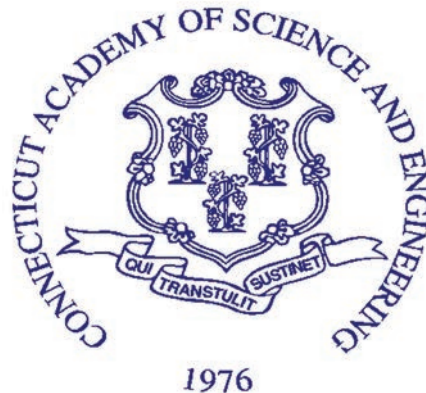


# GUIDELINES FOR THE DEVELOPMENT OF A STRATEGIC PLAN FOR ACCESSIBILITY TO AND ADOPTION OF BROADBAND SERVICES IN CONNECTICUT

DECEMBER 2011

A REPORT BY

THE CONNECTICUT  
ACADEMY OF SCIENCE  
AND ENGINEERING



FOR THE

CONNECTICUT OFFICE OF CONSUMER COUNSEL  
AND  
CONNECTICUT PUBLIC UTILITIES REGULATORY  
AUTHORITY, DEPARTMENT OF ENERGY AND  
ENVIRONMENTAL PROTECTION



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This study was initiated at the request of the Connecticut Office of Consumer Counsel and the Public Utilities Control Regulatory Authority, Department of Energy and Environmental Protection (known as the Department of Public Utility Control until June 30, 2011) and the on July 27, 2010. The project was conducted by an Academy Study Committee with the support of staff of the Connecticut Economic Resource Center serving as the study management team. The content of this report lies within the province of the Academy's Communication and Information Systems Technical Board. The report has been reviewed by Academy Members Peter G. Cable, PhD and Frederick J. Leonberger. Martha Sherman, the Academy's Managing Editor, edited the report. The report is hereby released with the approval of the Academy Council.

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## EXECUTIVE SUMMARY

### STUDY PURPOSE AND METHODOLOGY

The State of Connecticut received funding from the federal government to create a Strategic Plan for Accessibility to and Adoption of Broadband Services in Connecticut. This funding came from the US National Telecommunications and Information Administration (NTIA) pursuant to a January 13, 2010, competitive, merit-based matching grant through the State Broadband Data Program of the American Recovery and Reinvestment Act (ARRA) and the Broadband Data Improvement Act.

The Department of Public Utility Control (as of July 1, 2011 the Public Utilities Regulatory Authority “PURA”), in association with the Office of Consumer Counsel, Office of the Governor, and Office of Policy and Management, contracted with the Connecticut Academy of Science and Engineering (CASE) in August 2010 for the purposes of providing guidance—input and suggestions—for the state to use in its formulation of the state’s strategic plan.

The term broadband commonly refers to high-speed Internet access that is always on and faster than the traditional dial-up access. Broadband service provides higher speeds of data transmission allowing more content to be carried through the transmission “pipeline.” Another feature of broadband is that it does not block phone lines and does not require reconnecting after logging off.

The following are the goals and objectives of the state’s strategic plan that were identified in the state’s original project proposal to NTIA.

- The objective of all policies and implementation strategies adopted by the state in the next several years should lead to the creation of a broadband network that provides all communications services, including interactive, information, and entertainment services.
- The strategic plan must address the long-term sustainability of the expanded broadband access, recognizing that budgets rise and fall over time, and that technology always presents a moving target, changing the players as well as the basic methods of broadband accessibility.
- The strategic plan should provide for a flexible process for keeping abreast of the changing environment for broadband accessibility into the future.

A variety of study methods were used to gather data and information including:

- input from broadband experts at committee meetings;
- research on leading state and country broadband programs and initiatives;
- surveys of consumers and businesses;
- focus groups that were conducted throughout the state; and
- integration of the state mapping project findings into the final report.

This research formed the basis for the development of study findings. The findings were then used by the CASE Study Committee to formulate study recommendations that can help guide the state's strategic plan.

