



## **BROADBAND AS AN ECONOMIC DEVELOPMENT TOOL**

Broadband is truly 21<sup>st</sup> Century infrastructure, capable of connecting Americans not only with each other, but with jobs, information, and government resources that might otherwise be difficult if not impossible to obtain. The transformative power of broadband connectivity has and continues to change communities on a daily basis. It is vital for our economy that, as a nation, we work to bring ubiquitous high-capacity broadband to our homes, businesses, hospitals, schools and institutions within our communities.

Through the experiences of our members and communities nationwide, NATOA has seen first hand the impact broadband creates, and is working to see these benefits reach communities yet unserved by broadband. Toward that goal, NATOA has put together this document to provide functional guidance on how, as a country, we can help bring broadband to citizens longing to be connected to 21<sup>st</sup> Century infrastructure.

This document features NATOA's Statement of Principles and Suggestions on how to incorporate broadband infrastructure into future economic stimulus packages. In addition, there is an excerpt from a report assembled by the Baller Herbst Law Group showing the effect of broadband in North Carolina, providing examples of the wide ranging benefits broadband provides. Finally, an article from the NATOA Journal discusses how municipal bonding can help spur broadband deployment in communities.

Broadband infrastructure and connectivity provide a unique opportunity to not only provide an immediate economic surge, but also offer long-term benefits across almost every aspect of our communities. As need and opportunity converge, there is no better time to begin seeing these benefits than now, and NATOA is and will continue to be a leading resource for communities on broadband and its myriad benefits.



## BROADBAND'S ROLE IN ECONOMIC STIMULUS

### STATEMENT OF PRINCIPLES AND SUGGESTIONS

- I. BROADBAND IS ESSENTIAL INFRASTRUCTURE FOR THE 21<sup>st</sup> CENTURY
  - A. Broadband is a consumer service, a distribution system, a personal tool for interacting with the world, and a catalyst and enabler of an endless array of products, processes, and services. As such, it can appropriately be viewed as critical infrastructure for the 21<sup>st</sup> century.
  - B. Broadband benefits a wide array of stakeholders: Buyers and sellers of broadband connections, designers and builders of broadband networks, manufacturers of broadband-enabled equipment and devices, developers of software and other applications, creators of content of all kinds, and countless others who have a huge stake in America's rapid transition to an online digital society. The Fiber to the Home Council estimates that a fiber build to one-quarter million homes represents 5,000 to 7,000 jobs during construction. The Bureau of Labor Statistics states that the average wage for telecommunications equipment installers and repairers is of almost \$25.00 per hour (except Line workers, who make even more). See: <http://www.bls.gov/oes/current/oes492022.htm>.
  - C. Economic studies and case histories confirm that public investments in broadband, particularly high-capacity broadband networks, can yield up to ten times the value of the investment in increased jobs, spending power, sales, property values, tax revenues of all kinds, and more. Baller Herbst Law Group, *Bigger Vision, Bolder Action, Brighter Future: Capturing the Promise of Broadband for North Carolina and America* 13-19 (June 2008), <http://tinyurl.com/48j3rv> (Excerpts appended as Attachment A).
  - D. The leading Asian and European nations treat broadband as critical infrastructure and use a variety of incentives to stimulate its rapid deployment. If the United States wishes to remain globally competitive, it must do so as well.

- E. Many localities across the United States could proceed immediately with broadband projects if federal support were available to them. (A list of representative examples is appended as Attachment B).

## II. PRINCIPLES FOR FEDERAL INVESTMENT IN BROADBAND

- A. The federal government should not only include, but emphasize, broadband in any economic stimulus package.
- B. In fashioning an economic stimulus package, Congress should not merely focus on America's short-term needs. It should also consider investments that will enhance America's ability to compete in the emerging knowledge-based global economy, in the face of stiff and increasing competition from the leading Asian and European nations. For example, China has recently committed to investing \$586 billion to upgrade its infrastructure, including broadband. See James Carlini, "China's Infrastructure vs. the \$700 Billion Bailout" (November 12, 2008), <http://tinyurl.com/5kbc3w>.
- C. Federal funds to accelerate deployment of broadband should be tiered, so that incentives for the high-capacity next generation networks on which America's future economic vitality and global competitiveness will largely depend (e.g., networks with speeds of at least 100 Megabits/second) should be substantially greater than incentives to develop lower-capacity networks (e.g., 10 Megabits/second).
- D. An economic stimulus package will be most effective if it provides incentives for all major stakeholder groups, including local governments, to step forward to contribute to America's economic recovery and success. Federal incentives should be made available to public and private entities on a non-discriminatory basis.
- E. To encourage responsibility and cost sensitivity, incentives should not cover the full costs of broadband deployment but should require substantial contributions by network owners.
- F. If the federal government provides subsidies to the private sector to accelerate broadband deployment – through grants, tax concessions, or other taxpayer-supported incentives – recipients of such subsidies should make the broadband infrastructure, facilities, and services supported by such incentives available to third parties on an open, non-discriminatory basis.
- G. Federal subsidies should not give the private sector an undue advantage over public entities. Any public entity that competes with a private entity that receives a federal subsidy should receive similar subsidies and should be

exempted from any federal, state or local measure that precludes subsidization of communications infrastructure or services.

