

**A Report to Mayor Michael R. Bloomberg**

---

# **Telecommunications and Economic Development in New York City: A Plan for Action**

**Prepared by the New York City Economic Development Corporation,  
the New York City Department of Information Technology and Telecommunications  
and the New York City Department of Small Business Services**

**March 2005**



# Table of Contents

|  |    |
|--|----|
| I. EXECUTIVE SUMMARY .....   | 1  |
| A. Summary of City Initiatives .....                               | 3  |
| II. INTRODUCTION .....   | 7  |
| A. Background and Context .....                                    | 7  |
| B. Telecommunications in the New York City Economy .....           | 8  |
| C. Scope and Approach .....  | 10 |
| III. INDUSTRY AND TECHNOLOGY TRENDS .....                          | 13 |
| A. Industry at A Crossroads .....                                  | 13 |
| B. Emerging Technologies .....                                     | 14 |
| C. Convergence and Competition .....                               | 16 |
| IV. HOW NEW YORK CITY COMPARES WITH OTHER CITIES .....             | 17 |
| A. Measuring Telecommunications Coverage and Capacity .....        | 17 |
| B. Deployment of Fiber .....                                       | 18 |
| C. Access to Broadband .....                                       | 19 |
| D. Municipal Telecommunications Strategies .....                   | 20 |
| V. A VISION FOR NEW YORK CITY’S TELECOMMUNICATIONS<br>FUTURE ..... | 23 |
| VI. NETWORK RELIABILITY .....                                      | 27 |
| A. Importance .....  | 27 |
| B. Strengths and Weaknesses .....                                  | 27 |

C. Challenges and Opportunities..... 30

D. Action Plan ..... 31

VII. INFRASTRUCTURE FOR THE AGE OF BROADBAND..... 39

A. Importance ..... 39

B. Strengths and Weaknesses ..... 39

C. Challenges and Opportunities..... 41

D. Action Plan ..... 43

VIII. ENCOURAGING INNOVATION AND ENTREPRENEURSHIP ..... 55

A. Importance ..... 55

B. Strengths and Weaknesses ..... 56

C. Challenges and Opportunities..... 57

D. Action Plan ..... 59

ACKNOWLEDGEMENTS..... 67

# I. Executive Summary

## ***Overview of the Report***

In an era when New York City's role in the nation's and the world's economy is more than ever defined in terms of its role in the creation, dissemination and application of ideas and information, the City's telecommunications networks are vitally important parts of its basic infrastructure. They are as essential to its economic vitality as the subways that carry New Yorkers to and from work every day, the highways and bridges over which goods are trucked into and out of the City, and the airports that bring both foreign and domestic travelers to our shores.

The infrastructure of telecommunications, however, differs from that of other sectors. It is financed, built and maintained almost entirely within the private sector. Ownership is divided among multiple companies that provide services using a variety of technologies, and operating under different types of government regulation. Moreover, due to the technological changes that are now reshaping the industry, the ways in which telecommunications services are delivered – and the ways in which businesses and consumers use them – could change significantly during the next five to ten years.

Because of the central role of telecommunications in its economy, New York City must continue to monitor carefully the changes that are occurring in the industry – assess the issues and opportunities that those changes present – and determine how best to respond.

This plan, prepared by the New York City Economic Development Corporation, the Department of Information Technology and Telecommunications and the Department of Small Business Services, highlights three major issues affecting telecommunications infrastructure and services in New York City: network reliability, deployment of and access to broadband telecommunications services, and how to encourage innovation and

entrepreneurship through the delivery of telecom services. It then presents a series of initiatives through which the City can address these issues and take advantage of emerging opportunities in telecommunications.

The plan is the product of a six-month process of research, analysis and planning conducted jointly by NYCEDC, DoITT and DSBS. The work of the three agencies benefited greatly from the advice and assistance of the Telecommunications Policy Advisory Group – a panel that includes representatives of the telecommunications industry, business groups, academic experts, industry analysts and others. Appleseed, a New York City-based economic development consulting firm, also assisted NYCEDC, DoITT and DSBS with background research and preparation of the plan. After release of this Plan, next steps require specific identification of resources needed, the leveraging of existing assets and the reprioritization of existing resources.

### **Network Reliability**

In the Midtown and Lower Manhattan central business districts, businesses have access to telecommunications networks and services that are among the most sophisticated and most reliable in the world. Multiple carriers provide multiple connections to many buildings, and vendors offer companies a variety of wireless and other back-up systems.

Nevertheless, in some parts of the City, local telecommunications infrastructure is still characterized by numerous “single points of failure,” bottlenecks at which a major disruption could disrupt service to hundreds, thousands or even tens of thousands of users.

The federal funds provided by Congress to support the redevelopment of Lower Manhattan included an allocation of \$750 million for “Utility Restoration and Infrastructure Rebuilding.” A portion of these funds could be used for other investments more specifically geared toward improving network reliability in Lower Manhattan.

### **Infrastructure for the Age of Broadband**

During the next five to ten years, new uses of broadband telecommunications services are likely to help fuel the growth of a wide range of industries, including some that are central to New York City’s economy. By some measures of access to broadband telecommunications – such as the number of fiber-lit buildings in the city – New York City compares favorably with other major U.S. cities. However, New York lags behind several other world cities in deployment of broadband services.

Moreover, deployment of fiber optic infrastructure and availability of broadband vary considerably in communities outside Midtown and Lower Manhattan. The City has a vital interest in ensuring that high-quality broadband services are widely available to businesses that can profit from them.

During the next five years, wireless systems will play an increasingly important role in providing access to broadband services. City government can help facilitate deployment of wireless broadband by continuing to ensure that zoning and building regulations do not unduly restrict placement of antennas and by making City and other public property available for deployment of antennas and other equipment.

### **Supporting Innovation**

At a time when both technology and industry structure are rapidly evolving, New York City has the potential to emerge as a leading center of innovation and entrepreneurial growth in telecommunications. The continuing development of wireless broadband technologies could be an especially important source of new opportunities for growth in the:

- development of the infrastructure required to support these new technologies;
- delivery of telecommunications services over that infrastructure; and
- production of information services and products – “content” – for wireless broadband users.

City government cannot by itself create the combination of creativity, imagination and business talent that are so essential to innovation and entrepreneurial development. But it can help create the conditions that allow innovators and entrepreneurs to flourish.

---

## **A. Summary of City Initiatives**

There are several areas in which the City can act to address the issues of network reliability, access to broadband, and encouragement of innovation and entrepreneurship. Opportunities for action in each of these three major issue-areas are outlined below.

