

Illinois Online: Recommendations for Universal Broadband Access

Edward Feser
Tim Green
University of Illinois at Urbana-Champaign

Prepared for
The Office of Rural Affairs
Illinois Lieutenant Governor Pat Quinn

December 2005

Note: This is a slightly edited version of the original report released by the Office of the Lieutenant Governor.

Published by Illinois Institute for Rural Affairs
Stipes Hall 518
Western Illinois University
1 University Circle
Macomb, IL 61455-1390
iira@wiu.edu
www.IIRA.org

This publication is available from IIRA in print and on the IIRA website.

Quoting from these materials for noncommercial purposes is permitted provided proper credit is given.

First Printing: January 2006


 Printed on recycled paper

Table of Contents

Letter of Introduction	i
Executive Summary	iii
Recommendations.....	v
Introduction	1
Project Approach.....	2
Scope of the Problem in Brief	2
Basic Principles	6
Recommendations for Universal Broadband Access.....	7
Establish a State e-Champion	7
Seed and Support the Formation and Efforts of Local e-Champions	8
Move Infrastructure Grant Program to State e-Champion Organization.....	10
Conduct an Evaluation of the Community Technology Centers Program.....	11
Preserve Local Public Entities' Authority to Deploy Broadband Networks.....	12
Assess and Streamline Right-of-Way Acquisition, Process, and Cost.....	13
Catalog Illinois' Broadband Infrastructure	13
Track Broadband Use by Businesses and Consumers	15
Conclusion	15
References.....	17

Letter of Introduction

Many rural areas are struggling with how to revitalize their economies. Key to this revitalization is a recognition that reasonable access to high-speed broadband and information technology will be essential for most rural communities to keep pace. Unfortunately, in many instances, remote rural communities have fallen behind their metropolitan counterparts.

The Governor's Rural Affairs Council commissioned Professor Ed Feser, University of Illinois-Urbana-Champaign, to undertake a study of the technology options available for rural Illinois based on his earlier work in North Carolina. This report is important for local policymakers and community leaders to read and consider for use in their localities. Several of the recommendations have already been implemented through legislative and administrative actions.

The IIRA appreciates the willingness of Professor Feser and Lt. Governor Pat Quinn to allow us to publish this report, disseminate it, and use it in outreach programming. We strongly encourage community leaders to review this information for its possible impact on the ability of their regions to prosper economically.

Chris Merrett



Executive Summary

Broadband—a transmission channel of sufficient capacity to effectively deliver advanced information applications and services via the Internet—is an infrastructure that is critical to the economic and community development prospects of Illinois cities and rural communities.

Although the full extent of the problem is unknown, it is clear that many smaller Illinois towns and rural areas, as well as selected areas within the state’s metropolitan centers, currently lack access to broadband service despite ongoing rollout of digital subscriber line (DSL) and cable modem services by telecommunications companies and cable providers. In some cases, service is available but not affordable. Areas that remain without affordable service cannot be economically competitive. They will have little to no success growing and attracting business activity to replace declines in industries established prior to the Internet era. Isolated rural communities are at particular risk because they lack the option of capturing residential and commercial spillover growth from urban centers. Without an active effort to encourage widespread broadband deployment, Illinois will guarantee the decline of some of its rural communities and increase the shift in the relative distribution of population and business activity to urbanized areas.

This report, the result of a project commissioned by the Rural Affairs Council in the Office of Lieutenant Governor Pat Quinn, discusses how to accelerate the deployment of broadband in underserved communities in Illinois.



Recommendations

The rapid evolution of telecommunications markets, technologies, and the federal regulatory environment means that the broadband strategy in Illinois should (1) encourage innovative local and regional solutions to broadband provisioning rather than impose a top-down plan for universal deployment; (2) remain neutral with respect to technologies and provider types; and (3) include development of the necessary local and state administrative capacity to implement programs with maximum flexibility and effectiveness.

The following recommendations, premised on these three principles, are clear steps Illinois should take to accelerate universal broadband deployment.

Establish a State e-Champion

An effective state broadband policy involves multiple simultaneous interventions, including provision of consumer and business information, technical support for local planning and deployment, design and administration of supply- and demand-side incentives/programs, ongoing study and development of policy to reduce obstacles to deployment, and monitoring of program impact. Such activities are most effectively coordinated by a single organization that has the expertise and resources to maintain sustained leadership on broadband and Digital Divide issues. The organization could be constituted in one of several ways, including as a state government agency (or part thereof); an independent authority governed by an appointed commission; or a private, nonprofit entity.

Seed and Support the Formation and Efforts of Local e-Champions

In many poorly served rural and urban areas, the knowledge and capacity of local leadership to define and shepherd broadband solutions forward is weak. The state should help communities overcome obstacles to deployment by providing seed funds and technical support for the formation and activities of local e-champion organizations and committees that focus on developing deployment plans, demand aggregation strategies, technology literacy training programs, and other initiatives appropriate to their local context.

Move Infrastructure Grant Program to State e-Champion Organization

No monies have been disbursed from the Eliminate the Digital Divide Infrastructure Fund since its establishment in 2001. That means that approximately \$10 million remains to encourage and support deployment projects in geographic areas of highest need. To ensure active coordination of infrastructure incentives with other elements of the state's broadband strategy, administration of the infrastructure incentives grants program should be moved to the state's designated e-champion organization that has universal broadband deployment as its chief concern.

Evaluate the Community Technology Centers Program

The Community Technology Centers (CTC) program is currently Illinois' primary demand-side incentives program. It seeks to increase knowledge and use of computers and the Internet by supporting technology literacy training and public high-speed Internet access in low-income communities. The balance left to continue support of CTC is approximately \$7.1 million in Fiscal Year 2005. In anticipation of the pending exhaustion of those funds in one to two years, and the subsequent need to consider extending additional funding, the state should conduct a thorough evaluation of the CTC program. The evaluation should assess whether grants to the CTC program are the best way to meet the state's technology literacy training needs. The evaluation should indicate if and how the program should be retooled to improve its effectiveness in delivering broadband access and technology training in low-income communities.

