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ABSTRACT

        This report by the Blue Ribbon Task Force on
Wisconsin's Telecommunications Infrastructure considers
infrastructure to be the common network that connects individual
residences, businesses, and agencies, rather than the individual
systems and equipment themselves. The task force recognizes that
advances in telecommunications technologies and changes in the
telecommunications industry have outpaced Wisconsin's ability to
ensure infrastructure development through traditional regulatory and
administrative means. Solving the problems of creating the most
advanced telecommunications network across the state in an
environment of rapid and continuing change is vital to economic and
social development. The task force received input from leaders of the
state's telecommunications industries and potential users in arriving
at recommendations based on the premise that a robust communications
marketplace is most likely to provide the advanced infrastructure
that Wisconsin requires. Key points include: (1) developing a new
regulatory model; (2) assuring access for all; (3) removing barriers
to competition; (4) promoting effective deployment; and (5)
supporting cost-effective use. Twelve figures and one table present
task force findings.The appendix includes Executive Order Number 178,
lists of task force members and participants, a glossary of terms and
acronyms, and a 26-item selected bibliography. (SLD)

ED 368 333

Convergence, Competition, Cooperation:

The Report of the Governor's Blue Ribbon
Telecommunications Infrastructure Task Force

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Volume One

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"**N**early every aspect of our lives is being revolutionized by telecommunications. And the only way to maintain Wisconsin's competitiveness for the 21st century is to make sure that we have a first-rate telecommunications network in place. This electronic network will serve as an infrastructure, just as important as our highways, bridges, and railroads. Telecommunications will be a crucial link between Wisconsin and the rest of the world."

Governor Tommy G. Thompson
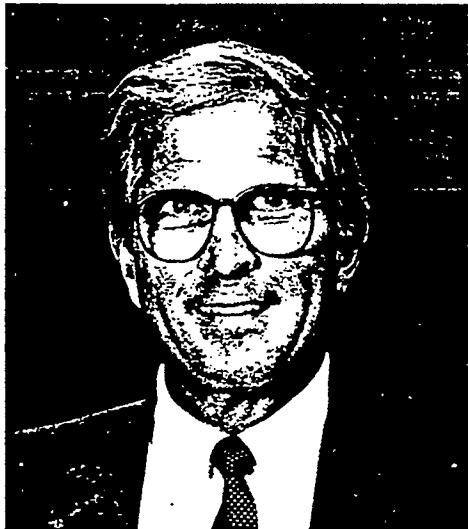
"**W**ith the broad representation of stakeholders on this Task Force, working in a spirit of cooperation, my hope is that Wisconsin will not just catch up with, but leap ahead of the infrastructure development of other states."

James B. Wigdale, Task Force Chairman
Chairman & Chief Executive Officer
Marshall and Ilsley Corp. and
M & I Marshall and Ilsley Bank, Milwaukee

"**A** reliable network, flexible enough to meet the changing technological needs of consumers and businesses alike, is essential to our continued economic growth and quality of life, especially in Wisconsin's rural communities."

Phil Schaecher, Task Force Vice-Chairman
Senior Vice President - Operations
Land's End, Inc., Dodgeville

Marshall & Ilsley Corporation
James B. Wigdale

November 8, 1993

The Honorable Tommy G. Thompson
Governor, State of Wisconsin
Room 115 East, State Capitol
P. O. Box 7863
Madison, WI 53707

Dear Governor:

I am pleased to present you with the final report of your *Blue Ribbon Telecommunications Infrastructure Task Force.*

The Task Force, established by you under <u>Executive Order #178</u>, consisted of 45 members drawn from Wisconsin's telecommunications industry, business and residential customers, educators, local and state government officials, and other citizens.

During the course of our study, we heard from the state's large and small telephone companies, long-distance carriers, and cellular and cable television industries. We took testimony from educators, rural health care providers, local law enforcement officials, business managers, consumer groups and other interested parties concerning their plans for innovative uses of telecommunications.

After assimilating the information garnered from these presentations and other research data collected by Task Force staff, we concluded the best way to bring the benefits of an enhanced infrastructure to the citizens of Wisconsin is to unleash the forces of competition.

The challenge lies in managing the transition to this new competitive marketplace, ensuring that the benefits of a free market -- lower prices and service innovation -- are available throughout the state.

It has been my pleasure to serve as Chairman of the Task Force. The Task Force members worked in a spirit of cooperation to develop a set of recommendations which should make Wisconsin a national model for telecommunications network innovation.

Sincerely,
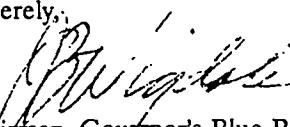
Chairman, Governor's Blue Ribbon
Telecommunications Infrastructure Task Force

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Introduction

A report that deals with advanced communications technologies—to say nothing of government regulations—cannot avoid getting into complexities, as the Governor's Blue Ribbon Telecommunications Infrastructure Task Force found. *Chapter One* of this Report, the Executive Summary, attempts to condense our process and results into terms that are concise and cogent. The recommended strategies and actions themselves are summarized (with no explanations) in *Chapter Five*.

Emerging from the complexities, however, is a simple and urgent message:

- Telecommunications is integral to every aspect of our lives, to every business, and to every government program and service. This is true even though the connection may not be visible to everyone yet. Some of the evidence that led us to this conclusion is in *Chapter Two* of this Report.

- If telecommunications affects everything we find most important, then it becomes doubly important to make sound decisions about "telecommunications infrastructure"—the common networks that support all the other systems we use. The ways we've made these decisions in the past, though successful then, no longer work. This is because both technology and the telecommunications industry, as every casual newspaper reader suddenly knows, are changing too fast. The Task Force found many reasons to develop a whole new, innovative model, and these reasons are presented in *Chapter Three* of this Report.

With the need for a new model—instead of just for "more technology"—in mind, we developed a set of six strategies and fourteen action recommendations. These are explained in some detail in *Chapter Four* of this Report (and summarized in *Chapter Five*). Together, these recommended strategies and actions will allow us to:

- **Manage the transition to a competitive communications marketplace.** Whether competition exists is no longer a question. The question is how smoothly we make the change, and at the same time protect basic service for all.

- **Remove barriers to competition and effective use of telecommunications.** Let's bring down the walls that are no longer needed between the people who use technology, and between users, suppliers and regulators.

- **Stimulate private sector deployment of enhanced telecommunications infrastructure.** The benefits of infrastructure are many. Where development isn't as fast in bringing us these benefits as we need it to be, let's get it moving.

And action is needed now. Debating at the edge of the volcano about the meaning of each bubble that comes to the surface will only leave us unprepared for the engulfing flow of technical and industry changes to come, and our education, health care, and other priorities stranded on islands of obsolescence.

Introduction

Chapter 1:
Executive Summary

Preparing Wisconsin for a New Era in Telecommunications

"*Nearly every aspect of our lives is being revolutionized by telecommunications,*" Governor Tommy Thompson noted when he created his Blue Ribbon Task Force on Wisconsin's Telecommunications Infrastructure. Governor Thompson was not exaggerating the impact of this burgeoning industry. Every year—indeed, every month—our state's economy and the well-being of our residents becomes more dependent on the creation, manipulation, and worldwide transfer of information.

Access to an advanced telecommunications infrastructure is essential to ensure continued economic growth and competitive advantage for Wisconsin, and a superior quality of life for Wisconsinites. "*Infrastructure*" as used in this report means the common network that connects individual residences, businesses and agencies—it does not include the individual systems themselves (telephones, computers, video systems, etc.). Infrastructure providers *transport* the voice, data, or picture "information" between locations and provides *switching* and other processing.

Both the critical importance of telecommunications and the growing complexity of the telecommunications industry are recent phenomena. In the past two decades, the telecommunications industry has diversified and grown enormously in size, importance, and technological sophistication. As late as the early 1970s, "telecommunications" meant either broadcast television or the nationwide network of copper telephone lines. Three major broadcast networks and one big telephone company dominated what we now think of as the "telecommunications industry". Phone service was provided by a regulated monopoly and television stations broadcast free programs to viewers over airwaves protected by a federal government agency. As a result, the country's telecommunications infrastructure was no more complex or difficult to control than the transportation infrastructure, with its interstate highway system, railroads, and scheduled airlines.

Today, the telecommunications industry has an entirely different face. A restructured AT&T competes with Sprint, MCI, and many other companies for long distance telephone customers. Eight additional huge companies (seven "Baby Bells" and GTE) plus hundreds of smaller local telephone companies hold virtual monopolies for local service. Cable television companies have wired about 70% of the country. They now promise—for a fee—to offer viewers as many as 500 video channels, as well as two-way bill-paying, home-shopping, and custom movie services. Cellular phones, fax machines, and computers that communicate with other computers are now common in many homes as well as businesses. Satellite and fiber optic technologies can now transmit audio and video signals and electronic data to rural communities that were barely served by copper telephone wires twenty years ago. And the Federal Communications Commission has just cleared the airwaves for an enormous expansion of wireless communications in every city and town.

These advances in telecommunications technologies and changes in the telecommunications industry have outpaced Wisconsin's ability to ensure infrastructure development through traditional regulatory and administrative means. In the past, state regulators could fairly easily encourage the growth and modernization of the smaller and simpler telecommunications systems by offering adequate incentives to the telephone industry. A common means, for example, was to increase the rates for phone service high enough to cover future infrastructure development. Regulators could also ensure telephone service to remote and costly-to-reach areas by such means as allowing monopoly phone companies to average the rates paid by consumers across their territories. State administrators could ensure adequate capacity for government, educational and emergency telecommunications needs by building or leasing state distribution systems.

These ways of doing business are now as outmoded as the rapidly-disappearing

"**I**nfrastructure" as used in this report means the common network that connects individual residences, businesses and agencies—it does not include the individual systems themselves (telephones, computers, video systems, etc.).

Cellular Telephone Subscriber Growth

Millions U.S.A.
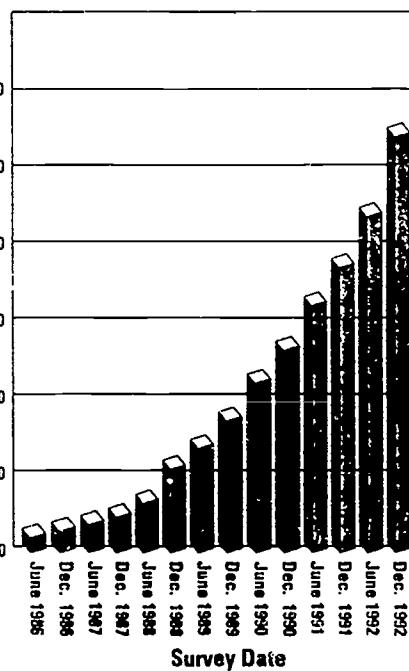
(Courtesy of Cellular Telecommunications Industry Association)

Executive Summary

We concluded that a robust communications marketplace is most likely to provide the advanced infrastructure Wisconsin requires.

WiscNet:
Wisconsin's High Speed
Data Highway to the Internet

rotary-dial telephone. The speed at which today's communications industry is changing has presented the state with a new and crucially important problem: **how to ensure the creation of the most advanced telecommunications networks across Wisconsin, in an environment of rapid and continuing technolog: al and structural change.**

Solving this problem is as important or more important to our future economic and social development as any other factor. The answers to crucial questions will be determined by the solution we choose.

- Will new telecommunications-based industries come to Wisconsin, bringing new jobs to cities and rural areas alike? Or will they locate elsewhere, in states with superior technological and regulatory environments?

- Will Wisconsin's existing businesses have the communications tools they need to compete nationally and globally?

- Will Wisconsin's businesses, government agencies, and consumers be able to reap the benefits of new telecommunications services offered at competitive prices?

- Will price competition jeopardize service to rural communities where construction costs are higher and there are fewer potential customers?

Questions like these faced our Task Force at its first meeting in May. We developed our final recommendations to solve the state's telecommunications infrastructure problem at a full-day retreat 97 days later. Between these key meetings, we heard from the leaders of Wisconsin's communications industries; reviewed the status of the state's privately—and publicly—owned communications networks; and saw

demonstrations of state-of-the-art mult: media communications systems.

We heard from large and small communications network customers w testified in person at public hearings a: on video via a statewide hookup. A te. of project consultants, University of Wisconsin faculty and experts from other states provided us their expertise. And in the end, our Task Force, comprised of competing industry representatives, state and local government agency heads, educators, small business owners, large corporate communications users, and private citizens, agreed that Wisconsin needs new strategies to encourage telecommunications development in the state.

We concluded that a robust communications marketplace is most likely to provide the advanced infrastructure Wisconsin requires.

The state should create a regulatory environment that allows our communications companies to respond quickly t customer demand. It should also demonstrate cost-effective uses of telecommunications in education, healt care, public safety, and government operations that will help stimulate this demand. By following these strategies, Wisconsin will position itself as a majo: intersection on the "Electronic Highwa'

The following two chapters examine Wisconsin's current telecommunication: infrastructure, document its strategic re in the state's economic and social development, and present recommendations to promote infrastructure improvement and expansion through th forces of a competitive market.
A companion volume to this report contains the background reports, worki: papers, and supporting materials that th Task Force used in developing its recommendations.

The Importance of Telecommunications to Wisconsin

Like our highways, bridges, railroads, and airports, Wisconsin's telecommunications infrastructure is a crucial part of our state's economic backbone. Wisconsin businesses operate in a marketplace that extends throughout the nation and the world, a *marketplace built on communications*.

"The Great Lakes economy was created, defined, and enriched first by its waterways, then by its railroads and highways . . . These transport infrastructures supported the region's development from a wilderness into the twentieth century's first mass-production industrial economy, with growth rates and living standards that made it the envy of the world. Since telecommunications infrastructure will move the knowledge and information driving the twenty-first century economy, the Great Lakes must lead in its development."

Building the Great Lakes Information Marketplace, The Great Lakes Telecommunications Initiative, page 2

Producing, manipulating, and transferring information— voice and video messages, and especially electronic data—is what lets us trade in the modern national and global markets. (Indeed, in many cases—such as, the trading of commodity futures, currencies, and stocks—the information is the market!) Imagine running a modern mail order business, for example, without the capacity to generate computerized inventory reports based on data transmitted from a distant warehouse; or to receive calls on an 800-line from clients in other states; or to verify credit cards instantly.

It is not surprising that many business location surveys rank the importance of high-quality communications facilities as equal to that of good transportation and reliable, skilled labor. Wisconsin needs a communications system that gives its businesses the tools they need to be competitive: worldwide competition requires a world-class communications infrastructure.

Telecommunications also plays an important and growing role in maintaining Wisconsin's quality of life. Education, health care, public safety, and cultural activities benefit from access to high-quality communications services within our communities. Rural areas, in particular, profit from employment opportunities made possible by enhanced telecommunications infrastructure links.

Some of the economic and social benefits of an advanced telecommunications infrastructure are highlighted below:

- *Telecommunications can increase Wisconsin's business competitiveness.*

All businesses increasingly rely on the effective management of information to administer internal operations and coordinate with local, national, and international customers and suppliers. New types of information-intensive businesses are emerging (just as the mail order industry developed to take advantage of current communications technologies.) An advanced telecommunications infrastructure is necessary to produce the high quality, family-wage jobs that will keep Wisconsin thriving.

- *Telecommunications is necessary to maintain a skilled work force.*

Wisconsin's educated and trained work force is key to its competitive edge. Through telecommunications, Wisconsin's educators will be able to provide cutting-edge continuing education and work force training directly to the workplace, preparing workers to compete in a global marketplace.

- *Telecommunications can improve the delivery of public services.*

Like businesses, health and social service organizations must use telecommunications facilities to improve their efficiency and extend their range of services. An advanced infrastructure is necessary to provide Wisconsin residents with high quality health and social services at reasonable prices. Access to

"Strategies to exploit information assets are already being implemented in competing regions throughout the world: Japan, Singapore, France. Each of these countries aspires to be a brain center of the advanced industrial economy . . . advanced telecommunications infrastructure is the neutral network for that activity."

Building the Great Lakes Information Marketplace, page 3

Executive Summary

adequate health care is a key ingredient in maintaining the vitality of both rural and inner-city areas, and in attracting and retaining business enterprises. Whatever the outcome of today's national debates on health care, the solutions will rely heavily on communications technology.

• *Telecommunications can improve the quality of education at every level and every location.*

The capacity to provide "distance learning" programs to students at remote locations enables schools to meet the needs of state residents for basic education, professional training, and lifelong learning. Programs can be delivered to satellite campus locations, to public libraries, to community centers, to workplaces, and to homes.

• *Telecommunications can improve the efficiency of government services, and increase citizen access to those services.*

Government agencies must use telecommunications to streamline their current operations, to develop new services to meet the changing needs of citizens, to improve access to services, and to lower the cost of services.

• *Telecommunications supports environmental goals and can promote Wisconsin tourism.*

Telecommunications facilities can be used to assess and monitor environmental threats. Tele-commuting—working at home or in rural "telecottages" and using telecommunications to maintain contact with the office—can replace some of the travel that contributes to automobile-based pollution.

Telecommunications links to new databases can also make it easier for residents and non-residents to plan vacations in Wisconsin. An advanced infrastructure is necessary for Wisconsin to engage in sustainable development that both protects the natural environment and supports expanded commerce.

We can describe these users of telecommunications technology because they are already in place somewhere in Wisconsin or another state. The problems they address are compelling and urgent. And the telecommunications industry is impelling us ever more urgently by the rapidity with which it introduces new technologies and new applications of these technologies. Ten years ago, few of us could have predicted the widespread use and importance of fax machines or cellular phones.

