Infrastructure
STRATEGY
For Iowa's Future Economy

Telecommunications Sector

REPORT & RECOMMENDATIONS

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Introduction

Iowans have high expectations for a strong economy, good jobs, and a future of opportunity. Setbacks came in 2008 with the summer disasters followed by the national recession and significant impacts on Iowa's infrastructure. Even while addressing those challenges through the influx of federal and state short-term funding for jobs, infrastructure, disaster recovery, and other broad needs, Iowans must also give significant consideration of the vision for the future economy and the infrastructure it will demand. Interested Iowans statewide will find in this report a set of recommendations and a strategic direction for the Telecommunications sector.

Telecommunications was the subject of deliberations over a four-month period by a diverse array of Iowans who contributed their expertise, experience, and perspectives on the future economy and the telecommunications infrastructure that will be required to meet those needs. Because the report was developed by stakeholders from across the state, it reflects and has future application to diverse stakeholders including the private sector, issue-based groups, nonprofit organizations, academia, and local and state government.

Iowa's rich history of development of telephone service dates back to the late 1800s and early 1900s, with private and cooperative development of telephone service throughout the state. Moving more than a century forward to today's reliance on telecommunications creates an image of continued advances and implementation of technology, bringing with it even wider application and heavier use to support the way we want to live and work in a strong economy everywhere in the state.

All Iowans are reliant to a great degree on telecommunications, whether through the basic wired telephone or through the dependence on advanced forms of information exchange by our agriculture, retail, health care, law enforcement, education, manufacturing, transportation, utility, and countless other segments of our society and economy. That reliance is expanding rapidly and creating much greater demands on telecommunications. In Iowa, the Sector Committee identified the fundamental challenges and set forth solutions in the pages of this report.

This report does not stand alone, however. As part of a comprehensive and coordinated statewide planning initiative under guidance of Iowa Department of Economic Development, the recommendations and insights on the telecommunications sector will be considered by a Task Force, along with similar reports on infrastructure needs for the future economy in buildings and vertical infrastructure, energy, natural resources, and transportation. The ideas and recommendations contained in the five reports and the coordinated plan reflect the involvement and engagement of more than 200 Iowans over a span of nine months. From those deliberations, a strategy for Iowa's future economy was developed on behalf of and for all stakeholders. It is the hope of the Telecommunications Sector Committee that policymakers, community leaders, business and industry, and others find ways to implement or support the

recommendations of this sector report and those of the coordinated Infrastructure Strategy for Iowa's Future Economy.

Executive Summary

Among the most critical needs for Iowa to grow and sustain its population, jobs, and economy is a world-class telecommunications system. Demand and use of telecommunications continue to expand in applications and technologies we could never have imagined just a few years ago. Business and industry, health care, education, government, citizens, and scores of others remind us of the sector's potential and the expectations of Iowans for connectivity. Iowa prides itself on its educated, well-informed populace. In today's world, that means access to the worldwide web and other on-line information resources. However, Iowa's telecommunications infrastructure is already insufficient, and much work remains to be ready for the future.

In its charge to review the issues and develop recommendations for a strong future economy, the Telecommunications Sector Committee clearly viewed telecommunications as fundamentally linked with the other four sectors engaged in this overall strategic initiative – buildings and vertical infrastructure, energy, natural resources, and transportation. In considering how to address telecommunications in the context of the other sectors, the current infrastructure investments, the impacts of the disasters, and the economic recession, the Committee embraced the essential elements of the future economy developed to guide the planning effort: smart planning and growth principles, a diversified economy that ensures a strong agricultural sector, a skilled workforce for quality jobs, environmental stewardship, Iowa-based energy solutions, an economy that is globally competitive, a population that chooses to live and work in Iowa, and realistic funding for new and maintenance of infrastructure.

The impact and involvement of connectivity and telecommunications services are often invisible to Iowans. Think of filling and purchasing a prescription medication, buying a home, operating a business, or sending an email to a family member. Iowans are beginning to expect the connectivity they need, whether or not they know they are using telecommunications.

Telecommunications Definition and Issues

Telecommunications was defined by the Committee as *infrastructure to provide information for all needs for everyone, at any time, anywhere.*

The Committee, in its series of intense and long discussions, identified two issues requiring immediate attention in order for Iowans and Iowa's economy to compete within the United States and globally. These two challenges are inextricably linked. Solutions for both issues are required in order to solve the fundamental problems with Iowa's connectivity.

- The telecommunications infrastructure is fragmented and does not meet the current or future needs of Iowans in capacity, access, and cost.

- Telecommunications policy is fragmented and is a barrier to developing the physical infrastructure required to be globally competitive.

Iowa is not keeping up with other states and the world. Those who have information and knowledge create opportunity and growth. The rest of the world is beginning to operate in a ubiquitous environment, one in which people move from place to place with seamless connectivity at a capacity that allows efficient performance of information transfer. The systems are technology agnostic, meaning that regardless of what tool one uses (cell phone, mainframe, laptop, etc.) it interfaces with the infrastructure with no thought required from the user. Iowa's network is neither ubiquitous nor technology agnostic. Iowa has nearly 300 telecommunications providers operating in the state, many with their own independent infrastructure. Duplicate infrastructure, not to be confused with redundancy required for reliability, is not uncommon in many communities. Redundancy is more difficult to achieve with the fragmented infrastructure.

Compared with other nations, the United States (US) ranks 28th in average download speeds in 2009, at 5.1 megabits per second (mbps), and Iowa ranks 35th among states at 4.5 mbps. This compares with the top two ranked nations, South Korea at 20.4 mbps and Japan at 15.8 mbps.

Policy governing telecommunications is not only fragmented as well, but there has been less regulation and oversight in recent years, leaving consumers confused and the state's telecommunications sector without needed structure.

Telecommunications Sector Recommendations

The Sector Committee presents the following three recommendations for urgent action on the part of the state and the many stakeholders involved. The group emphasized that it will require initial awareness and education of the public and all other stakeholders to the level of need and urgency for Iowa. The Committee also recognized that the greatest hurdle in implementation is successfully bringing the key stakeholders to agreement that they are willing to work together to develop the telecommunications infrastructure. Two critical Committee members from the private sector telecommunications industry, Qwest and Western Iowa Telephone, demonstrated their perspectives and participated fully in the forthright discussions. However, their business models and policy priorities prevented the private telecommunications companies from supporting elements of the recommendations, including the common backbone and any increased oversight. Yet, each appreciated the need for these discussions now and in the future for the benefit of all Iowans.