Preserve Local Public Entities' Authority to Deploy Broadband Networks

At least 15 states have enacted legislation to prevent or limit municipalities' authority to build and operate broadband networks. Fortunately, Illinois is not among them. Development of networks by local public entities (e.g., municipalities and public power utilities), singly or in partnership with private providers, is a valuable option for supplying desired services in places where broadband is either unavailable or the local provider(s) is supplying inadequate coverage, speeds, affordability, or customer service. Municipal networks are proving successful in bridging broadband gaps in other states. Illinois should continue to ensure that there are no undue obstacles to various models of municipal provision in its own communities.

Assess and Streamline Rights-of-Way Acquisition, Process, and Cost

The Illinois Broadband Task Force, or Illinois' designated state e-champion organization, should form a working group to assess obstacles to provider acquisition and use of local and state rights-of-way. The working group should review local government rights-of-way practices in the state, the adequacy of local resources for the prompt review and granting of rights-of-way, and ways to improve interagency coordination when rights-of-way needs span jurisdictions.

Catalog Illinois' Broadband Infrastructure

The state's designated e-champion organization should catalog Illinois' broadband infrastructure as accurately as possible and on a continuous basis while also preserving the confidentiality of service provider data. The experience of other states shows that cataloging (or mapping) can be accomplished effectively if it is undertaken by a lead organization in cooperation with service providers and if sufficient resources are allocated to sustain the effort over time. Knowing the location and characteristics of major broadband gaps is essential to implementing a flexible broadband strategy.

Track Broadband Use by Businesses and Consumers

The state's designated e-champion organization should conduct annual or biennial statewide household and business surveys to track computer and Internet use patterns, assess the status of obstacles to Internet access and use, and collect user-reported service availability information. Such surveys are a comparatively low-cost means of identifying broadband gaps and monitoring progress on program goals.



Introduction

Broadband—a transmission channel of sufficient capacity to effectively deliver advanced information applications and services via the Internet—is an infrastructure that is critical to the economic and community development prospects of Illinois cities and rural communities.

Illinois businesses will succeed in the face of stiffening foreign and domestic competition only if they manage supply chains and inventories with maximum flexibility and cost-effectiveness, target markets with precision, serve customers with a combination of efficiency and care, and continuously develop new products and services that adjust to rapidly changing tastes and shifts in demand. Businesses are growing dependent on applications already requiring bandwidth well exceeding what the Federal Communications Commission (FCC) presently defines as *advanced services*, and what is now commonly referred to as *broadband*. Likewise, consumers increasingly require access to broadband—either at home or at public access points—if they are to take serious advantage of the growing health-, education-, government-, and safety-related information services and applications being developed for Internet delivery.

Although the full extent of the problem is unknown, it is clear that many smaller Illinois towns and rural areas, as well as selected areas within the state’s metropolitan centers, currently lack access to broadband service despite ongoing rollout of digital subscriber line (DSL) and cable modem services by telecommunications companies and cable providers. In some cases, service is available but not affordable. Areas that remain without affordable service cannot be economically competitive. They will have little to no success growing and attracting business activity to replace declines in industries established prior to the Internet era. Isolated rural communities are at particular risk because they lack the option of capturing residential and commercial spillover growth from urban centers. Without an active effort to encourage widespread broadband deployment, Illinois will guarantee the decline of some of its rural communities and increase the shift in the relative distribution of population and business activity to urbanized areas.

This report, the result of a project commissioned by the Rural Affairs Council in the Office of Lieutenant Governor Pat Quinn, outlines a series of recommendations for accelerating the deployment of broadband in underserved communities in Illinois.

Project Approach

Illinois Online focuses on specific actions that would push widespread broadband deployment in Illinois. The emphasis is on policy solutions that encourage local innovation and market initiative while maintaining flexibility in the face of ongoing and dramatic changes in technologies, Internet content and applications, regulation, business needs, and consumer demand.

The recommendations were developed through a review of the extensive literature on state best practices, an examination of current broadband initiatives in Illinois, and counsel sought from individuals knowledgeable about broadband issues in and outside of Illinois, including telecommunications providers or their industry representatives; local, state, and federal officials; managers of broadband programs in other states; and staff of local development organizations. While what follows is not a consensus view of what should be done in Illinois, this report incorporates the interests of the many parties and stakeholders associated with the broadband deployment issue.

Illinois does not need another general study on what broadband is or why it is valuable. Therefore, this report does not focus on demonstrating why encouraging broadband deployment in underserved areas is an important policy objective. Nor does it provide a comprehensive discussion of the many complicated technological, regulatory, social, and economic issues associated with broadband deployment. It does not exhaustively review nationwide best practices, assess the potential of various technologies for solving last-mile and middle-mile challenges, or present a series of case studies of successful deployment initiatives in various communities in Illinois and elsewhere.

Instead, this report draws on the existing (and already enormous) body of work on all of those issues to explain the case for each specific, recommended action. Rather than revisit general issues that have been already subject to significant study and analysis, here the emphasis is on how to move Illinois' broadband policy forward.

Scope of the Problem in Brief

Broadband has become a general term referring to high-speed, always-on connectivity to the Internet. According to the FCC, *high speed* is 200 kilobits per second (Kbps) in either the downstream (provider to customer) or upstream (customer to provider) direction. By comparison, a standard dial-up connection to the Internet can achieve a maximum speed of approximately 56 Kbps. More generally, broadband may be defined as always-on connectivity at sufficient speeds to handle desired web content and Internet-based applications. The salient feature of broadband is bandwidth, which is effectively the size of the "pipe" through which information flows.

New applications are pushing bandwidth demands upward, although those demands vary widely across user types. Some technology specialists argue that true broadband is 100 megabits per second (Mbps) or higher (Bennett 2003; Green 2003). The currently dominant forms of provisioning—DSL and cable modem—offer speeds of between 1.0 and 6.0 Mbps, with an average of around 1.5 Mbps (typically higher for downstream than upstream). Some new technologies, such as wireless, are diffusing rapidly. Others, such as broadband over power line (BPL), have significant potential for bridging gaps in service but are not yet ready for significant deployment. Ultimately, so-called “true” broadband is likely to be achieved only by fiber-to-the-home/business (or possibly fiber-to-the-curb) solutions. So far, there are comparatively few fiber-to-the-home deployments nationwide, though at least three models are currently under active development or deployment in Illinois. In general, broadband policy is wise to anticipate a world of continuing increases in bandwidth demand (Green 2003).