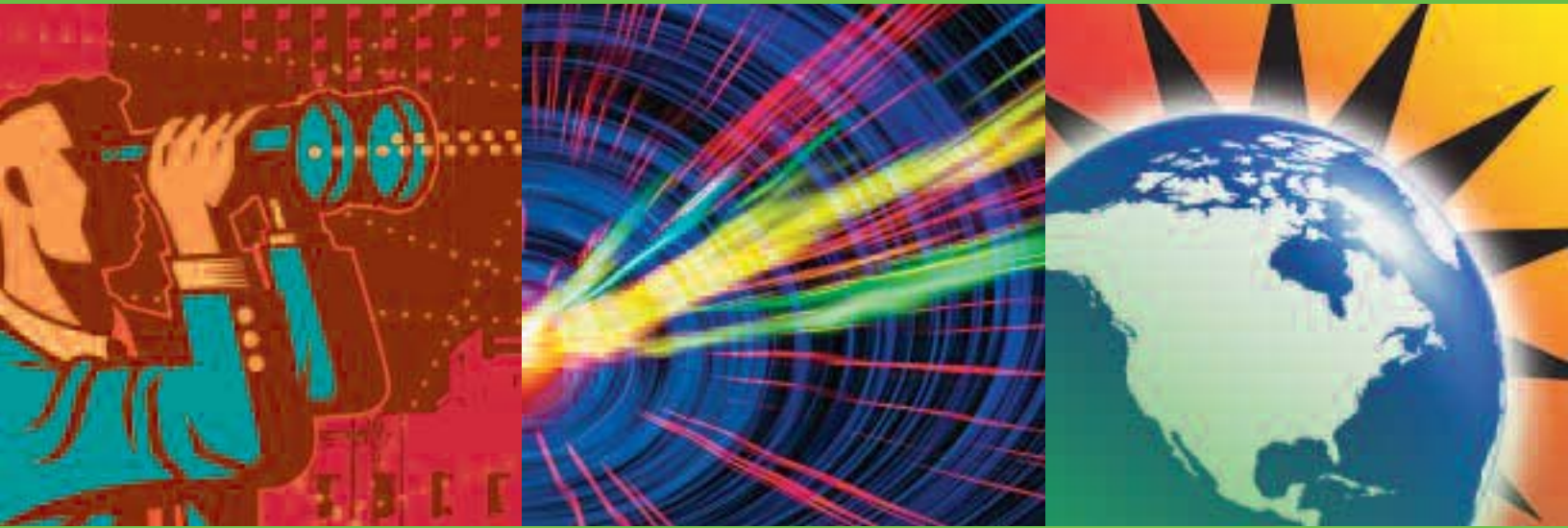
### III. Initial Recommendations

- A. To encourage public-private partnerships, Congress should repeal the “private use” provisions of Section 141 of the Internal Revenue Code so it will not apply to any public-private broadband partnership that is put into service. Christopher Torem, “Taxable Bonds and Municipal Telecom Facilities: a Modest Proposal (or Two),” *NATOA Journal of Municipal Telecommunications Policy* (Winter 2006) (Article appended as Attachment C).
- B. To stimulate more rapid deployment of broadband infrastructure, Congress should remove all state barriers to broadband initiatives by public entities. In particular, Congress should include in any economic stimulus legislation a provision that would incorporate the 110<sup>th</sup> Congress’s non-partisan “Community Broadband Act,” S.1853 and H.R. 3281.
- C. To compete successfully in the emerging information-based global economy, the United States must be mindful of the progress that other nations are making in developing advanced next-generation networks. Congress should not devote limited resources to mapping availability of low-capacity broadband connectivity (e.g., DSL) but should use such resources to stimulate the availability of true fiber-delivered broadband throughout the nation.
- D. Use of fiber for communications is an efficient, eco-friendly means of addressing local, state, and federal communications needs. Fiber itself has a lower carbon footprint than other communications technologies; it enables carbon reduction through environmentally friendly practices such as telework and distance learning; it is an advanced economic stimulus tool; and it benefits all sectors of our society. As such, fiber construction for broadband infrastructure should be the principal focus for broadband deployment for the 21<sup>st</sup> Century.
- E. In the effort to facilitate broadband deployment, local governments have partnered with a wide range of entities to share both effort and risk. Localities are open to a wide range of suggestions and welcome the opportunity to work with funding from a variety of sources—including both the private sector and the Federal government. Local governments seek risk sharing partnerships to deploy broadband in the best economic interests of the nation. Any funding mechanism made available to the private sector should therefore also be available in a non-discriminatory manner to the public sector, including grants, low interest loans and bond guarantees.

- F. To avoid delays that may result from addressing complex issues relating to existing federal subsidy programs (e.g. Universal Service, RUS, etc.), Congress should consider creation of a separate and distinct Economic Stimulus Fund specifically for the purpose of encouraging immediate and sustained deployment of broadband infrastructure. The size of the Economic Stimulus Fund should reflect the huge stakes involved for the United States.

#### IV. Next Steps

NATOA welcomes the opportunity to provide objective information and act as an expert resource on broadband as part of the economic stimulus package considered by Congress.



**Bigger  
Vision**



**Bolder  
Action**



**Brighter  
Future**

**Capturing the Promise of Broadband  
for North Carolina and America**

June 2008



***THE BALLER  
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For example, AT&T recently conducted field trials to test the veracity of certain cable industry claims that download speeds would be “up to” 6-8 Mbps. According to AT&T, actual speeds fell far short of these promises:

The result was quite different from what the cable company advertised. While AT&T saw peak speeds in the 3-4 Mbps range, average throughput was closer to 400 kbps. “Peak might be something that occurs at 3 am, when the network is lightly loaded,” said [AT&T Telecom Operations Group president John] Stankey. “Even at peak, the performance on these types of transactions was well below the 6 or 8 Mbps access speeds.”<sup>23</sup>

This problem is going to become increasingly acute as the number of broadband users grows and as applications consume ever-increasing amounts of capacity.