Many more future benefits of an advanced telecommunications infrastructure are currently on the drawing board than are yet visible. Others remain, for now, in the creative minds of engineers, programmers, futurists, and other specialists. Whatever the future brings, we believe it is clear that the benefits of improving Wisconsin's telecommunications systems are and will continue to be re significant and urgent. **We believe that development of the state's telecommunications infrastructure is a strategic investment in Wisconsin's future.**

Encouraging Infrastructure Improvements in a Competitive Telecommunications Marketplace

Governments employ several tried-and-true techniques for developing and improving any type of essential infrastructure. These techniques include using tax funds or issuing bonds for infrastructure construction (such as highways, bridges, or public broad-casting networks) and bidding the job out to private contractors who build to government specifications; and enabling or encouraging private monopolies (power utilities, phone and cable television companies) to make infrastructure improvements through a system of regulatory carrots and sticks.

Over the past fifty years, Wisconsin has used both of these techniques to build its current telecommunications infrastructure. And the techniques remain attractive to many policy-makers. Recently, telecommunications task forces in other states have spent considerable time and energy trying to determine the specific "silver bullet" communications technologies of the future so that their legislators can mandate state or private investment in an infrastructure designed for the twenty-first century.

We have chosen a different path. We believe that the best way to bring the benefits of an enhanced telecom-munications network infrastructure to Wisconsin's communities is to unleash the forces of innovation and competition among all the state's communications providers. This will not require a mandate for state or private investment in a specific technology, nor will it force a specific construction timetable on any particular industry or company. It will necessitate three simultaneous actions in the regulatory arena:

- That the state create a regulatory climate favorable to competition;
- That the state also protect basic services for all of the state's telecommunications customers; and
- That the state provide leadership in creating demonstration projects that take advantage of new technologies.

The communications industry is changing too rapidly for our old regulatory procedures to keep up.

The days of monopoly providers of single communications services and technologies are numbered. In the near future, cable television systems will offer telephone service: telephone companies will offer customers a choice of videos to view on their TV screens; and residents of rural areas will use wireless phones and palm-sized computers to manage their farms directly from their tractors. The state's challenge will be in managing the transition to this new marketplace, ensuring that the benefits of competition—the lowest prices and the most innovative services—are available to all of our communities.

A competitive telecommunications industry that responds quickly to customers' needs rather than to regulatory timetables will attract new information-based industries to our cities and towns. Telecommunications-knowledgeable users who know where to turn for information about the potentials of this technology will demand new services, and will be willing to contribute to the costs of needed infrastructure improvements.

State government can stimulate this demand both by demonstrating the cost-effective uses of existing networks, and by aggregating potential users of advanced infrastructure capacity, particularly in areas where market forces are weak. The state's communications providers must also help by supporting increased outreach to their existing customers, educating and training potential new users of advanced services, and encouraging community efforts to use infrastructure for social development and economic growth.

We believe that Wisconsin can create an environment that ensures telecommunications innovation and competitive advantage for the state in the global economy. Regulatory changes will be necessary; barriers to the use of telecommunications in business and government must be lowered; and

The communications industry is changing too rapidly for our old regulatory procedures to keep up. The days of monopoly providers of single communications services and technologies are numbered.

We believe that the best way to bring the benefits of an enhanced telecommunications network infrastructure to Wisconsin's communities is to unleash the forces of innovation and competition among all the state's communications providers.

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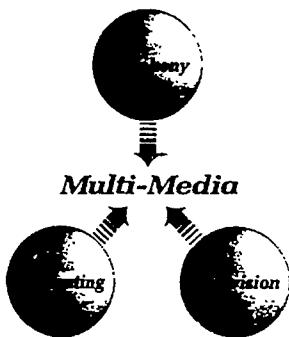
Multi-Media

*In tomorrow's digital world,
it's all "multi-media".*

programs to stimulate infrastructure
deployment must be developed and
funded. Each of these three strategies
and its associated action recom-
mendations is discussed at length in
Section Three of this report.
The strategies. and the major
recommendations the Task Force has
made to implement each strategy, are
summarized below:

Key Strategic Action Areas

**1.Manage the Transition to a
Competitive Communications
Marketplace**

The Public Service Commission
should expand its telecom-
munications mission from
its traditional role as a
regulator of rates and
earnings to a new role as
facilitator of the change to
competition. Its mandates should
include stimulating economic and
social development; increasing
consumer choice; and developing
a level playing field for all
competitors. The Public Service
Commission should eliminate
regulations that restrict competition
among telecommunications
providers.

**A Facilitator
Of Change**

In the new competitive marketplace.
all of the state's residents
must still be able to access
basic telecommunications
service at affordable rates. Toward
this end. all providers of telecom-
munications services in Wisconsin
should contribute to a universal
service fund. This fund should
provide credits that can be used
by low income residents, and by
customers located in designated high
cost service areas, to purchase a basic
set of communications services at
reasonable cost from the vendor of
their choice.

**Protecting
Universal Service**

The Public Service Commission
should regularly examine
and, if necessary. modify
the services covered as part
of the universal basic package to
reflect changes in technologies.
providers of telecommunications
services. and public interest
concerns.

**Promoting New Services
& Features**

**2.Remove Barriers to Competition a
Effective Use of Telecommunicatic.**

State of Wisconsin agencies shoulc.
identify and
eliminate
laws. rules.
regulations. and procedures that
hinder competition in the telecom
munications industry and hamper
businesses and individuals in thei
use of telecommunications.
particularly in their dealings with
state government.

**More Accessible
Government**

Wisconsin should continue its
efforts to cre
an equitable
tax environ-
ment for the state's telecom-
munications providers. The work
the 1987 Telecommunications Tax
Study Committee should be reviev
in the light of new competition
between technologies and the
growth of new providers of similai
services.

Tax Equity

State and local government agenc:
should iden
and eliminai
obsolete rule
and procedures that frustrate citize
efforts to use telecommunications
technologies including telephone.
fax. video. and electronic documei
transmission in their interactions
with state and local governments.

**Becoming
Telecommunications-Friendly**

**3.Stimulate Private-Sector Deploym.
of Enhanced Telecommunications
Infrastructure**

State government can play an
important ro
in stimulatin
the develop-
ment and construction of an
advanced telecommunications
infrastructure by serving as a role
model, educator, and facilitator of
use of new technologies.

**Encouraging The Demand
For New Services**

Executive Summary

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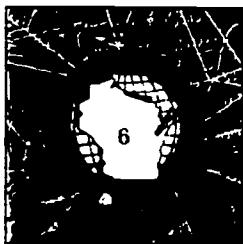
Rewarding Innovation

State agencies should be rewarded for developing innovative uses of telecommunications to speed administrative processes, reduce costs, and make government more accessible.

Supporting Community Development

The state should plan and fund, with private assistance, exemplary programs that use telecommunications to support distance learning, rural health care delivery, public safety, and environmental protection. Such programs will stimulate the extension of enhanced infrastructure to new areas of Wisconsin, where it can also be used by small business and residential customers.

Public/Private Partnerships

A public-private foundation should be created to help educate potential users about the state's new electronic highways, and to stimulate their use.

Procurement Policies

The state should use its purchasing power as a tool for aggregating potential users and stimulating the availability of reasonably-priced enhanced communications facilities in Wisconsin's rural and other "high cost" communities.

The specific action recommendations proposed by the Task Force to implement each of these strategies will have a direct impact on Wisconsin's economic and social development. Many of the recommendations can be undertaken relatively quickly, and will cost very little. Others must await the passage of new legislation and will require moderate levels of new funding.

Information Empowerment

All of the recommendations reflect a new shared commitment on the part of government and the state's telecommunications industries to make Wisconsin an Information Empowerment Zone: A forward-looking environment where educated consumers, competitive service providers, and innovative state and local agencies work together to use telecommunications to improve the quality of life and economic well-being of all state residents.

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Chapter 2: Exploring Wisconsin's Electronic Highways

Introduction

In the Executive Order creating our Task Force, Governor Tommy Thompson challenged us to "document the value of a modern telecommunications infrastructure for Wisconsin, and the benefits this infrastructure can bring to the State and its citizens." The Governor recognized that Wisconsin's electronic voice, data. and video networks have become as important as our highways. railroads, and airports in attracting and retaining job-creating businesses and in providing pathways for the delivery of services that improve the quality of life for Wisconsin's residents.

The 1990s have been called the "information age" because so much of the world economy now relies on the production and distribution of information. Almost 90% of all new jobs created in the last decade were in the information sector of the economy. Our communications infrastructure—what Vice President Al Gore calls a national "information highway"—has become the essential backbone of the nation's economy.

The success of Wisconsin's economy—the productivity of its small businesses, manufacturing and service sectors, tourism and agribusiness, and public sector services—is directly connected to the availability of affordable, reliable, high-quality telecommunications networks and services. The following examples demonstrate a few of the ways that communications access is an increasingly important competitive tool in this state:

- Catalog merchants like Lands' End in Dodgeville. Gander Mountain in Wilmot, and the Pleasant Company in Middleton, substitute telecommunications technologies for traditional retailing methods. These companies have made Wisconsin's friendly and educated work force known around the world.

- Many Wisconsin manufacturing plants send detailed prototype images and computer-aided design data to suppliers and customers—and many more need to do so.

- Agribusiness firms use data networks to access research databases at the University of Wisconsin and other campuses. They manipulate genetics coding models on remote supercomputers. And they rely on international electronic mail and fax communications.

- Farmers and livestock managers participate in satellite video auctions. bidding on prize cattle thousands of miles away. They use cellular phones to buy and sell grain while plowing their fields, and receive grain market prices over home computer networks and satellite dishes.

- Educators use distance learning technologies to reach students miles from the instructor's location. Several networks already deliver instruction to the state's classrooms. public libraries, hospitals, and work sites. These include the University of Wisconsin-Extension's Educational Teleconference Network, satellite courses coordinated by the Educational Communications Board. and regional two-way fiber optic, cable television, and private microwave radio systems.

Access to high-quality telecommunications has become an important factor in business location decisions. According to Forward Wisconsin, more and more service-based companies contemplating moves to the state are asking about the availability of telecommunications, as well as highway access, schools, and taxes.

Governor Thompson recognized the value of the state's communications networks. and their potential to serve as catalysts for economic growth and

"**D**ebates about economic growth and competitiveness are . . . intimately linked to questions about how to rapidly generate. communicate, translate, synthesize, package, and apply information."

U.S. Council on Competitiveness, Vision for a 21st Century Information Infrastructure, May 1993.

"**W**e've noticed that the availability of modern telecommunications facilities is becoming an increasingly important factor in business location decisions."

Task Force Member Robert Trunzo, Secretary, Wisconsin Department of Development

Exploring Wisconsin's Electronic Highways

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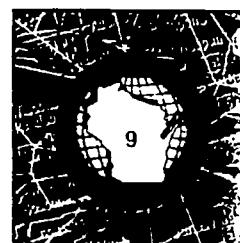
Vision Statement

To foster Wisconsin's economic development and support Wisconsin citizens' quality of life, the Task Force envisions an advanced telecommunications infrastructure that provides affordable, easy-to-use, secure communications among all users, and access to every home, business, health, government, education and social service facility.

The Task Force envisions Wisconsin's citizens and organizations as creative innovators who will lead the world in making effective use of their telecommunications infrastructure.

To achieve this vision as quickly as possible, Wisconsin will actively encourage the use of appropriate competition and technical innovation to create a wide choice of seamless networks, and will prepare users to employ these facilities effectively.

Exploring Wisconsin's Electronic Highways

improvement in our overall quality of life, when he charged our Task Force to "develop a statewide telecommunications infrastructure vision for Wisconsin." Based upon needs assessments, technical studies, and analyses of telecommunications data from Wisconsin and other states, our goal was to "recommend changes in public policy to meet customer needs remove barriers, enhance competitive ness, attract telecommunications-dependent businesses to Wisconsin, ₴ pave the way for securing other benef of the infrastructure vision."[1] This Report, its recommendations, and its companion volume of staff papers, resulted from this infrastructure revie·

Task Force History and Activity

Executive Order 178 established a 35 member task force. However, it soon became apparent that telecommunications development was such an important challenge for Wisconsin that additional members had to be added to the Task Force in order to represent all of the "stakeholders". The final Task force included 45 members.[2]

The Task Force included telecommunications users from the public and private sectors, small and large businesses, educational institutions, and local and state governments, as well as representatives of all segments of the state's communications industries. *Providers* of communications services joined with Wisconsin's network *users* to develop a set of strategies and recommendations for action in this report. These providers—including long distance and local phone companies, and cable television, cellular radio, and private microwave companies— represent interests often in fierce opposition. The recommendations here transcend many individual business advantages in the best interest of the state and its residents as a whole.

Our work was encouraged by the Governor's Office and supported by the services of the Wisconsin Department of Administration. It was funded by Wisconsin's local telephone companies (through the Wisconsin State Telephone Association), the state's cable television industry (through the Wisconsin Cable Communications Association), and long distance carriers AT&T and Schneider Communications.

The Task Force heard from Wisconsin's large and small telephone companies, its long distance carriers, and its cellular and cable television industries. We reviewed the status of the state's public and private communications networks, and saw demonstrations of the integration of video, voice and data into new multi-

media formats. We consulted outside experts, and our subcommittees and working group teams produced and reviewed numerous staff papers.[3]

The Task Force process also encouraged public participation. Our meetings were open to the press a the public. Press releases, newspaper stories. and several public hearings invited letters and more formal presentations. During a four-site interactive video conference, we hearc educators, rural health care providers. local law enforcement officials. busine managers, and other interested parties describe their plans for innovative use of telecommunications technologies. We followed this statewide meeting with more than forty telephone interviews of small business owners around the state.[4]

Task Force subcommittees conduct local hearings in Dodgeville, Eau Clair Stevens Point, and Milwaukee. In addition to the hearings, our Task For held two full-day discussion meetings special "technology day" presented by the state's communications industries. 1-1/2 day planning retreat, and numerous Executive Committee meetings. We collected submittals fro many more interested parties who did not attend the hearings.

We found in this process that the need for telecommunications infrastructure touch all lives and all sectors of our economy. Ultimately, w generated a set of strategies and action recommendations that represented a consensus position of the Task Force— manage the transition to competition, while protecting Wisconsin consumer:

1 See Appendix 1 for text of Executive Order Number 178.
2 See Appendix 2 for a listing of Task Force members.
3 See Volume Two for these papers.
4 Summaries of interviews are included in Volume Two
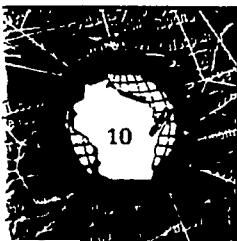
The Importance of Telecommunications Infrastructure

A state's telecommunications infrastructure is more than a complex of networks of copper wire, microwave radio and fiber optics. Coupled to telephones, facsimile machines, computers. video devices, and other digital information processing tools. the telecommunications infrastructure is the engine that drives the state's economic competitiveness and creates family-wage jobs. An advanced telecommunications infrastructure can provide both access to global markets, and a means of meeting local social concerns.

The Task Force learned that many industries and individual companies already use Wisconsin's existing telecommunications infrastructure to gain competitive advantage in the marketplace. For example. information networks have dramatically improved the performance of Wisconsin's banking and insurance industries. made Wisconsin a desired destination for new telemarketing and telephone catalog sales ventures. and provided small manufacturers with direct connections to their suppliers and customers. Wisconsin businesses use telecommunications to link dispersed offices. coordinate inventory and operations. and create new jobs in both rural and inner-city communities.

Government and social services also benefit from the existing telecommunications networks. which have improved education and health care delivery, supported cultural activities. and provided on-site training programs that are crucial to maintaining a high-quality, competitive work force, especially in the state's rural communities.

However, Wisconsin cannot rest satisfied with the past and current performance of its existing telecommunications infrastructure. The benefits of current state-of-the-art technologies are not uniformly available in all parts of the state: and telecommunications technologies are subject to such rapid change that even the most advanced technologies of 1993 will be outdated soon.

For every exciting and innovative application of telecommunications technology described to the Task Force. there were several examples of barriers limiting access to and use of the telecommunications infrastructure. The Task Force heard over and over that Wisconsin needs an enhanced telecommunications infrastructure now—one that is flexible enough to respond quickly to technological change. and able to meet the needs of all the state's residents. We heard concerns about lost opportunities. bottlenecks to innovation. and slow provider responses to customer needs. More importantly, we heard about unmet needs and the benefits of meeting them.

Wisconsin cannot rest satisfied with the past and current performance of its existing telecommunications infrastructure. The benefits of current state-of-the-art technologies are not uniformly available in all parts of the state; and telecommunications technologies are subject to such rapid change that even the most advanced technologies of 1993 will be outdated soon.

Direct benefits of telecommunications to rural manufacturing and resource-based businesses include:

- **Price information:** Producers such as farmers and fishermen can compare prices in various markets. This ability allows them to get the highest prices for their produce. It also helps them to reduce reliance on local middlemen, and to modify the mix and volume of their products in response to up-to-date market demands.

- **Reduction of downtime:** Time lost due to broken machinery is reduced both by timely ordering of spare parts, and by immediate contact with technicians and service personnel.

- **Reduction of inventory:** Businesses can reduce their inventories, and therefore their costs, when replacements can be ordered and delivered as needed.

- **Timely delivery of products to market:** If producers and shippers can better coordinate delivery of products to market, they can reduce spoilage, improve processing efficiency, and obtain higher prices for produce.

- **Reduced travel costs:** In some circumstances using telecommunications may supplement or even substitute for travel, resulting in significant savings in personnel time and travel costs. By far the largest benefit of 'teleconferencing' is in the productivity gains.

- **Energy savings:** Telecommunications can be used to plan trips, avoid unnecessary travel, and minimize fuel consumption. Essentially, it substitutes moving information for moving people and things.

- **Decentralization:** The availability of telecommunications capabilities can help to attract businesses to rural areas and decentralize economic activities. In many cases, the businesses that are attracted by such an information infrastructure are also those that are desirable in rural areas for other reasons.