**Enhancing  
Network  
Reliability**

- 1) *Work with the telecommunications and real estate industries and representatives of major user groups to establish standards for network reliability at the building level, and explore creation of a voluntary certification program for commercial and industrial buildings that meet these standards.*
- 2) *Consider the creation of new real property tax incentives for enhancing reliability at the building level.*
- 3) *Work in partnership with carriers and real estate developers to explore the feasibility of developing additional, geographically diversified colocation facilities within the City.*
- 4) *Use the federal Utility Restoration and Infrastructure Rebuilding program to finance the installation of carrier neutral lateral conduit in Lower Manhattan, as funds are available.*
- 5) *Use the federal Utility Restoration and Infrastructure Rebuilding program to finance the installation of redundant fiber connections to critically important public and private facilities in Lower Manhattan, as funds are available.*
- 6) *Collaborate with the Alliance for Downtown New York and the Lower Manhattan Development Corporation on the creation of a wireless back-up network for Lower Manhattan office buildings.*
- 7) *Use the City's participation in the New York State Public Service Commission's telecommunications reliability efforts and the federal Network Reliability and Interoperability Council to advocate state, federal and industry actions to improve reliability.*

**Improving  
Access to  
Broadband**

- 1) *Utilize redevelopment projects as platforms for expansion and experimentation with broadband infrastructure.*
- 2) *Work with current providers of broadband infrastructure and services to identify opportunities for extending their services into commercial and industrial areas that do not now have access – or only have very limited access – to broadband.*
- 3) *Explore the feasibility of expanding portions of the NYSERNET New York City Dark Fiber Network to service key properties with not-for-profit tenants in high-priority development areas.*



- 4) *Provide guidance and information to business improvement districts and other neighborhood organizations interested in establishing local wireless broadband networks, especially in areas currently under-served by DSL or cable modem service.*
- 5) *Educate small businesses in the potential uses of broadband.*
- 6) *Continue to explore ways to expand the use of City property for the deployment of wireless network infrastructure.*
- 7) *Enlist the cooperation of other major public-sector property owners in the City, such as the MTA, the Port Authority and the New York State Department of Transportation, in developing a common strategy for using public property to expedite the introduction of new wireless technologies.*
- 8) *Continue to work with providers to install lateral conduit for fiber as opportunities arise.*
- 9) *Develop and maintain a database on deployment of fiber and other broadband infrastructure, and on utilization of and demand for broadband among businesses in New York City.*

**Encouraging  
Innovation**

- 1) *Support and encourage university-based initiatives that target new opportunities in telecommunications.*
- 2) *Work with the private sector and other public agencies to develop and implement projects that would test innovative approaches to delivery of broadband services, including commercial use of WiMax and broadband-over-powerline technology.*
- 3) *Continue to ensure that franchising, leasing and procurement policies and procedures are flexible enough to include small and mid-sized entrepreneurial companies along with larger, more established firms.*
- 4) *Work with providers of broadband services to ensure that their offerings to residential customers are flexible enough to meet the needs of home-based businesses.*
- 5) *Promote New York's identity as a center of innovation through participation in industry events and through a targeted media campaign.*



## II. Introduction

---

### A. Background and Context

In today's global information economy, maintaining a reliable, easily accessible and state-of-the-art telecommunications infrastructure is essential for New York City's continuing economic development. The City's telecommunications networks are as vital to its economy as the subways that carry New Yorkers to and from work every day, the power systems that light our streets, and the airports that bring both foreign and domestic travelers to our shores.

#### ***A Unique Challenge...***

Telecommunications, however, differs in several important ways from most other elements of New York's infrastructure:

- The City's telecommunications infrastructure has been developed and is operated almost entirely by private companies – participants in a telecommunications marketplace that in the past twenty years has become fiercely competitive.
- Telecommunications technologies are evolving much more rapidly than the technologies of highway transport, mass transit or water supply. Technological change provides new choices for the City's businesses and residents. It creates new challenges for established providers and new opportunities for entrepreneurs. But it also makes major investments in telecom inherently riskier than investment in most forms of public infrastructure.
- Most of the public policy and regulatory decisions that affect investment in and use of telecommunications systems are made at the federal and state levels – not in City Hall.

**...and  
Opportunity  
for Action**

Taken together, these three factors mean that the City's ability to affect the ongoing development and deployment of its telecommunications infrastructure, and the quality of services delivered over that infrastructure, is limited.

Nevertheless, the City is not entirely devoid of means by which it can affect the quality and reliability of its telecommunications networks, or the speed at which the companies that build and manage those networks respond to technological change. Given the importance of those networks to New York's economic future, it is essential for the City to use the tools it has at its disposal as effectively as possible.

Toward that end, the New York City Economic Development Corporation, the Department of Information Technology and Telecommunications, and the Department of Small Business Services have formulated a comprehensive strategy for using New York City's telecommunications assets more effectively to strengthen its economy.

---

## **B. Telecommunications in the New York City Economy**

The economic significance of New York's telecommunications infrastructure can be viewed from several different perspectives.

- It is vital to the day-to-day operations of several of New York's largest and most important industries.
- Telecommunications is an important industry in itself. And as telecommunications technology continues to evolve, it presents opportunities for the creation of new businesses and new jobs in New York.
- The quality of the City's telecommunications services can affect New York's attractiveness as a place for talented people to live, work and do business.

**The Value to  
Key Industries**

Telecommunications is critical to the success of many of New York's largest industries – and to many of the industries that will drive the City's growth in the future.

- New York's status as a global financial center is heavily dependent on the capacity and reliability of its telecommunications networks. For example, the New York Clearing House processes as many as 26 million transactions

per day, valued at an average of \$1.5 trillion per day, for 1,600 financial institutions in the U.S. and around the world.<sup>1</sup>

- New York’s role as a global hub of print, broadcast and online media is heavily dependent upon telecommunications infrastructure for research, information gathering and, most importantly, distribution.
- With 374,000 employees, health care is also among the City’s largest sectors; and during the past fifteen years, higher education, with approximately 78,000, has been one of New York’s most consistent growth industries. Both of these sectors have in recent years grown increasingly dependent on high-quality, high-speed telecommunications.
- A wide variety of smaller firms also depend on telecommunications – firms such as Eriksen Translations, which, from its headquarters on Court Street in Brooklyn, manages the work of more than 5,000 translators and interpreters working in locations throughout the world.

***A major local industry***

Telecommunications is also a significant industry in itself. In 2003, the combined output of telecommunications carriers, cable television companies (including programming) and Internet service providers and publishers totaled more than \$23 billion; together they accounted for more than 3 percent of the City’s economy.