No comprehensive studies of availability, affordability, and reliability of broadband services in Illinois have been conducted¹; however, there is enough evidence from partial sources of information to support the conclusion that there remain significant gaps in service availability and affordability, particularly in the rural areas of the state, and that those gaps are not likely to be eliminated without public sector intervention in some form. Furthermore, studies show that low Internet utilization rates by lower income populations in both rural and urban areas are often a result of inadequate education and training—namely a lack of technology literacy—as much as service supply considerations (Horrigan et al. 2003). Consumer and business demand for broadband services has proven weaker than expected in some areas, which may reflect satisfaction with dial-up service, high prices, or lack of understanding of the potential value of broadband.² The demand versus supply conundrum is sometimes referred to as the “chicken or egg” problem: provisioning cannot accelerate without sufficient demand but demand will not materialize without higher-value Internet content and web applications that are themselves only viable with the proliferation of high-speed connections (Crandall 2003a, 2003b).

On the supply side, there is some evidence that broadband deployment in Illinois is proceeding rapidly in some areas. The number of high-speed lines reported by larger cable and DSL companies in Illinois

¹ The Illinois Institute for Rural Affairs, Western Illinois University, has published a report on broadband infrastructure in west-central Illinois that identifies the telecommunications companies serving each of nine counties: Adams, Brown, Hancock, Henderson, Knox, McDonough, Pike, Schuyler, and Warren. For some of the companies, more detailed service areas are also included (Maye-Myers 2002).

² A study by the Office of Economic and Regional Development at Southern Illinois University–Carbondale surveyed a random sample of 800 rural Illinois residents and 250 small business owners and found that 82 percent of household dial-up respondents were either not interested in upgrading to broadband or would not be willing to pay more than \$40 per month for a high-speed connection. Small business respondents were willing to pay slightly more. In characterizing the weaker than expected demand for broadband, the study noted that a significant share of the households and businesses that were not interested in broadband had never experienced a high-speed connection (see Schumacher 2003).

in June 2003 was up 57.5 percent from June 2002 (ICC 2004, 27).³ While the state is close to the national trend in rates of overall deployment, certain areas lack broadband service. An analysis by the Illinois Century Network (ICN) (2003b) found that 18.7 percent of Illinois ZIP codes did not have a single broadband provider as of June 2002 (4). Eighty-six percent of those codes had 1,000 or fewer residents, while the remainder had populations between 1,000 and 15,000. We estimate that the share of unserved ZIP codes had fallen to 13.3 percent by December 2003. Whether or not the remaining unserved ZIP codes will be provisioned soon is unclear. Such areas, which are scattered throughout central and southern Illinois (see Figure 1), are among the most difficult for providers to serve economically.

ZIP code-based provisioning data have to be interpreted cautiously. The data can be misleading for two reasons. First, the presence of at least one high-speed line—the criterion the FCC uses to determine whether a ZIP code is served—is a very poor indicator of the overall spread or availability of service in a given location. Many consumers and businesses in a nominally provisioned ZIP code may be located too far from a local exchange carrier central office to receive DSL, and they may also lack the option of cable modem, wireless, or other delivery mechanisms.

Second, simple physical availability of service should be considered jointly with affordability. The latter is a function of competitive provisioning as well as provider cost. Many rural areas are served by only a single provider. Prices in such locations may be higher as a result—not only because provisioning costs are higher in sparsely populated areas, but also because the local market is captive. As evidence of the unevenness of pricing across the state, ICN (2003a) reports devoting considerable staff time to negotiating favorable local loop connection rates for schools and other institutions in rural locations. ICN has found that the places with excessively high rates tend to be those with a single provider.⁴

Although indirect, data on competition in the plain-old-telephone-service (POTS) market gives some indication of likely geographic differences in the degree of competition in high-speed provisioning. The market share of competitive local exchange carriers (CLECs)—the companies competing for the local telephone market with formerly exclusive wireline providers known as incumbent local exchange carriers (ILECs)—stood at 22.3 percent in Illinois in December 2003 (ICC 2004). CLEC market share in Illinois slightly exceeds the national average; however, the state's numbers are skewed heavily by Chicago, a highly attractive POTS market given its population density. CLEC market shares in the Illinois' rural areas are much lower, in some cases less than 1 percent.⁵ The ICC (2004) reports that “high-volume, low cost customers in urban business districts generally are considered more attractive to new entrants [CLECs] than either rural or residential customers” (19). Although telephone companies are not the only suppliers of broadband services, the same general preference for established, population-dense service territories applies to broadband providers whether they are wireline, wireless, or cable.

³ The FCC reports 871,469 high-speed lines supplied by large providers as of June 2003.

⁴ Interview with Kirk Mulvany, Illinois Century Network.

⁵ The Illinois Commerce Commission (ICC) reports data on POTS competition between ILECs and CLECs by Local Access and Transport Areas (LATAs). CLEC market shares in rural LATAs such as Mattoon, Macomb, and Olney are less than 1 percent.

Figure 1. High-Speed Internet Service Providers per ZIP Code, December 2003



Source: Federal Communications Commission (FCC)

Basic Principles

The economic and technological context in which Illinois' broadband policy must be formed and implemented is characterized by complexity and flux, including the following:

- Rapid changes in broadband technologies and related standards, such as the emergence of various wireless protocols/systems and continuing development of satellite, broadband over power line (BPL), and fiber-to-the-curb/premise solutions
- Shifting definitions of broadband as bandwidth demands evolve
- Absence of a single optimal technological approach appropriate for all provider situations and geographic cases
- Locally and regionally specific business model viability for broadband provisioning as well as growing opportunities for regional solutions
- Multiple potential provider types to address specific broadband needs, including traditional telephone companies, cable companies, for-profit and nonprofit wireless providers, municipalities, electricity companies and cooperatives, and the ICN
- Diverse sources of potential federal funding to accelerate deployment, including Small Business Administration loans, U.S. Department of Agriculture Rural Utilities Service loans, and U.S. Department of Commerce Technology Opportunities Program grants
- Strong rates of market-driven deployment in many areas
- Continuously evolving federal regulatory environment
- Widely varying levels of public knowledge about broadband use and policy issues

The complexity and changing conditions imply that Illinois' broadband strategy should be built on three basic principles. First, it should encourage innovative local and regional solutions to broadband provisioning rather than impose a top-down plan for universal deployment.⁶ The most effective strategies in other states are designed to leverage local supply- (infrastructure

⁶ The Federal-State Joint Conference on Advanced Services similarly advocates avoiding "one size fits all approaches." (see Federal-State Joint Conference on Advanced Services 2002; see also National Association of Telecommunications Officers and Advisors 2003).

deployment) and demand-side initiatives.⁷ One state describes its broadband policy explicitly as a grassroots effort with the state acting as a catalyst and resource for locally driven initiatives (Rural Internet Access Authority [RIAA] 2001).