From "Rural America in the Information Age: Telecommunications Policy for Rural Development," The Aspen Report. pages 30-34.

Exploring **Wisconsin** Electronic **Highways**

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The Task Force was convinced that developing an advanced infrastructure will provide the basis for improving Wisconsin's economy, educational institutions, health and social services, government services, standards of public safety, environment, and quality of life. Following are a few of the indications we heard in each of these areas.

A. Telecommunications and Economic Development

Dr. Edwin Parker, an international expert on rural telecommunications, described for the Task Force his research that shows a cyclical feedback relationship between telecommunications investments and economic growth:

"The richer you get, the more you spend on telecommunications; and the more you spend on telecommunications, the richer you get."

Telecommunications investments provide numerous indirect benefits to a community's economic health. The return on a specific infrastructure investment may be small for the company making that investment. but the resulting return to the users of that network are significant—and they leverage other, indirect benefits over time.

High-quality telecommunications capabilities enable existing business to expand, and attract new telecommunications-dependent industries. According to the U.S. Department of Commerce, **more than 50% of Wisconsin's jobs are related to telecommunications-intensive industries.** These include communications, finance and insurance, business services, wholesale and retail trade, print and publishing, health, education, and social services.

Several business leaders told the Task Force about the increasing role of telecommunications in their industries and expressed their concerns that Wisconsin not lag behind in the quality of its communications networks.

A good example of this is the testimony presented by Robert Fischer, Executive Vice President of Midwest Security Insurance Companies of La Crosse. He described how Electronic Data Interchange (EDI) is revolutionizing the insurance business by streamlining claims processing and

payment and suggested that the development of a statewide "integrated, interactive, electronic intelligent network" to be used by business, government, and health care industries could make Wisconsin "the leading high tech state of the 21st Century."

Many others from around the state agreed.[5] Both in testimony and in series of interviews conducted by Task Force staff with small busine owners indicated a growing intere in the quality of the telecommunications infrastructure Small business owners also descri expense and lack of knowledge as primary factors that inhibit their increased and more sophisticated of telecommunications.

Access to enhanced communicatio has become a major consideration business planners' relocation decisions. More than 80% of the respondents to *Area Development* magazine's annual survey of corporate location planners rated "availability of telecommunicatior. as an important factor in attracting businesses. The quality of local communications is a particularly important concern in ensuring the economic vitality of rural areas. One recent study of new "high teci businesses in the Pacific Northwes reported that telecommunications and transportation were significan: factors in attracting these new entrepreneurs.

B. Telecommunications and Educatio

Telecommunications networks are being used to improve the efficien of school operations, connect students to educational experienci outside their school districts. exten the range of classes that can be offered, and provide ongoing professional development opportunities for classroom teache and school administrators.[6]

The Task Force heard of a number successful distance learning projec around the state, as well as the nee for additional state government funding for network planning. construction. and coordination.

Exemplary of the many thoughtful and compelling presentations was that of David Hildebrand, Presiden of Wisconsin Indianhead Technica College. He described his institution's successful use of telecommunications links among

Factors in Attracting Businesses	Value*
Amenities	4.7
Telecommunication & transportation	4.0
Commercial sites	3.3
Skilled labor	3.2
University	3.0
Interstate highways	2.7

Points are on a scale of 1 to 5. where 1 = "Not important", and 5 = "Very important."

"High Tech Entrepreneurs in Small Towns," Journal of the Community Development Society

Exploring Wisconsin's Electronic Highways
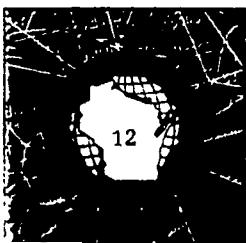
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5 See Volume Two for detailed summaries of many business leaders' remarks.
6 See Volume Two for a summary of educators written submittals and presentations to Task Force hearin
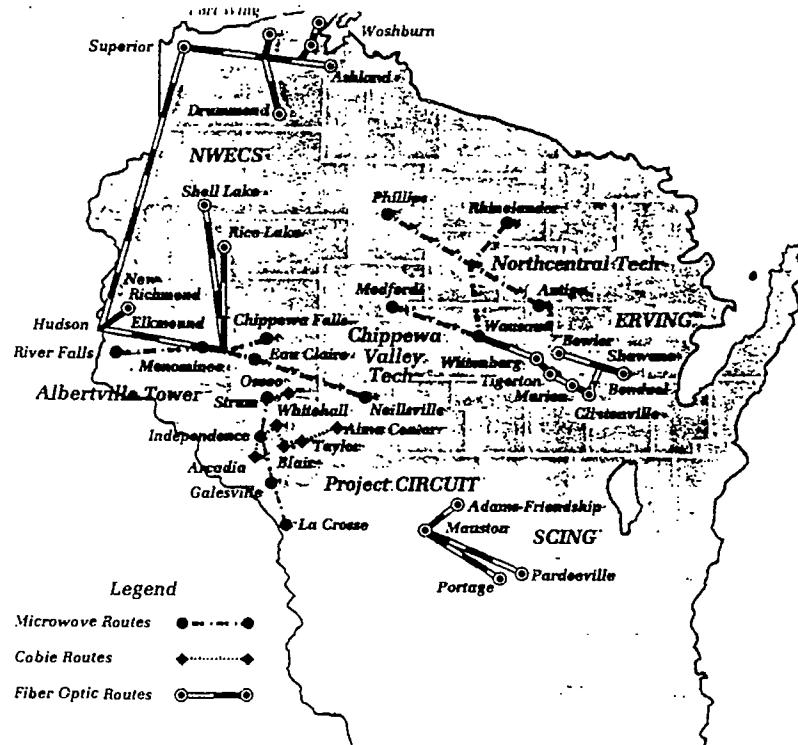
Active Two-Way Educational Networks
Courtesy of Evans Associates. Thiensville

Legend

Microwave Routes	●━━ ·━ ·━●
Cobie Routes	◆··········◆
Fiber Optic Routes	◎═══◎

Map labels: Superior, Washburn, Ashland, Drummond, NWECS, Shell Lake, Phillips, Rhinelander, Rice Lake, Northcentral Tech, New Richmond, Medford, Antigo, Hudson, Elkmound, Chippewa Falls, Wausau, ERVING, River Falls, Eau Claire, Chippewa Valley Tech, Whitenberg, Bowler, Shewamo, Menominee, Osseo, Tigerton, Marion, Bonduel, Albertville Tower, Strum, Whitehall, Neillsville, Clintonville, Independence, Alma Center, Taylor, Arcadia, Blair, Galesville, Project CIRCUIT, La Crosse, Adams-Friendship, Mauston, SCING, Portage, Pardeeville

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The Embarass River Valley Instruction Network Group (ERVING) connects seven high schools in rural Wisconsin via a fully two-way, interactive fiber optic-based network provided by Urban Telephone Company in Clintonville. As designed, each school receives three full-motion video signals and sends out one. Thus up to four classrooms can be taught by the same teacher.

The network is used to provide advanced courses, meet state requirements, and offer in-service education to the region's teachers and over 6,500 students, including pupils from the Stockbridge and Menominee Indian nations.

The Northern Wisconsin Educational Communications System (NWECS), now in operation in the Wisconsin Indianhead Technical College (WITC) area, will eventually connect 18 school districts and over forty sites, including the University of Wisconsin-Superior, the five WITC campuses, and the CESA #12 administrative office spread out over 10,700 square miles. The Task Force heard video testimony from the WITC-Rice Lake campus as part of its needs assessment program.

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their far-flung campuses so that teaching resources can be shared and more rural students can be served. However, he warned that many K-12 school administrators are still wary of the ongoing costs of distance learning, and asked for state assistance and guidance in helping schools plan for the use of new and existing telecommunications networks.

Educational needs are not limited to institutions. Bruce Casner of Miller Electric Manufacturing spoke of the increasing needs of small manufacturing concerns for continuing education and advanced technical courses, as well as access to national databases and communications systems.

Public library representatives told the Task Force that their communities need access to national and international databases, but costs are often prohibitive. Individual and small business patrons turn to libraries for computers and technical help they need to conduct on-line searches through Internet, the international communications highway that provides access to university databases around the world. But Task Force Member Sally Drew of the Division of Library

The Wisconsin Overlay Distance Education Network Plan
Courtesy of Wisconsin Educational Communications Board

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> "Telemedicine applications have
> the potential to dramatically
> improve health care in rural
> areas because they can provide
> local practitioners in medically
> isolated areas with access to
> specialists around Wisconsin
> through two-way, high-resolution
> broadband video, electronic
> databases, and videoconferenc-
> ing. Advances in telediagnostics,
> teleradiology, and telepathology
> allow physicians and patients in
> rural areas to obtain preventative·
> treatment, instant consultation,
> and second opinions from senior
> physicians throughout
> Wisconsin."
>
> **Task Force Member Todd Penske,**
> **Marshfield Clinic**

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lectronic **H**ighways

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Services of the Wisconsin
Department of Public Instruction said
that most libraries cannot afford dial
up rates to reach the few Internet
nodes available via Wiscnet, the
state's connecting network.

The Task Force was convinced that
expanded telecommunications will
improve the quality of education at
every level and every location.
Our state's educators told us that
expansion of Wisconsin's electronic
infrastructure, coupled with
increased training and user education
services, is essential for them to meet
the state's growing needs for K-12
and post-secondary education,
professional training, and lifelong
learning. Appropriate telecom-
munications technologies can make it
possible to deliver two-way video
and audio courses to classrooms,
public libraries, workplaces,
community centers, and homes
around the state.

C. **Telecommunications and Improved
Health and Social Services**

Representatives of Wisconsin's
health and social service community
described the role of the
telecommunications infrastructure in
their operations. Hospitals need to
develop regional networks that link
rural "satellite" clinics to the
expertise available in one—or more
—central hospital. Links would
include such critical functions as
patient and physician conferences,·
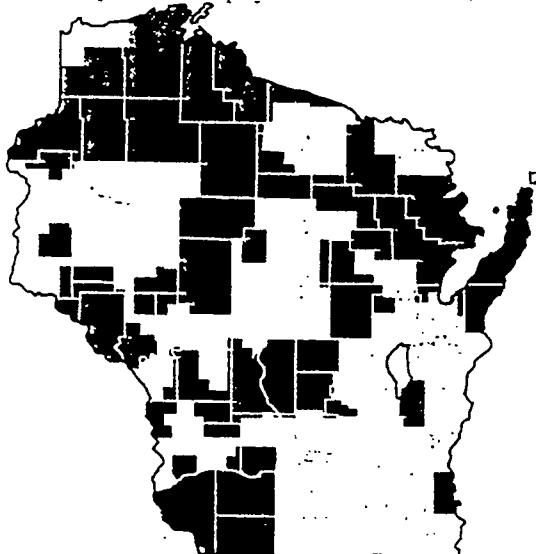
Health **P**rofessional
Shortage **A**reas
*Courtesy of University of Wisconsin
Office of Rural Health*

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and transmission of patient record
and complex diagnostic test result:
Video conferencing and very
complex digital images would neec
to be sent rapidly and cost
effectively. Expanded
telecommunications could link the
medical, pharmacy, and nursing
departments of multiple institution
to community hospitals and clinics
around the state; to the state's majc
teaching hospitals in Madison and
Milwaukee; and to specialists arou1
the world.

A number of University and
Technical College campuses are
already providing continuing traini1
and certification opportunities to
those in the medical professions via
distance education. However, as
Richard Dirks of University of
Wisconsin-Eau Claire noted, unevei
infrastructure development, cost, an
lack of training create barriers to th(
distribution of these services in rura
areas.

Task Force member Todd Penske
of the Marshfield Clinic also
emphasized the medical
communications needs of rural
health providers: physicians now
want more than the one-way
capabilities of paging devices, and
would like better rural cellular
coverage.

D. **Telecommunications and More
Effective Government**

The current "reinventing
government"[7] movement insists tha
government be more responsive to
the needs of its citizens, providing
improved and more timely access to
services. A number of states now us
telecommunications to improve thei
services. Some recent methods
include kiosks in public centers, on
line computer access, voice mail, an
facsimile on-demand.

Wisconsin has also begun to explore
the increased use of telecommuni-
cations for service delivery.
Kathy Hertz, Director of the
Bureau of Information and
Telecommunications Management,
Department of Administration,
described the data networks, voice
mail, and electronic mail
applications currently used by
Wisconsin state agencies, as well as
future plans to pilot-test statewide
administrative video conferencing.

[7] Term from David Osborne and Ted Gaebler. Reinventing Government: How The Entrepreneurial Spirit is Transforming The Public Sector. Penguin Books, 1992

She described barriers that prevent the state from being fully responsive to user needs: high costs to serve rural areas, high prices on calls within regional phone service areas, and limited opportunities to train potential users.

Among other things, an enhanced infrastructure would facilitate widely-available video teleconferencing. This (and other technologies) would improve communications between the Governor and the state's citizens, between legislators and their home districts. and between administrative agencies and their regional offices. An enhanced infrastructure would support more electronic filing of documents to reduce administrative delays; while telephone access to public meetings could increase citizen participation in government. especially by home-bound and rural residents.

1993 Wisconsin /Ameritech Partnership Projects

● *Dept. of Corrections/UW Hospitals*

■ *Dept. of Health & Social Services/ Milwaukee County Video Juvenile Court Proceedings*

▲ *Proposed West Central Wisconsin Distance Education Sites*

◆ *State Government Videoconference Network*

★ *Multimedia Audiographics UW-Extension (Madison) and UW-Milwaukee (plus 1 VTAE. 1 public library and 1 K-12 school yet to be determined)*

E. Telecommunications and Public Safety

Telecommunications can make Wisconsin a safer place to live by improving the link between citizens and public safety authorities. The availability of 911 has already made it easier for people to summon help quickly. "Enhanced 911" in some counties also provides the central switchboard with the caller's telephone number and address, so that help can be dispatched even if the caller is unable to identify him or herself or give a location. However, Dennis Klaila of the Public Service Commission testified that Wisconsin needs a statewide, seamless 911 system, rather than one planned and funded on a county-by-county basis. Technology is available now for such a system, but up-front costs, political boundaries, and regulatory factors impede implementation.

Telecommunications can also make public safety authorities more efficient and effective. For example. Director Jeffrey Zens of the Milwaukee County Sheriff's Department told the Task Force that his department has made over 19,000 prisoner transport trips between the County Criminal Justice Facility and the state's correctional institutions since 1988. Video conferencing offers a safer alternative that could replace many of these trips. Milwaukee Court Administrator Leticia Smith is beginning to use video for in-custody arraignments. She is planning now for a major shift in every aspect of court operations but how long these plans will take to mature depends a great deal on the results of this Task Forces' work.

F. Telecommunications and Protecting the Environment

Telecommunications networks can be used to assess and monitor environmental threats. and to support environmental policy and natural resources enforcement efforts. George Meyer, Secretary of the Department of Natural Resources, described several environment related telecommunications applications being considered by his agency. Multimedia kiosks located in public places could deliver regulatory, licensing and educational information and materials to citizens and tourists. Electronic bulletin boards and networks could allow

Exploring **W**isconsin' Electronic **H**ighways

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citizens, educators, industry representatives, government agencies and researchers to share environmental information and devise joint solutions to problems.

In the future, telecommunications will also replace some of the travel that contributes to air pollution and ozone depletion. An advanced infrastructure will help Wisconsin engage in "sustainable development" that both protects the natural environment and supports commerce.

G. Telecommunications and Tourism

A number of Wisconsin communities already offer information about local events and lodging via facsimile and voice mail. An enhanced telecommunications infrastructure will permit the extension of these services statewide, and will allow video images to be added to these tourism databases. Information kiosks at highway and other Wisconsin tourism information centers could give users access to information about events going on in Wisconsin and make it easier for tourists to plan their vacations ahead

or last-minute decisions about whɛ to do.

Access to cellular telephone servic digital transmission circuits, and high speed facsimile are important considerations to business retreat planners, and encourage vacation travel by permitting easier communication with home and workplace.

H. Telecommunications and New Consumer Services

An enhanced telecommunications infrastructure will bring a wide ran. of new consumer services to Wisconsin residents, ranging from home banking and shopping, to interactive encyclopedias, to menus of entertainment programs that can be ordered "on demand." Whether these services are provided by new 500-channel cable television systerr by high powered satellites, or by "video dial tone" from local telephone companies, all of Wisconsin's residents, including those living in rural areas, should have access to them at reasonable cost.

Employees Working at Home During Business Hours – U.S.A.

▲ Millions of Telecommuters

The Task Force determined that Wisconsin's existing communications network has been among the best in the nation...However, Wisconsin is already beginning to lag behind in deploying new technologies and services.

Over 97% of Wisconsin's households have basic telephone service.

Exploring Wisconsin's Electronic Highways

Wisconsin's Current Telecommunications Infrastructure

The Task Force surveyed the current telecommunications providers in Wisconsin. We reviewed their current filings with the Public Service Commission and the Federal Communications Commissions, and we listened to presentations from industry representatives on the status of Wisconsin's telecommunications infrastructure. We developed maps of the many individual and interconnected communications networks criss-crossing the state, and we created tables comparing Wisconsin's infrastructure with other states.[8]

The Task Force determined that Wisconsin's existing communications network has been among the best in the nation, and have served our state's residents and businesses well. A wide range of basic services have been available at reasonable prices throughout our communities.

However, Wisconsin is already beginning to lag behind in deploying new technologies and services.

The public switched telephone network—that is, the state's 95 local telephone companies—provide the majority of Wisconsin's voice and data communications paths. These telephone companies provide about 2,800,000 access lines to customers— more than 97% of the potential customers. Wisconsin's households have the highest penetration rate for basic service in the nation. Telephone rates in Wisconsin have been low, and service quality has been high. Our providers can be proud of their performance.