Telecommunications, cable and Internet service companies currently employ more than 43,000 people in New York City.<sup>2</sup> Moreover, the quality of jobs in this sector is generally high. In 2002, the wages of payroll employees in these industries in New York City averaged more than \$79,600 – 34 percent higher than average wage and salary earnings across all industries in New York City.

The telecommunications sector also represents a significant opportunity for growth and innovation. The rapid evolution of telecommunications technology, and the changes now occurring in the structure of the industry, will create opportunities for both established and start-up companies – in the development and management of the infrastructure needed to support new technologies, in

---

<sup>1</sup> “Testimony of John R. Mohr, Executive Vice President, Clearing House Association, U.S. House of Representatives Committee on Financial Services, September 8, 2004.” [www.nych.org]

<sup>2</sup> New York State Department of Labor, Current Employment Survey and ES-202 data. Employment by telecommunications providers in New York City has in fact been declining steadily for some time – from 42,000 in 1990 to 23,500 in June 2004. This decline has been offset, however, by growth in other segments of the industry – and perhaps even more importantly, by a shift in the employment of telecommunications specialists from the *providers* to the major *users* of these services.

the delivery of telecommunications services via that infrastructure, and in the creation of new information products and services designed to take advantage of newly-developed telecommunications capabilities.

***Attracting and retaining talent***

An extensive body of research conducted over the past twenty years confirms that the single most important determinant of the prosperity of U.S. cities is the depth and quality of their human resources. In the long run, New York’s success depends on its ability to attract, develop and retain the talented people who drive its economy. This in turn requires that the City create and maintain the kind of high-energy, active environment that makes talented young people want to be here. Being at the cutting edge of deployment of new telecommunications technologies – and being a hotbed for development of the new services made possible by new communications capabilities – will reinforce New York City’s identity as both a magnet for and a developer of talent.

---

## **C. Scope and Approach**

***Process***

This plan is the product of a six-month process of research, analysis and planning conducted jointly by NYCEDC, DoITT and DSBS. The work of the three agencies benefited greatly from the advice and assistance of the Telecommunications Policy Advisory Group – a panel that includes representatives of the telecommunications industry, business groups, academic experts, industry analysts and others. The Group’s members are listed in the Acknowledgements. Appleseed, a New York City-based economic development consulting firm, assisted NYCEDC, DoITT and DSBS with background research and preparation of the plan.

***Structure of the Plan***

The plan consists of two parts. Part One addresses:

- Technological and industry trends affecting New York City’s telecommunications sector; and
- The status of telecommunications in New York City and in several other cities with which New York competes.

Part Two of the plan presents an overall vision for the City’s telecommunications future, with specific action plans in three main areas:

- Network reliability;

- Access to broadband telecommunications; and
- Encouraging innovation and entrepreneurship.

The plan does not directly address issues relating to public safety, though certain topics addressed here have implications for public safety. Nor does this plan address the needs of City government as a user of telecommunications services. These issues are being addressed through separate initiatives by DoITT and other City agencies.





### III. Industry and Technology Trends

New York City's telecommunications networks have undergone rapid change in the last twenty years. During the next decade, industry restructuring and technological innovation will continue to reshape the City's telecommunications landscape. This section highlights the current state of the industry, the most important emerging infrastructure technologies, and the implications for the telecommunications marketplace in New York City.

---

#### A. Industry at a Crossroads

##### ***Boom and bust***

The breakup of AT&T in 1984, the rapid development of new telecommunications technologies and federal telecommunications reform in 1996 unleashed an unprecedented wave of investment in the nation's and the City's telecommunications infrastructure. Between 1997 and 2001, an estimated \$100 billion was spent nationwide by private carriers on fiber optic network deployment. By the end of the 1990s there were no fewer than six competing transcontinental fiber-optic networks linking major U.S. cities.<sup>3</sup>

The investment climate of the late 1990s, however, led to excessive speculation by telecommunications firms. While common wisdom in the industry held that data traffic on the Internet was doubling every 100 days during the telecom boom, in fact it was only doubling at one-quarter that rate.<sup>4</sup> By 1999, an

---

<sup>3</sup> Townsend, A. 2003. *Wired/Unwired: The Urban Geography of Digital Networks*. (Unpublished Ph.D. dissertation, MIT School of Architecture and Planning)

<sup>4</sup> KG Coffman and A M Odlyzko. 1998. "The size and growth rate of the Internet". *First Monday*. 3(10).

insatiable demand for additional bandwidth had turned into a glut of excess capacity. Scarce revenues and heavy debt from rapid network expansion drove many carriers into bankruptcy and liquidation.

### **Today's marketplace**

The legacy of the 1990s telecommunications boom and bust is a more cautious, risk-averse sector. The implications of a dramatically changed telecommunications industry for New York City are clear.

- Existing local loop fiber optic networks, a particularly hard hit sector, will expand much more slowly over the next decade. With a few exceptions, such as Verizon's planned "fiber to the premises" service, extension of these grids will be incremental. It will primarily be tied to large commercial and institutional customers, with little or no speculative deployment.
- Carriers will increasingly attempt to defend revenue streams from franchise fees and other levies, applying pressure at the federal and state level to preempt municipal regulation of deployments and operation.
- Privately held small and medium-sized enterprises will have a greater presence in the landscape of innovation in new telecommunications products and services. This will favor New York's entrepreneur-driven economy. However, they may face obstacles in successfully bringing these innovations to the marketplace.

---

## **B. Emerging Technologies**

During the next five to ten years, trends already underway or now emerging could significantly affect the shape of the telecommunications sector in New York City – how businesses and residents use telecommunications – and opportunities for innovation and entrepreneurship in both the delivery and use of telecommunications services. This section of the plan focuses first on developments in wireless technology and the public policies that govern it and then on technological and industry developments in several other areas.

### **The Wireless Revolution**

A rapidly changing technological and regulatory environment is opening the door for rapid innovation in wireless voice and data communications. The pace of technological change is forecasted to increase dramatically over the next

decade, as federal spectrum allocation policies make a wider range of frequencies available for new technologies and new applications.<sup>5</sup>

Several developments appear likely to occur in New York City:

- Cellular carriers will deploy broadband “third-generation” (**3G**) cellular data network to provide high-speed mobile data over wide areas.
- **WiMax** may blanket entire neighborhoods and emerge as an alternative to cable and DSL for residential and small business broadband customers.
- **Wi-Fi** will continue to be used to provide very high speed guest Internet access in strategically located “hot zones” throughout the city.<sup>6</sup>

### **Wireline Networks and Applications**

While wireless technologies will continue to captivate the attention of industry, consumers and regulators, new landline networks technologies and applications will continue to appear in the marketplace in the next decade. We anticipate that in New York City:

- **Voice over Internet Protocol (VoIP)** will continue to supplant traditional PBX systems in the corporate market, and is likely to become a competitive threat to conventional residential phone service.
- Verizon’s **fiber to the premises (FTTP)** roll-out will provide a broadband convergence network for homes and small businesses, offering voice, data, and video on a single infrastructure.<sup>7</sup>
- **Broadband over Powerline (BPL)** has recently overcome important regulatory obstacles and may offer a fourth competitor for residential subscribers, as well as a low-cost alternative to rewiring older commercial buildings.