## **BRIEF STATEMENT OF PRIMARY CONCLUSIONS**

By improving communication and the flow of information and social interaction, broadband facilitates job creation, reduces miles driven and fossil fuels consumed, expands consumer choice, and improves competition for goods and services. Broadband enables advancements in health care, public safety, energy, government performance, education, economic development, workforce development, and transportation—encompassing almost every aspect of life.

Through the research, the CASE Study Committee found that even though the state has benefited from broadband infrastructure investments by the private and public sectors, Connecticut lacks coordination among broadband policy makers and does not have clearly defined broadband goals. In researching other states and nations, one common thread that was evident among broadband leaders was a need for a clearly defined goal and actionable steps to achieve that goal.

The state needs a broadband strategic plan that establishes goals and objectives, continues the initiatives already underway in the state, leverages public and private investments, and incorporates the following:

1. As the first step, Connecticut needs to create a sustainable mechanism for communication among existing broadband policy makers. In addition, progress needs to be continually monitored through the development and implementation of quantifiable metrics so that Connecticut remains competitive in retaining and attracting residents and businesses.
2. Although Connecticut has enjoyed relatively high adoption rates, those in households with low incomes may fail to adopt broadband for several reasons, including having set a lower priority for the value of using the Internet; the expense of the technology, including hardware, to access broadband; and a perception that broadband service itself is unaffordable relative to other household expenses.
3. Lack of digital literacy among some residents is another barrier to broadband adoption.
4. Without streamlined pole attachment and cell-tower siting processes, competition and investment in newer broadband infrastructure will likely be inhibited.
5. A fiber network spans the state, including rural areas, but the full potential of this network has not been realized.
6. State policies that facilitate making broadband technologies accessible to all residents will be an engine of growth for the state.

## SUMMARY OF FINDINGS AND RECOMMENDATIONS

Broadband can be described as the electricity of the 21st century; it is a major driver of the global economy. Broadband has enabled innovations across all aspects of the economy, throughout many sectors and industries. Given the role broadband plays in increasing economic competitiveness, it merits significant attention from state policy makers. This will ensure that the state is a global leader in broadband networking capacity that can support the applications of tomorrow, enhancing personal and economic growth and educational attainment.

Through the investment of millions of dollars in broadband infrastructure by private providers, Connecticut enjoys nearly ubiquitous broadband service coverage. The coverage makes Connecticut one of the most “wired” states in the country and among the leaders in the world. However, for Connecticut to maintain its status as a leader in broadband access and adoption, the state needs to maintain and develop policies to promote continued investment in ever-advancing broadband capability and capacity. The state needs to be proactive in this area since other states and countries are also installing fiber-optic technology for widespread residential and business use.

In addition, the demand for mobile devices continues to rise, which increases the need for expanded and faster wireless networks.

Through the research and interviews with other state leaders on broadband policy, it is evident that Connecticut policy makers have not given broadband access and adoption the degree of attention and resources as have other states. On the other hand, Connecticut has not needed to make broadband policy a priority since most state residents and businesses have access to broadband that meets their needs today. In order to remain competitive, Connecticut must focus resources to ensure that the state’s residents and businesses continually have the best broadband infrastructure and service, and adoption rates increase. To the extent that the private entities have not addressed access and adoption issues, the state government has an obligation to its citizens and businesses to make every effort possible to provide ubiquitous service at reasonable prices. The study recommendations are focused on five main areas that warrant state attention:

- state organization,
- establishing goals and progress metrics,
- adoption of broadband,
- pole attachment and cell tower siting processes, and
- infrastructure and access.

### State Organization

**FINDINGS:** As shown in Figure ES-1, with current responsibilities for broadband policy dispersed through multiple public state entities<sup>1</sup>, the state lacks a formal communications structure that can monitor and promote broadband policy. This lack of coordination has led to missed opportunities for enhancing broadband infrastructure and programs, as well as for federal and other funding. For example, without a mechanism for cross-agency broadband collaboration, highway projects that involve digging up state roads could result in missed opportunities for installing fiber networks.