1. The infrastructure needs to be a common, unified backbone that supports the public interest, is a public-private partnership that includes mutual benefits, and is built by consortiums.

2. Establish state policy that represents the public interest, pursues and advocates the mission/vision for telecommunications, and establishes financial plans to implement the policy.
    a. Establish state policy for "criteria" or goals for connectivity to the curb of every premise (fiber or equivalent transport technology), such as globally-competitive speed, universal access, and cost.
    b. Establish state policy for "criteria" or goals for consumer adoption.

c. Establish a mechanism to recommend policies, processes, and programs and to coordinate the common, statewide system, including a review of tax and regulatory policy for telecommunications and related industries and of investment policy.
d. Determine the state entity to implement the policy.

3. Establish a state consumer protection policy incorporating performance metrics for the purpose of telecommunications services and determine the state entity to implement the policy.

The Committee's vision for a technology agnostic and ubiquitous fiber-optic network to the curb of every premise is not only possible, but imperative for the future economy, jobs, and well-being of Iowans. In this vision, the state plays a role in setting policy and standards for access and technology. The private sector, including existing providers, participates in private consortiums to build, operate, maintain, and upgrade the state's world-class connectivity.

Iowa's Future Economy

There is no crystal ball to predict exactly what Iowa's economy will be like in 2020 and beyond, but there are indicators and, certainly, steps that can be taken to shape the economy as Iowa recovers from the dual challenges of the 2008 disasters and the national recession. The Infrastructure Strategy for Iowa's Future Economy initiative was designed to work from a common understanding of Iowa's current economy and forecast of economic factors in order to establish some strategic direction for the state. Essential elements of the future economy were identified from this information and from the deliberations of the participants in the process. This section highlights the foundational premises of the Sector Committees and Sector Chairs Group that guided their work.

Essential Elements of the Future Economy

Iowa's economy of the future can benefit from and faces challenges because of the disasters and the recession. Iowans have vowed to come back from adversity stronger than ever. The future holds opportunity for innovative and strategic thinking, which tend to be a departure from day-to-day challenges to our infrastructure. In early discussions, each Sector Committee and the Chairs Group worked to identify how Iowa's economy can build upon current short term investments grow to stronger and more globally competitive.

Eight essential elements of the future economy were identified by the Sector Committees and the Sector Chairs Group. The essential elements were used by the Sector Committees to guide and measure their work and their recommendations against the vision for Iowa's economic future.

The Essential Elements of Iowa's Future Economy are:

- Smart planning and growth principles
- A diversified economy that ensures a strong agricultural sector
- A skilled workforce for quality jobs
- Environmental stewardship
- Iowa-based energy solutions
- An economy that is globally competitive
- A population that chooses to live and work in Iowa
- Realistic funding for new and maintenance of infrastructure

Iowa's Current Economy and its Impacts

In the current environment in Iowa in 2010, a number of trends are affecting the state's economy. The following factors are taken from data provided to the Committees by researchers at Iowa State University's Department of Economics. First, the population of Iowa is shifting from rural to urban areas. Other factors include the aging population and the baby boomer generation nearing retirement age. There has also been an increase in the outmigration of youth workers to

other states, and population growth in Iowa has been due to increases in immigrant and minority populations in the state.

Because of the economic recession and the scaling back or closing of significant numbers of manufacturers across the state, non-metropolitan Iowa is losing both jobs and Iowans between ages of 25 and 44, which also has an echo effect of population loss in the under-20 category, reflecting loss of the children of those 25-44 year-olds. Iowa's unemployment rate, which has typically remained relatively low, may start to have a structural upward shift. The rural housing stock is deteriorating, and economic vitality is concentrated in a relatively few areas. Additionally, tax capacity in non-metropolitan communities is rapidly eroding, due to population shifts and loss of manufacturing employers. However, rural energy opportunities, such as biofuels and wind, are evolving.

Iowa in 10 Years

ISU researchers predict that in ten years, Iowa will see the results of current trends in population, namely, that there will be fewer people in non-metropolitan areas, more investment and growth in metropolitan areas, and the continued outmigration of young and working-age people. Regional trade centers, called micropolitan communities (populations of 10,000 – 50,000), will be mostly stable, but not growing. The sectors that will lead in job demand will be business, personal care, education, and health services. Although some downplay the role of energy production in rural resettlement, the Sector Committees identify the energy industry's crucial role in the future economy of Iowa as a significant contributor to the overall rural economy and its potential to be a mitigating factor in further rural depopulation. It is also predicted that manufacturing will still be important, but the number of jobs will have decreased, and the manufacturing businesses that remain will be those with the most efficient and productive processes.

It is clear that action taken to shape Iowa's future economy will be key determinants in the success of the state. As technology develops, energy and telecommunications infrastructure will be critical to the state's competition in a global economy. Additionally, transportation, buildings, and vertical infrastructure will remain fundamental for moving and storing goods and services and supporting Iowa's workforce. Finally, natural resources will be essential to the state's continued economic success within the agricultural, industrial, and business sectors. All sectors are integrated and mutually dependent. The work of the planning initiative is to harness the opportunities of these critical sectors. When people come to live and work in Iowa, it will be because of Iowans' anticipation of the coordinated natural resources, transportation, buildings and vertical infrastructure, energy, and telecommunications infrastructure to support a robust economy.

The Issues

Picture this: firefighters from multiple towns fighting a large fire, a sales associate selling a sweater at a local store, a student researching a topic using the Internet, a new cloud computing business starting up in Iowa, a patient wearing a portable heart monitor at home, airplanes landing at a regional airport, a couple watching a movie on cable TV or downloaded from Netflix, grandparents keeping in touch with distant grandchildren over webcam, travelers checking road reports before driving Iowa's highways, teens texting and posting to their Facebook pages, and the list goes on endlessly.

These are but a few ways telecommunications has exponentially grown and changed to touch our lives nearly constantly. Much of the time we rely on advanced forms of exchanging information and data without realizing it. The Telecommunications Sector Committee of the Infrastructure Strategy for the Future Economy initiative recognized the expansive and increasing demand for information transfer and the accompanying opportunities. In focusing its work, the Committee developed its definition of telecommunications.

Definition of Telecommunications
Infrastructure to provide information for all needs for everyone, at any time, anywhere.