---

<sup>5</sup> For one vision of the future of spectrum regulation based on smart radio technology, see K. Werbach. 2003. *Radio Revolution: The Coming Age of Unlicensed Wireless*. (New American Foundation: Washington, DC)

<sup>6</sup> New York City’s Business Improvement Districts were pioneers in the deployment of public Internet zones based on Wi-Fi technology. Their model is being widely copied throughout the world.

<sup>7</sup> The first deployment of Verizon’s residential fiber-to-the-premises in New York City is expected in Staten Island and Queens in early 2005.

---

## C. Convergence and Competition

**Advancements are Breaking Down Barriers** One of the most important results of continuing technological change in telecommunications is the extent to which it is relentlessly breaking down barriers among various segments of the industry, inviting companies – and in some cases, effectively forcing them – to compete for business on what was once other companies’ turf.

For example, Time Warner and Cablevision are using VoIP to attack Verizon’s residential phone business. Verizon plans to challenge the cable companies in services such as video on demand through its planned fiber to the premises network. New entrants such as Clearwire plan to use technologies such as WiMax as a way to compete with both cable providers and the incumbent local exchange carriers (ILECs) for broadband Internet customers, as well as with cellular carriers for mobile phone subscribers.

**Possible Outcomes**

These trends suggest several possible developments:

- Increased competition for New Yorkers’ telecom business;
- A heightening of the pace of innovation in telecom products and services;
- A wave of new investment as companies race to roll out new services and reach potential customers first; and
- A new generation of telecommunications-based business opportunities.

Overall, the next five years are likely to be marked by heightened competition across once-separate segments of the telecommunications sector – wireless vs. landline, telephone companies vs. cable television companies vs. satellite service.

## IV. How New York City Compares With Other Cities

New York City is among the world’s most extensively networked cities, providing a highly competitive platform for economic development in industries that require infrastructure for moving information. This section describes the present state of New York City’s telecommunications infrastructure, and how the City compares with its domestic and international competitors. While the City remains a leader in the coverage, capacity, and capability of its commercial and residential telecommunications infrastructure, a number of areas for improvement remain.

---

### A. Measuring Telecommunications Coverage and Capacity

#### **Obstacles**

The successful formulation of a municipal telecommunications plan requires an accurate and timely survey of existing network assets. However, several factors limit the City’s ability to fully understand the coverage and capacity of the many telecommunications networks deployed throughout the five boroughs:

- Rapid pace of change – the most important telecommunications networks are very young, often less than five years old.
- Invisibility – wired telecommunications infrastructure is usually deployed along existing right-of-way, and in many locations is underground. Wireless networks reveal themselves only through antenna structures.
- Secrecy – network providers guard route and capacity data carefully, due to the highly competitive nature of the sector.

## **Sources of data**

Because of these obstacles to locating and identifying telecommunications networks, publicly available maps of this infrastructure typically are not comprehensive, and are out of date or otherwise inaccurate. To address these limitations, the analysis in this report is based upon four primary sources of data:

- Maps of fiber optic deployment by telecommunications carriers franchised by the city. DoITT maintains up-to-date maps of these networks based on information provided by the carriers. Due to confidentiality agreements between the City and the franchisees, these maps are not available to the general public.
- Data on building-level fiber optic deployments developed by third party information providers.<sup>8</sup>
- Broadband deployment reports published by the Federal Communications Commission and market research firms.
- Published academic research on telecommunications infrastructure.

Unfortunately, no existing source of information can provide a fully comprehensive comparison of the city's array of telecommunications networks. As a result, this analysis highlights those areas of strategic advantage and disadvantage that can be identified using these limited sources.

---

## **B. Deployment of Fiber**

Fiber optic networks form the backbone of all modern digital telecommunications networks, carrying Internet data, voice calls (fixed and mobile), and other data across cities, continents, and oceans.

### **An International Network Hub**

In terms of total capacity and external connections to other cities and countries, New York City's fiber optic infrastructure is only challenged by London and Tokyo, the world's two other great financial centers.

Due to its large local market of telecommunications users and its coastal location, in the 1990s New York City expanded its role as a key hub in international telecommunications networks. Massive investment in transatlantic undersea fiber optic networks – which come ashore almost exclusively in the

---

<sup>8</sup> Providers of background data for this study include Universal Access Inc. and Geo-Tel Communications.

New York vicinity – has reinforced the City’s historical role as North America’s primary telecommunications gateway.<sup>9</sup>

The New York metropolitan area is also the nation’s leading hub for both domestic and international Internet backbone networks – one of the primary services layered on top of the physical fiber optic infrastructure. The New York region overtook Chicago as the nation’s leading domestic Internet hub in 2000.<sup>10</sup> Approximately 430 Gbps of international Internet capacity terminates in the New York region. By comparison, the number two U.S. hub, Washington/Baltimore, had just 158 Gbps as of mid-2004.<sup>11</sup>

**The World’s  
Most Wired  
Central  
Business  
District**

Within the city, extensive “local loop” fiber optic networks connect buildings to these global grids. In the last decade, competing firms have deployed approximately three million fiber miles of fiber optic network infrastructure in the five boroughs. Currently, seventeen firms are franchised by the city to operate broadband networks.<sup>12</sup> It is estimated that at least 3,700 buildings in New York City are “fiber-lit,” that is, broadband service is provided by fiber optic cable that comes directly into these buildings. New York has more fiber-lit buildings than other U.S. cities. In Midtown and Lower Manhattan, where approximately 3,000 of the City’s fiber lit buildings are located, the local fiber distribution network is extensive.

---

## **C. Access to Broadband**

The city has also seen aggressive deployment of lower-cost alternatives to fiber optic links, which are cost-effective only for the largest and most demanding telecommunications customers. These broadband access networks serve small and medium sized enterprises, and residential customers.