Second, broadband providers typically emphasize download speeds in their advertising and downplay upload speeds – if they even mention upload speeds at all. This disguises the fact that, in the United States, most broadband connections today are asymmetric – i.e., they have substantially less capacity for uploads than they do for downloads. That is so because most DSL and CMS networks have limited capacity, and network operators have dealt with this by allocating most of their available capacity to downloads. As discussed more fully below, such restrictions on upstream capacity can severely limit economic development and user creativity.

Furthermore, Internet users, particularly young people, are increasingly becoming producers of content and need more upstream capacity to send it to the Internet. This trend is likely to gain compelling force as the Internet evolves to its so-called “Web 2.0” stage, during which users will typically become “prosumers” – i.e., both producers and consumers of information. We will discuss these developments in Section B.13, below.

## B. The Many Benefits of Broadband

### 1. Economic Development

Among the most important attributes of broadband is its ability to serve as an engine of economic development, enabling communities, regions, nations, and even whole continents to develop, attract, retain, and expand job-creating businesses and institutions. Broadband also improves the productivity and profitability of businesses and institutions of all kinds in an endless variety of ways. This is not only true of large enterprises, but also of the small and medium businesses (SMBs) that “comprise more than 98 percent of U.S. firms and roughly half of all U.S. workers. SMBs spend in the range of \$70 billion to \$80 billion annually on voice and data services, or between \$600 and \$800 monthly per firm, on average.”<sup>24</sup>

There was a time when the major telecommunications and cable companies, seeking to persuade state legislatures to ban or restrict municipal broadband initiatives, insisted that there was no relationship between broadband and economic development. To back up their claims, they relied upon reports by “experts” who attacked the early studies showing that such a relationship existed.<sup>25</sup> Now, the evidence overwhelmingly proves that broadband and economic development go hand-in-hand, even at the paltry data speeds that the FCC used to treat as “broadband.” A growing body of evidence also indicates that high-capacity next-generation broadband networks will have a much more pronounced effect on economic development.

In this section, we first summarize ten studies connecting broadband and economic development. We then review ten representative case histories confirming that this is so. Because municipalities around the world, including the United States, have led the way to deploying high-capacity next-generation networks, most of these examples involve municipal fiber projects. Next, we pull back from our narrow focus on the United States and examine developments around the world that are leading to the emergence of a vast knowledge-based global economy. Finally, we discuss the Information Technology and Innovation Foundation’s 2007 State New Economy Index, a highly useful tool to compare and contrast how well the various states are doing in establishing competitive economies. In Part III, we apply the Index to North Carolina.

#### a. Studies

In July 2001, Criterion Economics released a Verizon-sponsored study finding that “[b]roadband access to the Internet in all its forms – ADSL, cable modems, and various wireless services – will bring enormous benefits to our economy.”<sup>26</sup> The authors calculated that widespread adoption of broadband by 2013 would result in a net present value of more than \$500 billion.

In February 2002, TeleNomic Research published a study concluding that a national broadband network would result in the addition of 1.2 million permanent jobs, broken down as follows:

- 166,000 jobs would be created directly in the telecommunications sector
- 72,000 manufacturing jobs would be generated by the direct purchase of network plant and equipment and customer premise equipment, and
- 974,000 indirect jobs would be created if a high-capacity network were built<sup>27</sup>

In September 2002, the U.S. Department of Commerce (DOC) issued a seminal report on broadband demand in the United States.<sup>28</sup> The DOC reviewed the Criterion Economics and TeleNomic studies cited above as well as numerous other then-existing studies and concluded that widespread broadband deployment and adoption was critical to “promoting jobs, productivity, and sustained growth,” to “enabling anywhere, anytime, student-appropriate learning,” to “transforming health care,” to upgrading the military to cope with “the global war on terror,” to “securing the home front” by enhancing homeland security, and to “bringing new possibilities and hope” to disabled persons and senior citizens. The DOC then set forth numerous actions that all levels of government, business leaders, and innovators and entrepreneurs could take to stimulate broadband demand.

Notably, after reviewing what it called the “U.S. Supply of Current Generation Broadband (Cable & DSL),” the DOC cautioned:

It is important to note here that the current generation of broadband technologies (*cable and DSL*) may prove *woefully insufficient* to carry many of the advanced applications driving future demand. *Today’s broadband will be tomorrow’s traffic jam*, and the need for speed will persist as new applications and services gobble up existing bandwidth.<sup>29</sup>

In 2003, Criterion Economics refined its research and found that, over the next 19 years, ubiquitous adoption of current-generation DSL and CMS would result in a cumulative increase in gross domestic product (GDP) of \$179.7 billion and in 61,000 new jobs a year. Criterion also found that introducing next-generation fiber-to-the-home (FTTH) technology at a reasonable pace would increase cumulative GDP to \$440 billion and new jobs to 140,000 a year.<sup>30</sup>

In April 2005, Applied Economic Studies published a study focusing on a municipal broadband deployment in Lake County, Fla. The study concluded that “Lake County has experienced approximately 100% greater growth in economic activity—a doubling—relative to comparable Florida counties since making its municipal broadband network generally available to businesses and municipal institutions in the county.”<sup>31</sup>

In February 2006, Massachusetts Institute of Technology and Carnegie Mellon University published the results of a study that they had performed for the U.S. Department of Commerce, to measure the impact of broadband on economic growth.<sup>32</sup> The MIT/CMU team found that “between 1998 and 2002, communities in which mass-market broadband was available by December 1999 experienced more rapid growth in employment, the number of businesses overall, and businesses in IT [Information Technology]-intensive sectors, relative to comparable communities without broadband at that time.” They also found that broadband’s impact on the number of jobs and business establishments “was particularly large relative to our expectations.”