**RECOMMENDATIONS:** With limited state and federal dollars expected to be available for projects, the state needs to ensure that consideration of broadband infrastructure expansion is factored into all state infrastructure projects including roadway and utility improvements. Therefore, it is recommended that a formal communication structure for developing and sustaining broadband policy, strategy and promotion, in the form of a broadband cabinet, be created to enhance economic development and leadership opportunities for Connecticut.

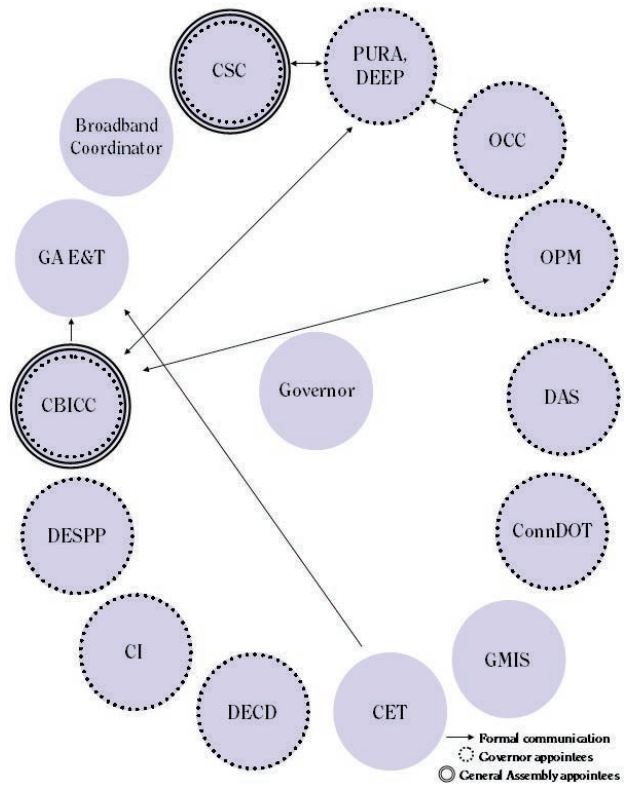


FIGURE ES-1: CURRENT COMMUNICATION AMONG BROADBAND POLICY MAKERS AND COORDINATING AGENCIES

Since this does not represent creating a new entity, but rather coordinating existing entities, it is not anticipated that significant additional state funding will be needed to support this function. However, if the cabinet decides to move forward with some or all of the recommendations outlined in this report, additional funding or legislation may be required for implementation.

By working within the existing entities in the state that focus on broadband policy, this proposed coordination structure, the broadband cabinet, seeks to create a link between all the entities and ensure strong coordination and communication (see Figure ES-2 for an example of entities to be included in the cabinet and others with links to broadband issues). The broadband cabinet creates a comprehensive process, shared by the legislative and administrative branches

<sup>1</sup> CBICC: Connecticut Broadband Internet Coordinating Council; CET: Commission for Education Technology; CI: Connecticut Innovations; ConnDOT: Connecticut Department of Transportation; CSC: Connecticut Siting Council; DAS: Department of Administrative Services; DECD: Department of Economic and Community Development; DEEP: Department of Energy and Environmental Protection; DESPP: Department of Emergency Services and Public Protection; GA E&T: Energy and Technology Committee, General Assembly; GMIS: Government Management Information Sciences; OCC: Office of Consumer Counsel; OPM: Office of Policy and Management; PURA: Public Utilities Regulatory Authority, DEEP



- Developing and maintaining the broadband website and dashboards that measure progress.
- Reviewing the leadership, vision, mission, goals, sustainability, and management structure of the Connecticut Education Network (CEN) to plan for the possible future demand from its open access network.
- Building upon and integrating the statewide plan with the national broadband plan.
- Ensuring the sustainability of broadband efforts through policies.
- Monitoring federal funding opportunities.
- Communicating progress to the public and policy makers by continually updating and making available timely broadband benchmarking and mapping information.
- Promoting the development of state e-government efforts.
- Advocating for broadband improvements at the national level. An example involves expanding the use of unlicensed bandwidth spectrum for applications such as Wi-Fi that increase the utility of broadband. Another example involves allowing Connecticut to be a recipient of funding from the Connect America Fund even though there are no areas in Connecticut with a federal rural designation.
- Reviewing Internet security and privacy issues that may impact residents or businesses.
- Reviewing emergency events regarding preparedness, disaster recovery and service restoration for lessons learned; determining if there are ways to enhance broadband system reliability and resiliency.