In considering the world and Iowa's economy in ten or twenty years, it is clear to the Telecommunications Sector Committee that the demand for access to high capacity connectivity will continue to grow at a faster pace than we have seen in past years. The question is whether Iowa's current infrastructure can serve that need; the consensus is that it cannot. It is crucial for Iowans' economy, lives, and work that the infrastructure not only meets the minimum needs of today, but be capable of handling the ever-growing, and still unknown, utilization of telecommunications technology and services.

Make no mistake; this is a very complex issue with physical, policy, and behavioral elements. Solutions will require change within those elements and implementing a vision of the future that steps away from the systems that no longer work in today's and tomorrow's world.

Telecommunications Issues
The Committee, in its series of intense and long discussions, identified two issues requiring attention in order for Iowans and Iowa's economy to compete within the United States and globally. These two challenges are inextricably linked. Solutions for both issues are required in order to solve the fundamental problems with Iowa's connectivity.

- The telecommunications infrastructure is fragmented and does not meet the current or future needs of Iowans in capacity, access, and cost.
- Telecommunications policy is fragmented and is a barrier to developing the physical infrastructure required to be globally competitive.

Context and Explanation of Telecommunications Infrastructure

Telecommunications in Iowa is at a tipping point, and the state will either take a leap into global competitiveness or will fall farther behind. Telecommunications is a significant driver of the economy and of jobs that accompany a healthy economy.

The world is becoming technology agnostic, where it makes no difference which tool one uses (such as a laptop, a cell phone, or a credit card machine) or where one happens to be, the connectivity is there supporting it. In fact, many countries are already operating in this manner, and the US is far behind, meaning our competitiveness continues to drop. The fundamental requirement is a robust information transport network. In today's world, that is a fiber-optic network.

Iowa's fragmented connectivity is a sharp contrast to the Japanese technology agnosticism. The Telecommunications Sector Committee was provided this description early in its work.

> *Technology is permitting a shift toward an "ubiquitous" environment. In Japan for an example, mobile devices hop from network to network seamlessly. While at home, one would plug into a Fiber-To-The-Home (FTTH) network or a high-speed personal wireless system (802.11n) and as this person moves outdoors, the connection moves onto the 4G cellular network. After arriving at the office, the person's communications automatically connects to the corporate high-speed network. This ubiquity fundamentally puts the consumer in constant communications at the best possible configuration. It will change how people work and live. For Japan, the providers are not the same. Regulation forced the networks to open selection (pick your equipment and providers) and then the providers value add by making it seamless to move across all the networks.*

The description of the Japanese infrastructure is stark in comparison to Iowa, where the telecommunications infrastructure is neither connected nor seamless. The Sector Committee was thoughtful in its approach to the infrastructure issue and sought to identify and understand the current situation so that constructive recommendations could be developed.

In short, the current system reflects Iowa's history and values. Local control is a fundamental premise of public and private entities alike. When the telephone came into use in the late 1800s, enterprising Iowans brought service to homes and businesses across the state. The entrepreneurial spirit resulted in scores of telephone companies serving the needs of communities of all sizes and rural areas of the state. Since that time, voice service has become only one service necessary for a competitive future in an expanding information age.

The legacy of telecommunications' early years in Iowa is a current array of several large telecommunications providers (Qwest, Iowa Telecom, Frontier, and, recently, Mediacom), 154 historical rural telephone companies (incumbent local exchange carriers – ILECs), more than 100 additional competitive telephone companies receiving certification after September 30, 1992 (competitive local exchange carriers – CLECs), and 15 municipalities providing

telecommunications services. In addition, in the early 1990s, the Iowa General Assembly and Governor approved and signed legislation creating a fiber-optic network, the Iowa Communications Network (ICN), designated to providing full-motion video access to every kindergarten through university level educational system in the state.

Even though each telecommunications provider has its own independent infrastructure, all providers are interconnected for the reciprocal exchange of traffic. All major providers connect at points of presence or central offices. Small carriers connect at meet points. In recent years, wireless providers have signed interconnection agreements with all wireline providers, and, recently, Mediacom has begun the same process for interconnection. Some providers have come together in networks to provide certain infrastructure and services. The ICN contracts with private providers for last mile infrastructure, as required by law. Fragmentation is evident when one realizes that, even though Iowa has ample infrastructure, it is not connected in a common network and access to the infrastructure is limited and operates under different authorities and regulations. Many pieces exist, but no open access to a statewide fiber network exists in the state.

Service to difficult-to-reach and rural areas is a challenge worldwide; Iowa is no exception in certain markets. Some rural providers are installing fiber-to-the-home or providing broadband services throughout the exchange. The economics of the private sector model, understandably, creates a challenge. Motivation to provide service in rural areas is low because of the small market, light population density, cost to build the infrastructure, with no guarantee of an ongoing customer commitment. The ICN was designed, in part, to address that challenge for education. The need to communicate does not end at the borders of the state, so connectivity across state lines is also an issue.

With hundreds of providers, it is clear there is duplication of infrastructure. Some areas of the state have several types of telecommunications infrastructure side by side because of the duplicate or different technologies used by the respective providers. Traditional telephone, cable, fiber, and multiple wireless infrastructures are typically found in the same communities, serving the same customers with different services.

In an effort to achieve the connectivity necessary for competitive success and meet pressing needs, Iowa communities, companies, and consortiums turn to building their own networks. This has happened with school districts, community colleges, universities, cities, and private industry. Telecommunications providers, including the ICN, have been parties to independent solutions. The results, while addressing those individual needs, further fragment Iowa's system and create additional duplication.

Duplication of infrastructure should not be confused with redundancy. While it is critical for telecommunications to have contingencies for continued service should part of the system temporarily "go down," without duplicate infrastructure being connected to the whole of the network, it does not provide the redundancy needed statewide.

Existing infrastructure consists of traditional wireline, fiber-optic cable, cable, wireless, and electronic services such as Google Voice and Vonage that look like traditional telephone service, but are not the same technology. Private and public investments in infrastructure are significant and costly to maintain. Iowa has more middle-mile fiber-optic cable than any state in the nation. Network challenges now and for the future lie in the last mile infrastructure.

One of the greatest challenges is to determine agreement on the means to bring together all types of existing infrastructure when fiber, or an equivalent transport technology, is necessary to deliver the common connectivity the state requires.

The focus must be on the future and making changes to Iowa's system now. Fiber-optics is recognized as the world standard for infrastructure capable of the connectivity necessary for global success.