In June 2007, a study sponsored by the Brookings Institution found that, for every one percentage point increase in broadband penetration in a state, employment increases by 0.2-0.3 percent per year. For the entire U.S. private non-farm economy, the study projected an increase of about 300,000 jobs a year, assuming that the economy was not already at full employment.<sup>33</sup>

In November 2007, a study commissioned by AT&T found that increased use of DSL and CMS would directly result in 14,853 new jobs in the Solano County area of California in the next 10 years. The study also showed that, with a nearly 4 percent annual percentage point increase in adults using broadband, the state could see a net cumulative gain of 1.8 million jobs and \$132 billion in payroll over the next decade.<sup>34</sup>

In February 2008, Connected Nation issued a report estimating that if broadband adoption were to increase an additional 7 percent in every state, the United States would experience aggregate economic benefits of approximately \$134 billion a year. This would include \$92 billion from 2.4 million jobs produced or saved; \$662 million in reduced health-care costs; \$6.4 billion in savings from reduced driving; \$18.2 million in carbon credits associated with 3.2 billion fewer pounds of carbon dioxide emissions; and \$35.2 billion in the value of saving 3.8 billion hours by accessing broadband from home.<sup>35</sup>

Most recently, Strategic Network Group concluded, based on a study of the effects of fiber deployments on a total of 223 businesses in three communities, that

The real benefits of FTTP (fiber to the premises) are more than about doing the same things faster. The most significant gains from FTTP occur after 2 years of use once organizations have adopted new business models to realize new revenue streams and to transform their business operations for cost avoidance. *While the greatest gains are*



*realized when moving from dial-up to FTTP, there continue to be significant gains for businesses that move from other forms of broadband access.*

In addition to these direct benefits, there are economic multiplier effects (increases in GDP, jobs, tax revenues) that can be calculated. In SNG's research since 2003, we have found significant increases in local economic activity attributable to broadband. *In fact, the increase in local GDP is more than ten-fold the value of the investments in broadband infrastructure.*<sup>36</sup>

The difference between the 5-10 Mbps and the 100 Mbps is not simply one of moving data faster. It is, rather, an economically crucial difference that causes a profound shift in how the medium is used. For example, a study in Japan of the effects of widespread, near-symmetric 100 Mbps (as opposed to the asymmetric download-priority model that dominates in the U.S. and elsewhere), found a dramatic increase in the use of peer-to-peer applications of various types, as well as in the creation of a whole new class of creative "heavy hitter" users who take advantage of such applications.<sup>37</sup> In other words, affordable access to high-bandwidth capacity results in a surge of applications and of both content users and content creators that does not – and cannot – exist in an asymmetric, low-capacity environment.

*There are two important lessons to be gleaned from the experience in Japan. The first is the crucial importance of robust upstream connections, enabling users to produce and distribute their own content and applications. The second is that "big" broadband, as opposed to puny broadband at DSL and CMS speeds, makes not only a quantitative difference, but also a crucial and economically significant qualitative difference.*

## b. Case Histories

The results of the studies cited above are borne out by the experience of numerous communities around the United States. Some representative examples follow. These examples predominantly involve municipal systems because, as in other countries around the world, municipalities were the pioneers of high-capacity networks, and "[o]ne important early result of municipal FTTH systems was to help prove and incubate the technology of direct fiber optic access."<sup>38</sup>

- **Lafayette, La.:** "When Nucomm International needed to locate a new call center – one that would add 1,000 jobs ... to the local economy – it chose Lafayette, Louisiana, because the city is building a massive fiber network to connect everyone."<sup>39</sup>
- **Fort Wayne, Ind.:** Between 2000-2004, industrial employment in Fort Wayne fell 21 percent (compared to 15 percent statewide). In response, then-mayor Graham Richard launched a vigorous and ultimately successful effort to attract a Verizon "FiOS" fiber-to-the-home network to the City. The City then established several innovation teams (ITeams) to develop ways to take maximum advantage of the high-bandwidth capacity that would now be available to the City and its businesses, institutions, and residents. ITeams have focused on government services, health-care information systems, transportation, public safety, online learning, library services, advanced manufacturing, and various other areas, and their efforts have resulted in numerous innovative programs. Examples include enhancing net literacy of senior citizens, handicapped individuals, and others through public computer labs and training programs; putting special cameras in clinics to enable real-time remote health diagnoses and treatment; establishing an "e-Mentoring" program that enables college students to support under-served urban students; and an initiative to support new business development and job creation. The latter program has, among other things, prompted Raytheon to expand its facilities in the City to take advantage of the new bandwidth. Now, Fort Wayne has a 4 percent annual growth rate, which is tops in the state.<sup>40</sup>
- **Cedar Falls, Iowa:** "In the 1990s, Cedar Falls Utilities built a citywide municipal hybrid fiber/coaxial network and provided specialized broadband telecommunications services including fiber connections to commercial and industrial customers in both the city and the industrial park. In contrast, the neighboring town of Waterloo, served by incumbent cable and telecommunications operators, generally did not have any fiber connectivity. Cedar Falls projected that, by the end of 2003, it would have companies employing over 5,000 people and occupying 4,000,000 square feet of building space. In contrast, Waterloo had a total of 10 businesses in its three industrial parks and has witnessed companies relocating from Waterloo to Cedar Falls, in part because of their need for bigger bandwidth."<sup>41</sup> As Doris Kelly showed in an analysis comparing Cedar Falls and Waterloo on a broad range of criteria, the only significant difference between them was Cedar Falls' broadband utility.<sup>42</sup>

In Cedar Falls's most recent coup, Peregrine Financial Group decided to relocate 70 high-paying jobs, with an annual \$10 million payroll, to the Cedar Falls area.<sup>43</sup>

- **Bristol, Va.:** As the 21st Century began, Bristol, Virginia, a town of 18,000 on the border of Virginia and Tennessee in southwest Virginia, was facing the simultaneous decline of its bedrock industries – tobacco, textiles, coal mining, and agriculture. Many of its stores and businesses were boarded up, and the future looked grim for Bristol and the entire region. The City leaders, with the encouragement and assistance of U.S. Rep.

