater Madison - Madison	\$32,850	Expand the job training program for unemployed and underemployed by providing increased access to online career information, by providing skills training and offering an earn your own computer program.
<b>Total Awarded</b>		<b>\$467,861</b>	

**MEDICAL TELECOMMUNICATIONS EQUIPMENT GRANT AWARDS - FY06**

**Table C2**

<b>Project #</b>	<b>Name and Location of Organization</b>	<b>Grant Dollars Approved</b>	<b>Summary of Project</b>
T06-1	Ashland County Health and Human Services - Ashland	\$14,492	Purchase additional videoconferencing equipment to expand telehealth availability and enable access to additional mental health professionals with emphasis on child and adolescent psychiatric needs.
T06-5	Boscobel Area Health Care - Boscobel	\$71,690	Purchase a computed radiography system to enable 24/7 radiology coverage by sending images to a radiologist offsite.
T06-6	Brown County Human Services Dept - Green Bay	\$9,302	Purchase videoconferencing equipment to provide consistent mental health outpatient treatment of incarcerated populations and enable patients to see doctors outside the area.
T06-12	Grant Regional Health Center - Lancaster	\$96,135	Purchase of a Picture Archive and Communication System system and computed radiography system for improved medical care for patients, improved radiology coverage, lower hospital operating costs and improved records storage and security.
T06-13	Gunderson Clinic, Ltd. - La Crosse	\$25,389	Purchase telemedicine video equipment and ancillary equipment to provide remote oncology medical services in Viroqua.
T06-14	Ho-Chunk Nation - Black River Falls	\$25,389	Purchase telemedicine video equipment and ancillary equipment to provide medical specialist services at its clinic.
T06-17	Kewaunee County/Manitowoc County Human Services Dept - Kewaunee	\$15,000	Purchase videoconferencing equipment for Kewaunee and Manitowoc Counties to enable access to additional mental health professionals with emphasis on child and adolescent psychiatric needs.
T06-18	Lake Superior Community Health Center - Superior	\$6,953	Purchase videoconferencing equipment to enable access to additional mental health professionals for low income clients with psychiatric needs.
T06-21	Milwaukee Health Services, Inc. - Milwaukee	\$6,953	Purchase of video conferencing equipment to link patients with mental health specialists in the area.
T06-23	Ministry Home Care, Inc. - Marshfield	\$55,000	Purchase telemedicine in-home monitoring equipment to provide patient monitoring and health management.

T06-24	Moundview Memorial Hospital & Clinics - Friendship	\$26,883	Purchase telemedicine in-home monitoring equipment to expand from pilot to full scale for improved patient monitoring and health management.
T06-26	Richland Hospital, Inc. - Richland Center	\$40,356	Purchase telemed video equipment and ancillary equipment to provide remote medical services and access to specialists at two rural clinics.
T06-27	Scenic Bluffs Community Health Centers - Cashton	\$54,226	Purchase digital radiology equipment to enable more efficient storage and to enable access from a remote site.
T06-29	Southwest Health Center - Cuba City	\$6,953	Purchase video conferencing equipment to enable geriatric psychiatric patients to make remote court appearances and provide psychiatric service to nursing homes.
T06-34	Upland Hills Home Care and Hospice - Dodgeville	\$45,279	Purchase telemedicine in-home monitoring equipment to provide patient monitoring and health management.
Total Awarded		<b>\$500,000</b>	

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**MEDICAL TELECOMMUNICATIONS EQUIPMENT GRANT AWARDS – FY07**

**Table C3**

<b>Project #</b>	<b>Name and Location of Organization</b>	<b>Grant Dollars Approved</b>	<b>Summary of Project</b>
T07-1	Calumet County Health Department & HHC/Hospice Agency - Chilton	\$40,132	Purchase home health care monitoring equipment to monitor homebound patients with cardiovascular and respiratory health issues.
T07-3	Door County Community Programs - Sturgeon Bay	\$10,500	Purchase videoconferencing equipment to link the county health program with psychiatric services so those services can be provided to eligible children and families.
T07-4	Door County Memorial Hospital/Ministry Health – Sturgeon Bay	\$25,000	Purchase a telecommunications system to replace an unreliable and outdated system with a system that can meet current and future demand and offer additional features.
T07-5	Family Health/La Clinica - Wautoma	\$12,345	Purchase videoconferencing equipment to provide psychiatric services to patients of the community health center by linking with bilingual services offered offered at other health centers.
T07-6	Franciscan Skemp Behavioral Health – La Crosse	\$32,780	Purchase videoconferencing equipment to provide psychiatric services to patients at four rural clinics including Arcadia, Prairie du Chien, Sparta and Tomah.
T07-8	Gundersen Clinic Ltd – La Crosse	\$33,380	Purchase equipment to expand telehealth to the Tomah Clinic for cancer, cardiac and specialty healthcare needs for children; builds on existing system.
T07-9	Hess Memorial Hospital, Inc. - Mauston	\$22,699	Purchase four telehealth monitors and peripherals to provide home health care to congestive heart failure patients.
T07-10	La Crosse County HSD – La Crosse	\$30,000	Purchase four videoconferencing units to provide expanded psychiatric care to the health center, two community-based residential treatment facilities, and an outpatient clinic.
T07-11	Marinette County Health & Human Services - Marinette	\$16,498	Purchase two video conferencing systems to link outpatient clinics in Niagara and Marinette with public and private psychiatric services in Madison.
T07-12	Marshfield Clinic - Marshfield	\$40,000	Due to obsolete stethoscopes, replace stethoscopy equipment with 40 new digital stethoscopes and add some existing sites to continue to provide high quality telemedicine at rural clinics.