Second, Illinois' broadband strategy should be neutral toward technologies *and* provider types. While private sector provisioning is the preferred approach, public (e.g., municipal) and public/private provisioning options should be encouraged where needs dictate and local citizen and business interest is present (TechNet 2003). Furthermore, policy and programs should not encourage any particular technology as the "magic bullet."

Third, the state's strategy must include development of the necessary local and state administrative capacity to deliver programs with maximum flexibility. Flexible programs are harder to implement than programs constrained by arbitrary parameters such as technology type, eligibility of provider type, minimum or maximum grant size, and so on. Flexible programs require a clearly designated authority with the dedicated expertise and resources needed to make the right decisions about where scarce resources should be directed to achieve maximum impact.

Recommendations for Universal Broadband Access

The following recommendations, premised on the three principles identified above, are clear steps Illinois should take to accelerate universal broadband deployment.

Establish a State e-Champion

An effective state broadband policy involves multiple simultaneous interventions, including provision of consumer and business information, technical support for local planning and deployment, administration of supply- and demand-side incentives programs, ongoing study and development of policy to reduce obstacles to deployment, and monitoring of program impact. Such activities are most effectively coordinated by a single organization that has the expertise, resources, and authority to exercise sustained leadership on broadband and Digital Divide issues. Such an organization should serve as an information clearinghouse (including being a guide to foundation, state, and federal funding sources), technical resource, policy advisor, and program administrator. Centralizing activities in one authority avoids duplication across state government; provides a "one-stop shop" to assist service providers, consumers, and local governments

⁷ Interview with Jane Smith Patterson, Executive Director of e-NC, formerly the Rural Internet Access Authority of North Carolina.

undertaking broadband initiatives; helps facilitate leveraging of foundation, corporate, and federal funding sources; and ensures that broadband issues receive sustained policy leadership.⁸

A number of states have established lead broadband organizations. Two that have received national attention are Michigan and North Carolina (TechNet 2003). The Michigan legislature created the Michigan Broadband Development Authority (MBDA) in March 2002, giving it the mandate to lead the state's broadband effort and the authorization to issue taxable and tax exempt bonds to assist financing of public and private sector infrastructure development. MBDA was capitalized with a \$50 million bond sale in April 2002. The agency's administrative expenses, not including interest on bonds, were approximately \$4.12 million in the fiscal year ending September 2003 (Michigan Office of the Auditor General 2003). Telecommunications companies and other private businesses, nonprofit organizations, and government entities are all eligible for MBDA financing.

North Carolina established the Rural Internet Access Authority (RIAA) in August 2000, giving it three years to achieve broadband deployment to all 100 of the state's counties. RIAA (2001) was funded with \$30 million of the proceeds from the sale of a company spun out from a state-funded microelectronics research center. RIAA operates with a staff of twelve and an annual budget for administrative expenses of roughly \$1.8 million. In the year ending December 2003, it expended an additional \$3.0 million on education and outreach programs, including maintenance of an extensive web-based infrastructure mapping application; \$1.2 million to fund four telecenter/incubators; and \$4.5 million on infrastructure incentive grants. RIAA reports leveraging \$200 million in cash and in-kind resources from corporations, foundations, and the federal government in its first three years of operation. RIAA was re-authorized for an additional three years in August 2003, changing its official name to the e-NC Authority.

An independent organization charged with championing and administering broadband programs need not be large, as the Michigan and North Carolina cases demonstrate. It should be established for a limited period (three to five years) and assigned measurable targets. Such an authority in Illinois should assume management of grant programs supported with remaining monies in the Digital Divide Elimination Fund and Digital Divide Elimination Infrastructure Fund, as well as develop and administer new programs.

Seed and Support the Formation and Efforts of Local e-Champions

Illinois' broadband strategy should be viewed as a bottom-up effort, driven largely by local initiatives and public/private partnerships. It should also recognize that in the locations in which provisioning gaps are most severe and likely to be long lasting, technical and financial hurdles are very high. Moreover, in many poorly served rural and urban areas, the knowledge and capacity

⁸ "In states without such an authority, responsibility is typically divided between two or more agencies, which have other priorities and responsibilities that may prevent them from demonstrating leadership and exerting necessary authority on broadband policy" (TechNet 2003, 14).

of local leadership to define and shepherd broadband solutions forward may be weak.⁹ Private providers may also be hampered by local governments' disinterest in facilitating deployment or their lack of resources or expertise.¹⁰ The first step in removing obstacles to deployment at the local level is to embed the issue firmly in local plans and economic development strategies.

To do that, the state should provide seed funds and technical support for the formation and activities of local e-champion committees and organizations that focus on developing deployment plans, demand aggregation strategies, technology literacy training programs, and other initiatives appropriate to local context. State grant funds should seed the local e-champion effort and be supplemented with a required local match as a measure of community commitment. The state e-champion would provide planning, guidance, and technical assistance. Local communities should be encouraged to seek additional foundation, corporate, and federal funding (e.g., U.S. Economic Development Administration local planning grants).

Some communities in Illinois have already been proactive in developing technology plans.¹¹ Local e-champion grants and support would provide encouragement and resources for more communities to actively assess their broadband needs as well as take advantage of assistance already available in the university system. The challenge for university programs is that they often depend at least partially on fees for service. The Rural Information Technology Planning Project, operated by the Illinois Institute for Rural Affairs, focuses on establishing local planning teams, but its funding is nearly exhausted.¹² The Laboratory for Community and Economic Development (LCED) at the University of Illinois at Urbana-Champaign designed web-based demand and community readiness tools but then found that few communities have even the basic expertise to take advantage of them.¹³ LCED had the funding to create the tools but not to actively engage in outreach to promote their use. Seed grants and support to local e-champions would help provide the resources communities need to access the assessment tools and assistance that are available but underutilized around the state.