The Glass Highway

The Telecommunications Sector Committee, in its recommendations later in this report, states that it is imperative and urgent to develop a fiber-optic or equivalent transport technology network to provide the connectivity Iowa must have to survive in the future Iowa and global economies. It was after much discussion of Iowa's telecommunications needs and the vision of the future, that the "glass highway" emerged as central to Iowa's future and the future of coming generations.

Iowa's history provides both opportunities and questions around how stakeholders might come to support creating this new network, but there is little doubt that a shared, unified backbone is the heart of telecommunications now and into the future.

The Sector Committee also was aware that for most Iowans, discussion of technology and telecommunications is like speaking another language. It is critical, though, to understand what is available, the context in which decisions must be made, and to have good information available about the technology most suited for the necessary connectivity. Then, informed and strategic decisions can be made.

Glass fiber can carry more data than any other medium known at this point, making a fiber-optic backbone the obvious choice for any new network. The "glass highway" has frequently been likened to the interstate highway network in explaining how it would be constructed and accessed. There was one federal interstate highway system built, and everyone has access to the use of this network of highways to get anywhere in the nation. The investor in the interstate system is the federal government, and users of the network of highways pay for its repair, maintenance, and expansion through fees and taxes based on use or payment to service providers who use it.

Service providers, such as Heartland Express, Hy-Vee, or FedEx do not need to build their own interstate highways in order to serve their customers. It would be absurd to think that each

provider would need its own roads to deliver goods and services and move people from place to place; yet we often find that telecommunications service providers, such as Qwest or Mediacom, must build their own infrastructure in order to sell their services to customers.

Some may argue that not everyone needs the super-fast access provided by fiber or an equivalent state-of-the-art transport technology. There are different views of telecommunications by Iowans ranging from those who use the basic telephone land line service and are happy with that to those whose business or personal needs for telecommunications have fast outgrown what the network can offer and are thwarted by the fragmentation of infrastructure and policy. Between those extremes are Iowans who do not recognize what telecommunications can do for them so they do not demand it, those who need and have some basic services and are satisfied, and some who still do not have access to connectivity.

Information and knowledge create opportunity and growth. The glass highway meets the diverse needs of all sectors of the economy and of Iowans as they rely more and more on information. On a day-to-day basis, Iowans rely on telecommunications, whether they know it or not, in financial transactions, public safety and emergency services, health care, education, government services and information, personal social interaction, business, industry, commerce, advocacy, and so much more. For many Iowans, entertainment is a rapidly-growing use of telecommunications infrastructure. Iowa's economy and lifestyles demand connectivity to meet their expectations and to compete globally.

Iowa's Competitive Standing

Many are surprised to discover just how far behind the rest of the world the United States and Iowa lag. Average download speed is often used to compare connectivity. The United States is 28th among nations in download speeds in 2009, according to Speed Matters, a project of the Communications Workers of America. Iowa ranks 35th among the 50 states. The United States ranks 15th behind other nations in broadband adoption.

Download Speeds and Rankings for 2009*

World Ranking	Country	Average Download Speed (megabits per second – mbps)
1	South Korea	20.4
2	Japan	15.8
5	Sweden	12.8
9	Netherlands	11.0
13	Germany	8.3
28	**United States**	5.1
	Iowa (35th among states)	4.5

Iowa Download Speeds*

Download Speed Range	% of Iowa
Less than 768 kbps	17%
768 kbps to 6 mbps	55%
6 to 10 mbps	19%
10 to 25 mbps	8%
Greater than 25 mbps	1%

*Source: US data from speedmatters.org test results. International data from speedtest.net.

The new definition of broadband established by the Federal Communications Commission is 768 kilobits per second (kbps). The Telecommunications Sector Committee does not believe that 768 kbps is an adequate goal for Iowa. Many uses of telecommunications demand significantly greater speeds. Committee members discussed download speeds of 3 mbps to upwards of 100 mbps as speeds necessary for Iowans to meet identified needs in business, education, and other functions. Other nations are starting to talk in terms of gigabits per second as well. By thinking in terms of a goal of 768 kbps for high-speed broadband, the Committee believes Iowa would immediately be placing itself in a non-competitive position.

Clearly, Iowa's telecommunications infrastructure is fragmented, and policy is not effectively supporting the infrastructure we have now, let alone that needed for the future.

Context and Explanation of Telecommunications Policy

Like the physical infrastructure, telecommunications policy is, in some cases, fragmented, outdated, or nonexistent as a result of the emergence of new telecommunications technologies and services and the shift in consumer demand from other technologies and services. Regulation, which traditionally had been reserved for monopoly services, has receded as telecommunications services have been deemed competitive. Thus, as telecommunications have become more complex and critical to the economy and the lives of Iowans, there has been a move toward less regulation. Many on the Telecommunications Sector Committee agreed that these developments have left the sector without a policy-setting body to turn to.

Regulation is confusing and challenging for many, even those involved in the sector, and sometimes creates real or perceived inequity among providers. The Committee noted that some older and outdated regulations make little practical sense in this century and serve as barriers to investment, profit, and service to Iowans. Included in the policy gap is that, in many instances, there is no single place for residents to turn to address issues they experience with the array of providers and services.

Wireless numbers now exceed land lines by about a three-to-two margin in Iowa. Licensing and regulation of wireless providers is under the authority of the Federal Communications Commission (FCC). Landline carriers are under the authority of the Iowa Utilities Board (IUB) for service quality and complaint resolution, but the IUB does not have retail rate-setting authority. Nomadic Voice over Internet Protocol (VoIP) carriers are considered interstate and are subject to some regulation by the Federal Communications Commission. There are other, newer

applications that use VoIP technology, such as Google Voice, that want to operate with even fewer regulatory constraints.

The revenue sources supporting the telecommunications industry vary within the industry itself. Traditional landline telephone companies receive customer revenues, access revenues for completing toll calls, and in most cases, some Universal Service Fund (USF) support. Access rates are under state or federal regulation, depending on whether a toll call crosses state lines. USF support is primarily regulated by the FCC. Access revenues and USF support may vary widely depending on whether a landline carrier is considered rural or urban. Wireless carriers receive customer revenues, but in most cases, little or no access revenues. Some wireless carriers receive USF support. Cable telephone companies receive customer revenues, access revenues, and may or may not receive USF support. VoIP carriers may only receive customer revenues.