**Two choices  
for residential  
broadband...**

Well ahead of many parts of the country, New York City has achieved nearly universal deployment of competing broadband technologies for residential customers. According to Verizon, 85-90 percent of all telephone lines in the

---

<sup>9</sup> *Global Communications Submarine Cable Map 2004*. TeleGeography Research Group (Washington, DC)

<sup>10</sup> Gorman S and E Malecki. "Fixed and Fluid: Stability and Change in the Geography of the Internet," *Telecommunications Policy*, vol. 26, nos. 7-8 (August-September 2002), pp. 389-413.

<sup>11</sup> *Global Internet Geography*. TeleGeography Research Group (Washington, DC)

<sup>12</sup> DoITT maintains a comprehensive, current list of all telecommunications franchise agreements on its website. [[http://www.nyc.gov/html/doitt/html/business/business\\_telecom.shtml](http://www.nyc.gov/html/doitt/html/business/business_telecom.shtml)]

five boroughs are eligible for DSL service. The city's cable franchisees report that all homes in the five boroughs are eligible for cable Internet service.

As of early 2005, the cost of basic residential DSL service in New York City was \$29.95-34.95 per month, comparable to other American cities.

***Small businesses have fewer options***

Unfortunately, small businesses and organizations generally pay higher prices than the City's residential customers for the same services.<sup>13</sup>

A major obstacle to providing competitive broadband services to small firms is the lack of cable television infrastructure in the vast majority of the city's commercial buildings. Because there has historically been very little demand for cable television service in office buildings, warehouses, and factory lofts, there is no pre-existing wiring over which cable companies can deploy Internet service. In recent years, larger pockets of demand have allowed cable companies to wire buildings such as the Empire State Building – a large collection of small and medium-sized tenants. Time Warner Cable has added more than ten thousand business customers in the last three years. However, the need for individual negotiations between cable companies and individual commercial landlords is slowing the pace of expansion.

***Trailing some world cities***

While statistics are not available for New York City, the New York metropolitan area has one of the highest rates of residential broadband usage in the nation. But the region lags behind some of its global competitors in residential broadband penetration –especially the megacities of Eastern Asia. While the New York metropolitan area outpaces both San Francisco and Los Angeles in residential broadband penetration, it trails far behind cities such as Tokyo, Hong Kong, and Seoul. However, the New York region remains well ahead of its European competitors, where the deployment of residential broadband services is occurring more slowly.

---

## **D. Municipal Telecommunications Strategies**

***Assessing the competition***

New York City is not alone in facing challenges to the development of reliable, robust and accessible telecommunications infrastructure. Throughout the

---

<sup>13</sup> For example, the same basic DSL service that Verizon markets to residential customers for \$31.95 month (excluding line charges) is priced starting at \$39.95 for business customers. As with telephone line charges, this higher rate reflects generally heavier use of business lines compared to residential lines.



United States and the world, cities are exploring the implications of telecommunications planning and deployment on long-term economic development. NYCEDC and DoITT surveyed eleven cities to better understand the various challenges and strategies faced by local governments in shaping the development of telecommunications infrastructure.<sup>14</sup>

Key lessons learned from the cities surveyed are as follows:

**Key lessons  
from other  
cities**

- *New York is keeping pace with other cities in addressing telecommunications issues.*
- *The experience of other cities is of limited relevance to New York City. While NYCEDC will continue to track developments in other cities, importing successful models from other cities will require major modifications to succeed here.*
- *The City should gather better information on demand for and access to telecommunications infrastructure. All cities are grappling with the challenge of formulating policy on the basis of very little information on the supply and demand for telecommunications infrastructure.*
- *The City should focus attention on buildings as the basic building block of telecommunications networks. Just as buildings are the basic building blocks of redevelopment, they are the basic unit by which network infrastructure is extended to firms across the city. They also offer City government a rare point of leverage in the telecommunications marketplace.*
- *Continued vigilance is needed in expanding the capacity and capability of wireless networks. Cities around the world have recognized the critical importance of a diverse, robust, universal and reliable array of wireless infrastructure to support public, commercial, and personal communications.*
- *The City should avoid making commitments regarding telecommunications infrastructure that are not feasible. Many of the cities surveyed have failed to implement telecommunications infrastructure projects effectively that, in retrospect, were overly ambitious. These failures will limit these cities' ability to act in this area in the future by eroding confidence in their understanding of the issue.*

---

<sup>14</sup> The cities surveyed were Atlanta, Austin, Boston, Chicago, Los Angeles, San Diego, San Francisco, and Seattle in the United States, and London, Seoul and Singapore internationally.



## V. A Vision for New York City's Telecommunications Future

### ***The Need for Vision***

Coordinating action across the many agencies that make decisions affecting New York City's telecommunications infrastructure requires a clear vision of goals and principles before considering specific recommendations in Parts VI through VIII of this plan. This vision identifies what the City wants to achieve in the telecommunications sector – what the future of telecommunications systems and services should consist of five to ten years from now.

In some other cities and states, telecommunications plans have produced ambitious statements about the future to which the plans' authors aspire – for example, providing a one-gigabit fiber optic connection to every home, business and institution by 2010.<sup>15</sup>

Given the complexity of New York City's economy and its existing telecommunications networks – the diversity of needs and interests in the City – and the speed at which both technology and industry structure are evolving -- it is unrealistic to suggest that there is one overarching solution to the City's telecommunications needs. It is impossible to predict the state-of-the-art even five years in the future, or the firms and business models that will supply those services. ***The City should therefore define its vision of the future in terms of an ongoing process of innovation and adaptation, rather than an end state to be achieved.*** The vision outlined below reflects this approach.

---

<sup>15</sup> Gartner, Inc., *One Gigabit or Bust Initiative: A Broadband Vision for California*, Corporation for Education Network Initiatives in California, 2003, p. 1.

## **The Vision**

This statement of New York City's vision for telecommunications infrastructure is not intended to provide a detailed blueprint for future development, but rather a broad framework within which specific proposals can be defined.

New York City should seek to be a place where:

1. *Multiple telecommunications providers using diverse technologies compete vigorously for the opportunity to meet business, non-profit and residents demands for:*
  - a. Enhanced network reliability;
  - b. Increased network capacity and functionality; and
  - c. Useful applications of new telecommunications capabilities.
2. *Competition drives providers to keep:*
  - a. Extending their infrastructure to reach new customers;
  - b. Upgrading the capabilities of their networks;
  - c. Developing new products and services that aim to take advantage of these capabilities;
  - d. Providing high levels of customer service; and
  - e. Offering globally and nationally competitive pricing to both corporate customers and consumers.
3. *The City looks to the private sector to meet the telecommunications needs of its businesses and residents, with the City agencies seeking to establish conditions that facilitate this process, by:*
  - a. Facilitating the use of public property for the development of network infrastructure;
  - b. Providing targeted incentives and exploring telecommunications tax reform to spur investment in infrastructure;
  - c. Working with telecommunications companies to expedite the introduction of new technologies and services in New York City;
  - d. Using major development projects as platforms for expansion of existing services and introduction of new technologies;

- e. Ensuring that City policies and procedures governing land use, franchising and procurement encourage and support innovation and entrepreneurship in telecommunications.