The CBICC continues to act as legislatively mandated; that is, to monitor trends in the state's efforts to develop statewide, world-class communications infrastructure and to issue reports to the General Assembly about technology.<sup>2</sup> In addition to its current role, the CBICC provides an advisory role to the broadband cabinet by reviewing and commenting on the annual broadband report. An amendment to the CBICC-enabling legislation will be required to name additional ex officio members of the CBICC. These additional members should include the broadband coordinator to facilitate policy discussions, as well as a member of the Connecticut Government Management Information Sciences (GMIS) Users Group to provide municipal perspectives on state issues within the broadband policy arena.

### ***Broadband Goals and Progress Metrics***

**FINDINGS:** Connecticut not only lacks coordination among decision-making entities for broadband policy but it also does not have a clearly defined broadband goal. One common thread that was evident among broadband leaders in other states and nations was a need for a clearly defined goal and actionable steps to achieve that goal. Goals help guide policy decisions and create a defined end point to identify level of achievement.

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<sup>2</sup> See Connecticut General Statutes § 4d-100(a) which provides the empowering statutory authority granted to the CBICC.

**RECOMMENDATIONS:** It is recommended that the following broadband vision statement be integrated into Connecticut's strategic plan and serve as a guide for future recommendations and action steps:

*Broadband technology is an enabler that significantly advances the ability of Connecticut's residents, organizations and businesses to communicate, learn, work, create, consume, access services, and recreate, therefore participating competitively in the global economy. Connecticut residents, organizations and businesses will have access to affordable broadband service that meets their current and future needs. To this end, the State shall adopt and promote the policies and programs needed to achieve affordable, ubiquitous access and adoption of broadband services sufficient to enable today's applications and the applications of tomorrow.*

In addition, it is recommended that the following action steps be taken by the proposed broadband cabinet to ensure both that the highest performance broadband infrastructure as is practical is offered, and that a base level of broadband access is available across the state:

- Determine a minimum standard for all Connecticut citizens and businesses to access broadband, such as the ability to email, browse the web and conduct basic transactions on government and other websites. The minimum standard for Connecticut should be at least the national standard set forth in the National Broadband Plan.<sup>3</sup>
- The proposed broadband cabinet should also consider setting goals to make Connecticut stand out as a global broadband leader, such as the goals set forth by the state of North Carolina as well as by other countries.<sup>4</sup>
- Publish the minimum standard and other goals on [www.ct.gov/broadband](http://www.ct.gov/broadband).
- Routinely monitor and upgrade the minimum standard and other goals as needed.
- Monitor broadband metrics to assure Connecticut is globally competitive and communicate these attributes as an economic development tool.

### *Adoption of Broadband*

**FINDINGS:** Unlike other parts of the country where access to broadband is an issue, in Connecticut broadband adoption presents a greater challenge for some residents. As the consumer survey results of this study indicate, fewer urban respondents access the computer at home and this was statistically different than the respondents from rural and suburban towns. Urban respondents are also less likely to use the Internet, a statistically significant finding at a time when more transactions are conducted online, such as applying for a job or accessing government forms for services. Both in Connecticut and nationwide, a smartphone with its wireless connection can be an alternative to a typical broadband connection with a computer. In recent studies, as well as from the findings of this study, use of a smartphone is often adopted when the up-front cost of the typical connection is an issue.