As the number of wireline customers decreases, the revenue streams of the wireline telephone carriers are strained. Because wireline telephone companies have a large role in the deployment of broadband services, the challenge of providing affordable broadband services and maintaining infrastructure becomes apparent.

Potential changes in federal policy and regulation have created uncertainty for some in the state as they attempt to plan. For several years, the FCC has contemplated changes to access charges and USF support. Thus, significant changes to telecommunications carrier revenue streams could be forthcoming. In addition, the FCC is expected to announce the blueprint for a National Broadband Plan in mid-March 2010. Though these are significant initiatives, the Telecommunications Sector Committee urges that its recommendations proceed toward implementation with an eye to these initiatives and the flexibility to adapt as necessary.

In its discussions, the Sector Committee stresses the separation of the infrastructure itself from the services, or “applications,” that may be provided using the infrastructure. Policy, too, will need to consider this separation in a new system. With the imperative shift to a different, common infrastructure proposed by the Committee, current policies can be replaced with policy supportive of tomorrow’s telecommunications.

As policy is examined, several fundamental decisions are necessary around the three components of the infrastructure issue identified by this Telecommunications Sector Committee – access, capacity, and cost. The state should set policies that effectively support development of an effective telecommunications backbone.

This is the context in which the Telecommunications Sector Committee seeks imperative and rapid change to both the infrastructure and the policy supporting telecommunications in Iowa.

Costs and Benefits to the Economy

Fragmentation of telecommunications infrastructure and policy exact a daily toll on Iowans in all walks of life and sectors of the economy. Competitiveness is clearly compromised. The state's future, arguably, is at stake with the potential loss of Iowa's youth, workers, and businesses that have choices about where to live, work, raise a family, and support jobs and the economy.

In Committee discussions, it was suggested that some early exploration of the cost of building a new system to provide fiber-optics to the curb of every premise in Iowa was placed at an estimated $2.5 billion, though data were not sought and further research was not conducted by the Committee to verify this cost.

While that estimated cost may seem challenging to some, it was also suggested that the value of making this investment now greatly exceeds the cost. In fact, the case could be made that it would cost more to not make the change to the glass highway. Those projections of value and cost savings include:

- A 1.5 percent gain in Iowa's $180 billion economy for one year equals more than the cost of the system.
- Quality of life opportunities would be enhanced for the state of Iowa, its communities, and all living in or visiting the state.
- Cost of communication services for individuals could be reduced while providing greatly enhanced service.
- Smart energy management becomes practical to achieve.
- Industrial and agricultural business could achieve lower costs and have access to worldwide information and opportunity for innovation.
- Public services could save costs and improve services.
- Educational systems would be able to deliver greater value at reduced costs.
- Health care costs would decrease and services expand and improve.

Telecommunications Sector Committee members recognized that the subject matter is not as exciting or visible as some other infrastructure, but it is certainly equally critical for the future of the state. Iowa is now beginning to raise generations of "digital natives," children who have never known anything but technology and telecommunications at their fingertips to do everything from pay bills to play games. Three year-olds are able to use a computer and show their parents how to maneuver through the technology. Connectivity is a given with this generation.

The costs to Iowa by not moving forward to the glass highway, according to Committee members, include the demise of rural Iowa, loss of Iowa's youth and future workforce, failure to achieve global competitiveness, and failure to look out for future generations. It is about the economy, and it is about high speed broadband access for every Iowan to allow success.

Relationships to Other Sectors

Telecommunications is integrated into the interests and work of the other sectors involved in this planning effort. Some on the Committee referred to telecommunications as the glue that holds together many functions of many sectors. New uses for telecommunications are identified every year, and the demand for moving information is expanding rapidly. The future economy will be increasingly dependent on telecommunications in ways not imagined today.

In a literal sense, telecommunications infrastructure is what connects buildings and other vertical infrastructure to the outside world. In designing and siting infrastructure, attention to access to telecommunications is a consideration, as is building telecommunications into original construction. Telecommunications serves myriad functions in buildings, ranging from allowing and limiting access to structures to bringing people and information to the site instantly via telecommunications. Access to connectivity is a fundamental element in whether construction of a physical “place” is necessary at all, thereby supporting smart planning and growth principles.

Energy and telecommunications are mutually dependent. Telecommunications operations are dependent on reliable energy sources. Likewise, the smart grid and energy transport are heavily dependent on connectivity that is fast, high capacity, and accessible everywhere. Monitoring of water, gas, and electricity call upon telecommunications, and as this practice grows to serve individual home and business applications, demand for connectivity will increase. World-class connectivity can also reduce energy use by allowing telecommuting and alternative workplace configurations that will reduce the number of vehicle miles traveled.

On a systemic level, telecommunications has enabled natural resources to do more and do it better in monitoring and tracking information in water, air, solid waste, and other environmental factors. For example, water quality and air quality testing require connectivity, as does real time river and stream monitoring. Drinking water, wastewater, and storm water are all monitored with systems that transport data via telecommunications. Telecommunications also allow Iowans to visit wireless hot spots around the state, use Iowa Department of Natural Resources’ online reservation system, and access online licensing.

A wide array of common interests are found between transportation and telecommunications. Public safety relies very significantly on telecommunications and access to high speed connectivity. Road conditions, traffic flows, providing information and warnings to motorists, and automated weigh stations for commercial vehicles are examples of current transportation application of connectivity. Management of truck fleets and monitoring specific data of individual trucks is growing more common. Public policy in some communities now allows traffic ticketing using technology and connectivity to move information.

These are but a few examples of the integrated nature of the sectors involved in this planning initiative. The Telecommunications Sector Committee supports efforts that will ensure globally-competitive connectivity statewide and recognizes the benefits such change will also bring to the other sectors.

Recommendations

The recommendations presented in this section are not for the faint of heart. They are based on the future economy, creating globally competitive businesses in Iowa, and ensuring that Iowa's children and their children's children can choose to live, work, and enjoy Iowa. The recommendations require that the current image and structure of telecommunications be set aside, and that current state policy also be set aside. They also require that, to some level, stakeholders set aside their personal interests long enough to recognize and determine the benefits of implementing the vision for the citizens, the state, and for them. The vision for telecommunications is based on reality; Iowa simply must act, and act soon, to make real and lasting change for the sake of Iowa's economic survival.

Achieving the recommendations of the Telecommunications Sector Committee will require action on two critical elements. First, Iowans must understand and grasp the vision for this change in telecommunications for all. The public, business and industry, and the public sector must come together to support the vision and work collaboratively to move from discussion into construction.