Most of the state's telephone companies have installed or soon will installing the next generation of digital switching equipment at their central

8 See Volume Two for additional data.
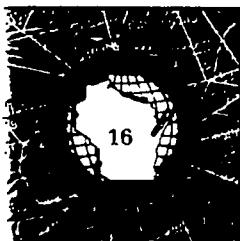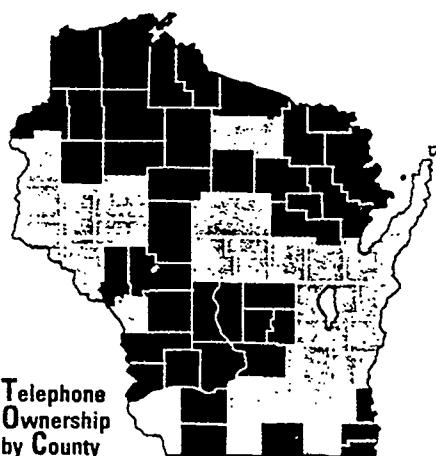
Telephone Ownership by County

Wisconsin State Telephone Association: 1990 U.S. Census

■ *Below U.S. Average*

■ *Below WI Average*

▨ *Above WI Average*

shop-at-home and educational services, database links, and personal "micro-cellular" telephone service delivered by "cable."

More than 90% of Wisconsin's residents, and 95% of its cities and towns larger than 1,000 residents, now have access to cellular service. Rates for this service have dropped by more than 50% from an initial cost of $0.40 per minute, and usage has increased eight-fold in the last five years. Cellular companies are adding new towers to their networks every month, extending coverage and filling in low-density areas as demand increases. New cellular-based data services now offer fax and modem links, and future services will provide virtually the same capabilities as the most sophisticated business telephone networks.

Over 90% of Wisconsin's area is covered by cellular service.

offices, making it possible to provide new services features including caller identification, custom calling, and many others.

Nearly 6,000 miles of high capacity fiber optic cable have been installed between these central offices. Combining local and long distance telephone companies, we have almost 8,000 miles of fiber in place. The industry has plans in the works to increase fiber miles by more than 50% in the next three years. This is in addition to the 10,000 miles of other types of digital facilities. These media dramatically improve the quality of telephone and computer transmissions, and paves the way for future high-capacity services such as video conferencing and multi-media imaging.

The state's telecommunications infrastructure extends well beyond its public switched telephone circuits. Cable television, cellular radio, and alternative access providers also cross Wisconsin with coaxial cables, microwave towers, and fiber optics. The cable television industry serves more than 1,000,000 customers and has lines that pass 70% of all residences. Many cable systems, including those in Milwaukee and Madison, are installing optical fiber technology that will increase picture quality, expand viewer choices, and pave the way for multi-media transmissions, video-on-demand,

Percent of **W**isconsin **T**elephone **S**witches with **A**dvanced **S**ervice **F**eature

Public Service of Wisconsin: Wisconsin State Telephone Association

The state's advanced telecommunications infrastructure is growing rapidly. Advanced telecommunications technologies encompass both transmission and switching capabilities. Fiber optics provide for greater transmission capability at higher levels of signal quality. Advanced digital switching increases routing capacity while reducing setup times and enabling a wider array of services.

Wisconsin's cable television industry serves over 1,000,000 homes.

Exploring Wisconsin' Electronic Highways

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Areas of Concern:

- *Low-Income Customers*
- *Intra-LATA Long Distance*
- *Availability of Advanced Services*
- *Need For Cooperative Planning*

Low Cellular Telephone Coverage Areas
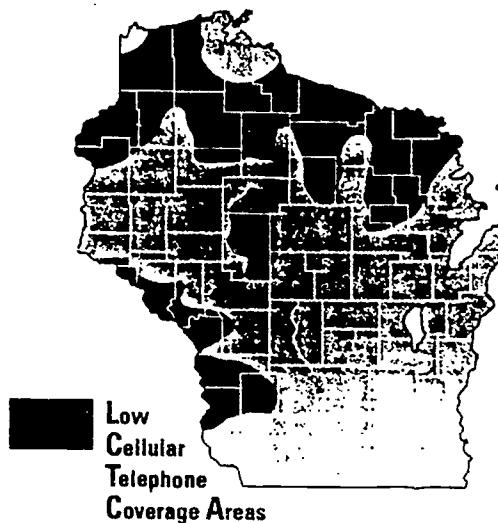
There are 8,000 miles of fiber optic cable in Wisconsin today.

Digital switching is now in service over 65% of the residential access lin and 63% of the business access lines. As mentioned earlier, long distance a local telephone companies, as well as regional cable television systems, are installing thousands of miles of high capacity fiber optic cable.

The increased capacity has already made it possible for phone companies deliver fully interactive two-way vide between a number of the state's rural public schools and institutions of high learning. Wisconsin compares favorable with other states for fiber deployment, and is comfortably above average (though not at the forefront) for the adoption of advanced switching.

It is apparent that a wide range of reliable, basic telecommunications services are available to the vast majority of Wisconsin's residents. Wisconsin's rural telephone companie have made significant strides in providing state-of-the-art technology t their customers, and other telecommunications services are also spreading statewide. However, the Ta Force did identify several areas of concern.

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Wisconsin Fiber Optic Cable
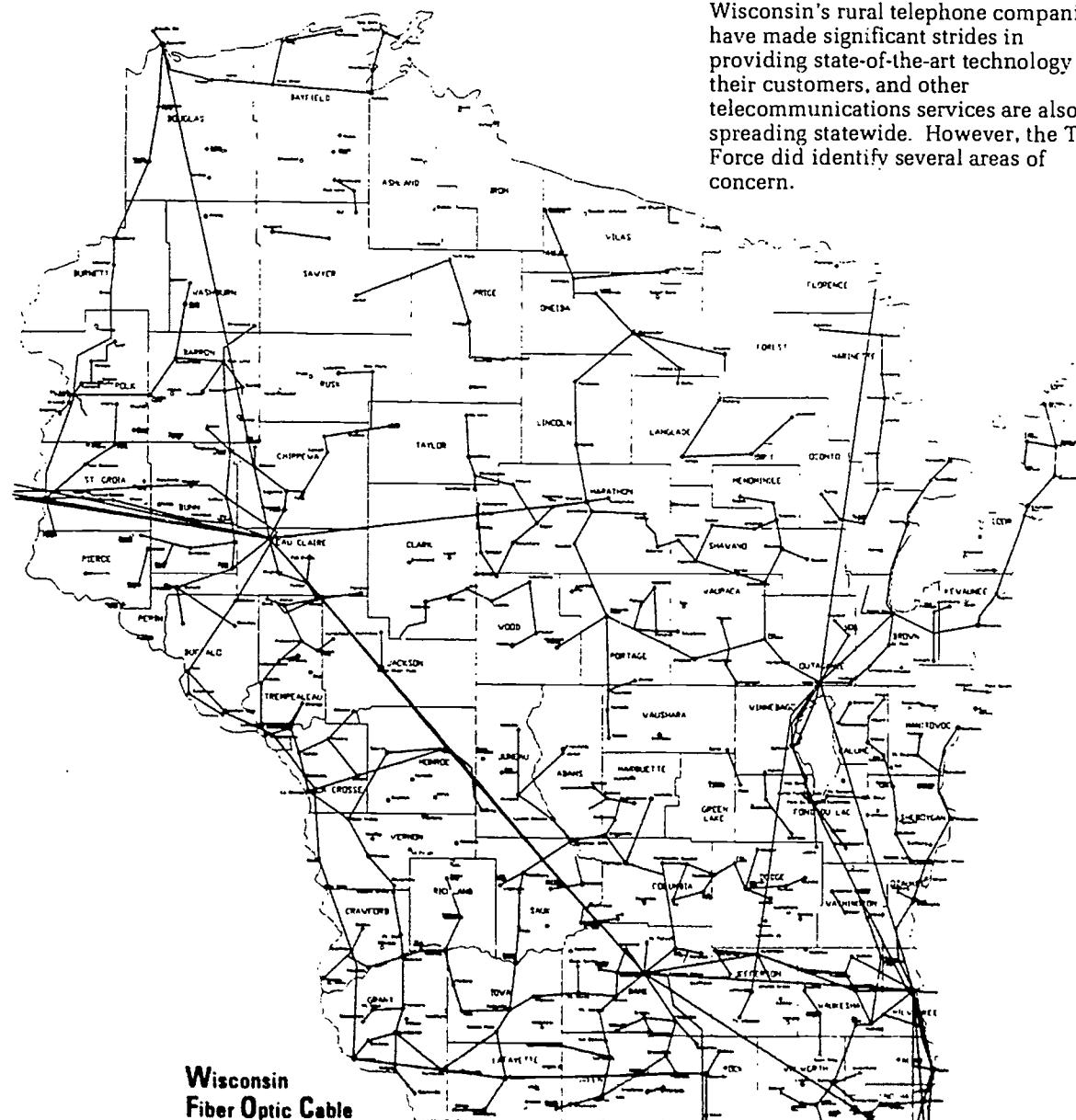
- In some rural areas, particularly low-income counties, penetration levels for basic telephone service are much lower than 90%. Dr. Edwin Parker suggested that Wisconsin's telephone industry and the Public Service Commission should work together to develop special "minimum service packages" and credit plans to help bring affordable basic service to areas with significantly lower levels of telephone penetration.

- Smaller communities, particularly those in rural areas, complain that the structure of long distance rates within local phone service regions (LATAs) make it unreasonably expensive to make essential calls to nearby communities. It's less expensive to call Minneapolis, for example, from communities in the western part of the state, than to call Eau Claire. Current open dockets at the Public Service Commission address these concerns.

If Wisconsin's telecommunications system is to continue in the nation's forefront, continuous upgrading and redevelopment of infrastructure is required. Infrastructure progress requires deployment of the most advanced technologies, design of new services, and development of new working arrangements among the telecommunications carriers and those they serve.

Improved transmission and advanced switching capability make possible a wide array of advanced telecommunications services that provide convenience and productivity enhancement to telecommunications users. However, telecommunications users will not be able to fully realize these benefits unless the new services enabled by an advanced infrastructure are made commercially available. For a variety of reasons, Wisconsin has not led the nation with regards to the provision of new services to its telecommunications users. Though Wisconsin has been progressive in the deployment of advanced telecommunications technology, organizational and regulatory changes may be required to speed the infrastructure of new services.

Deployment and use of systems that enable video conferencing, distance learning, and telemedicine require a significant degree of coordination and cooperation among the

telecommunications providers. A single school district, for example, may extend over the service territories of more than one telecommunications company. Unless the various providers are able to find effective means for cooperation, users may not be able to take advantage of the services the new telecommunications technologies make possible.

Wisconsin's telecommunications companies have recognized the need for greater coordination and cooperation. For example, Wisconsin's local phone companies have formed a consortium, Access Wisconsin, that allows them to jointly offer services to educators. This innovative arrangement greatly increased the State's ability to put distance learning services in place rapidly and cost-effectively. Even the structure and functioning of the Task Force gives indication that Wisconsin is among the nation's leaders in providing for the degree of organizational cooperation needed for advanced telecommunications systems. And while many within the industry and elsewhere believe that the state's regulatory policies are not in accord with the needs of advanced telecommunications systems, the deliberations and recommendations of this Task Force provides a direction for change in industry-regulatory relations.

The Task Force also heard concerns—from local phone companies, other providers of telecommunications services, and private and public sector users of these services—about future development of Wisconsin's telecommunications infrastructure. Although this testimony expressed the points of view of quite different constituencies, two common concerns ran through it:

1. First, deployment of fiber optic networks is not coordinated within the state. As a result, existing systems are not fully interconnected, and not universally accessible. Smaller customers who can't support their own private networks, and customers in rural areas, are particularly affected. Even where fiber networks exist, access may be prohibitively expensive.

2. Second, this situation is likely to continue unless changes are made in the current regulatory system. The Public Service Commission requirement that a public telephone

Though Wisconsin has been progressive in the deployment of advanced telecommunications technology, organizational and regulatory changes may be required to speed the infrastructure of new services.

Exploring Wisconsin
Electronic Highways

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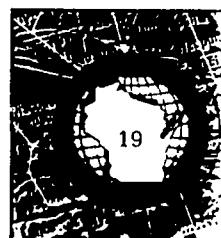
How can the Public Service Commission of Wisconsin better respond to changing technology and market forces?

Construction Application Processing Time January 1990 to June 1993

Public Service Commission of Wisconsin; Wisconsin State Telephone Association

Days

Construction Applications
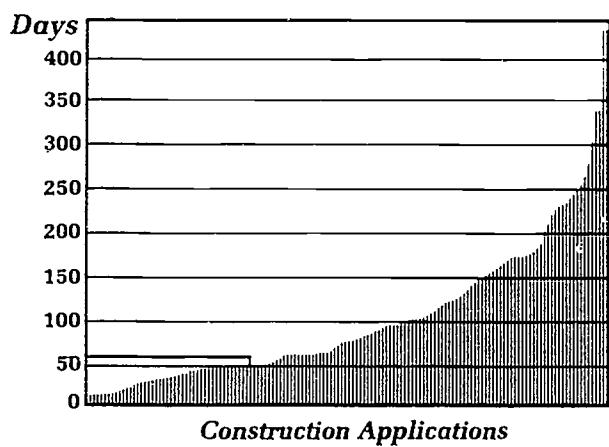
PSC goal is 60-day processing time.

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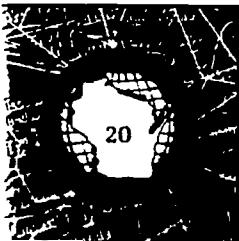
company project show sufficient projected demand before it is built means that the cost to the first customer can be prohibitive. Competing, non-regulated, providers are not always available outside of major cities to construct private networks; even when they are available, the cost of a private network is too high for a small user.

Local Telephone Company Concerns

Local telephone companies also expressed frustration with Public Service Commission rules that require extensive pre-construction approval for new networks and restrict the companies' ability to respond quickly to the real needs of their customers.

In addition, local companies complain that PSC policies that favor competition[9] put them in an unfair position. They cannot lower their costs to meet price competition from these new providers. As a result, they lose revenues that they could otherwise invest in developing rural and other low-demand areas.

New Competitor Concerns

On the other hand, new competitive providers complain that the monopoly status awarded to local phone companies prevents them from bringing new services to local communities. Further, these providers explained, even if they were permitted to compete for local service, they would be at a serious disadvantage because the former monopolies would continue to control phone numbers, on-site wiring, and other important assets. They noted that, if the PSC permits local telephone companies to subsidize infrastructure upgrades with fees paid by local monopoly customers, it gives the local companies an unfair competitive advantage.

Business Customer Concerns

Both potential business and government customers confirmed that new, enhanced telecommunications ar often simply unavailable; and where they are available, the access costs are too high. Private sector concerns included the high construction costs fr new networks, particularly for first users. Smaller businesses, especially, explained that they are often unaware the uses they might make of new technologies, and the benefits that mig. justify infrastructure investment. Both large and small businesses suggested that government regulations often inadvertently thwart their efforts to use new telecommunications (for example. in some communities, local zoning rule have restricted employees' from workii full-time from their homes. or from creating independent home-based businesses).

Government Customer Concerns

Small public sector agencies told us they cannot afford to lease private networks. If an enhanced public network existed, and users could pay f: access as needed. these users felt they would implement many applications. But public sector users also expressed concerns that go beyond the network itself. Schools. libraries, hospitals, anc. other potential users in the public sect' have difficulty finding funds in their operating budgets for in-house equipment that connects to telecommunications networks— computers. fax machines, video monitors. and the like—or for the training necessary to prepare staff to us the new technologies. These potential users emphasized the need for start-up funds and projects that would demonstrate the benefits of enhanced telecommunications technologies.

Residential Customer Concerns

Representatives of residential customers told the Task Force of an additional concern: that they not subsidize advanced infrastructure to be used primarily by business and government. Residential customers, according to Chris Blythe. Director of the Citizens' Utility Board (CUB), "have already paid a lot for the existing telecommunications infrastructure."

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9 By licensing new competitive access providers who offer business communications services that bypass the local company

Any move from regulation to competition, said Blythe, should include safeguards against the use of residential customer monies to cross-subsidized, unregulated business ventures of the states' telephone companies. The Consumer Federation of America also wrote to the Task Force, encouraging us to protect "an updated definition of 'universal service' that guarantees affordable prices for an evolving array of (new) services . . . and equipment."

The enormous social and economic benefits made possible by a robust advanced telecommunications infrastructure are within Wisconsin's grasp.

Wisconsin's Telecommunications Challenge

The Task Force believes that, despite the concerns expressed by communications providers, potential users, and others, the enormous social and economic benefits made possible by a robust advanced telecommunications infrastructure are within Wisconsin's grasp. We envision:

- An advanced telecommunications infrastructure that provides affordable, easy-to-use, secure communications among all users and access to every home, business, health, government, education, and social service facility.

- Wisconsin citizens and organizations leading the world in making effective use of this telecommunications infrastructure.

In order to meet the demand for faster data communications, video transmission, and global inter-connection anticipated by Wisconsin's businesses, educators, health care providers, and government agencies, the state will need to encourage additional telecommunications infrastructure enhancement and infrastructure extension. This will require installation of new high capacity networks and switching technologies, and the creation of a progressive regulatory and investment policy.

Wisconsin faces a multi-dimensional challenge in bringing this vision to life. The state must figure out how to stimulate infrastructure development without either posing too much risk to consumers or sacrificing the Wisconsin's competitive economic position. Two factors complicate this problem: the rapidly changing nature of both telecommunications technologies and the telecommunications industry itself; and the state's relatively limited role in setting communications policies.