Furthermore, state government has not fully realized the potential of broadband capabilities in e-government interactions with citizens and businesses. Several reports that rank the states'

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<sup>3</sup> <http://www.broadband.gov/plan/2-goals-for-a-high-performance-america/>

<sup>4</sup> See page 33 of report for details.

adoption of technology have placed Connecticut at the bottom. For example, the Center for Digital Government, a national research institute on informational technology policies and best practices in state and local government, gave Connecticut a B- in 2010 based on using technology to streamline operations and improve service delivery.

In addition, even though the CEN reaches at least one school in every municipality, not every school utilizes its full capabilities either through teacher instruction or student use, which further perpetuates the digital divide in the state, and inhibits adoption.

**RECOMMENDATIONS:** Therefore the following recommendations should be reviewed by the proposed broadband cabinet and implemented through legislation if necessary:

- Find ways to address both the cost of broadband service and to increase digital literacy in populations not currently using broadband service in order to increase adoption rates, thereby decreasing the growing “digital divide.” For example, advocate at the national level that the Universal Service Fund (currently a surcharge on all telephone bills), which has now been made available to broadband providers who offer reduced rates for broadband service to low-income residents in rural areas, be expanded to include states such as Connecticut that do not have designated rural areas, but have unserved areas where the market does not support broadband provider investment. This could also include a special rate for wireless Internet users for this same group of residents.
- Consider establishing a statewide pilot program designed to assist low-income residents with the cost of broadband service, such as the issuance of data vouchers, if the Universal Service Fund is not made available to broadband service.
- Consider mobilizing state agencies to embrace broadband use throughout their business activities as a way to advance e-government efforts.
- Increase awareness of the CEN to teachers and students not yet taking advantage of the current system as a way to promote broadband adoption to reduce the educational digital divide.
- Facilitate the development of public-private partnerships between nonprofits that are educating residents in the use of broadband and gifting computers, with providers that offer reduced-price broadband services to low-income residents (e.g., Comcast “Internet Essentials Program” and FCC “Connect-to-Compete”). These partner relationships can jointly promote programs that increase adoption with low-income residents. Once the Lifeline/Linkup federal program funding (through the Universal Service Fund) is expanded to broadband services, the nonprofit-provider partnerships may be able to receive additional funding to expand efforts and offer alternatives such as less expensive mobile devices. These public-private partnerships should focus on urban households where there is a lower rate of adoption. Examples of existing programs that could be expanded include:
  - o Concepts for Adaptive Learning (CfAL), based in New Haven, targets underserved parents of students at urban public schools; provides software that adapts teaching methods to each student’s learning style; and works with teachers to adopt technology in the classroom. The program for parents first provides technology training and then installs computers and computer-related equipment in the home.

- o One Economy engages youth in major cities throughout the United States to provide technology training and support to their peers and neighbors by becoming a Digital Connector. The youth first receive training and then serve as volunteers in their community.

### *Pole Attachment and Cell Tower Siting Processes*

**FINDINGS:** Current trends in broadband indicate that the future will continually demand broadband access at higher speeds with greater reliability, reduced latency and enhanced security. In addition, the demand for mobile devices continues to rise, which increases the need for expanded and faster wireless networks.

Connecticut was fortunate that providers were willing to make the infrastructure investments in the state in the early phase of broadband availability to meet consumer demand, and state policies should continue to promote an environment where Connecticut remains an attractive market for providers to invest in communications innovation. Improvements in broadband capacity frequently require the deployment of new infrastructure, and the state regulatory system has not kept pace with the changes. Two hurdles faced by companies wanting to enter or expand in the broadband market include pole attachment and cell tower siting processes.

In 2008, the Department of Public Utility Control (DPUC, now PURA) established fixed time intervals for pole owners to issue licenses to third party attachers, regulated the completion of make-ready work, and imposed other limitations on the pole owners' management of telecommunication infrastructure.<sup>5</sup> However, telecommunications providers continue to face obstacles in trying to deploy facilities and fiber on poles. For example, pole owners have 90 days to issue licenses to third party attachers. However, deadlines are often not met and recourse is rarely taken.<sup>6</sup> In addition, if a customer wants service in less than 90 days, accommodations are rarely made.