The most extensive local e-champions program is operated by North Carolina's e-NC Authority (what it calls its e-Communities Program). North Carolina has channeled roughly \$6 million to the initiative,

⁹ Interviews with Paul Galligos, Rural Partners, and Doug Dougherty, Illinois Telecommunications Association.

¹⁰ In Salem, Illinois, limited local government resources are slowing the deployment of an innovative fiber-to-the-home model. The provider is signing up customers faster than Salem has resources to conduct required marking of underground facilities (known as JULIE locates, for Joint Utility Locating Information for Excavators) prior to the provider's fiber-line deployments (Interview with John Andrews, US SONET).

¹¹ Examples are the collective efforts of Geneva, St. Charles, and Batavia to create a public utility that delivers fiber to every home and business as well as recent readiness assessment projects conducted in two three-county areas (Franklin, Perry, and Williamson; and Coles, Clark, and Cumberland). The tri-county projects were sponsored by Rural Partners and carried out by consultant Frank Knott of ViTAL Economy (Knott 2004; ViTAL Economy 2004).

¹² Three Illinois communities—Monmouth, Canton, and Pittsfield—have worked with the Illinois Institute for Rural Affairs to create Information Technology Action Resource Teams (ITARTs). The teams are organized to locally assess, drive, and manage the technology planning process for their communities. According to project staff, there is only enough money in the project to undertake similar efforts in one or two more communities (Interview with David Lamie, Illinois Institute for Rural Affairs).

¹³ Interview with Julie Fesenmeier, formally with the UIUC Laboratory for Community and Economic Development (see Community and Economic Development 2005).

although that includes related infrastructure and training grants and the e-NC Authority's own staff costs for providing technical support. The formation of local e-champions and steering committees are seeded for as little as \$10,000 per county, though more funds are channeled to counties where leadership or local capacity is weak. The e-NC Authority claims that its e-Communities grants have leveraged an additional \$2.5 million in public, private, and in-kind donations (RIAA 2001, 7).

Move Infrastructure Grant Program to State e-Champion Organization

Passage of the Eliminate the Digital Divide Law in 2000, together with a rewrite of the Illinois Public Utilities Act in 2001, created two funds to address the Digital Divide: the Digital Divide Elimination Fund and the Digital Divide Elimination Infrastructure Fund. The funds were originally financed with \$30 million (\$15 million each) from a legal settlement with Ameritech and were to be augmented with 40 percent of future penalties assessed for violations of the Public Utilities Act as well as voluntary telephone customer contributions.¹⁴ The Digital Divide Elimination Fund supports the Community Technology Grants Program administered by the Department of Commerce and Economic Opportunity (DCEO). The Digital Divide Elimination Infrastructure Fund was intended to support infrastructure incentives grants to speed deployment in underserved areas. This fund is administered by the Illinois Commerce Commission (ICC).

While the Digital Divide Elimination Infrastructure Program is an essential element in the state's broadband strategy, it has yet to disperse any monies since its establishment. This is a significant missed opportunity for the development of Illinois' broadband infrastructure as delays in the program have resulted in the recapture of part of the funds to meet other state government needs (approximately \$5 million of the initial \$15 million).¹⁵ Moreover, continuing delays in the

¹⁴Note that it is unlikely that a large portion of *future* penalty funds will be dedicated to either Digital Divide fund. The main reason is that different types of penalties go to different programs. The Public Utilities Act directs one of the most common types of penalties—fines for violations of service quality—to programs other than the Digital Divide Fund. At this point, the likelihood that significant fines will be levied under the section of the Act that would send them to the Digital Divide Fund is low, according to ICC staff.

¹⁵The ICC did not determine a rule for disbursing the funds until 2003. The 2001 Public Utilities Act (220 ILCS 5/13-517) included a requirement that all ILECs provide "advanced telecommunications services" to not less than 80 percent of their customers by January 1, 2005. The law authorized the ICC to grant a full or partial waiver of the requirement in cases of technical infeasibility or significant adverse economic impact. Under the 2003 ICC rule, money in the Digital Divide Elimination Infrastructure Fund was to be directed toward those areas for which ILECs had sought waivers. While the rulemaking was underway, \$4 million from the fund was redirected to the general fund to help plug budget shortfalls. Eventually, only Verizon sought a waiver from the 80 percent rule. The ICC then amended the rule in 2004 to allow any area to be eligible for infrastructure grants. In the 2004 legislative session, a new law was passed that required yet another revision of the rule. Senate Bill 2517 mandates that some funds from the Digital Divide Elimination Infrastructure Fund be used to help libraries make time-sensitive printed material available to the visually impaired. Public Act 93-0797 creates the Accessible Electronic Information Fund, which takes 1/2 of the annual funding necessary to cover the program from the Digital Divide Elimination Infrastructure Fund (the program received \$300,000 in appropriations in its first year). ICC is currently finalizing the rule for infrastructure grant disbursements as required by the new law. ICC staff believe the rule will be complete and the remaining funds (about \$10,000,000) ready for disbursement for infrastructure grants by early- to mid-2005 (Interview with Jon Feipel, ICC).

establishment of rules for fund disbursement have created uncertainty for broadband providers who would seek to use a portion of state funds to leverage other private and public financing sources. Financing is the most significant obstacle facing smaller would-be broadband providers, particularly those seeking to serve rural or low-income communities.¹⁶

It is imperative that infrastructure incentives grants be carefully deployed so that they bridge the most significant gaps in the areas of greatest need, leverage other sources of funding (particularly corporate and federal), and provide opportunities for additional network build-out. Grant applications must be evaluated thoroughly to ensure the financial viability of the applicant organization. The challenge is all the greater if there is to be flexibility in the program design so that it does not bias particular technologies or providers. Administration of incentives grants, therefore, requires not only technical and financial expertise but also active coordination with other elements of the state's overall broadband strategy. To achieve that coordination, administration of the infrastructure incentives grants program should be assigned to the state's designated e-champion organization that has universal broadband deployment as its primary concern.