T07-13	Menominee County Health and Human Services Department - Keshena	\$7,995	Purchase video conferencing equipment to link the Keshena clinic to Madison or Marshfield clinics to provide psychiatric services to county/reservation clients. Purchase a 48 port switch.
T07-14	Milwaukee Health Services, Inc. - Milwaukee	\$6,953	Purchase video conferencing equipment to become connected to the Wis. Telehealth Services Network and provide expertise of HIV and mental health professionals for patient care.
T07-15	Moundview Memorial Hospital & Clinics - Friendship	\$64,810	Purchase a computed radiography system will enable timely interpretation of medical by providing access to an offsite radiologist 24-hrs./day.
T07-16	Planned Parenthood of Wisconsin, Inc. - Milwaukee	\$21,331	Purchase Cisco Call Manager telephony equipment including video phones connecting the patient (in Beaver Dam or Mitchell Street - Milwaukee clinics) and medical professional located in Milwaukee to provide patient consults.
T07-17	Portage County Health and Human Services – Stevens Point	\$12,345	Purchase video conferencing equipment to provide services, at times court ordered, to county residents that are institutionalized outside the county.
T07-19	St. Joseph's Community Health - Hillsboro	\$79,591	Purchase telemed equipment including peripherals to connect Hillsboro Hospital to family clinics in Wonewoc, Elroy and Hillsboro. Purchase a wireless communications system for communications with the physicians.
T07-20	St. Mary's Hospital of Superior - Superior	\$25,000	Purchase a phone system for the hospital and clinic that will add features, capacity, reliability and flexibility to hospital/clinic communications.
T07-21	Sheboygan County Health and Human Services - Sheboygan	\$8,645	Purchase video conferencing equipment to provide psychiatric child and geriatric services by connect Mendota Mental Health and other providers.
T07-22	Southwest Health Center – Cuba City	\$9,996	Purchase video conferencing equipment to provide the hospital, nursing home and psychiatric unit with telepharmacy and teletranslation services.
<b>Total Awarded</b>		<b>\$500,000</b>	

# Appendix D

## APPROVED ALTERNATIVE REGULATION PLANS (Wis. Stat. § 196.195)

Company	Docket #	Date Approved or Extended	Altreg Plan Expiration Date
Badger Telecom, Inc. (TDS)	300-TI-101	2/5/02	Indefinite
Black Earth Telephone Company (TDS)	540-TI-101	2/5/02	Indefinite
Bonduel Telephone Company (TDS)	640-TI-101	2/5/02	Indefinite
Central State Telephone Company (TDS)	1020-TI-101	2/5/02	Indefinite
CenturyTel of Fairwater-Brandon-Alto, Inc.	1910-TI-101	10/5/00	11/1/05
	1910-TI-102	2/10/05	11/1/09
CenturyTel of Forestville, Inc.	2050-TI-100	10/5/00	11/1/05
	2050-TI-101	2/10/05	11/1/09
CenturyTel of the Midwest-Kendall, LLC	2815-TI-103	12/23/03	2/1/08 <sup>24</sup>
CenturyTel of Wisconsin, Inc.	2930-TI-101	11/30/99	
	2930-TI-102	2/10/05	3/1/09
CenturyTel of Larsen-Readfield, Inc.	3070-TI-100	10/5/00	11/1/05
	3070-TI-101	2/10/05	11/1/09
Mid-Plains Telephone, Inc. (TDS)	3650-TI-102	8/28/96	
	3650-TI-107	6/28/02	Indefinite
EastCoast Telecom, Inc. (TDS)	3880-TI-100	2/5/02	Indefinite
Mount Horeb Telephone Company	3940-TI-102	7/3/97	6/30/02
	3940-TI-103	3/3/03	Indefinite
CenturyTel of the Midwest-Wisconsin, Inc.	4260-TI-100	6/21/96	
	4260-TI-101	4/13/00	
	4260-TI-102	2/10/05	4/11/09
Grantland Telecom, Inc. (TDS)	4580-TI-103	4/26/01	Indefinite
CenturyTel of Southern Wisconsin, Inc.	4590-TI-100	10/5/00	11/1/05
	4590-TI-101	2/10/05	11/1/09
Riverside Telecom, Inc. (TDS)	5140-TI-100	4/26/01	Indefinite
Frontier Communications-St. Croix, Inc.	5210-TI-101	10/21/96	
	5210-TI-102	5/15/02	5/15/06 8/9/10
Scandinavia Telephone Company (TDS)	5280-TI-101	2/5/02	Indefinite
CenturyTel of Northwest Wisconsin, Inc.	5530-TI-100	10/5/00	11/1/05
	5530-TI-101	2/10/05	11/1/09
Stockbridge and Sherwood Telephone Company (TDS)	5710-TI-100	2/5/02	Indefinite
Tenney Telephone Company (TDS)	5850-TI-101	2/5/02	Indefinite

<sup>24</sup> As this Report was being prepared, the Commission was investigating a proposal to modify the existing alternative regulation plan for this utility in docket no. 2815-TI-104.

UTELCO, Inc. (TDS)	6030-TI-100	2/5/02	Indefinite
CenturyTel of Northern Wisconsin, Inc.	6040-TI-100	10/5/00	11/1/05
	6040-TI-101	2/10/05	11/1/09
Frontier Communications of Wisconsin, Inc.	6050-TI-101	9/25/98	10/31/02
	6050-TI-102	7/21/03	Indefinite
Frontier Communications of Viroqua, Inc.	6150-TI-101	11/21/97	
	6150-TI-102	5/15/02	5/15/06 8/9/10
Waunakee Telephone Company (TDS)	6250-TI-101	2/5/02	Indefinite

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