The Task Force concluded that it would be a mistake to try to identify a single "silver bullet" technology to meet Wisconsin's telecommunication infrastructure needs. New telecommunications technologies appear with startling regularity, eclipsing technologies that were state-of-the-art only a short time before. These changes blur the boundaries we once considered obvious and eternal: between telephones and television, for example, or computer networks and cable TV. New technologies also blur distinctions between vendors of telecommunications services: they make the precise nature of the vendor irrelevant to the consumer who doesn't, after all, care whether a cellular company, a cable company, or a local monopoly provides telephone service, so long as the connection is made.

The Federal Communications Commission and the courts will continue to be the sources of many of the regulations and rulings that determine the structure and nature of the telecommunications industry, in Wisconsin and in other states. Wisconsin's role as a regulatory entity, and its ability to direct the future of telecommunications through legislative means, is necessarily limited. But this does not mean that the state is an unimportant player in its own telecommunications future. Quite the contrary: the state can create an attractive and encouraging climate for new telecommunications investment and new telecommunications businesses; it can, to a large extent, determine the nature of services available locally; and it can encourage the development of telecommunications facilities for government, education, social service, and other public uses at the local, regional, and state levels.

No "Silver Bullet" Technology!

New technologies also blur distinctions between vendors of telecommunications services; they make the precise nature of the vendor irrelevant to the consumer who doesn't, after all, care whether a cellular company, a cable company, or a local monopoly provides telephone service, so long as the connection is made.

Exploring Wisconsin Electronic Highways

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Wisconsin must develop a flexible approach to infrastructure enhancement, using the forces of competition and technical innovation to create a wide choice seamless networks that respond to consumer and business needs. The Task Forc has not concluded that a specific network technology or a specific network provider should be the focus of all infrastructure investment strategies. In a time of rapidly changing technologies and the emergence of new, unregulat services, we must not make the mistake of thinking that only one provider can meet the state's enhanced communications needs, or that a "silver bullet technology" deserves all the attention.

Our focus should be on removing the barriers that prevent the state's communications providers from rapidly meeting consumer demand for enhanced telecommunications. Our communications regulations and other government policies should encourage the demand for advanced infrastructure investments, educate users to the potentials of telecommunications, and reward innovation in technologies and services. We must ensure that the most useful, most exciting telecommunications technologies are available in Wisconsin, and that our residents, businesses, and government agencies are adequately prepared to take advantage of these new opportunities.

The Task Force has developed a strategic action plan for telecommunications infrastructure development in Wisconsin. The plan:

- Provides a new regulatory framework for the inevitable reality of competition among telecommunications providers in local communities;

- Removes non-regulatory barriers that currently limit the perceived benefits of an enhanced telecommunications infrastructure; and

- Identifies opportunities for cooperation between the state and the telecommunications industry in order to create telecommunications networks and applications that meet the social and economic development goals of Wisconsin's communities.

The details of this strategic plan, and the specific action recommendations developed by the Task Force, are described in Chapter 3.

Exploring **Wisconsin's** **Electronic Highways**

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Chapter 3:
A New Model for Telecommunications Infrastructure Development

Introduction

Telecommunications providers, expert consultants, and current and potential telecommunications users from the private and public sectors had little difficulty convincing the Governor's Task Force of the benefits an enhanced telecommunications infrastructure would bring to the state of Wisconsin. After three months of study, public hearings, and meetings, the Task Force, despite the diverse interests it represented, agreed that Wisconsin needs

"Seamless telecommunications networks. . . providing affordable, easy-to-use, secure communications among all users and access to every home, business, health, government, education, and social service facility in the State."

But how should this vision be implemented? The Task Force initially faced three basic questions:

- Which technologies will best meet the state's future telecommunications needs?
- When should these technologies be available across the state?
- Who will pay for the construction of new telecommunications networks?

These are questions that regulatory agencies like the Wisconsin Public Service Commission have traditionally answered by balancing the needs and concerns of consumers against those of utilities investors. And it was during the process of considering possible answers to these questions that the unique strength of our Task Force—its representation of diverse telecommunications stakeholders—became apparent. We brought to our discussions the quite different perspectives of aggressively competitive communications providers and local monopoly phone companies, of telecommunications industry representatives and consumer advocates, of major users of advanced technologies and small business people.

All of us recognized that our constituencies could be unfairly affected by unwise decisions—or no decisions—about infrastructure investment and development, particularly decisions based on current regulatory policies. Early in the process, we studied the history of telecommunications regulation in Wisconsin and other states. We also examined the models adopted by other states to encourage development and construction of advanced telecommunications infrastructures.[10] As we did so, we realized that our uneasiness derived in large part from the fact that these "old" models are obsolete.[11] We concluded that the regulatory models with which we were familiar, and which have been adopted or adapted by other states, are simply inadequate to meet the challenges presented by rapidly changing communications technologies and the continually evolving structure of the telecommunications industry.

Wisconsin, like other states, has traditionally taken a primarily regulatory approach to communications infrastructure development. The Wisconsin legislature created the Public Service Commission to regulate a natural monopoly, and the Task Force agreed that it has done an admirable job. Virtually all of the state's residents are served by low-cost basic telephone service.

But over the past two decades, the telecommunications industry has become an entirely different beast. The regulatory mechanisms appropriate to a natural monopoly are not appropriate to a highly-competitive, rapidly-changing industry. Both the PSC and the Wisconsin Legislature have recognized this. Beginning in the mid-1980s, they took several innovative regulatory actions to accommodate the emergence and growth of competition in the telecommunications industry. However, this process is incomplete, as the PSC itself has noted.

The regulatory mechanisms appropriate to a natural monopoly are not appropriate to a highly-competitive, rapidly changing industry.

A New Model for Telecommunications Infrastructure

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10 See Volume Two for detailed summaries of other states' recent actions.
11 The other state models are in fact fairly recent, but the approaches they all took were traditional ones (even though the specific results were different).

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The procedures set forth in s.196.195, Stats., require the PSC, after hearings, to make certain findings in order to determine whether effective competition exists in a market for a telecommunications service. Specifically, s.196.195 (2)(a), Stats., sets forth seven factors that the PSC shall consider in determining whether effective competition exists. Once the determination is made, the PSC must then decide whether this competition justifies lesser degree of regulation and if such a lesser degree of regulation will serve the public interest . . . However, the PSC itself has noted, that if the Legislature wants the Commission to have broader authority to allow other potential alternatives to rate base, rate of return regulation, the statutes need to be modified accordingly.

Gary Evenson, Wisconsin Public Service Commission

Telecommunications Is a Strategic Advantage

\ New Model for Telecommunications Infrastructure

The Task Force believes that it is time for Wisconsin to move rapidly to encourage and reward competition in the telecommunications marketplace. Wisconsin's infrastructure investment decision should be based as much as possible on rapidly meeting user needs. New technologies offer more than new opportunities for the state's businesses, educational institutions, government agencies, and health and social service providers: They offer a chance for the state to provide truly innovative leadership by adopting a new model for telecommunications infrastructure development. Such a model must go beyond regulatory mechanisms to encourage market forces in a newly competitive, and highly competitive, industry.

The Task Force has concluded that this model will enable the state and the telecommunications industry, working together, to create the advanced infrastructure required for future economic and social development in Wisconsin. The new model requires actions in three general areas:

- Managing the transition to a competitive communications marketplace;

- Removing barriers to competition and effective use of telecommunications; and

- Stimulating private-sector deployment of an enhanced telecommunications infrastructure.

The Task Force believes that the actions it recommends will fuel the rapid development of an appropriate advanced telecommunications infrastructure for Wisconsin by encouraging competition within the telecommunications industry.

Why A New Model for Infrastructure Development is Necessary

In the past, discussions about telecommunications infrastructure development have usually focused on finding the right set of regulatory mandates, or somehow motivating local telephone companies to install advanced facilities ahead of the actual demand.

Phone companies have been naturally wary of the essentially speculative nature of major construction projects. Risks include very long lead times, high capital costs for hardware, and slow pay-back (depreciation) schedules for recouping financial investments. Since customers have generally paid these costs, regulators, too, have been concerned about new investments that might raise consumer rates without providing obvious benefits. Often, new technologies were installed only when demand was clearly demonstrated; as a result, infrastructure developed at a slow, measured pace.

The regulatory system governing telecommunications also evolved slowly. State agencies like the Public Service Commission of Wisconsin were charged with balancing the needs of

telephone company ratepayers (captive customers of the local communications monopolies) with those of the industry shareholders (phone company owners and investors). The federal governmen through the Federal Communications Commission and the judiciary, controlled long distance communications (across state boundaries) and emerging non-telephone technologies like radio, broadcast television, and cable television. For many decades, moves toward deregulation were both advocated and resisted largely on the grounds of ideology and partisan politics.

By the late 1970s, however, new communications technologies were becoming available. Recognition dawned that high-quality networks provide a strategic competitive opportunity for economic and social development. These shifts began to challenge the traditional demand-based model of regulation. New technologies suddenly made an incredible range of services possible. Regulatory agencies like the PSC faced the challenge of

providing an infrastructure that made these services accessible without creating excessive risk for either the ratepayers or the shareholders. An "overbuilt" infrastructure might serve some interests (large business customers, hospitals, government, and schools, for example), but it would increase rates for local residential and small business telephone service beyond acceptable limits. An "underbuilt" infrastructure would drive large customers away and hinder the state's economic and social development goals.

The debate over how quickly to build telecommunications infrastructure continues to rage in state public utility commissions and legislatures around the country. To get on with the task of preparing for the information age, states have tried various infrastructure development plans. Some have mandated infrastructure modernization, passing the costs on to the shareowners and rate-payers. Others have tried incentive plans which allow telephone companies to keep some of the profits that exceed their regulated limits, rather than returning these "over-earnings" to their customers, in exchange for modernization efforts.

All of these plans have generated heated discussion. Consumer advocacy organizations argue that all telephone company "over-earnings" should be returned to residential customers. Utilities and their larger customers, as well as potential public-sector beneficiaries of enhanced network capacity, argue for sharing the cost of infrastructure development among all customers.

Our Task Force includes former proponents of each of these positions. However, we agree that any forward-looking infrastructure development plan must recognize that the entire telecommunications industry has changed: new technologies have blurred old distinctions between such industry segments, and new mergers, court rulings, and buy-outs have blurred the old distinctions between the providers of various services.

Technological innovations continue to emerge at a dizzying rate. Computer processing capabilities rise as costs fall. Scientists find new modes of

transmission and clever new ways to increase the capacity of a given conduit. New applications of new technologies require ever-increasing bandwidth. Access devices like computers and telephones appear with new features. Storage capacities increase.

No one predicts that this rush of innovations will slow in the foreseeable future. As telephony, television, and data communications converge into one multi-faceted world of "digital multimedia," it becomes impossible to plan for—or regulate—each technology as a separate and distinct entity.

Competition now seems to be the natural state of the telecommunications industry. Twenty-five years ago, AT&T and three broadcast networks dominated an industry that also included hundreds of "mom-and-pop" local "community antenna" (cable) television systems. Today AT&T is a different company, and there are eight huge regional telephone companies (7 Bells and GTE). Cable has emerged as a powerful new industry, while videocassettes have added a new link in the distribution chain. The computer industry has mushroomed and begun to merge with the communications industry. There are literally thousands of small data and communications companies, each offering competitive prices and services in an industry that, in earlier and less technologically complex times, was once considered a "natural monopoly."

Telecommunications policy-makers now find themselves in the unenviable position of trying to maximize consumers' benefits from the competitive new telecommunications technologies while protecting the public from any of the risks that accompany technological change. The following examples demonstrate that traditional regulatory mechanisms are now inadequate tools for this task:

• In a competitive marketplace, prices will theoretically move closer to costs, and high-cost customers will start paying higher prices for service. But public utilities regulation traditionally guarantees "universal service," which averages both costs and prices so that customers throughout the state pay about the same (low) amount for local telephone service.

Recent Telecommunications Industry News:

• *New Jersey Bell announces video dial tone trial along with Sammons Cable.*
• *Teleport Communications, a major CAP, purchased by 4 cable companies.*
• *TCI, the nation's largest cable operator, announced it will be wiring 90% of its customers with fiber optics within the next four years. Bell Atlantic announces plan to purchase TCI for over $30 billion.*
• *Southwestern Bell Telephone purchased two cable operations in suburban Washington, D.C.*
• *US West announced the purchase of 25% ownership in Time Warner.*
• *Ameritech announced a proposed major restructuring, proposing to expand Open Network Architecture, and proposing to enter the interLATA toll market.*
• *Bell Atlantic sues United States government for right to offer cable television service in its own territory.*
• *AT&T purchases McCaw Cellular for $12.6 billion.*
• *FCC announces first-ever "spectrum auction" for new P.C.S. wireless service.*

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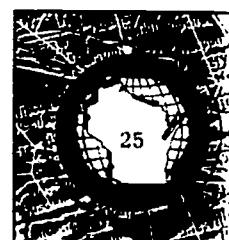
Indeed, the Task Force believes that state regulatory policy must now assume a different but essential role: managing the transition to a competitive telecommunications marketplace.

•Access charges paid by long distance carriers have traditionally provided a high percentage of the income that small, rural telephone companies use for infrastructure development and maintenance. In recent years, competition in the long distance market has forced down prices, reducing the pool of revenue available for cross-subsidies, and hence, for infrastructure improvement.

•Telecommunications regulations have not been able to keep up with the pace of technological and mark changes. As a result, the regulatory arena has, in many cases, become a substitute for the marketplace. Companies attempt to gain significant market advantage by involving their competitors in regulatory hearings or court cases that last for years.

The Elements of the Task Force Plan

The technological and structural changes we have been discussing have not eliminated the need for state regulatory agencies. Indeed, the Task Force believes that state regulatory policy must now assume a different but essential role: managing the transition to a competitive telecommunications marketplace in which market demand drives infrastructure investments whenever and wherever possible. In addition, state regulators must continue to ensure universal access to basic telecommunications services for all of the state's residents.

But the new model for infrastructure development involves more than revising some rules, or even changing the regulatory structure. In Wisconsin (and elsewhere), a fully competitive telecommunications industry faces many non-regulatory barriers, from state tax structures which favor some telecommunications providers over others, to local zoning ordinances that restrict construction of satellite dishes. These non-regulatory barriers must be identified and lowered to facilitate full competition among providers.

Finally, this new model for infrastructure development requires th state to take responsibility for helping stimulate consumer demand. The Tas Force expects that there will continue be situations in which the market doe: not generate sufficient demand to justi development of accessible, affordable. interconnected, state-of-the-art networks. This will be particularly tru: during the early stages of the transitior process, and in sparsely-populated an(low-income regions. The state should do everything within its power to stimulate demand: for example, by assisting users in understanding and articulating their telecommunications needs. and by aggregating potential customers to create profitable markets for infrastructure investment.

The Task Force has developed a set of six strategies and associated recommendations for action designed t implement this new model for telecommunications infrastructure development. The next chapter of this Report introduces and presents these strategies and recommendations.

Chapter 4:
Strategies and
Recommendations for Action

Managing the Transition to a Competitive Communications Marketplace in Wisconsin

Wisconsin was one of the first states to regulate the telephone industry. Our current regulatory system has its origins in the era when "telecommunications" meant "plain old telephone service" and one telephone company served each locality. Each company received a local monopoly, but the Public Service Commission set acceptable company profits (rates of return) and rates for service, and reviewed company investment decisions. The PSC also developed mechanisms to ensure that residents in all areas of the state had access to "universal service"—that is, affordable basic "dial tone." At that time, higher profits from long distance and business customers subsidized local residential service, ensuring low rates even in areas with relatively few customers and high construction costs.

In the late 1970s, entrepreneurs began to use new technologies to compete with telephone companies, especially in the area of long distance services. Within a few years, competition began to challenge the concept of local telephone monopolies. New technologies such as digital switching and fiber optics offered the potential for new networks and increased network capacity, and federal court and FCC rulings promoted the entry of new telecommunications competitors eager to profit from the new technologies. These new players installed telecommunications systems that in some cases offered lower prices and better service than the telephone companies. Partly this was a result of their competitive orientation, and because they sought out high-volume business customers—the users who, not incidentally, had been subsidizing universal service.

In the mid-1980s, following a federal court's break-up of AT&T, the

Wisconsin Legislature and the PSC continued the state's tradition of regulatory innovation by taking several actions to recognize the emergence and growth of competition in the telecommunications market. In 1984, the Legislative Council established a Special Committee on Telecommunications comprised of legislators and representatives of industry and consumer interests to examine the impact of deregulation on telecommunications and consider the need for new state regulatory policies.

The Special Committee's recommendations were codified by the Legislature in 1985 *Wisconsin Act 297*. These statutory changes significantly increased the PSC's flexibility with regard to pricing telecommunications services and decreasing regulation in competitive markets. In *Act 297*, the legislature noted its intent to:

- Maintain universal service at just and reasonable rates;
- Give the PSC flexibility to deal with the current period of transition in the industry;
- Have the PSC rely on competition rather than regulation to determine the variety, quality, and price of telecommunications services, when consistent with the public interest;
- Ensure that users of regulated services pay only reasonable and just charges for these services which do not include costs associated with competitive activities; and
- Rely on partial deregulation to facilitate competition where it may exist, imposing regulation equally among all service providers in fully competitive markets.

- *Develop a new regulatory model*

- *Assure access for all*

- *Remove barriers to competition*

- *Promote effective deployment*

- *Support cost effective use*

Strategies and Recommendations for Action

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The PSC has taken action under this legislation to lessen regulatory burdens and help ensure that telecommunications services, features, and alternatives are more readily available to Wisconsin customers. However, both technology and the telecommunications market have undergone significant changes in the past decade. The Task Force believes that it is time to review and update our regulatory policies in the light of these changes, with particular attention to creating a regulatory structure that

1. Ensures a level playing field for new services;
2. Reduces regulation and favors market solutions to investment decisions;
3. Promotes the education of consumers about telecommunications options and applications; and
4. Preserves and expands the concept of universal service.