Conduct an Evaluation of the Community Technology Centers Program

Monies in the Digital Divide Elimination Fund are intended to support the establishment and operation of Community Technology Centers (CTC) (DCEO 2004). The CTC program is currently Illinois' major demand-side incentives program. It seeks to increase knowledge and use of computers and the Internet by supporting technology literacy training and public high-speed Internet access in low-income communities. The CTC program operated with general funds of \$1 million in FY 2001 and \$500,000 in FY 2002. Digital Divide Elimination Fund monies have kept the program operating since (ITA 2002). DCEO disbursed \$3,044,699 and \$4,483,229 in FY 2003 and 2004, respectively. The balance left in the fund is \$7,130,601 as of FY 2005.¹⁷ No CTC can receive more than \$50,000 from the program in any year.

Funds from the Digital Divide Elimination Fund are likely to be expended within two to three years, but the needs of organizations providing computer and Internet access to low-income populations will remain. In anticipation of the pending exhaustion of the funds in one to two years, and the subsequent need to consider extending additional funding, the state should conduct a thorough evaluation of the CTC program. The evaluation should assess whether grants to the CTC program are the best way to meet the state's technology literacy training needs. The evaluation should indicate if and how the program should be retooled to improve its effectiveness in delivering broadband access and technology training in low-income communities.

¹⁶Interviews with Michael Koonce, Mt. Carmel Online, and John Andrews, US SONET.

¹⁷Interview with Dennis Sienko and John Barr, DCEO.

Preserve Local Public Entities' Authority to Deploy Broadband Networks

The development of networks by local public entities—municipalities and public power utilities—is an important option for providing desired services in locations where broadband is not available at all or the local exchange carrier and/or cable provider is providing inadequate coverage, speeds, affordability, or customer service.¹⁸ Municipal networks, particularly fiber and wireless solutions, are growing rapidly across the United States as communities perceive the economic development benefits of bigger bandwidth and the limits of DSL and cable modems. There are examples of public wholesale-only and full-service retail deployments, as well as public/private partnerships (Bode 2003). It is also increasingly common for municipalities to join together to build cost-effective connections from local Internet access networks to an Internet backbone (the backhaul connection) (Gillett, Lehr, and Osorio 2003).

At least 15 states have enacted legislation to prevent or limit municipalities' authority to build and operate broadband networks (Gillett et al. 2003). Fortunately, Illinois is not among them. Several states, including Alabama, Arizona, California, Florida, Oregon, and Virginia, have enacted legislation to grant municipalities pursuing specific projects express authority to deploy networks (National Association of Telecommunications Officers and Advisors 2003). Such legislation may make sense in Illinois in specific deployment instances such as when the creation of a regional authority can facilitate interjurisdictional cooperation and planning.¹⁹

Public utility broadband deployment is controversial. ILECs and cable service providers often strongly oppose municipal provision because of the alleged unfair advantage enjoyed by local governments given their access to tax-based financing instruments. ILECs and cable companies have strongly supported efforts to prevent municipal provision in other states and may see value in similar legislation in Illinois. Yet, in most places where municipal networks are being deployed, it is because private providers have declined to develop services at levels that the local community would prefer.²⁰ In Illinois, the citizens of Geneva, St. Charles, and Batavia will vote on a second referendum on the November ballot that would allow the cities to create a public utility that delivers fiber to every home. A first referendum failed under heavy opposition from the local exchange carrier (SBC Communications, Inc.) and citizen concerns over potential tax increases. Such debates are legitimate and should not be preempted. The citizens of Illinois cities and towns should be permitted to judge for themselves whether municipal provision of broadband is a worthy public service for which they are willing to pay.

¹⁸Municipal provision is endorsed by TechNet, an organization of leading U.S. technology company executives (see TechNet 2003). TechNet advocates for a particular form of public provisioning—wholesale service—through which service providers utilize publicly provided, owned, and maintained infrastructure.

¹⁹Interview with Jim Baller, Baller Herbst Law Group, September 29, 2004.

²⁰The trend toward municipal provision of broadband in poorly served areas mimics the history of public electric utility formation in the early 20th century (see Baller 1994).

Assess and Streamline Rights-of-Way Acquisition, Process, and Cost

The Illinois Broadband Task Force, or the designated state e-champion organization, should form a working group to assess obstacles to provider acquisition and use of local and state rights-of-way. The working group should review local government rights-of-way practices in the state, the adequacy of local resources for prompt review and granting of rights-of-way, and ways to improve interagency coordination when rights-of-way needs span jurisdictions. A state working group would parallel the interagency Federal Rights-of Way Working Group led by the U.S. Department of Commerce's National Telecommunications and Information Administration. The federal working group was organized to "identify and recommend changes in federal policies, regulations, and practices that would improve the process of granting rights-of-way for broadband communications networks on lands under federal jurisdiction" (National Telecommunications and Information Administration 2004a, 2). The federal group's main concerns are easing the rights-of-way application process and rationalizing fees.

Policies to ease deployment roadblocks were assigned the highest weight (most emphasis) in a recent popular composite index ranking of states' broadband strategies (TechNet 2003). Problems that providers often encounter include fees based on gross revenues rather than cost considerations, demands for in-kind payments of selected infrastructure components, excessive delays in approvals, complicated procedures for securing rights-of-way across jurisdictions, and efforts by some communities to use rights-of-way as a revenue generation mechanism.

No comprehensive studies of rights-of-way obstacles have been conducted for Illinois, so it is unclear what, if anything, should be done to ease providers' ability to deploy networks. Common approaches among the states include establishment of uniform minimum application processing periods, development of model license agreements, and designation of a state or regional authority to handle rights-of-way issues for multiple jurisdictions (a one-stop shop model) (National Telecommunications and Information Administration 2004b). Out of its review process, the Federal Rights-of Way Working Group recommended several actions that could be adopted at the state level, including establishment of a central website with information on the rights-of-way permitting process, inclusion of rights-of-way information and procedures on all relevant government agency websites, minimization of delays in application reviews, and standardization and simplification of fees (National Telecommunications and Information Administration 2004a).