Perhaps the most important principle of the City's telecommunications vision is that the City does not have to put all its chips on any particular technology or business model. New York's telecommunications market is big enough and diverse enough to sustain many different technologies and many different approaches to the delivery of services.



## VI. Network Reliability

---

### A. Importance

**Overview** As noted in Part IV, New York City’s telecommunications networks are in many respects among the most reliable in the world. Ensuring the reliability of this network became and even more urgent priority after the Al Qaeda attacks of September 11, 2001 and the August 14, 2003 blackout.

---

### B. Strengths and Weaknesses

**Strengths** At the highest level, the telecommunications network that serves New York City and connects it to the rest of the nation and the world, is highly resilient. The intelligence that is designed into the network allows it to detect trouble spots quickly and re-route traffic around them. Despite extensive damage to telecommunications facilities on September 11, 2001, there were few disruptions in service outside of Lower Manhattan. At this network level, New York’s telecommunications systems performed well on September 11<sup>th</sup> and thereafter.<sup>16</sup>

Moreover, the concentration of highly sophisticated business customers in New York City – especially in Midtown and Lower Manhattan – has resulted in the development of infrastructure and services designed to meet these businesses’ demands for high levels of reliability:

---

<sup>16</sup> Computer Science and Telecommunications Board, National Academy of Science. 2003. *The Internet Under Crisis Conditions*. (National Academies Press); Noll M, ed. 2003 *Crisis Communications: Lessons from September 11*. (Roward and Littlefield)

- Redundant fiber optic connections provided by Verizon and competing local exchange carriers.
- Specialized services that carriers provide to corporate and institutional customers who require especially high levels of reliability.
- Fixed wireless systems provided by companies such as TowerStream and FiberTower that can move large volumes of data into and out of New York City without touching the local landline infrastructure. Laser-based network technologies from companies such as Terabeam are widely used as backups in the financial services industry.

New York's Mutual Aid and Restoration Consortium (MARC) also contributes to the reliability of the City's telecommunications networks. Established by DoITT in 1992, MARC established standards and procedures for cooperation among carriers in the New York metropolitan area during emergencies that disrupt telecommunications services. By ensuring that carriers can more quickly identify problems, and efficiently share network facilities and other resources, MARC facilitates quicker restoration of service. MARC also conducts training exercises for its members, based on simulation of various types of emergencies. MARC worked effectively on September 11, 2001 and during the blackout of 2003.

## **Weaknesses**

The September 11 attacks, the 2003 blackout and several other major disruptions have shown that key portions of New York City's local telecommunications infrastructure remain vulnerable. Numerous "single points of failure" remain, at which any major disruption could disrupt service to hundreds, thousands or even tens of thousands of users.<sup>17</sup> For example:

- Many older office buildings in New York City have only one physical entrance through which telecommunications cables (including phone, Internet and dedicated data networks) are brought into the building. Even minor damage at this point can sever the entire building's communications.
- The ability of tenants to get redundancy by contracting with multiple carriers is severely limited by the fact that in most instances, competitive local exchange carriers (CLECs) share the conduits with Verizon and other CLECs.

---

<sup>17</sup> State of New York, Public Service Commission. *Order Concerning Network Reliability Enhancements*. July 28, 2004. Case 03-C-0922.



- The density of customers in New York City means that a single Verizon central office may serve the equivalent number of phone lines as entire nations. Verizon's central office at 140 West Street, heavily damaged in the September 11 attacks, served nearly 3 million voice and data lines in Lower Manhattan. While Verizon rapidly re-provisioned these customers from other nearby central offices, telecommunications traffic is still highly centralized in a few central offices and colocation facilities.
- During the blackout, three Verizon Central Offices in New York City were thrown off-line because they had lost power supplied by Con Edison, and did not have enough back-up generating capacity to stay in operation for more than a few hours. This failure left tens of thousands of Midtown customers without service. Since the blackout, Verizon has taken significant steps to avoid this problem by upgrading the generators at these facilities and arranging for stand-by generators to be deployed in case of need.
- The relative immaturity of wireless technologies and network deployments means that they tend to be more fragile than their wired counterparts. Most importantly, they are particularly vulnerable when they are needed most – during an emergency. The September 11th attacks highlighted some of the ways wireless network infrastructure can be disrupted.
- Disruptions of wireless services in the New York area were attributed to four primary causes:
  - Congestion caused by extremely high call volumes on public cellular systems;<sup>18</sup>
  - Exhaustion of backup electrical power at cellular antenna sites;
  - Physical destruction of antenna facilities; and
  - Disruption of wired backhaul to antenna sites.

---

<sup>18</sup> The Department of Homeland Security is addressing the task of providing government officials with priority access to the cellular system during emergencies through the National Communications System's Wireless Priority System program. Full implementation of WPS among all cellular carriers is expected by 2006.

---

## C. Challenges and Opportunities

### **Challenges**

As it seeks to improve the reliability of its telecommunications networks, New York City faces certain challenges:

- The multiplicity and diversity of providers involved in the network is a source of great advantage to the City. But it can also make it more difficult to fashion a coordinated response to the problem of network reliability.
- Emerging trends in telecommunications technologies and industry structure could make the challenge of enhancing reliability even greater than it is today. Voice over Internet Protocol (VoIP), for example, offers users a low-cost, flexible alternative to conventional phone service. But while VoIP operates over the Internet – a network with proven resilience in disasters, it is highly vulnerable to disruptions in electrical power supply.
- New York City’s formal role in regulating telecommunications providers is limited. The most critical regulatory decisions affecting network reliability occur at the federal and state levels.

### **Opportunities**

There are, nevertheless, several ways in which the City can work to foster a higher overall level of network reliability.