The Task Force is particularly concerned that Wisconsin residents continue to share the benefits of universally affordable telephone service. Technology no longer is a barrier to universal service. Even customers whose credit risk is high can now be given the ability to receive calls, but limited to placing only emergency calls.

New technologies also suggest that the definition of universal service will have to be expanded over time to include more than basic dial tone. Single party lines and touchtone service that permit fax and modem communications are already necessities for today's small businesses. As new technologies such as Enhanced-911 or high speed video and data communication links become more readily available and more critical to the state's economic development and the provision of social services, they should also be considered for inclusion in the definition of universal service.

Strategies 1 and 2 address the need to manage the transition while protecting the needs of citizens.

Strategy 1: Develop a New Regulatory Model to Manage the Transition to a Competitive Telecommunications Marketplace.

The Task Force has concluded that the best way to bring the benefits of an enhanced telecommunications network infrastructure to Wisconsin's communities is to unleash the forces of competition. We believe that the communications industry is changing too rapidly for our old regulatory procedures to keep up, and that the days of monopoly providers of communications services are numbered. We believe that our challenge lies not in deciding what specific technology, vendor, or physical infrastructure improvement to support, but in removing the barriers that limit Wisconsin's businesses and residents from receiving the fastest and highest-quality service from a competitive communications marketplace.[12]

The Task Force has developed a number of recommendations directed towards revising the policies and procedures of the Public Service Commission of Wisconsin. These recommendatio move the PSC from a regulator of rates and earning to a facilitator of the change to a competitive telecommunications market in Wisconsin. Economic and social development goals, consume. choice, and the development of a level playing fiel for all competitors, would be added to the PSC's mandate. Appropriate federal waivers would be sought to allow Wisconsin to implement new technologies and creative regulatory approaches.

Recommendation 1.1

The Public Service Commission of Wisconsin should take a pro-active role in developing a competitive telecommunications marketplace, an facilitating the introduction of innovative new services in this competitive marketplace.

Appropriate legislation should be enacted that provides this expanded mandate. The Commission should provide an annual report to the Governor and the Legislature on the progress toward a competitive telecommunications industry.

The PSC's new role should include the followin· key elements:

- Moving from regulating rates and profits to facilitating the change to competition.
- Identifying the barriers to competitive telecommunications markets and seeking to remove them, creating a level playing field for a. providers.
- Assessing the degree of competition in telecommunications market sectors and adjustin its style of regulation to match the degree of competition.
- Promoting competition in local service and PSC regulated long distance service.
- Requiring the unbundling of service elements sr that consumers may price and procure them fror different providers.
- Requiring the interconnection of competitive networks and encouraging cooperative planning for a seamless, transparent network of networks, accessible to all providers on equal terms and conditions.
- Supporting changes to eliminate any local exchange carrier special rights for use of, or control over, conduit and right-of-way.
- Supporting policies which permit telephone number portability and eliminate exchange carrier control of the telephone numbering plan.
- Supporting pricing rules based on efficiency as there is movement of prices toward cost-based rates for service elements. All pricing must be non-discriminatory precluding any anti competitive conduct.
- Supporting the removal of any unnecessary restrictions on resale or sharing allowing potential competitors to put together service offerings without fear of price discrimination.
- Considering the impacts of PSC decisions on the state's economic development and the quality of life of all the state's residents.

12 Task Force member. Louis Reilly, expressed a reservation that promoting competition in urban areas may affect mechanisms necessary to promote infrastructure development in rural areas

Recommendation 1.2

Recognizing that competition will not come to all areas at the same time, transition policies will be needed. During this period, regulation should be geared towards facilitating economic development and protecting consumers. Regulation should be phased out as competition develops.

The PSC, assisted by industry representatives, should complete a report to the Governor and the Legislature on transition policies with a goal of implementing such changes by July 1, 1994.

Recommended transition policies include:

- Focusing on services provided and prices charged, rather than the earnings of the company providing service. Considering other forms of regulation where competitive circumstances exist or incentive criteria for infrastructure development are needed.
- Emphasizing concern for the goal of economic development in both rural and urban areas.
- Eliminating regulatory delays and excessive administrative involvement which prevent existing providers from responding to changes in the marketplace. These include pre-construction reviews and approvals, prior approvals of affiliated interest agreements, lack of flexibility in establishing depreciation rates, restrictive capital and corporate structure policies, extensive rate case processes, and delays in approvals of new services for earnings-regulated providers. Existing authority over construction, depreciation, capital structure, and affiliated interest agreements for price-regulated providers should be eliminated wherever possible.
- Maintaining necessary review authority to ensure protection against cross-subsidies between competitive and non-competitive businesses and services.
- Deleting or modifying laws and administrative rules and procedures that hinder the transition to competition.
- Moving to eliminate exclusive local franchises as barriers to market entry, and as a consequence, removing the "carrier of last resort" obligation.
- Developing incentives for deployment of modern infrastructure where competition does not exist.
- Protecting consumers and competitors from anti-competitive practices.
- Assuring quality of service standards for consumers in non-competitive service areas.
- Supporting efforts to educate consumers about telecommunications services and their benefits.
- Establishing simplified standards and an expeditious process to determine whether competition exists.
- Assuring that basic service rates for residential and small business customers in any area of the state do not exceed a reasonable level.

Recommendation 1.3

Wisconsin Should Seek Federal Designation as an Information Empowerment Zone.

This designation by the Department of Commerce would enable Wisconsin to obtain waivers from certain Federal regulations as recommended by the Governor on the advice of the industry, consumer and labor groups, and the PSC, in order to experiment with creative approaches to telecommunications and information issues. The designation should permit Wisconsin to make new communications technologies and services available to its residents and businesses more rapidly.

Strategy 2: Assuring Telecommunications Access For All Protecting Access to Affordable, High-Quality Basic Telecommunications Services For All Wisconsin Residents.

The proposed recommendations under this Strategy address the need to regularly review and update the concept of "basic universal telephone service" to reflect the rapid changes in technologies, providers of telecommunications services, and public interest concerns.

State policy should continue to make basic universal service available to all residents at affordable rates. In the new competitive marketplace, all telecommunications providers should contribute to a universal service access fund which would target credits to low-income residents and those located in designated high-cost service areas. Disbursements from the fund would be vendor-and technology-neutral, and would be phased out as prices dropped and as new ways to serve high-cost areas were developed.

Recommendation 2.1

Wisconsin should develop a new concept of universal service that meets the present and future needs of its residents. At least every two years, universal service should be examined and, when necessary, changed to reflect the current needs of Wisconsin residents. This examination should be conducted by an advisory group that reports its recommendations to the PSC. The PSC should establish this advisory group no later than June 1, 1994.

- A basic set of telecommunications services, "universal service," should be made available to all customers at reasonable prices. The exact nature of these services should be based on market and social principles—a combination of the percent of customers who have the service, the percent of customers who have access to the service, and the importance of the service rather than a specific technology.
- The delivery of universal service should not favor one technology or carrier over another. New approaches should be considered for delivering the basic set of services to customers in high-cost areas, including the use of shared facilities and high-cost pool contracts for the lowest cost provider(s).

Recommendation 2.2

Universal service funding mechanisms should be created (or maintained) that ensure low-income and high-cost area customers access to reasonably-priced basic services. The PSC should report its recommendations for the

Strategies and Recommendations for Action
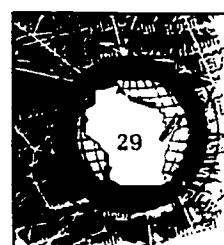
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operation of this fund as part of the initial report of the Universal Service Fund Advisory group.

- All providers of telecommunications services delivered to local customers in Wisconsin should contribute to a universal service access fund based on net revenues received for these services. Exemptions for small providers and new entrepreneurs should be considered.
- Support should be targeted to low-income customers, consumers with disabilities, and customers in high-cost areas, to provide access to the same (or the functional equivalent of) basic or "universal" services available to all other consumers.
- The fund could be administered by an association of Wisconsin telecommunications providers analogous to the National Exchange Carriers Association, or by the PSC, or by an independent third party.
- Innovative approaches to supporting subscrib in high-cost areas which encourage cost-effect and competitive provision of service should b developed.
- Under competition, any subsidies must be apparent; for example, as a line item on bills. This will help move toward eliminating subsidies as the market becomes more competitive.
- Where multiple providers are available, low income customers could select the providers o their choice, who would then get the subsidy, either directly from the fund or through vouchi from the customers.

Removing Barriers to Competition and Effective Use of Telecommunications

Even if changes in regulatory policies created a completely level playing field for Wisconsin's telecommunications industry, barriers to the deployment and effective use of an advanced telecommunications infrastructure would remain. These *non-regulatory barriers* must be discussed and removed to facilitate the creation of a fully-competitive market for infrastructure investment and construction.

The Task Force identified three kinds of barriers:

- Certain tax policies affecting the telecommunications industry;
- Government regulations such as local franchise requirements, right-of-way and access policies, and zoning restrictions that impede the deployment and full utilization of telecommunications technologies; and
- Other state and local government policies that inhibit telecommunications use by the state's businesses and individual citizens, and by government agencies themselves.

Ensuring fair tax treatment for Wisconsin telecommunications companies concerns the Task Force because it is essential to attracting new businesses to the state. Excessively high taxes on the industry as a whole will place Wisconsin at a disadvantage relative to other states. Inequities in the tax structure within the industry will defeat attempts to create a fully competitive market that can develop a strong, modern infrastructure. The tax savings to a provider favored by an inequitable system can be passed along to customers, giving that provider an unfair competitive advantage.

Wisconsin clearly understands the importance of equitable tax policies. The Telecommunications Tax Study Committee created by Legislature in 1987 compared the state's telecommunications tax policies with those of other states, and other industries within the state, and concluded in its 1989 Final Report that "the current telecom-munications tax structure has hurt" the state's

economic development efforts, and that tax reform although expensive, would prove advantageous.[13] In the years since this report was issued, substanti changes have occurred in the telecommunications industry. The Task Force believes it is time to revisit the important questions raised in the Telecommunications Tax Study Committee report

Government regulations often—and usually *inadvertently*—create barriers to telecommunica-tions infrastructure development. For example, n fiber optic networks crossing highways and trails must satisfy the varied requirements of the state Department of Transportation, county boards, and the Department of Natural Resources. The need for towers to develop new cellular services raises issu about zoning regulations, environmental impact, and access to state-owned land and facilities.

Lack of coordination between levels of government can also present formidable obstacles would-be telecommunications infrastructure providers. For example, to further economic development, the state might encourage construction of new cellular service built primaril for "roaming" customers travelling between bigger cities. The new service might well benefit rural residents in the coverage area as well. Local sales and service people could use the cellular network : keep in touch with the home office less expensivel than using coin telephones. But town and county agencies controlling access and right-of-way issues may not understand these benefits, and they have the power to block construction.

The Task Force cannot change, and should not second-guess local regulations, but examples like this indicate the need for discussions with local government entities about the importance of telecommunications for economic development in rural areas. Similarly, the Task Force identified a need for state and local government entities to set uniform or coordinated policies regarding lease

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13 Telecommunications Tax Study Final Report, 1989

terms, fees, and other contractual issues that can hamper infrastructure development. It is essential, to insure a competitive environment, that intergovernmental and inter-agency policies encourage uniform, technology-neutral treatment of all providers. At the same time, policies should recognize the importance of making exceptions, when necessary, for economic development opportunities in rural areas.

The Task Force learned that many other state and local government policies that seem unrelated actually inhibit telecommunications use by the businesses, citizens, and government agencies. For example, Wisconsin's open-meetings law, enacted long before the advent of video teleconferencing, requires that many hearings and meetings be held face-to-face, so that all citizens can participate. State Statutes, Administrative Codes, and judicial procedures often require personal appearances or submission of signed original documents. It is clear that videoconferences, electronic document submissions, and facsimile copies could save hundreds of thousands of dollars; increase accessibility of meetings (especially to homebound and rural residents); reduce time required for document transfers; and improve government responsiveness to citizens. At this point, however, state laws and agency regulations create artificial barriers to the use of these technologies.[14]

Still other barriers hinder telecommunications use within state agencies. The Task Force learned that many government agencies remain unaware of the advantages of videoconferencing. Even agencies that are eager to use the technology find the state's budgeting policies restrictive. Start-up equipment costs (not to mention infrastructure development costs) are prohibitive for organizations that must find the necessary funds in their existing budgets. Schools face similar problems in creating educational video networks; start-up and training costs restrict their ability to introduce telecommunications technologies they know would benefit their students and teachers.

Strategies 3 and 4 address the problems of government taxation, access and right-of-way, and other policies that present barriers to the development of advanced telecommunications infrastructure for Wisconsin.

Strategy 3:
Establish Taxation Policies That Are Equitable Between The Telecommunications And Other Industries, and Within The State's Telecommunications Industries

The Task Force recommends that Wisconsin move to establish a level playing field in its treatment of different telecommunications providers. As competition between technologies and among vendors increases, we must ensure that no one industry has an unfair tax advantage, and that the communications industry as a whole is taxed no differently than other businesses in the state.

Recommendation 3.1

The Governor should direct the Departments of Revenue and Administration to review all tax statutes and policies that affect the telecommunications industries, and report its findings on the revenue disparities between and among industries by June 1, 1994.

Areas of review should include:

- Gross receipts taxes;
- Property taxes;
- Sales and Use taxes;
- Distinctions between personal and real property;
- Machinery and equipment exemptions (central office equipment equity among telecommunications industries);
- Franchise fees;
- Public Service Commission assessments;
- Special assessments placed on telephone bills for items such as 911 and Telecommunication Relay System (TRS) services; and
- Other social obligations, such as cable access channels.

Strategy 4:
Eliminate Government Laws, Policies, and Practices That Create Inadvertent Barriers To Telecommunications Use

Some state agencies, local governments, public school systems, and Technical College districts have started to review their internal rules and procedures in the light of new communications technologies. The Task Force urges the removal of barriers to telecommunications infrastructure development, particularly in high-cost areas that are created by local and state government restrictions on access and right-of-way. In addition, the Task Force recommends a pro-active campaign to identify and eliminate agency barriers that preclude the use of telephone, fax, video, or electronic document communications when conducting business with state and local government units.

Recommendation 4.1

The state should have as a goal the removal of unnecessary restrictions that prohibit or delay the deployment of telecommunications facilities in Wisconsin—particularly in high-cost areas where market forces are underdeveloped.

The Governor should direct state agencies to examine their policies regarding the leasing of rights-of-way, properties, and buildings by telecommunications providers, and report their findings to the DOA by July 1, 1994. The Department of Administration should review these recommendations and report to the Governor by November 1, 1994.

The state and other government units should develop standards for the compatible uses of their assets on a non-exclusive basis for telecommunications facilities. Uniform policies that encourage non-discriminatory access at market rates to such facilities should be developed.

Local units of government should also examine their zoning restrictions on the placement and use of telecommunications facilities.

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+ Task Force member, Ann Crump, expressed her concern that telecommunication technology not be used solely as a means of nating "living wage" jobs, but as a job-creating tool

Recommendation 4.2

The Department of Administration should review all relevant Attorney General's opinions and court rulings that may place constraints on the use of telecommunications to conduct state meetings. It should report its findings to the Governor by November 1, 1994.

Agencies should develop mechanisms that employ enhanced telecommunications to meet the objectives of Wisconsin's Open Meeting Law. Such technologies as listen-only, audio-dial-in, fax-on-demand, and others may not only meet the letter of the law but provide new ways to increase citizen access to government, especially for rural residents, the elderly, and those with disabilities.

Recommendation 4.3

The Governor should encourage the elimination of barriers created by the procedures and policies of state agencies, local government units, and public school and Technical College districts.

The Governor should direct state agencies to examine their p ocedures and policies for such barriers and make recommendations to the Department of Administration by July 1, 1994. The Department of Administration should review these recommendations and report to the Governor by November 1, 1994 on the steps that are being taken to remove these barriers.

Barriers that should be examined include the following:

- Legal requirements for paper filings of documents with administrative agencies and judicial bodies;
- Personal appearance requirements of administrative and judicial proceedings;
- Personnel restrictions that prohibit or frustrate telecommuting;
- State aids requirements that students be taught 1 classrooms; and
- Budget process restrictions such as the requirement that savings from efficiencies realized from the use of telecommunications technologies be returned to the General Fund. and agencies' inability to capitalize justified telecommunications equipment.

Stimulating Private-Sector Deployment of an Enhanced Telecommunications Infrastructure

The telecommunications infrastructure envisioned by the Task Force can be created only when sufficient demand for advanced telecommunications services accumulates to make major capital investments appear potentially profitable. Prospects for success rest on two important assumptions: first, that potential customers understand the capabilities of enhanced telecommunications and are able to articulate their demand for those capabilities; and second, that competition will be uniformly available throughout the state. At present, neither of these conditions is fully developed in Wisconsin.

The Task Force believes that the state can and should play an essential role in stimulating demand for an enhanced telecommunications infrastructure. Its agencies can serve as model users of advanced telecommunications technologies. It can use its purchasing power and tax policies to stimulate infrastructure demand, particularly by aggregating customers in low-density rural areas. And it can provide essential and invaluable assistance to projects that demonstrate cost-effective telecommunications solutions to meet needs for education, health, public safety, and other social services. Adopting these strategies will serve both to "prime the pump" and to educate potential telecommunications customers, thus stimulating the increased demand essential to a competitive telecommunications marketplace.

Wisconsin's experience with the creation of distance education networks offers several examples of how the state's actions can stimulate demand for telecommunications. The Legislature charged the University of Wisconsin-Superior to study the economic development effects of

telecommunications networks used to provide educational benefits throughout their region. CES: District 12. the Wisconsin Indianhead Vocational & Technical Adult Education District. and the K-12 Schools in the area formed a consortium to work or this project. The proposed telecommunications network would enable the members—many in rura areas—to share instructional resources, conduct administrative meetings, offer state-mandated and specialized academic courses in schools with low enrollment, and meet other educational goals.