Catalog Illinois' Broadband Infrastructure

The state's designated e-champion organization should catalog Illinois' network infrastructure as accurately as possible and on an ongoing basis while also preserving the confidentiality of service provider data. The experience of other states shows that cataloging (sometimes called mapping) can be accomplished effectively if it is undertaken by a lead organization in cooperation with service providers and with sufficient resources to sustain the effort over time.

Absence of good information about the location of broadband gaps limits progress on broadband issues in three ways. First, it makes it harder for the state to develop a flexible infrastructure grants program while also ensuring that the areas of greatest need receive highest priority. Policymakers are more inclined to arbitrarily limit eligibility for grants programs or, alternatively, disburse grant funds widely in small and less effective increments. Second, consumers, businesses, economic development organizations, and municipalities are left without good information on service options, making the development of demand aggregation strategies and the formulation of local deployment plans much more difficult. Third, without cataloging gaps, Illinois cannot track progress on broadband goals. The result may be poor program management and over- or underspending on broadband programs.

Cataloging Illinois' broadband infrastructure means assembling data on the location of broadband networks together with information on user cost, bandwidth, and reliability. Private sector providers are understandably reluctant to supply extensive data on the location and characteristics of their facilities. They believe that to do so would reveal key market information to their competitors²¹; however, the experience of three states—Ohio, Maryland, and North Carolina—indicates that infrastructure cataloging/mapping can be pursued in a manner that protects providers' interests while also serving critical policy and planning needs.

Ohio's Technology Policy Group (TPG) in the Ohio Supercomputing Center used interviews and questionnaires to collect information directly from regulated and unregulated providers. It then combined the primary data with publicly available information from the Public Utilities Commission of Ohio (Sabety and Gordon 2001). It also tested the quality of Internet services in various regions by developing an innovative automated system of dialing and testing Internet service provider (ISP) access lines.²² Maryland's Technology Development Corporation (2003) contracted with Ohio's TPG in 2000 to apply the same methodology. Maryland's project, dubbed eReadiness Maryland, cost \$355,000 and was funded by state (\$145,000), federal EDA (\$100,000), and corporate sources (\$110,000).²³ To our knowledge, neither Ohio nor Maryland's mapping data are continuously updated.²⁴

Like Ohio, North Carolina began by interviewing and surveying service providers to assemble a baseline map of the state's infrastructure. North Carolina went further, however, and developed a system for continuously updating the data. The key is a web-based application that allows

²¹ Mathew Johnson, Director of Government Affairs for Verizon, and Rick Holzmacher, lobbyist for the Illinois Independent Telephone Association, indicated that Illinois telecommunications companies would be reluctant to release data to an agency other than the ICC in the absence of clear confidentiality agreements (Meeting at the Rural Affairs Council offices in Springfield, March 31, 2004).

²² The tests identified busy signals, ping response times, file download speeds, and e-mail receipt speeds (Sabety and Gordon 2001). At one time TPG was assisting other states with mapping efforts. Illinois explored, but eventually did not pursue, a mapping contract with TPG several years ago (Interview with Dennis Sienko, DCEO).

²³ Note that the \$355,000 included costs for administering a telephone survey of businesses and households.

²⁴ In fact, Ohio's TPG no longer exists.

providers to log in and add new information about the location and types of services they offer. The baseline data in North Carolina's "Service Provider Update" application is kept confidential and is used primarily to inform e-NC's internal planning efforts and grants making; however, certain elements of the information that providers have agreed in advance to release are made available to the public through an extensive web-based mapping application (see North Carolina's e-NC Authority 2005). The cost of the initial development of North Carolina's system, including the design of the web-based applications and initial infrastructure inventory, was approximately \$1.1 million (RIAA 2001). Ongoing maintenance of the data is much less expensive, given the provider update application and continuing work of e-NC staff on deployment projects in specific regions. The latter provide opportunities to add and revise data in the system.

Track Broadband Use by Businesses and Consumers

The state's designated e-champion organization should conduct annual or biennial statewide household and business surveys to track computer and Internet use patterns, assess the status of obstacles to Internet access and use, and collect user-reported service availability information. Such surveys, conducted occasionally or routinely in many states, provide a comparatively low-cost means of identifying gaps in service and tracking progress on broadband goals. With sufficient sample sizes, they can be used to analyze trends in supply and demand down to the county level. The survey instruments should be designed to permit direct comparison of Illinois data with national data on the Digital Divide such as those reported regularly by the Pew Internet and American Life Project (Bell, Reddy, and Rainie 2004; Horrigan et al. 2003).

Conclusion

Access to broadband service at an affordable rate is not a sufficient condition for economic prosperity in Illinois' rural communities, but it is increasingly a necessary one. More and more businesses rely on information technology and the Internet to communicate with customers and suppliers, market goods and services, and manage billing and other financial transactions. Likewise, consumers are increasingly reliant on computers and the Internet as community colleges and universities, hospitals, and governments deploy more sophisticated applications to deliver education, health and government services online. Many business and consumer online applications and services are no longer just supplementing traditional in-person and paper-based services. They are replacing them entirely. That means that the ability to get online at transmission speeds that meet application demands is less a luxury than a necessity.

This report outlines specific steps that Illinois state government can take to spur the deployment of broadband infrastructure throughout the state (universal deployment), as well as to better address the demand side of the problem (e.g., access to computers, appropriate training,

improved applications, and the like). The report's most important contribution, however, is in setting out a larger state broadband policy framework. With quite mixed success, some states have approached rural broadband deployment policy from the top down, that is, by first undertaking costly comprehensive assessments of broadband gaps and then formulating large-scale statewide plans. Others have preferred to take a mostly hands-off approach, with perhaps modest use of financial incentives to address selected supply- and demand-side needs. Daunted by the complexity and politically charged nature of the telecommunications industry, as well as the rapid rates of change in the development of broadband technologies, the majority of states have adopted a wait-and-see posture, in effect hoping that deployment and utilization take care of themselves through a combination of technological change and market imperatives.