- The City can encourage property owners to enhance reliability at the building level. As noted above, some of the most common vulnerabilities in local telecommunications infrastructure are found within individual buildings.
- City government’s control of the streets provides another point of leverage through which it can affect the pace of improvements in local telecommunications infrastructure.
- To the extent that new facilities are needed to enhance network reliability, the City can use its real estate development resources and its experience in forging public-private partnerships to develop such facilities.
- The City has an important voice in national debates on network reliability through its leadership on this issue. Although its formal regulatory role is limited, New York is the only city invited by the FCC to participate in its Network Reliability and Interoperability Council (NRIC) and DoITT is also working closely with the New York State Public Service Commission on telecommunication reliability efforts underway on the state level.
- In the aftermath of the attack on the World Trade Center, the U.S. Congress appropriated \$750 million in federal funds for restoration and upgrading of Lower Manhattan’s telecommunications and energy infrastructure. The possible availability of this funding provides an unusual opportunity to

accelerate the process of improving network reliability in Lower Manhattan.

---

## D. Action Plan

New York City can use the authority and the resources highlighted above to drive the City's telecommunications networks to higher levels of reliability.

### **Goal**

*To maintain New York City's position as a preferred location for businesses that demand high levels of reliability in their telecommunications systems and services.*

Consistent with the vision described in Part V, network reliability should be defined as a process of continuous improvement. This will involve both:

- Incremental improvements in reliability within the framework of existing technologies; and
- Looking for opportunities to use emerging technologies as a basis for major improvements.

### **Objectives**

Specific objectives for the next two to five years include:

1. To increase the number of commercial buildings and other critical facilities in Midtown, Lower Manhattan and secondary business districts that have redundant connections to the local loop and to carriers' central offices.
2. To increase the number of businesses using wireless back-up systems.
3. To enhance the geographic diversity of colocation facilities serving central business districts.

### **Strategies**

Strategies for achieving these objectives include:

1. Encourage investment in reliability at the building level.
2. Encourage the diversification of colocation facilities in New York City.
3. Use funds available under the federal Utility Restoration and Infrastructure Rebuilding Program to improve network reliability in Lower Manhattan.

4. Advocate actions at both state and federal levels aimed at improving network reliability.

## **Initiatives**

To implement these strategies, New York City will undertake the following initiatives aimed at improving network reliability.

- 1.1 Work with the telecommunications and real estate industries and representatives of major user groups to establish standards for network reliability at the building level, and explore the creation of a voluntary certification program for commercial and industrial buildings that meet these standards.*
- 1.2 Consider the creation of new real property tax incentives for enhancing reliability at the building level.*
- 2.1 Work in partnership with carriers and real estate developers to explore the feasibility of developing additional, geographically diversified colocation facilities within the City.*
- 3.1 Use available funds from the federal Utility Restoration and Infrastructure Rebuilding program to finance the installation of carrier neutral lateral conduit in Lower Manhattan.*
- 3.2 Use available funds from the federal Utility Restoration and Infrastructure Rebuilding program to finance the installation of redundant fiber connections to critically important public and private facilities in Lower Manhattan.*
- 3.3 Collaborate with the Alliance for Downtown New York and the Lower Manhattan Development Corporation on the creation of a wireless back-up network for Lower Manhattan office buildings.*
- 4.1 Advocate for improved state, federal and industry reliability efforts by continuing to work with the New York State Public Service Commission on state telecommunications reliability initiatives and with the Federal Communications Commission's Network Reliability and Interoperability Council.*

These initiatives are described in the following pages.

---

## 1.1 Encouraging Resiliency at the Building Level Through Voluntary Certification

NYCEDC and DoITT will convene discussions among telecommunications and real estate industry representatives, and representatives of other City and State agencies, with the goal of establishing “best practice” standards for enhancing resiliency of telecommunications infrastructure within individual buildings. These standards could, for example, include:

- Having at least two physically separate telecommunications cable entrances;
- Carrier-neutral dual risers within buildings; and
- Availability of rooftop wireless back-up systems.

Working with the same organizations and agencies, NYCEDC would also seek to establish a system for voluntary third-party certification of commercial and industrial buildings that meet these standards. In 2002, the Lower Manhattan Telecom Users Working Group estimated that the cost of creating dual entrances and risers in Lower Manhattan office buildings that now lack them would cost an average of \$250,000 per building.

### ***Justification***

The lack of dual entrances to many Lower Manhattan office buildings was identified in the report of the Lower Manhattan Telecommunications Users Working Group as one of the most common “single points of failure” in New York City’s local telecommunications infrastructure. With only one entrance point, even limited physical damage to a building can sever tenants’ essential communications. Establishing “best practice” standards and an independent system of certification would allow property owners to market their buildings as being “network reliable” to tenants for whom reliability is critically important. It would thus encourage owners to make the investments needed to ensure resiliency at the building level.

### ***Responsible Agencies***

- NYCEDC will have primary responsibility for this initiative, with support from DoITT and the Department of Buildings.
- Other interested parties will include telecommunications carriers, real estate industry organizations, representatives of major user groups and the New York State Public Service Department.

- Implementing a certification program may require creation of an independent, third-party certification body.

---

## 1.2 Providing Incentives for Improving Resiliency at the Building Level

NYCEDC and DoITT, in collaboration with the Department of Finance, will explore the possibility of drafting legislation that will provide incentives for owners of existing commercial office buildings to invest in the creation of dual entrances and dual risers. An incentive could, for example, take the form of a one-time credit against real property taxes equal to 20 percent of the cost of creating dual cable entrances, and installing dual risers and rooftop wireless back-up systems.

### ***Justification***

Especially in multi-tenant buildings – and especially in a relatively weak office market – property owners may be unwilling to incur the costs associated with making building-level telecommunications infrastructure more resilient, if they do not believe they will be able to recoup those costs. Real property tax incentives will encourage building owners of older buildings to upgrade voluntarily; and will also offset the costs incurred by those who are required to do so.

### ***Responsible Agencies***

- NYCEDC, the Department of Finance, the Office of Management and Budget and DoITT will be responsible exploring the feasibility of and preparing the proposed legislation.
- The Department of Finance would be responsible for administration of the program.

---

## 2.1 Development of Geographically Diverse Colocation Facilities

NYCEDC and DoITT will work with the City’s telecommunications carriers and with the real estate industry to explore the feasibility of developing one or more colocation facilities at a location (or locations) outside Midtown and

Lower Manhattan. Issues to be considered include the potential contribution of greater geographic diversity to overall network resiliency, carriers' interest in participating, identification of suitable sites, and the potential role of public-sector development financing tools.

**Justification**

Very large volumes of telecommunications traffic are today routed through a small number of colocation facilities; and these facilities are concentrated within a relatively small area in Manhattan. While this has some advantages in terms of operating efficiency, centralization may increase the network's vulnerability to disruption.