Other states have established laws as a way to streamline the process and allow for competition in the market. They have done this through allowing temporary pole attachments and shortening the time frame in which the work must be completed.

Furthermore, as experienced by the power outages during the 2011 October Nor'easter, many of Connecticut's poles were damaged and confusion over ownership created delays in repairs.<sup>7</sup> A streamlined process would provide greater security for Connecticut's power and telecommunications services through a more responsive management system that in turn would enhance the state's emergency preparedness.

In addition, in some areas of Connecticut, the siting of cell towers can be a challenge. Tower siting issues in towns are often due to opposition of town residents for aesthetic or other reasons even before the proposed tower siting is brought to the Connecticut Siting Council for approval.

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<sup>5</sup> DPUC Docket Number: 07-02-13, DPUC Review of the State's Public Service Company Utility Pole Make-Ready Procedures - Phase I, 4/30/2008

<sup>6</sup> DPUC Docket Number: 11-03-07, Investigation into the Appointment of a Third Party Statewide Utility Telephone Pole Administrator for the State of Connecticut

<sup>7</sup> PURA Docket Number: 11-09-09, PURA Investigation of Public Service Companies' Response to 2011 Storms, 12/6/11.

However, this prevents access to broadband for residents and also creates public safety issues with residents not having a reliable way to communicate.

Removing the major barriers to pole attachment and cell tower siting processes will help open up competition and allow companies to invest in new broadband infrastructure which will enhance Connecticut's competitiveness.

**RECOMMENDATIONS:** Therefore, it is recommended that the following action steps be reviewed by the proposed broadband cabinet and implemented through legislation if necessary:

- Develop a streamlined process for pole access to allow Connecticut to be seen as a business- friendly state with a competitive broadband market. A representative within PURA with pole administration duties should have the authority to keep pole access schedules on track, allow for temporary pole attachments when warranted by customer needs, and impose penalties if the timelines are not met. In addition to assuring fair policies for the companies seeking access to poles that they do not own, the pole administrator within PURA will work to assure that the state remains an attractive place for continued investment by the companies that currently own the poles. Enabling legislation that will allow for this single pole administrator function within PURA will reduce the need to open dockets and carry forth with litigation when there are disputes over the time needed for pole access.
- In areas where cell tower siting is an issue, consider the use of newer technologies to bring wireless access to areas that are currently not served.
- In connection with the Connecticut Siting Council, review and seek amendments to any federal or state statutes that may facilitate the location of additional cell towers in order to increase public safety and emergency operations efforts.
- Explore the use of leasing space on state-owned equipment, buildings, or land (e.g., fire towers, telecommunications towers, public safety towers and state forests) for the deployment of wireless-based broadband equipment to expedite the deployment of broadband networks.

### ***Broadband Infrastructure and Access***

**FINDINGS:** The majority of the state's residential and business customers are accessing the Internet through a broadband infrastructure which includes coaxial cable, hybrid fiber coaxial cable (HFC) and DSL. Through the ARRA, many states received federal funding to install the latest technology, including fiber-to-the-home or node, which has the capability to deliver broadband at speeds multiple times faster than traditional cable, HFC or DSL. In addition, providers continue to invest in advanced networks in the state where there is an expected return on their investments.

However, in some areas of the state, broadband access is not available. In these areas where the providers have not provided service, the state may consider strategies to address this market issue so that all citizens and businesses have some broadband service. (See Appendix H for maps of Connecticut broadband access.)

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How is Connecticut positioned to meet the bandwidth demands of tomorrow? In addition to the private investments already occurring in the state, Connecticut received almost \$94 million in ARRA funding to install additional fiber that expands the Connecticut Education Network (CEN) into rural areas of the state and is being used to connect public safety facilities in towns to an enhanced 911 system. The original shared core infrastructure and fiber of the CEN were funded through state bonding, with no federal e-rate funding. The portion of the CEN that used e-rate<sup>8</sup> funding included AT&T's OPT-E-MAN® circuits (a switched Ethernet service that connects LANs within the same metropolitan area with flexible bandwidth options), frame and DSL.