There are good reasons to believe that much of the broadband deployment problem will take care of itself. Business and consumer demand for broadband is strong, and where market demand is strong, business solutions will follow; however, there is also ample evidence that gaps will remain, particularly in sparsely populated regions, communities with little competition in service provision, and low-income areas. In some areas of the state, the pace at which affordable service is being rolled out is the economic development challenge. In others, the quality and speed of the service is the problem. In still others, the chief concern is affordability.

This report argues that the State of Illinois should embrace a grassroots strategy in which it acts as engaged broker and catalyst for locally based initiatives that are, by definition, tailored to unique local needs. Such a model maximizes the state's ability to adapt to rapid changes in technology and the telecommunications market. Through the hands-on process of assisting local e-champions with the technical and financial challenges of implementing supply- and demand-side initiatives, a lean but capable state e-champion organization will accumulate a badly needed reserve of information on the bridgeable gaps in the state, the kinds of local solutions that work best, and the policy changes that are needed to eliminate unnecessary impediments to deployment. Projects initiated from the bottom up, driven by local stakeholders, will utilize strategies that are appropriate to local circumstances and preferences. No technology, deployment approach, market model, or source of financial support need be embraced to the exclusion of others. As communities gain access to better information and expertise, initiating new projects will become easier and the prospects of completing them successfully will increase. With better information, local communities will capture a bigger share of available federal resources as well as better leverage on private sector and foundational sources of financial support.

References

- Baller, J. 1994, November. *The essential role of consumer-owned electric utilities in developing the national information infrastructure: A historical perspective*. Paper presented at the American Public Power Association Annual Telecommunications Conference, Nashville, TN.
- Bell, P., P. Reddy, and L. Rainie. 2004. *Rural areas and the internet*. Washington, DC: Pew Internet and American Life Project.
- Bennett, M. D. 2003. *A broadband world: The promise of advanced services*. Washington, DC: Alliance for Public Technology.
- Bode, K. 2003. Broadband reports: Interview with Jim Baller. *BroadbandReports.com*. Available online at: www.broadbandreports.com/shownews/2853. Retrieved September 19, 2005.
- Community and Economic Development. 2005. Homepage. Available online: <http://communitydevelopment.uiuc.edu/webworks/files/index.php>. Retrieved September 9, 2005.
- Crandall, R. W. 2003a. Broadband communications. In *The handbook of telecommunications economics, Vol. II*, ed. by M. E. Cave, S. K. Majumdar, and I. Vogelsang. Amsterdam: North Holland.
- Crandall, R. W. 2003b. *Debating U.S. broadband policy: An economic perspective* (Policy Brief 117). Washington, DC: Brookings Institution.
- Department of Community and Economic Opportunity (DCEO). 2004. *Bridging the digital divide: Charting a course for technology accuracy. Request for applications*. Chicago: DCEO.
- Federal-State Joint Conference on Advanced Services. 2002. *Broadband services in the United States: An analysis of availability and demand*. Washington, DC: Federal-State Joint Conference on Advanced Services.
- Gillett, S. E., W. H. Lehr, and C. Osorio. 2003. *Local government broadband initiatives*. Cambridge: Massachusetts Institute of Technology.
- Green, P. E. 2003. *Fiber-to-the-home white paper*. Available online: www.ftthcouncil.org/documents/FTTH%20White%20Paper%20PaulGreen%200203.pdf. Retrieved September 19, 2005.

-
- Horrigan, J., L. Rainie, K. Allen, A. Boyle, M. Madden, & E. O'Grady. 2003. *The ever-shifting internet population: A new look at internet access and the digital divide*. Washington, DC: Pew Internet and American Life Project.
- Illinois Century Network (ICN). 2003a. *Advanced engineering taskforce report*. Springfield: ICN.
- ICN. 2003b. *An analysis of the deployment and availability of broadband in Illinois: Challenges and opportunities*. Springfield: ICN.
- Illinois Commerce Commission (ICC). 2004. *Annual report on telecommunications markets in Illinois*. Springfield: ICC.
- Illinois Telecommunications Association (ITA). 2002. State program, carrier and customer donations make computers available to those in need. *TeleState 11(4)*.
- Knott, F. 2004. *Readiness assessment for the Illinois counties of Coles, Clark, and Cumberland*. Riderwood, MD: ViTAL Economy.
- Maryland Technology Development Corporation. 2003. *eReadiness Maryland: Assessing our digital opportunities*. Columbia: Maryland Technology Development Corporation.
- Maye-Myers, D. 2002. *Technology infrastructure in west central Illinois*. Macomb: Illinois Institute for Rural Affairs, Western Illinois University.
- Michigan Office of the Auditor General. 2003. *Financial audit of the Michigan Broadband Development Authority*. Lansing: Michigan Office of the Auditor General.
- National Association of Telecommunications Officers and Advisors. 2003. *Making sure no citizen is left behind: A report on how local government is promoting the availability of advanced telecommunications services to all consumers*. Alexandria, VA: National Association of Telecommunications Officers and Advisors.
- National Telecommunications and Information Administration. 2004a. *Improving rights-of-way management across federal lands: A roadmap for greater broadband deployment*. Washington, DC: National Telecommunications and Information Administration.
- National Telecommunications and Information Administration. 2004b. *State and local rights-of-way success stories*. Washington, DC: National Telecommunications and Information Administration.
- North Carolina's e-NC Authority. 2005. e-NC internal mapping application. Available online: <http://204.211.135.120/enc-telco-maps/>. Retrieved September 9, 2005.

Rural Internet Access Authority (RIAA). 2001. *2001 annual report*. Raleigh, NC: RIAA.

Sabety, J. P., and S. I. Gordon. 2001. *Assessing a state's readiness for global electronic commerce: Lessons from the Ohio experience* (E-Government Series). Arlington, VA: PricewaterhouseCoopers Endowment for the Business of Government.

Schumacher, S. 2003. A study of Internet use patterns and broadband availability among rural Illinois households and small businesses. *Rural Research Report 14(4)*. Macomb: Illinois Institute for Rural Affairs, Western Illinois University

TechNet. 2003. *The state broadband index: An assessment of state policies impacting broadband deployment and demand*. Palo Alto, CA: TechNet.

ViTAL Economy. 2004. *Readiness assessment for the Illinois counties of Franklin, Perry and Williamson*. Riderwood, MD: ViTAL Economy.