The study found support for the development of a network that went well beyond expectations. As result, the first segments were implemented quickly and the network has continued to grow. The numbers have formed a permanent coordinating body.

The system already offers distance learning courses for small businesses, medical clinics, and other residents of the area. It serves as an example of the aggregation of customer demand. Although i was built for educational purposes, its potential influence in stimulating further demand for advanced telecommunications services extends deep into their business and social service communities.

NWEC's experience demonstrates the state's ability to help with procuring and negotiating the construction of communications networks in rural areas and other communities. It is now clear that the state can and must educate users, pilot new applications of available technologies, provide financial support for technical training, and offer other support for the full utilization of new telecommunications technologies.

The state has provided one-time special appropriations for a few fiber optics projects that demonstrate advanced telecommunications applications for distance learning. The state and the telephone industry have also helped to fund existing ITFS networks. However, Wisconsin has no ongoing mechanism for supporting projects that will stimulate new demand for telecommunications services. The Task Force believes that the state and the telecommunications industry should establish a foundation to pool public and private funds that can be used to underwrite exceptionally significant and innovative projects. Strategies 5 and 6 address these areas.

Strategy 5:
Wisconsin Should Encourage the Deployment of Advanced Telecommunications Infrastructure Throughout the State.

Wisconsin state government can play a major role in encouraging the extension of high-capacity, publicly-available, interconnected networks throughout all areas of the State. Agencies should be rewarded for developing innovative uses of telecommunications to speed administrative processes, reduce costs and make government more accessible.

The use of special tax incentives as well as the State's purchasing processes are also recommended as important tools in stimulating the deployment of reasonably-priced communications facilities in Wisconsin's rural and other "high-cost" communities.

Recommendation 5.1

The Governor should instruct each state agency to develop telecommunications plans and procedures as part of its information technology strategic plans. These plans and procedures should encourage the use of telecommunications to make government more effective and more accessible to the state's residents.

As part of its Information Technology Strategic Planning Process, the DOA should convene inter-agency teams to look at sharing facilities, consolidating services, and implementing joint industry-government telecommunications-based productivity solutions such as Electronic Data Interchange.

DOA currently coordinates this major statewide planning program. The Task Force endorses this program and believes it should be expanded permanently to incorporate efforts for pro-active adoption of telecommunications-based productivity tasks.

Telecommunications-based links to agency information technology systems can provide many opportunities for enhanced productivity as well as methods for making government more citizen-friendly, particularly for those at a distance from Madison, those with disabilities, and the elderly.

Telecommunications-based applications are changing rapidly, and Wisconsin state government can play a role in educating citizens and businesses about these new applications. Successful

government implementation of telecommunications projects provide models for small business and other potential users.

Agencies should be encouraged to:

- Facilitate a better understanding and appreciation of telecommunications technologies by their employees;
- Encourage and reward employees for innovative uses of telecommunications technologies to meet the needs of agency "customers;"
- Provide incentives to experiment with telecommunications-based solutions to agency operational problems; and
- Encourage the joint use of telecommunications technologies and facilities for further cost savings.

Recommendation 5.2

The Governor should direct the Department of Revenue to examine tax policies and recommend changes that will encourage the development of a robust telecommunications industry within the state. This report should be delivered to the Governor no later than June 1, 1994.

Through its tax policies, Wisconsin can stimulate deployment of enhanced telecommunications infrastructure in high-cost, harder-to-serve areas. Policies that encourage the deployment of advanced switching equipment in rural areas, for example, can bring benefits to business, government, health, and education users throughout a region. Other programs can encourage the retention and/or expansion of communications industry employment in Wisconsin. However, caution must be taken to prevent the unnecessary over-building of facilities.

Recommendation 5.3

Wisconsin should continue to procure telecommunications network services from the private sector at the lowest cost to its taxpayers; however, when evaluating procurement options, state and local government agencies should consider the impact of any proposed solution on the overall vitality of publicly available, switched, communications networks.

The Department of Administration should coordinate a multi-agency workgroup to develop a set of "non-price" criteria, consistent with state procurement policies and other management practices, to be used by the Bureau of Information and Telecommunications Management in major state telecommunications network procurement contracts not later than July 1, 1994.

State agencies, local governments, and public school and Technical College districts are large purchasers of telecommunications services. The manner in which they procure these services can affect the development of the state's communications infrastructure. The building or leasing of dedicated "private networks" for state government use which bypass the existing public networks or cannot be interconnected with such networks should be discouraged, especially in high-cost areas, where few other large customers exist.

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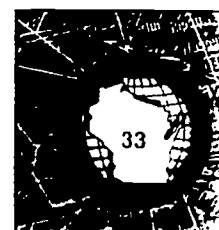
When issuing telecommunications service contracts. agencies, local governments, and school districts could consider:

- The extent to which the contract will assist in deploying enhanced network facilities to Wisconsin communities;
- The ability of the proposed facilities to be inter connected with other elements of the state's telecommunications infrastructure;
- The provider's adherence to standards set for state government's telecommunications infrastructure;
- Whether the provider has met its obligation to contribute to the universal service fund;
- The impact on current jobs, both inside and out of the telecommunications industry, economic and community development; and
- How well the contract supports the Task Force vision.

> **Strategy 6:**
> Wisconsin Should Provide Incentive Funding, Planning, Implementation, Evaluation, and User Training Support to Programs That Use Cost-Effective Telecommunications Solutions for Education, Health, Public Safety, and Other Needs.

The Task Force endorses Wisconsin's continued leadership in the use of telecommunications for education, rural medicine, public safety, and environmental protection. Incentive funding is recommended for well-planned programs that enhance Wisconsin's economic and social infrastructure, increase government efficiency, and stimulate the extension of high-quality, affordable telecommunications services to all areas of the State.

The Task Force proposes establishment of a new public-private foundation to aggregate state, telecommunications industry, and other private sector contributions, and to use these funds to match Federal and other grants to stimulate the extension of, use of, and education about the state's new electronic highways.

Recommendation 6.1

Wisconsin should continue to support agency and regional initiatives that aggregate potential users of telecommunications, allowing for economies of scale in planning, standards-setting, contract negotiation and procurement.

Wisconsin should support telecommunications based projects that enhance the state's economic and social infrastructure, increase government productivity, and stimulate the extension of affordable enhanced telecommunications features to all communities in the state.
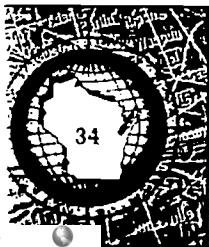
Such projects could include:

- Regional distance education projects;
- Rural Area Networks that combine local government, health, public safety, and educational applications;
- Public-private partnerships that promote extending telecommunications facilities and educating potential user groups about the value of enhanced telecommunications-based applications.

Recommendation 6.2

The Governor and the Legislature should encourage the creation of a public-private foundation that can assist in funding telecommunications technology application projects and efforts to educate users about telecommunications, both of which will benefit Wisconsin citizens.

Characteristics of this foundation could include:

- Funding by contributions from the telecommunications industry and other private and public sources.
- A governing board composed of funders, providers of telecommunications services, users of telecommunications services, and others with telecommunications applications expertise.
- A clearinghouse function that matches potential projects with interested funding sources.
- Funds for projects that provide matching resources. thus leveraging the fund's contribution.
- Grants to projects that demonstrate cooperative applications between users, and between users and providers; that are replicable and contain an educational component; that have a demonstrated need; that are not competitive with the private sector; and that are multiple-use.
- Funds for projects that promote the effective use of the telecommunications infrastructure, and that further Wisconsin's ambition to be a "world class" telecommunications state.
- Funds for proposals that include such benefits as technology transfers, user education, software and curriculum development, in addition to telecommunications equipment and services.
- Funds for programs to educate users—for example, small businesses, individual consumers, and non-profit organizations—about telecommunications technologies, applications. and alternatives.

Chapter 5:
Recommendations
Summary

Strategy 1:
Develop a New Regulatory Model to Manage the Transition to a Competitive Telecommunications Marketplace

The best way to bring the benefits of an enhanced telecommunications infrastructure to Wisconsin is to *unleash the forces of competition.* The communications industry is changing too rapidly for our old regulatory procedures to keep up, and the days of monopoly companies are numbered. Our challenge lies not in deciding on a specific "silver bullet" technology or vendors, but in removing barriers to getting the fastest and highest-quality service from a competitive marketplace.

These recommendations are directed towards the Public Service Commission of Wisconsin, moving it from a regulator to a facilitator of the change to competition, and adding economic and social goals, consumer choice, and the development of a level playing field to it's mandate. Appropriate federal waivers would also be sought to foster new technologies and creative regulatory approaches.

Recommendation 1.1

The Public Service Commission of Wisconsin should take a pro-active role in developing a competitive telecommunications marketplace, and facilitating the introduction of innovative new services in this competitive marketplace.

Appropriate legislation should be enacted that provides this expanded mandate. The Commission should provide an annual report to the Governor and the Legislature on the progress toward a competitive telecommunications industry.

Recommendation 1.2

Recognizing that competition will not come to all areas at the same time, transition policies will be needed. During this period, regulation should be geared towards facilitating economic development and protecting consumers. Regulation should be phased out as competition develops.

The PSC, assisted by industry representatives, should complete a report to the Governor and the Legislature on transition policies with a goal of implementing such changes by July 1, 1994.

Recommendation 1.3

Wisconsin Should Seek Federal Designation as an Information Empowerment Zone

Strategy 2:
Assuring Telecommunications Access For All: Protecting Access to Affordable, High-Quality Basic Telecommunications Services For All Wisconsin Residents.

The concept of "basic universal telephone service" must be regularly reviewed to reflect rapid changes in technologies, providers, and public

interest concerns. State policy should continue to make basic universal service available to all residents at affordable rates. In the new competitive marketplace, all telecommunications providers should contribute to a universal service access fund which would target credits to low-income residents and high-cost service areas. Disbursements would be vendor- and technology-neutral, and would be phased out as prices dropped.

Recommendation 2.1

Wisconsin should develop a new concept of universal service that meets the present and future needs of its residents. At least every two years, universal service should be examined and, when necessary, changed to reflect the current needs of Wisconsin residents. This examination should be conducted by an advisory group that reports its recommendations to the PSC. The PSC should establish this advisory group no later than June 1, 1994.

Recommendation 2.2

Universal service funding mechanisms should be created (or maintained) that ensure low-income and high-cost area customers access to reasonably-priced basic services. The PSC should report its recommendations for the operation of this fund as part of the initial report of the Universal Service Fund Advisory group.

Strategy 3:
Establish Taxation Policies That Are Equitable Between The Telecommunications And Other Industries, and Within The State's Telecommunications Industries

Wisconsin must establish a level playing field in its tax treatment of different telecommunications providers. As competition increases, we must ensure that no one industry has an unfair tax advantage, and that the communications industry as a whole is taxed no differently than other state businesses.

Recommendation 3.1

The Governor should direct the Departments of Revenue and Administration to review all tax statutes and policies that affect the telecommunications industries, and report its findings on the revenue disparities between and among industries by June 1, 1994.

Strategy 4:
Eliminate Government Laws, Policies, and Practices That Create Inadvertent Barriers To Telecommunications Use

State agencies, local governments, and educational districts need to review and remove barriers to infrastructure development, particularly restrictions on access and right-of-way. A pro-active

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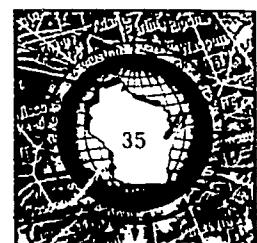
campaign is needed to identify and eliminate other barriers to using telephone, fax, video, or electronic document communications when conducting business with state and local government units.

Recommendation 4.1

The state should have as a goal the removal of unnecessary restrictions that prohibit or delay the deployment of telecommunications facilities in Wisconsin—particularly in high-cost areas where market forces are underdeveloped.

The Governor should direct state agencies to examine their policies regarding the leasing of rights-of-way, properties, and buildings by telecommunications providers, and report their findings to the DOA by July 1, 1994. The Department of Administration should review these recommendations and report to the Governor by November 1, 1994.

Recommendation 4.2

The Department of Administration should review all relevant Attorney General's opinions and court rulings that may place constraints on the use of telecommunications to conduct state meetings. It should report its findings to the Governor by November 1, 1994.

Recommendation 4.3

The Governor should encourage the elimination of barriers created by the procedures and policies of state agencies, local government units, and public school and Technical College districts.

The Governor should direct state agencies to examine their procedures and policies for such barriers and make recommendations to the Department of Administration by July 1, 1994. The Department of Administration should review these recommendations and report to the Governor by November 1, 1994 on the steps that are being taken to remove these barriers.

Strategy 5:
Wisconsin Should Encourage the Deployment of Advanced Telecommunications Infrastructure Throughout the State.

State government can play a major role in encouraging the statewide extension of high-capacity, public networks, and agencies should be rewarded for developing innovative uses of telecommunications to speed administrative processes, reduce costs and make government more accessible. The State can also use special tax incentives and its own purchasing processes to stimulate the deployment of reasonably-priced facilities in rural and other high-cost areas.

Recommendation 5.1

The Governor should instruct each state agency to develop telecommunications plans and procedures as part of its information technology strategic plans. These plans and procedures should encourage the use of telecommunications to make government more effective and more accessible to the state's residents.

As part of its Information Technology Strategic Planning Process, the DOA should convene inter-agency teams to look at sharing facilities.

consolidating services, and implementing joint industry-government telecommunications-based productivity solutions such as Electronic Data Interchange.

Recommendation 5.2

The Governor should di⁰ t the Department of Revenue to examine tax policies and recommend changes that will encourage the development of a robust telecommunications industry within the state. This report should be delivered to the Governor no later than June 1, 1994.

Recommendation 5.3

Wisconsin should continue to procure telecommunications network services from the private sector at the lowest cost to its taxpayers: however, when evaluating procurement options. state and local government agencies should consider the impact of any proposed solution on the overall vitality of publicly available, switched. communications networks.

The Department of Administration should coordinate a multi-agency workgroup to develop a set of "non-price" criteria, consistent with state procurement policies and other management practices, to be used by the Bureau of Information and Telecommunications Management in major state telecommunications network procurement contracts not later than July 1, 1994.

Strategy 6:
Wisconsin Should Provide Incentive Funding, Planning, Implementation, Evaluation, and User Training Support to Programs that Use Cost Effective Telecommunications Solutions for Education, Health, Public Safety, and Other Needs.

Wisconsin should continue its leadership in using telecommunications for education, rural medicine, public safety, and environmental protection. Incentive funding is recommended for well-planned programs that enhance our economic and social infrastructure, increase government efficiency. A new public-private foundation should be established to aggregate state, telecommunications industry, and other private sector contributions: these funds could be used to stimulate the extension of, use of, and education about the state's new electronic highways.

Recommendation 6.1

Wisconsin should continue to support agency and regional initiatives that aggregate potential users of telecommunications, allowing for economies of scale in planning, standards-setting. contract negotiation and procurement.

Recommendation 6.2

The Governor and the Legislature should encourage the creation of a public private foundation that can assist in funding telecommunications technology application projects and efforts to educate users about telecommunications, both of which will benefit Wisconsin citizens.

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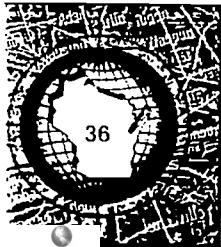
Appendix 1

OFFICE OF THE GOVERNOR

EXECUTIVE ORDER #178

Relating to the Governor's Blue Ribbon Telecommunications
Infrastructure Task Force

WHEREAS, I am committed to ensuring that Wisconsin's telecommunications infrastructure is superior in meeting the needs of the citizens and businesses of this state;

NOW, THEREFORE, I, TOMMY G. THOMPSON, Governor of the State of Wisconsin, by the authority vested in me by the Constitution and the laws of this State, and specifically by Wisconsin Statute section 14.019, do hereby:

1. Establish the Governor's Blue Ribbon Telecommunications Infrastructure Task Force.

2. Provide that the Task Force shall consist of not more than thirty-five members, appointed by the Governor to serve at his pleasure. A Chairperson and Vice-chairperson shall be appointed by the Governor from among the membership.

3. Direct the Task Force to:

   a. Formulate a working definition of the telecommunications infrastructure and develop a statewide telecommunications infrastructure vision for Wisconsin.

   b. Identify the participants and stakeholders in the development of the telecommunications infrastructure.

   c. Undertake an assessment of customer needs and expectations that may be addressed by telecommunications infrastructure enhancements.

   d. Assess the current state of the telecommunications infrastructure in Wisconsin.

   e. Assess conclusions and pertinent data from resources currently available such as other state and national infrastructure studies.

   f. Evaluate the current pace of investment in the telecommunications infrastructure in Wisconsin.

   g. Identify barriers to achieving the statewide infrastructure vision.

h. Document the value of a modern telecommunications infrastructure for Wisconsin, and the benefits this infrastructure can bring to the State and its citizens.

i. Recommend changes in public policy to meet customer needs, remove barriers, enhance competitiveness, attract telecommunications-dependent businesses to Wisconsin, and pave the way to securing other identified value and benefits of the infrastructure vision.

4. Direct the Task Force to submit to the Governor a report of its activities and accomplishments, including advisory recommendations and recommendations for further action by the Task Force, by September 1, 1993.

5. Direct the Task Force to coordinate its activities with other state councils, agencies, departments, and committees which have economic development and telecommunications missions and responsibilities. These cooperating organizations are further directed to assist the Task Force in carrying out its duties.

6. Direct the Secretary of the Department of Administration to provide the Task Force with sums of money that are necessary and proper for the legitimate expenses of State officials of state employees who are members of the Task Force.