Rick Boucher, decided to take matters into their own hands and rebuild the local economy through advanced telecommunications infrastructure and services. In 2001, Bristol won a crucial challenge to Virginia's then-existing barrier to public entry, and it began to build a state-of-the-art FTTH system. Three years of industry-backed legislative challenges and litigation disrupted Bristol's progress and substantially added to its burdens and costs, but Bristol stayed the course. Now, the City system serves more than 65 percent of Bristol's residents and businesses, and it has begun to attract hundreds of high-paying jobs to the town and region. For example, a recent article notes that two new employers alone will bring up to 1,500 high-paying jobs to Bristol.<sup>44</sup>

- **Tacoma, Wash.:** Tacoma Click! Network has just passed its 10th anniversary. It played a significant role in revitalizing Tacoma and has attracted more than 100 high-tech businesses to the community. Business leaders readily acknowledge that it is the municipal communications utility's ability to serve their needs that made them comfortable with moving to Tacoma rather than to Seattle or other large cities.<sup>45</sup>
- **Powell, Wyo.:** In anticipation of the construction of a fiber-to-the-home system in rural Powell, Wyo., this summer, a South Korean venture capital firm has agreed to pay up to \$5.5 million to engage 150 certified teachers in rural Wyo. to teach English to students in South Korea using high speed video teleconferencing. The Powell fiber system will enable the teachers to work from home. The company that developed this project is now planning similar projects for China, Japan, and Taiwan.<sup>46</sup>
- **Scottsburg, Ind.:** In Scottsburg, Verizon refused to wire the 6,000 person town because the company believed there was not enough interest or a large enough population to make its efforts profitable. In response, the Town created a wireless municipal broadband network that utilized the local power company's fiber for backhaul. The network, which cost \$385,000 to create, was directly responsible for saving 60+ jobs at a local Chrysler repair shop that Chrysler corporate headquarters had planned to close due to the lack of high-speed access. In addition to the benefits of retaining these jobs, the network saves the community \$6,000 per month in telecommunications costs.<sup>47</sup>
- **Auburn, Ind.:** Auburn's story is similar to Scottsburg's, except that Auburn used fiber rather than wireless to achieve its economic development goals. Cooper-Standard Automotive was going to move 75 high-tech jobs out of this small Indiana town because no private company was willing to provide broadband in the town. The mayor and municipal electric utility offered to furnish Cooper "industrial strength connectivity" through fiber optics. Cooper accepted and stayed.<sup>48</sup>
- **The Dalles, Ore., vs. Danville, Va.:** The Dalles, Ore., a city of 11,873 in the picturesque Columbia River Gorge, operates a 17-mile municipal fiber optic network. As a direct result of The Dalles' municipal networking capabilities, Google in 2005 decided to purchase an industrial site there for \$1.87 million, to house high-tech equipment that would be connected to the rest of the company's network. The project will create "between 50 and 100 jobs over a matter of time, earning an estimated average of \$60,000 annually in wages and benefits."<sup>49</sup> In contrast, Danville, Va., did not have a fiber network when AOL came looking for a site. As a result, AOL struck Danville off its list of potential sites for a new data center and located the center in Prince William County, Va.<sup>50</sup>
- **Jackson, Tenn.:** "For a small city, Jackson, Tenn., boasts a high concentration of firms that provide off-site computing resources for other businesses. The reason: its state-of-the-art fiber network."<sup>51</sup>

The examples above – particularly the contrast between The Dalles' and Danville's experience – confirm that advanced telecommunications networks are essential to attract or retain "New Economy" businesses and institutions. As business site selection experts now frequently say, "[t]o be a real competitor in the new global economy, an area must provide an advanced telecommunications infrastructure – the basic building blocks of the IT [information technology] sector."<sup>52</sup> In other words, having an advanced telecommunications network will not guarantee that a business will move to or stay in a community, but not having such a system will for many communities guarantee failure.

### c. Competitiveness in the Emerging Global Economy

The potential of broadband to spur economic development has become particularly important for the United States in view of the sharp increase in competition from low-cost nations in the last few years. As the blue-ribbon New Commission on the Skills of the American Workforce noted in its recent report entitled "Tough Choices or Tough Times," American workers are increasingly competing with workers in China, India, and other countries who are not only better educated but are also willing to work for far lower wages than Americans are used to earning.<sup>53</sup> To maintain its high standard of living, the United States must therefore prepare its workforce for highly-skilled, knowledge-based work that can command the wages American workers want and need from American and foreign employers. Success in achieving this will, in turn, depend on the availability of advanced communications networks:

Every day, more and more of the work that people do ends up in a digitized form. From X-rays used for medical diagnostic purposes, to songs, movies, architectural drawings, technical papers, and novels, that work is saved on a hard disk and transmitted instantly over the Internet to someone near or far who makes use of it in an endless variety of ways. Because this is so, employers everywhere have access to a worldwide workforce composed of people who do not have to move to participate in work teams that are truly global. Because this is so, a swiftly rising number of American workers at every skill level are in direct competition with workers in every corner of the globe. So it matters very much that, increasingly, it is easier and easier for employers everywhere to get workers who are better skilled at lower cost than American workers.<sup>54</sup>

Similarly, in his best-selling book *The World is Flat*, Thomas Friedman focused on the trend of companies worldwide to break manufacturing, production, service, and other processes into discrete tasks, to “source” the tasks to the workers anywhere in the world who can perform them most cost-effectively, and to use advanced communications technology to make everything work successfully:

The dynamic force in [the current stage of globalization]-the thing that gives it its unique character-is the newfound power for individuals to collaborate and compete globally. And the lever that is enabling individuals and groups to go global so easily and so seamlessly is not horsepower, and not hardware, but software-and all sorts of new applications-in conjunction with the creation of a global fiber optic network that has made us all next-door neighbors. Individuals must, and can now ask, “Where do I fit into the global competition and opportunities of the day, and how can I, on my own, collaborate with others globally.”

....

[W]e are entering into a phase where we are going to see the digitization, virtualization, and automation of almost everything. The gains in productivity will be staggering for those countries, companies, and individuals who can absorb the new technological tools. And we are entering a phase where more people than ever before in the history of the world are going to have access to these tools-as innovators, as collaborators, and, alas, even as terrorists. You say you want a revolution? Well, the real information revolution is about to begin. ...<sup>55</sup>

China’s surging economy is particularly threatening to America’s standard of living. In his book *China, Inc.*, Ted Fishman observed that China expects some three hundred million people to move from the countryside to major cities over the next 15 years. To accommodate this massive population shift, China will have to build the equivalent of Houston, Texas, *every month*, and will have to expand and accelerate its aggressive twenty-year-old program of encouraging importation of as many businesses and jobs from around the world as possible. The following passage from *China, Inc.* captures well the high stakes involved for the United States and the rest of the world:

The most daunting thing about China is not that it is doing so well at the low-end manufacturing industries. Americans will be okay losing the furniture business to China. In the grand scheme of things, tables and chairs are small potatoes in the U.S. economy. The Japanese, for their part, have lost the television business. The Italians are losing the fine-silk business. Germans cannot compete in Christmas ornaments. Everyone but the Chinese will lose their textile and clothing factories. More worrisome for America and other countries is the contour of the future, where manufacturing shifts overwhelmingly to China from all directions, including the United States. Consumer goods trade on the surface of the world’s economy and their movement is easy for consumers to see. The far bigger shift, just now picking up steam, is occurring among the products that manufacturers and marketers trade with each other: the infinite number and variety of components that make up everything else that is made, whether it is the hundreds of parts in a washing machine or computer or the hundreds of thousands of parts in an airplane. And then there are the big products themselves: cars, trucks, planes, ships, switching networks for national phone systems, factories, submarines, satellites, and rockets. China is taking on *those* industries too.<sup>56</sup>

To remain competitive in the face of challenges, the United States must ensure that its businesses, institutions, and residents have affordable access to world-class communications infrastructure that is capable of supporting the most advanced broadband technologies and applications.

**d. The 2007 State New Economy Index**

The Information Technology and Innovation Foundation (ITIF) has developed an invaluable index for measuring and comparing the degree to which state economies are knowledge-based, globalized, entrepreneurial, Information Technology (IT)-driven, and innovation-based.<sup>57</sup> We introduce the index and the concepts underlying it here, and we return to it later in Section III.B, in our discussion of North Carolina.

ITIF posits that the United States has evolved through several kinds of economies during the last century – the “factory economy” that emerged in the 1890s, the “mass-production, corporate economy” that emerged in the 1940s and 1950s, and the “New Economy” that has begun to emerge in recent years. ITIF defines the “New Economy” as “a global, entrepreneurial and knowledge-based economy in which the keys to success lie in the extent to which knowledge, technology, and innovation are imbedded in products and services.”<sup>58</sup> ITIF compares the major features of the “New Economy” to those of the “Old Economy” in the following chart:

*Table 2*

The Old and New Economies		
ISSUE	OLD	NEW
Markets	Stable	Dynamic
Scope of Competition	National	Global
Organizational Form	Heirarchical	Networked
Production System	Mass Production	Flexible Production
Key Factor of Production	Capital/Labor Intensive	Ideas
Key Technology Driver	Mechanization	Digitization
Competitive Advantage	Economies of Scale	Innovation/quality
Relations Between Forms	Go it alone	Collaborative
Skills	Job-specific	Broad and changing
Workforce	Organization Man	“Intrapreneur”
Nature of Employment	Secure	Risky

*Source: ITIF*

The ITIF index consists of 26 indicators, which are divided into five categories “that best capture what is new about the New Economy” – Knowledge Jobs, Globalization, Economic Dynamism, Transformation to a Digital Economy, and Technological Innovation Capacity.<sup>59</sup> While all of these categories are important, we will focus here on two of them – Knowledge Jobs and Transformation to a Digital Economy.

According to ITIF, knowledge jobs are important for the following reasons:

Workers who were skilled with their hands and could reliably work in repetitive and sometimes physically demanding jobs were the engine of the old economy. In today’s New Economy, knowledge-based jobs are driving prosperity. These jobs tend to be managerial, professional, and technical positions held by individuals with at least two years of college. Such skilled and educated workers are the backbone of the states’ most important industries, from high value-added manufacturing to high-wage traded services.