Furthermore, the fiber network and subsequent upgrades do not use e-rate funding, but instead were funded through ARRA funding, which places no use restrictions on this network and requires open access. In addition, fiber networks are being installed in neighboring states (e.g., MassBroadband 123), which may provide an opportunity to create regional networks, particularly along the I-91 and I-95 corridors. An expanded network would support regional economic development efforts.

**RECOMMENDATIONS:** Therefore, the following recommendations should be reviewed by the proposed broadband cabinet and implemented through legislation if necessary:

- Explore the feasibility of expanding the CEN to additional municipal buildings, including public safety and first responder facilities. Assess which municipal buildings, in addition to the libraries and schools already on the CEN, are in close proximity to the CEN and could be easily linked up, thereby increasing the number of public spaces with fiber-optic broadband access. Examples of successful public-private partnerships that can guide Connecticut's efforts include Axxess Ontario in New York (see Appendix G for more information).
- Municipalities can explore the feasibility of connecting to the fiber networks in the state through any provider, although the costs to do so may be prohibitive.

In areas of the state that are underserved or unserved by broadband, even after the CEN is fully built out using the federal funding, consider ways to fund broadband expansion projects. A revolving loan fund that would leverage public funds and make loans to private companies that invest in broadband infrastructure could be established similar to state infrastructure banks established for transportation.<sup>9</sup> There have also been proposals at the national level to create a National Infrastructure Development Bank. The national proposal, most recently championed by Representative Rosa DeLauro in the 111th Congress, was to create a stand-alone entity that would make loans or loan guarantees to leverage private dollars for infrastructure projects. Projects would be selected based on merit and demonstrated need. Therefore, Connecticut should assess how an infrastructure bank could work in expanding the reach of the fiber broadband infrastructure to areas throughout the state. In addition, tax incentives to providers that build out in unserved areas could be considered.

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<sup>8</sup> E-rate is the common name for the Universal Service Fund for Schools and Libraries, established by section 254 of the federal Telecommunications Act of 1996. The E-Rate program is administered by the Universal Service Administrative Company (USAC) under the direction of the Federal Communications Commission and provides discounts to K-12 schools and libraries to obtain affordable telecommunications and Internet access for educational purposes. E-rate funding stipulates that the money can only be used for "educational purposes."

<sup>9</sup> State Infrastructure Banks (SIB) were authorized in 1995 as a part of the National Highway Designation Act (NHS) to help accelerate needed mobility improvements through a variety of financial assistance options made to local entities through state transportation departments.

## CONCLUDING REMARKS

Given that broadband technology is an enabler that significantly advances the ability of Connecticut's residents, organizations and businesses to communicate, learn, work, create, consume, access services, and recreate, it merits serious state attention. The recommendation regarding creating formal communication among existing policy makers places greater emphasis on broadband policy with the development of the broadband cabinet. This will help increase communication and coordination between state agency leaders who can impact broadband policy. The establishment of a broadband goal provides direction for policy makers and helps establish Connecticut as a broadband leader.

In order to be a global leader in broadband capacity, Connecticut must ensure that the state maintains a competitive environment for broadband providers and remains attractive for continued investment. Streamlining the pole attachment and cell tower siting processes will ease the burden for providers in the market. Furthermore, since open access to the CEN is required as part of receiving ARRA funding, review the leadership, vision, mission, goals, sustainability, and management structure of the CEN so that it may adapt to the possible future demands on the fiber network.

Finally, although Connecticut does have some of the highest broadband access rates in the nation, there are segments of the population that lack broadband connections due to factors such as lack of interest or understanding of the need for an Internet connection as well as the cost of technology and broadband service. Therefore, it is hoped that the proposed recommendations will increase access rates by leveraging existing resources and working within the existing infrastructure of nonprofits and organizations that assist low-income residents.