IN TESTIMONY WHEREOF, I have hereunto set my hand and caused the Great Seal of the State of Wisconsin to be affixed. Done at the Capitol in the City of Madison this twenty-ninth day of March in the year one thousand nine hundred and ninety-three.
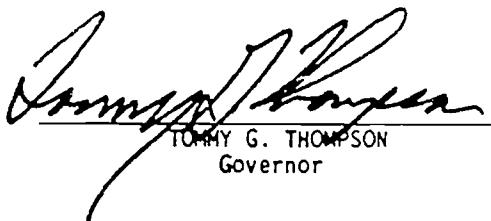
_____
TOMMY G. THOMPSON
Governor
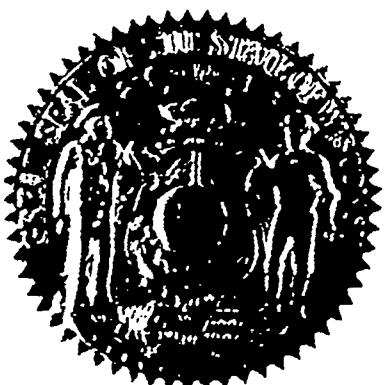
By the Governor:

_____
DOUGLAS LA FOLLETTE
Secretary of State

Appendix 1

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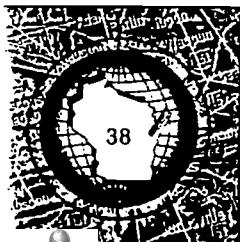
Appendix 2

Governor's Blue Ribbon Telecommunications Infrastructure Task Force Membership List

Dick Bohling, Regional Manager - Governmental Affairs, GTE North, Wisconsin Operations
Ronald C. Bornstein, Senior Vice President, University of Wisconsin System
Patrick Boyle, Chancellor, University of Wisconsin-Extension
Mark Bugher, Secretary, Wisconsin Department of Revenue
Geoff A. Clouthier, Branch Manager - Milwaukee, Sprint
Ann Crump, President, Communications Workers of America Local 4600
John Cusack, Director - External Affairs, Ameritech Mobile Cellular Communications
Glenn Davison, Executive Assistant, Board of Vocational, Technical and Adult Education
Don Detampel, President, Schneider Communications, Inc.
Larry Dickerson, Deputy Director, Wisconsin Educational Communications Board
Gary Doty, Senior Executive Account Manager, MCI Telecommunications Corporation
Sally Drew, Assistant Superintendent, Department of Public Instruction
Michael J. Flanigan, President & General Manager, Cellular One/Eastern Wisconsin
John Geroux, Vice President - External Affairs, Wisconsin Bell, Inc.
Tim Hall, Region Vice President, Century Telephone
The Honorable Doris Hanson, Wisconsin State Assembly
Todd Howard, Executive Vice President, Access Wisconsin
Gwen Jackson, Chapter Chair Emeritus, Greater Milwaukee Chapter, American Red Cross
The Honorable Robert Jauch, Wisconsin State Senate
The Honorable Scott Jensen, Wisconsin State Assembly
Donald Jones, Managing Partner, Star Cablevision
Daniel T. Kelley, City Manager, City of Beloit
Larry Knegendorf, General Manager, Baldwin Telecom, Inc.
James Leonhart, State Director, Government Relations, AT&T
Peggy Lescrenier, Vice President, Gammex Companies
William E. Malkasian, Executive Vice President, Wisconsin Realtors Association
Cheryl L. Parrino, Chairman, Wisconsin Public Service Commission
Todd Penske, Director of Telecommunications, St. Joseph's Hospital/Marshfield Clinic
Glen Pulver, Professor Emeritus, University of Wisconsin - Madison
Kailas J. Rao, MBA, Ph.D., Executive Managing Director, Glaisner, Schilffarth, Grande, and Schnoll, Ltd.
Louis D. Reilly, Vice President, Mid-West Telecom, TDS Telecom
Larry Saunders, Madison
Phil Schaecher (Vice-Chair), Senior Vice President - Operations, Land's End, Inc.
Penny Scheuerman, Manager - Economic Development, Wisconsin Electric Power Co.
Jerald W. Schoenike, Ed.D., Superintendent, Clintonville Public School District
Ronald Semmann, Deputy Secretary, Wisconsin Department of Natural Resources
Steve Smith, President, Journal Communications
The Honorable Donald Stitt, Wisconsin State Senate
Charles Thompson, Secretary, Wisconsin Department of Transportation
Robert Trunzo, Secretary, Wisconsin Department of Development
Pamela Wegner, Administrator, Wisconsin Department of Administration
Fred Weier, General Manager, Tri-County Telephone Cooperative
Leon Weinberger, President and Chief Executive Officer, Wausau Insurance
James Wigdale (Chair), Chairman & Chief Executive Officer, Marshall & Ilsley Corporation
Gus Wirth, Jr., Ozaukee County/American Signal Corporation
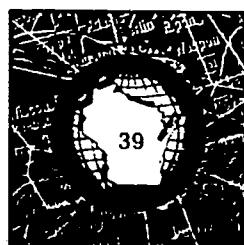
Governor's Blue Ribbon Telecommunications Infrastructure Task Force Project Consultants and Staff

Steven R. Vedro, Network Resources, Inc., Project Manager

Krasna Svoboda, Network Resources, Inc., Project Administrator

Eric S. Brown, Management Consultant, Madison

David Devereaux-Weber, P.E., DDW Services, Madison

Harry Hegna, Wisconsin State Telephone Association

Kerry Horneck, Network Resources, Inc., Administrative Assistant

Susan E. Koch, Ph.D., Independent Consultant, West St. Paul, MN

Fred Moore, Graduate Student, University of Wisconsin - Madison

Paul Nelson, Wisconsin Department of Administration

Edwin Parker, Ph.D., Parker Telecommunications, Inc., Gleneden Beach, OR

Linda Smith, Esq., University of Wisconsin - Madison

Rodney Stevenson, Ph.D., University of Wisconsin - Madison

Randall Young, MEANS, Inc., Plymouth, MN

Appendix 3

Governor's Blue Ribbon Telecommunications Infrastructure Task Force

Participants List

Dan Adams, Wisconsin Educational Communications Board
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Terry Anderson, Omni Tech Corporation
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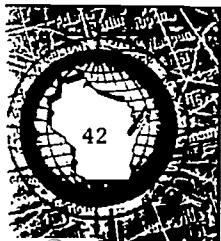
Appendix 4

Governor's Blue Ribbon Telecommunications Infrastructure Task Force Definitions & Acronyms

ANI: Automatic Number Identification. Equipment that automatically records the calling number, and also passes it along to other equipment so the call can be billed. Also called CLI or Calling Line Identification.

Access Charge: Since divestiture, all users pay for their access to public switched long distance networks. Also called "subscriber line charges." Long distance carriers pay a different set of carrier access charges to the local telephone carriers.

Analog: A way of sending voice, video or data signals in which the signal is like the original. From the word "analogous". A continuously-varying electrical signal in the shape of a wave.

Architecture: How a system is designed and how the components are connected and operate together.

Asynchronous: The capability of communications to be time-independent because the information can be stored or recorded for later playback; or, communications that are only one way at a time.

Audiotex: A generic term for interactive voice response equipment and services for one-way (listen only) voice bulletin board systems and services.

BITM: Bureau of Information & Telecommunications Management. Located within the Wisconsin Department of Administration, Division of Finance & Program Management, BITM oversees state telecommunications policy, budgets and procurements, and operates the STS and CDN.

BITNET: "Because It's Time" Network, an electronic mail network connecting 300+ universities as well as major European and Asian academic data networks; see also Internet.

BOC: Bell Operating Company. Wisconsin Bell/Ameritech is the local BOC.

BPS: Bits per second. A measure of the amount of data transmitted in a fixed amount of time.

Bandwidth: The range of electrical frequencies a device or a network channel is able to handle. For example, a voice channel has a range of 300 to 3,300 Hertz.

Baseband: A signal in its original form, not changed by modulation. May be analog or digital.

Bit: One bit is one digital signal element; a single alphabetical or numeric character is typically represented by 10 bits.

Bridge: Communications device that passes information between two separate networks.
Broadband: A transmission channel with a bandwidth greater than an ordinary voice channel.

CATV: Community Antenna Television or Cable TV. CATV is a broadband service.

CDN: Central Data Network. The shared statewide computer network operated by BITM for all agencies and universities.

CESA: Cooperative Educational Service Agency. In Wisconsin there are 12 CESAs, providing shared support to public schools in such areas as special education, media and library services, etc. A number of CESAs have taken local leadership in developing regional distance education networks in their service areas.

CLASS: Custom local area signalling services. (Bellcore service mark.) Includes number-translation services such as call forwarding, caller identification, automatic recall, distinctive ringing, call waiting, and others.

Cellular Service: A mobile radio service in which an area is broken into many cells, and each cell has its own receiver/transmitter. Calls are handed off from one receiver/transmitter to the next as the user moves between cells.

Central Office: Telephone company facility where subscriber lines are terminated on switching equipment, from which connections can be made to local and long distance points.

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Centrex: Business telephone service offered by local exchange carriers that is similar to a PBX but with the switching equipment located in the telephone company central office.

Coax, Coaxial Cable: A cable composed of an insulated central conducting wire, inside a cylindrical conductor, with a buffer layer in between. Carries much more information than copper "twisted pair" cables. Used primarily for data or television signals.

Codec: Compression-decompression. Device used to convert audio or video signals from analog to digital form.

Common Carrier: A company that is recognized by an appropriate regulatory agency as providing communications service to the general public.

Compressed Video: Digital signals can be compressed by various methods to save bandwidth, storage, and transmission time. Only the changes in the moving frames are captured and transmitted.

"Customer First": Name given by Ameritech to its current tariff request which essentially deregulates subscriber loops.

DETIC: Distance Education and Technology Initiative Council.

DOA: The Wisconsin Department of Administration.

DOR: The Wisconsin Department of Revenue.

DOT: The Wisconsin Department of Transportation.

DPI: The Wisconsin Department of Public Instruction.

DS-0, DS-1, DS-3: Digital services—levels 0, 1 and 3. DS-0 is the worldwide standard speed for one digital voice signal (64000 BPS). DS-1, in North America, equals 24 voice channels or 1.544 Mbps. DS-3 equals 28 DS-1 channels, or 44.7 MBPS.

DTMF: Dual tone multi-frequency. Generic term for "touchtone", which is an AT&T service mark.

Database: An organized collection of files and information stored on a disk and available for update and retrieval.

Digital: Information expressed in binary code; digital transmissions are by discrete signals (bits) rather than continuously variable analog waves. Digital processing and transmission allows for very high speed data communication, voice processing and compressed video.

Distance Education, Distance Learning: The application of information technology (and infrastructure) to educational and student-related activities.

Downlink: Transmission link from a satellite to a ground receiving station.

ECB: Wisconsin Educational Communications Board, the agency charged with public broadcasting and educational telecommunications coordination.

Equal Access: Under divestiture, subscribers must be able to reach all long distance common carriers by dialing "1".

Exchange Area: Geographic area—generally surrounding a telephone central office—in which telephone services and prices are the same.

FCC: Federal Communications Commission, established in 1934 to regulate all interstate communications, set prices, determine standards, and allow access.

FDDI: Fiber distributed data interface. An emerging standard for computer LANs operating at 100 MBPS over fiber optic cable.

Fiber Optic: Thin glass strands through which light beams are transmitted; capable of carrying very large amounts of information over long distances.

Franchise: The exclusive right to operate telephone service in an area.

GIS: Geographic Information System . A method of linking complex database information to graphic maps. For example. a GIS system could be used to display the location of all telephone central offices in the state; "clicking" on to a particular office symbol could reveal the data about that location.
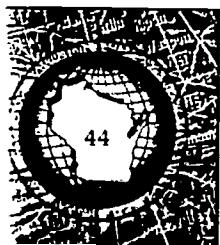
Internet: A network of networks; the U.S Internet usually refers to the collection of inter-university networks using the TCP/IP communications protocol providing such services as electronic computers, database access, etc. The Internet is connected to the Bitnet and to NREN. Future Internet services will include audio and video transmission and multi-media communications.

ISDN: Integrated services digital network. A hierarchy of digital switching and transmission systems that provides voice, data and video in a unified manner. A new standard for end-to-end digital networking.

ITAB: Information Technology Advisory Board. The ITAB was convened by the Wisconsin Department of Administration and produced its report in November, 1990. The ITAB called for a number of management changes in Wisconsin's computer and telecommunications networks, including state agency strategic information plans.

ITFS: Instructional Television Fixed Service. Local (i.e. 25-mile radius) one-way broadcast channels that operate at very high microwave frequencies.

IXC: Interexchange carrier. Long distance carriers, as opposed to LEC's. IXCs are regulated by the FCC and provide inter-LATA service; LECs are regulated by the PSC. Some IXCs have registered with the PSC and offer intra-LATA long distance service subject to PSC tariff review.

LAN: Local area network. Data communications network with a limited geographic area, usually a single or a few contiguous buildings.

LEC: Local exchange carrier. The local telephone company, a BOC or an independent, that provides subscriber lines and local calling services. Except in special cases, LECs have a monopoly on service within their LATAs, and cannot offer inter-LATA services.

LATA: Local Access Transport Area. The geographic area in which a LEC can offer long-distance services. Created by divestiture.

Mbps: Megabits per second, or million bits per second. A measure of the amount of data transmitted in a fixed amount of time.

MFJ: Modified Final Judgement. The federal court ruling that set up the rules for divestiture of the Bell System.

Microwave: Radio frequency spectrum signals between 890 Megahertz and 20 Gigahertz. Common form of transmitting telephone, facsimile, video, data, and radio "conversations" for both end users and carriers. Microwave signals only travel in straight lines. Also used to transmit to and from satellites.

Modem: Modulator-demodulator. Device that converts digital computer signals to analog, voice-grade signals so that they can be transmitted over telephone lines.

Multiplex: To transmit two or more signals simultaneously over a single transmission channel.

NREN: National Research and Education Network. The proposed, federally-funded, high capacity digital "electronic highway" providing the backbone links for the Internet.

NTIA: National Telecommunications and Information Agency, located in the Department of Commerce.

NWECS: Northwest Wisconsin Educational Communications System – a fiber optic-based distance learning network coordinated by CESA 12; NWECS connects a number of K-12 schools with the Indianhead Technical College and the University of Wisconsin - Superior.

PBX: Private Branch Exchange. A private telephone switching system. usually located on the user's premises. Connected to a common group of lines from one or more telco central offices to provide services to many users internally.

PCS, PCN: Personal Communications Service. Personal Communications Network. A system of small hand-held wireless computer-based devices combining computing. communications and personal notebooks/organizers.

POP: Point of Presence. Physical location in a LATA where an IXC connects to the network of a LEC.

POTS: "Plain Old Telephone Service". Basic service consisting of a plain telephone line, a plain telephone, and access to the public switched network, and nothing else.

PSC of W: Public Service Commission of Wisconsin. Regulates communications carriers and services in-state.

PUC: General term for a public utilities commission.

REA: Rural Electrification Administration. Federal agency that makes loans to extend telephone services into rural areas.

RBOC: Regional Bell Operating Company. Holding company that owns one or more BOC. Ameritech is in this relationship with Wisconsin Bell.

RSA: Rural Service Area, as defined by the Federal Communications Commission.

STS: State Telecommunications System (Telephone) System. A contracted private network providing low-cost long distance service to state agencies and affiliated government organizations in Wisconsin.

T-1, T-3: See DS-1, DS-3.

Telecommuting: Commuting to another location electronically (i.e., using information technology) rather than physically.

Telemedicine: The application of information technology (and infrastructure) in the health care industry in support of patient care and patient-related activities.

UW-System: University of Wisconsin - System. The central coordinating body, headed by a Board of Regents and a System President, for the 27 UW institutions.

Universal Service: Originally, the concept put forth by the first Bell System chairman that residential telephone service be priced low enough so that anyone in the U.S. could afford it.

Uplink: Transmission link from an earth station to a satellite.

VSAT: Very Small Aperture Terminal. Small satellite receive dishes, making it economical to serve isolated locations with voice, video and data services. Two-way VSATs allow for return data transmission.

VTAE: Vocational, Technical & Adult Education. In Wisconsin the of VTAE Board coordinates the state's 16 technical college districts.

Video Dial Tone: An FCC ruling allowing for limited video services to be delivered by telephone companies in their service areas. Seen as a competitor to cable television.

Video Teleconference: Real-time, usually two-way transmission of video images between two (or more) locations.

Virtual: A service that appears to be something it is not. For example, a virtual private line appears to the user to be a dedicated circuit, but is really ordinary dial-up service that is available to the subscriber on demand.

WSTA: Wisconsin State Telephone Association. An organization whose members include all LECs in the state, and which represents the interests of its members in a variety of ways.

WiscNet: Based at the University of Wisconsin - Madison, WiscNet connects 27 member organizations, including the entire UW system and many private colleges, private schools, and state agencies to each other, to the UW Centers (via CentersNet), and to the national Internet.

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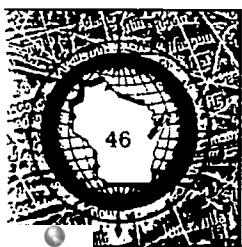
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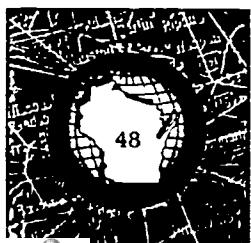
Appendix 6

Convergence, Competition, Cooperation
Volume Two: Assessment of User Needs and Existing Environment

Volume Two is offered as a companion to this report, for those who desire more detailed background information. Volume Two contains the staff and consultant work papers that the Task Force used in the first stages of its work. This information is also presented in a condensed form in the second chapter of this (Volume One) report.

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