Of the transformation to a digital economy, ITIF says,

As the use of IT has transformed virtually all sectors of the economy, the result has been a significant boost in productivity. For example, the \$500 billion trucking industry has saved \$16 billion annually through the use of on-board computers that allow companies to track and dispatch trucks more efficiently. Farmers use the Internet to buy seed and fertilizer, track market prices, and sell crops. Governments issue E-Z Passes to automate toll collection. Whether it is to pay bills or locate a package, consumers increasingly forgo a phone call to corporate customer service centers in favor of more efficient self-service over the Internet. All of this translates into productivity gains and increased standards of living. In this way, digital technology is doing as much to foster state economic growth in the early 21st century as mechanical and electrical technologies did in the early and mid-20th century.<sup>60</sup>

Of particular relevance here is ITIF's discussion of broadband deployment, one of the key indicators included within the transformation-to-a-digital-economy category:

**Why Is This Important?** Over computer networks, bandwidth measures the “size of the pipes” between the sender and receiver of data. Greater bandwidth allows faster transmission of larger amounts of data, which is critical for the increasing number of businesses that use the Internet to communicate with customers, suppliers, and other parts of the company. Broadband access for households is also important, not only allowing a state's residents to more robustly engage in ecommerce, but also enabling telecommuting, distance education, telemedicine, and a host of other applications that can boost productivity and quality of life.<sup>61</sup>

As we will discuss at greater length in Section III.B, below, North Carolina ranks a surprisingly low 26th among the states in the New Economy Index for 2007. According to ITIF, the primary reason for this is the sharp disparity between the North Carolina's urban and rural areas on what it takes to foster a “New Economy.”

## 2. Education

Another important benefit of broadband is its ability to enhance lifetime education. “In the City of the future, education will be open to all. Learning will no longer be confined to particular times in a citizen's life or to particular places. It will be a lifelong process, easy to engage in and accessible anytime, anywhere.”<sup>62</sup>

As the California Broadband Task Force has recently observed,

Broadband networks ... have enhanced education by providing students and teachers with access to a vast array of resources. Text-based materials, photos and images, videos, animations, interactive lessons, data-manipulation tools, oral history collections, music, and educational gaming programs are just a few of the valuable benefits. Interactive 3-D experiences and visual-simulation software allow critical-care nurses, for example, to effectively train from their homes and gain simulated “hands-on” experience comparable to those in a hospital setting. And the future holds even more opportunity. The National Science Foundation (NSF) report “Cyberinfrastructure Vision for 21st Century Discovery,” predicts that the “future will see increasingly open access to online educational resources including courseware, knowledge repositories, laboratories, and collaboration tools.” To effectively realize this future, access to a robust broadband infrastructure is imperative.<sup>63</sup>

For insights about the higher education community's need for high-capacity next-generation networks with speeds of at least 100 Mbps, we turn to EDUCAUSE, the association representing America's 2,500 colleges and universities. EDUCAUSE's mission is to advance higher education by promoting the intelligent use of information technology. In a recent white paper, EDUCAUSE briefly summarized these needs as follows:

Distance learning is perhaps the most obvious, but not the only, educational use of bigger bandwidth. Because the majority of today's students live off campus today, the need for big broadband is important to ensure that they receive the same quality of education as on-campus students. Furthermore, many state colleges, especially those in rural states, have extensive distance learning programs to serve students all across the state. Many community colleges need big broadband to provide their students with the same quality of instruction as larger institutions. There are not enough teachers in enough places to meet the need; while it is not physically possible to provide a teacher of advanced calculus to every community, a high-speed network can extend the boundaries of the classroom anywhere.

...

[H]igh-quality video can provide meaningful two-way, interactive, real-time educational experiences: a student at home can continue to participate in regular classes; parents can confer with a teacher using a videoconference; study groups can form, with members working on projects together, remotely consulting databases, video libraries, computer simulations, and each other. Virtual field trips can take students and teachers sitting in their classrooms to faraway places, such as touring the Smithsonian National Air and Space Museum, experiencing a tribal dance in Africa, or scouring the depths of the Pacific Ocean in a submarine. Music students can receive lessons from a master instructor hundreds of miles away, who will be able to hear, see, and interact with the student. Homework can be researched using digital archives at the Library of Congress, where 3D objects can be examined from all angles.<sup>64</sup>

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# Legislative Review:

## The Communications Act

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# tax exempt bonds and municipal telecom facilities:

## A Modest Proposal (Or Two)

**A**s the battle for the future of broadband and wi-fi heats up in the halls of Congress, municipalities are reviewing the value of their assets in contributing to such advanced systems for public benefit. Cities across the country are launching public-private initiatives with third party vendors to provide such facilities.

Congress is also advocating that municipalities seriously investigate the role of the private sector in advanced communications. H.R. 5252, currently before the Senate, advocates that each public provider seeking to provide advanced telecommunications capability to the public should consider the potential benefits to the public of “public-private partnerships” prior to providing such capability or services.

At the same time, armed with “no barriers to entry” provisions of Section 253 of the Telecommunications Act of 1996, aggressive private vendors are wheedling and pushing, through negotiation and

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**BY CHRISTOPHER TOREM, ESQ.**

litigation, to get their wireless equipment located on municipal light poles or in the public way.

The result has been a variety of compensation arrangements to be paid by vendors or to managers regarding the use of municipal facilities.

Often overlooked in the rush to rewire are potential mine fields posed by prior tax exempt financing. Not only are there few incentives in the federal tax code to benefit such public-private partnerships, but the current federal tax code may actually discourage the efficient use of such facilities for modern telecommunications and information services.