Second, these changes are possible and affordable, particularly when compared to the greater long-term costs of not taking prompt and definitive action. Perhaps the greatest challenge is to move the key stakeholders to decide they will work together to solve a mutual problem in a way that will provide benefit to every partner. Once they have decided and committed to the vision, they will be able to work together through the details.

The Committee looked at the current telecommunications infrastructure and policy status, other nations' systems, and the aggregate demand for connectivity in future years. From that information and those deliberations, the Committee reached a significant level of agreement on the recommendations for Iowa.

Because diverse perspectives and honest discussion were encouraged at the meetings, differences were identified and aired. Yet, these recommendations are supported by all but two members of the group. That is not to say that every person who supported the recommendations agreed with every word. It is important to note that "the devil is in the details," and how the recommendations may be implemented will require much additional discussion.

The two Committee members who were unable to support substantive elements of the recommendations were from the private sector telecommunications industry. Qwest and Western Iowa Telephone members explained their positions, provided information to the group, and participated fully in the forthright discussions. However, their business models and policy priorities prevented these two private telecommunications companies from supporting elements of the recommendations. Of particular concern were elements of the recommendations that call for a common, unified backbone and any increase in oversight and government involvement.

Even with these significant concerns, each appreciated the need for these discussions now and in the future for the benefit of all Iowans.

One thing is very clear and underpins the success of any implementation – telecommunications infrastructure and supporting policy are inextricably linked.

Recommendations for the Telecommunications Sector

In Iowa, both the physical infrastructure and the policy supporting the infrastructure are needed for the state to enter the ranks of states and nations with competitive-level connectivity. Three recommendations should be implemented to achieve Iowa's world-class connectivity and bolster opportunities for economic, social, and individual success.

1. The infrastructure needs to be a common, unified backbone that supports the public interest, is a public-private partnership that includes mutual benefits, and is built by consortiums.
2. Establish state policy that represents the public interest, pursues and advocates the mission/vision for telecommunications, and establishes financial plans to implement the policy.
    a. Establish state policy for "criteria" or goals for connectivity to the curb of every premise (fiber or equivalent transport technology), such as globally-competitive speed, universal access, and cost.
    b. Establish state policy for "criteria" or goals for consumer adoption.
    c. Establish a mechanism to recommend policies, processes, and programs and to coordinate the common, statewide system, including a review of tax and regulatory policy for telecommunications and related industries and of investment policy.
    d. Determine the state entity to implement the policy.
3. Establish a state consumer protection policy incorporating performance metrics for the purpose of telecommunications services and determine the state entity to implement the policy.

Context and Explanation of the Recommendations

Recommendation 1: The infrastructure needs to be a common, unified backbone that supports the public interest, is a public-private partnership that includes mutual benefits, and is built by consortiums.

The implications of this short statement are complex. Many options and courses of action can be devised to implement this recommendation. The infrastructure is, simply, a connected network that reaches to the curb of every address and provides access to all Iowans to connect to a home, government building, community organization, business, industry or other premise. The Committee discussed many elements related to implementation and offers its insights. These elements included the concerns of private telecommunications providers.

The Committee discussed in detail how to emphasize the requirement that the network consist of the transport technology representing the greatest capacity, speed, convenience, and economic efficiencies available. In 2010, that technology is fiber-optic cable. Should a new technology innovation be developed to replace fiber before the network is developed, that technology should be the choice for the backbone. The Committee, seeking immediate efforts for implementation, does not anticipate a new technology in the near term that would replace fiber-optic cable.

First and foremost, there needs to be one network, the backbone of the statewide system. The backbone would be fiber-optic cable for the first, middle, and last miles of the system. While the network could be built new from the start, the Committee understands the value of the thousands of miles of fiber already in the ground. Implementation should include connecting existing infrastructure to create the backbone and building remaining segments as needed. This approach also recognizes the investment of those who built existing infrastructure and includes consideration of that investment within the statewide network.

The network would provide fiber to the curb of every premise in Iowa. This means that globally-competitive connectivity would be available to all Iowans. It would remain the responsibility of each person to connect from their business, home, office, or agency to the access point at the curb.

The resulting glass highway would allow open access to those who want to deliver services via the network for a cost. Customers would have greater choice of providers and services in this system because all services are flowing over the same network. For example, current telecommunications providers, education, business, government, health systems, and anyone else could use this common backbone to deliver their specific services. Likewise, consumers of those services would have access at their premise to the wide array of services provided at a cost to the consumer.

The Sector Committee, with exceptions previously noted, strongly believes that Iowa's future depends upon implementing the vision for this system. The Committee agreed that neither an "all public sector" solution or a "private sector only" solution would be best for Iowa. Rather, the network should be a public/private partnership. The responsibilities of the public sector would be to set policy for access and technology standards as described in the next recommendation.

The private sector responsibilities would be broad, encompassing building, maintaining, operating, upgrading, and financing the glass highway. This could be done by one or more private entities or by a consortium of private entities. The Committee envisions a consortium of private entities including existing telecommunications providers, "applications" providers (educational systems, health care systems, Internet services, and many more) wishing to sell their services via the network, and other interested parties.

Financing the telecommunications infrastructure would be completed by the consortium and structured to achieve its cost recovery within a period of years through fees to providers of services to each premise.

Various scenarios should be evaluated as part of the planning for implementation of this significant change in connectivity for all. State policymakers would also need to determine how the building of the common backbone will be undertaken. The state's role would need to be defined, including whether the state would issue a request for proposals to solicit competitive private sector approaches and costs to develop the network. The structure of contracts for ongoing operations, maintenance, and upgrades would be included in the planning to implement the recommendation.

Clearly, the physical infrastructure is closely tied to the policy decisions early in the initiative as well as the policy supporting the network's future. The next recommendation focuses on the element of state policy.

Recommendation 2: Establish state policy that represents the public interest, pursues and advocates the mission/vision for telecommunications, and establishes financial plans to implement the policy.

a. *Establish state policy for "criteria" or goals for connectivity to the curb of every premise (fiber or equivalent transport technology), such as globally-competitive speed, universal access, and cost.*
b. *Establish state policy for "criteria" or goals for consumer adoption.*
c. *Establish a mechanism to recommend policies, processes, and programs and to coordinate the common, statewide system, including a review of tax and regulatory policy for telecommunications and related industries and of investment policy.*
d. *Determine the state entity to implement the policy.*

A common, unified fiber-optic network will demand careful consideration of policy to address critical issues, and the Sector Committee sees the need for infrastructure, access, capacity, and cost policy. Representing the public interest must be the guiding principle.

Strong state leadership is necessary to bring together consortiums and drive the change. The Committee recognizes the significant opportunity for the state to develop practical, consistent, reasonable policy for telecommunications. It is expected the state will set the standards for access and technology.

Within these discussions, age-old policy questions in Iowa will be answered:

- Who builds the network, and who gets to use it?
- What does universal access mean in Iowa?
- What is the government's role?
- What is the private sector's role?
- How do the existing private and public telecommunications become partners with the infrastructure and continue to offer services once the backbone is built?

- How is building the backbone paid for and how are ongoing costs and improvements financed?
- Who decides all of these issues?

The Committee discussed and reached some level of agreement on many of these issues, recognizing fundamental differences, and reflected those thoughts in this report. The Sector Committee will appreciate and support the efforts of those in authority as they address Iowa's urgent need to develop policy and infrastructure for world-class connectivity and to implement the recommendations of this Committee.

Recommendation 3: Establish a state consumer protection policy incorporating performance metrics for the purpose of telecommunications services and determine the state entity to implement the policy.

The Telecommunications Sector Committee was troubled throughout its deliberations by the fact that there is no point of contact for consumer protection. Current issues arise because of the fragmentation of regulation and that there is no Iowa source of information or enforcement.

With implementation of the recommendations of the Committee, those issues should disappear within the new infrastructure and connectivity and the supporting public policy. However, consumers will have more choices of service providers, and with that comes a need for consumers to be able to do comparison shopping. By requiring performance metrics, consumers will have access to the data and information they need to make decisions based upon their individual needs. In addition to this, consortiums operating under the guidelines developed for implementation will have metrics applied to their operations to ensure quality and effective rollout of services.

Infrastructure Planning Process

Across Iowa, economic strength and competitiveness depends, in part, on our state's infrastructure. In his 2008 Condition of the State address, Governor Chet Culver highlighted the need for a statewide infrastructure plan to ensure all of Iowa is ready for the economy of the future. At that time Iowans could not have foreseen the tragic disasters of 2008 or the seriousness of the economic recession, but their impacts underscored the need for integrated and strategic priorities for Iowa's infrastructure in future years.

Those challenges resulted in a short-term infusion of more than $6 billion for Iowa over a three-year period through the American Recovery and Reinvestment Act (ARRA), I-JOBS, and federal disaster recovery funds. These funds are being spent effectively and as expeditiously as possible on clear priorities for disaster recovery, jobs creation, economic recovery, and other infrastructure and non-infrastructure priorities for the near term.

Iowa also must be poised for the longer-term through strategic and visionary planning for the economy of the future. Iowa needs to continue to make investments in infrastructure, seeking value and success competing in an international economy. The planning process builds on the significant impact of past and current initiatives, opportunities, issues, and challenges.

Iowa Department of Economic Development (IDED) was charged with developing a plan for Iowa. Funding for the planning initiative was provided by US Department of Commerce, Economic Development Administration as part of the disaster recovery grant to the State of Iowa. Under a competitive Request for Proposals process, State Public Policy Group, Inc. (SPPG) was awarded a contract for managing, facilitating, and developing the issues-focused plan under the direction of IDED and project director Thomas W. Hart.

The planning activities span August 2008 through April 2010 when the statewide plan for infrastructure to support Iowa's future economy will be completed. The process for developing the infrastructure strategy was designed to challenge and encourage Iowans to suggest strategies that link infrastructure sectors and position Iowa to shape and fully participate in the economy of the future. With guidance from state leaders in the five sectors of focus, stakeholders with a diversity of perspectives and experiences from across Iowa were engaged in the activities to develop an issue-focused plan with relevance to the public, private, and nonprofit sectors throughout the state.

Five sectors of focus were determined by IDED: Buildings and Vertical Infrastructure, Energy, Natural Resources, Telecommunications, and Transportation.

Leadership of the project was provided by a Sector Chairs Group comprised of state agency directors representing each sector. Sector Chairs met regularly throughout the planning process to ensure consistency in the work of each Sector Committee and to address overarching issues.

The following individuals serve on the Sector Chairs group working closely with IDED and SPPG:

- Thomas W. Hart, Iowa Department of Economic Development, Project Director, Sector Chairs Group Chair, and Task Force Chair
- Joseph Cassis, Iowa Communications Network, Telecommunications Sector Committee Co-Chair
- Steve Flagle, The University of Iowa, Telecommunications Sector Committee Chair
- Richard Leopold, Iowa Department of Natural Resources, Natural Resources Sector Committee Chair
- Bret Mills, Iowa Department of Economic Development, Buildings and Vertical Infrastructure Sector Committee Co-Chair
- Joe O'Hern, Iowa Finance Authority, Buildings and Vertical Infrastructure Sector Committee Co-Chair
- Nancy Richardson, Iowa Department of Transportation, Transportation Sector Committee Chair
- Roya Stanley, Iowa Office of Energy Independence, Energy Sector Committee Chair

Additional individuals with special expertise related to the planning initiative participated on the Sector Chairs Group and the Task Force:

- Elisabeth Buck, Iowa Workforce Development
- Emily Hajek, Rebuild Iowa Office
- David Miller, Iowa Homeland Security and Emergency Management Division
- Jon Murphy, Iowa Office of the Governor