### **Tax Exempt Financing and Its Potential Effect on the Private Use of Municipal Facilities**

Many municipal facilities are financed with tax exempt bonds (bonds whose interest is exempt from taxation under the Internal Revenue Code). This tax break permits public financing to be issued at lower interest rates than conventional financing, thus reducing the cost of borrowing. However, this tax break is subject to complex and severe restrictions on the use of the financed facility.

In broad brush strokes, IRS Code Section 141 and its applicable regulations indicates that a bond will lose its tax exempt status as to interest if two tests are “passed.” First, the “private use” test is passed if more than 10% of the bond proceeds are used directly or indirectly in the trade or business of a private entity. Under additional rules, that percentage is reduced to 5% to avoid application of the complex “unrelated and disproportionate” test where bonds can be disqualified if use which is unrelated to the primary use and is “disproportionate” exceeds 5%. Second, the “private security” test is passed if payments made by private entities in connection with any private use of the bond-financed facilities which are not taxes of general applicability, whether or not such payments are used to fund the bond-financed projects, exceed more than 10% (5% under the unrelated and disproportionate test) of debt service on the related bonds. If both tests are passed, the bonds could be deemed taxable, with serious consequences to both the issuing municipality and to the investor. Additionally, no more than 5% or \$5,000,000 of bond proceeds may be lent to a vendor as a “private loan.”

The private use test is aimed at any arrangement where the benefits of tax exempt financing may be transferred to a private party through a special entitlement to use of the facilities. Even if no bond money is spent on the actual equipment installed by a private vendor, the fact that it uses tax exempt bond financed facilities may constitute private use of proceeds.

Private use is contrasted with public use. For example, private use may occur if a private party has a right to use designated parking spaces in a garage for more than a short-term period. If, however, the spaces in a garage are available on a first come, first service basis, this is a public use. These complex rules should be reviewed with qualified bond counsel.

Recently released proposed IRS regulations, which mirror historical views on these issues, have posited

complex rules for cases of mixed use property (i.e., where there is both public and private use). If there is a “discrete portion” to allocate to private use, then that portion will be measured against the private use test for the project overall. If the use is “undivided” because the project is being used at the same time and on the same basis or at different times, then the use is measured based on proportionate benefit derived from the private users and the governmental users.

These complex tests can be avoided if:

- The facilities in question were financed with general revenues (i.e., not bond proceeds).
- The facilities are being offered to the private vendor for free and there are no other user fees for these facilities (i.e., no private payments).
- Any use by a vendor does not involve use different from the general public, special reservation of space only short-term, and user fees are uniform for similar uses.
- The amount of the payments received and to be received on a present value basis from all private users of the facilities does not and will not exceed 5% of debt service on the related bonds. This so-called “bad money” test will require good records to determine which bonds may be related and that there are no other “bad money payments” in connection with the facility.

At least two other exceptions permitted under the IRS regulations are worth considering in more detail:

#### **Qualified Management Contract Exception**

If the private party is managing the public facility for the benefit of the public in accordance with tests prescribed by the IRS, there is no private use. However, meeting these tests generally requires that fees paid for management is largely fixed in advance. The longer the term of the contract, the greater the percentage of compensation to the manager that must be determined in advance. In addition, the contract may have to be subject to early termination by the municipality. Moreover, no portion of the compensation to the manager may be based on a share of the net profits of the facility. This presumes that the municipal wi-fi system is like a parking garage and the vendor merely manages it for use of the general public.

**Incidental Use Exception.** The use is small enough in relation to the facility that it is deemed “incidental use” because it does not fundamentally change the public facility. This generally means that no more than 2.5% of the “facility” can be used for private use on a short-term basis. Although facility is not defined in the current IRS regulations, prior interpretations and the new proposed mixed use regulations suggest that facility could be similar to “project,” so that a facility could include functionally integrated facilities such as light poles connected by a single controller. Any use must be non-possessory, except for “vending machines, pay telephones, kiosks and similar uses” so that no transfer is made to the private vendor of space that is separated from other space by partitions or other barriers (such as a night gate separating the private use).

If the facility is large, such as a bridge, tunnel or a city hall, then the incidental use exception is likely to

## A Modest **Proposal (or Two)**

The result of all this complexity is that municipalities are caught between the impelling push of the federal telecommunications act and potential congressional action to accelerate the deployment of advanced communications facilities through public and private initiatives and the need to avoid violating IRS regulations and rendering bonds potentially taxable.

work (assuming there are not other incidental uses). If, however, the facility is a light pole or other small facility, then the calculation of incidental use becomes more complicated in measuring interior and exterior use as well as determining other private uses.

The result of all this complexity is that municipalities are caught between the impelling push of the federal telecommunications act and potential congressional action to accelerate the deployment of advanced communications facilities through public and private initiatives and the need to avoid violating IRS regulations and rendering bonds potentially taxable. Clearly, simplification is needed. I have set forth two such proposals below.

### **Two Modest Proposals**

First, as an incentive for governmental systems, the

IRS management contract rules could be modified to permit revenue sharing where a municipality seeks a private vendor to manage a municipally owned advanced telecommunications system. This would encourage public-private cost and revenue sharing partnerships to install, operate and maintain these new advanced systems.

Second, the IRS mixed use regulations should be clarified so that incidental use would include all uses of a public facility for advanced communications purposes so long as (1) the public purpose of the facility is not affected (e.g. a light pole would continue to be a light pole); and (2) the facility would continue to be owned and operated by the municipal entity. Ideally, such a provision would clarify existing law; alternatively it could be added to the final version of the proposed regulations discussed above. ■