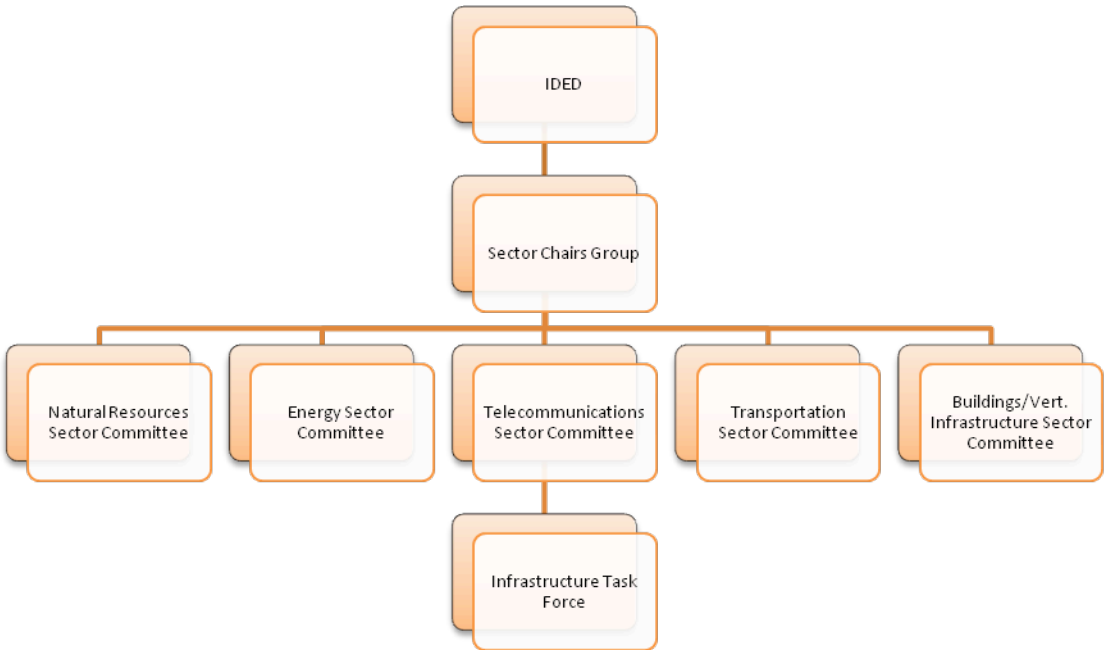
Each Sector Committee met four times in day-long deliberations between November 2009 and February 2010. Sector Committee membership was comprised of private, academic, issue-based, and public representatives providing a diversity of perspectives and strategic vision. Each committee was chaired by the respective member(s) of the Sector Chairs Group. Each of the five Sector Committees was responsible for defining the sector for purposes of this initiative, identifying issues, and developing recommendations based on research, experience, and information reviewed by each committee. Sector Committees were also charged with considering each sector's interaction and integration with the other sectors. Sector Committees were guided by the Essential Elements of Iowa's Future Economy and the common understanding of Iowa's economic situation and forecast described earlier in this report. The findings of each sector were detailed in five separate Sector Committee Reports.

Six community forums were held in Johnston, Coralville, Ottumwa, Dubuque, and Sioux City, with an ICN session conducted at 10 sites statewide. ICN sites were in Atlantic, Carroll, Clinton, Council Bluffs, Creston, Dubuque, Fairfield, Mason City, Storm Lake, and Urbandale. The forum in Dubuque was canceled due to winter weather, but rescheduled as an ICN site. These community forums were structured to elicit public input regarding the initial issues and ideas developed by the Sector Committees, and to inform the process going forward. Comments and

suggestions from stakeholder proved very informational and beneficial to the overall process. The input from these community forums was integrated into each Sector Committee Report and Recommendations. Sector Committee reports were completed by March 1, 2010, and forwarded to the Task Force.

The Infrastructure Planning Task Force is charged with developing the statewide strategic plan, outlining priorities to achieve a strong and competitive economy. The Task Force, chaired by project director Thom Hart, includes all members of the Sector Chairs Group and several individuals from each Sector Committee and will meet three times during March and April. The plan and recommendations of the Infrastructure Task Force will be presented to IDED in May 2010.

Below is a graphic depiction of the relationship of all components of the process for developing the Infrastructure Strategy for Iowa's Future Economy.



The Infrastructure Strategy for Iowa's Future Economy will outline the Task Force's consensus direction for Iowa's buildings and vertical infrastructure, energy, natural resources, telecommunications, and transportation as sectors integrate with one another and as they impact the economic strength and competitive position for Iowa. This information should be of practical value to policymakers at all levels, state and local government agencies, the private sector, non-profit organizations, issue-based organizations, and the public.

The planning process created a clear understanding that Iowa's infrastructure as it exists and is funded today is neither sustainable nor affordable. The Infrastructure Strategy provides insights for all stakeholders as they shape their future.

Conclusion

A unified fiber-optic backbone using common infrastructure is a critical need for the economy, jobs, and Iowans' lives. Perhaps not as visible or headline-grabbing as other infrastructure needs, connectivity is the future. Many simply do not pay attention because the direct impact has not yet touched them. Burdened by history and the complexity of the technology, telecommunications is sometimes set aside when the discussions get difficult. But, if Iowa wants to be globally competitive, change is imperative, and it is possible.

Telecommunications is a sector where integration with the other five sectors is clear, natural, and necessary. As infrastructure resources continue to be in short supply, the coordinated planning and strategic implementation serves as a means to bring mutual benefit to multiple sectors and ensure wise investment of scarce resources.

Iowa's world-class connectivity – to be built, operated, and maintained by private sector consortiums – will offer countless opportunities for other sectors to develop and deliver new services on the open access network. Education, workforce, manufacturing, health care, entertainment, public safety, and every other sector or interest stands to benefit from the changes brought by the recommendations of the Telecommunications Sector Committee for:

1. Development of a common, unified telecommunications infrastructure that supports the public interest.
2. Establishment of state policy that supports the infrastructure in access, capacity, and cost, as well as standards, technology, and financing.
3. Establishment of a state consumer protection policy.

With completion of this Report and Recommendations, the Telecommunications Sector Committee forwards it to the Infrastructure Planning Task Force for consideration, deliberation, and inclusion in the plan that will be developed by the Task Force and delivered to Iowa Department of Economic Development. The Sector Committee is confident that these bold and broad recommendations will contribute to a strong future for all Iowans, jobs, and the economy.

Supporting Documents

Meeting Notes

- December 1, 2009
- January 6, 2010
- January 26, 2010
- February 23, 2010

Presentations to the Committee

- Who Can Do What: Local Voice Landscape in Iowa
- Assessing High-Speed Internet: Access in the State of Iowa
- Experiences in Other States and Nations

Telecommunications Industry in the State of Iowa

Map of Fiber-Optic Cable in Iowa

Other Resources

- Iowa State Interoperable Communications System Board, www.isicsb.iowa.gov
- Johnson, Nicholas, "The Broadband Challenge: Consumer Protection in a Deregulated Digital Age," February 2010, http://www.nicholasjohnson.org/writing/BroadbandChallenge.doc
- *Next Generation Connectivity*, a report on behalf of the FCC http://www.fcc.gov/stage/pdf/Berkman_Center_Broadband_Study_13Oct09.pdf
- Speed Matters, a Communications Workers of America informational website http://speedmatters.org/content/resources/