Since the "telecom bust" of 2001, real estate developers have shown little interest in the development and management of new colocation facilities. Public-sector leadership may be needed to secure the involvement of both carriers and developers.

These colocation facilities can also be "hubs" for wireless and well as wired links to underserved customer buildings within their vicinities.

**Responsible Agencies**

NYCEDC, in collaboration with DoITT, will take the lead in organizing industry discussions and will conduct the feasibility study.

---

### **3.1 Installation of Lateral Conduit in Lower Manhattan**

NYCEDC, DoITT and the Empire State Development Corporation (ESDC) would jointly issue a request for proposals for the installation of carrier-neutral lateral conduit in those street segments below Canal Street that are not now connected to (or are not well-served by) existing fiber optic infrastructure. In addition to offering prospective providers an opportunity to obtain a City franchise for the installation of carrier neutral conduit, the RFP would offer financing on terms designed to provide an incentive for investment in such conduit.

The Partial Action Plan governing the administration of the \$750 million federal Utility Restoration and Rebuilding Program allows for up to \$50 million of available funds for carrier-neutral lateral conduits.

Details of this initiative, including prioritization of Lower Manhattan Street segments and the nature of the incentives to be provided, will be resolved only after a study of the program's costs and potential economic benefits. ESDC has

selected a consultant to conduct this study, which is scheduled to be completed at the end of March, 2005.

**Justification**

Installation of carrier neutral conduit would facilitate future connection of buildings to the area's network of fiber optic trunk lines. In addition to easing the extension of fiber to buildings that do not now have it, installation of carrier neutral conduits would also make it easier for users requiring high levels of reliability to obtain redundant fiber connections.

Part of the rationale for this initiative is that it can be undertaken at relatively low cost during the reconstruction and repaving of Lower Manhattan's streets. Installing conduit after streets are rebuilt will be much more costly and more disruptive.

**Responsible Agencies**

- NYCEDC, ESDC and DoITT, in collaboration with the New York City Department of Transportation and the Department of Design and Construction, would be responsible for management of the RFP and franchising processes.
- Financing for providers of conduit would be provided through available Utility Restoration and Infrastructure Rebuilding Program funds as administered by ESDC.

---

### **3.2 Installation of Redundant Fiber Optic Connections to Critical Facilities in Lower Manhattan**

DoITT and the ESDC would jointly issue a request for proposals for the installation of redundant fiber optic connections between critical facilities (such as hospitals) in Lower Manhattan and Verizon central offices.

Details of this initiative, including identification of critical facilities to be included, will be resolved only after a study of the program's costs and potential economic benefits. ESDC has selected a consultant to conduct this study, which is scheduled to be completed at the end of March, 2005. The Partial Action Plan governing the administration of the \$750 million federal Utility Restoration and Rebuilding Program allows for up to \$20 million of available funds for redundant fiber optic connections to critical facilities in Lower Manhattan.



**Justification** Installation of geographically diverse redundant fiber optic connections to central office facilities will reduce the vulnerability of critical public, quasi-public and private facilities in Lower Manhattan.

**Responsible Agencies**

- DoITT and ESDC, in collaboration with NYCEDC, NYCDOT and DDC, would be responsible for management of the RFP process.
- Financing for installation of fiber would be provided through available Utility Restoration and Infrastructure Rebuilding Program funds as administered by ESDC.

---

### 3.3 Lower Manhattan Wireless Backup Network

DoITT and NYCEDC would collaborate with the Alliance for Downtown New York, the Lower Manhattan Development Corporation (LMDC) and ESDC on the planning and implementation of a rooftop wireless data network covering office buildings in Lower Manhattan. The network would be designed to ensure that tenants in these buildings could to move data into and out of the City, even if landline communications were severely disrupted.

ESDC has funded a consultant study that is exploring in greater depth the feasibility of the project, and possible approaches to its implementation. The study is to be completed in early 2005. The Downtown Alliance has estimated the cost of developing the network at \$10 million, and has requested that LMDC provide funding in this amount from Community Development Block Grant funds.

**Justification** In 2003, the Lower Manhattan Telecommunications Users Working Group – a group of senior telecommunications managers at leading companies, convened late in 2001 by the Alliance for Downtown New York – proposed creation of a wireless back-up network that during emergencies would provide participating companies with an alternative to landline communications. Such a network could offer a quick and cost-effective way to provide another layer of network resiliency in Lower Manhattan – especially for smaller companies that may not be able to afford creation of their own wireless back-up systems.

- Responsible Agencies**
- The Alliance would be responsible for outreach to building owners and tenants.
  - A private provider (or providers) would build and operate the network.
  - LMDC would provide funding.

---

## 4.1 Advocating Federal, State and Industry Actions to Enhance Network Reliability

In its role as the City’s principal representative in dealings with federal and state regulatory agencies, DoITT will continue to advocate regulatory actions and policies that will enhance the reliability of New York’s telecommunications networks.

**Justification** Many issues affecting the resiliency of New York City’s telecommunications networks – back-up power requirements for carriers’ central offices, for example, or standards for connecting wireless phone services to the local wireline telephone network – fall within the jurisdiction of the Federal Communications Commission or the New York State Public Service Commission. Given that reliable communications are vital to the current functioning and continued growth of its economy, the City must continue to take an active role in working with federal and state regulators to address these issues.

Some issues are most effectively addressed not through formal regulatory action, but through consultation and collaboration among industry participants. DoITT’s work with the state on telecommunications reliability initiatives and its participation in the federal Network Reliability and Interoperability Council provide an important opportunity for the City to promote and collaborate in industry efforts to improve reliability.

**Responsible Agencies** DoITT and NYCEDC will have primary responsibility for this initiative, with support from the Law Department.

# VII. Infrastructure for the Age of Broadband

---

## A. Importance

During the past few years, a broad range of voices has focused on the potential of broadband telecommunications to spur economic growth. In 2001, the Brookings Institution estimated that universal deployment of broadband technologies could generate approximately \$400 billion annually in economic benefits and create 1.2 million new jobs nationwide.<sup>19</sup>

Broadband infrastructure is as important to the City's economy in the information age as its factories, railways and warehouses were in the industrial age. This section of the plan analyzes New York City's strengths and weaknesses in broadband infrastructure, and the challenges and opportunities they present for action.

---

## B. Strengths and Weaknesses

### **Strengths**

As described in Section IV, New York City compares very favorably with its domestic and international competitors in deployment of telecommunications infrastructure for commercial, residential and mobile users:

---

<sup>19</sup> Robert Crandall and Charles Jackson, "The \$500 Billion Opportunity: The Potential Economic Benefits of Widespread Diffusion of Broadband Internet Access," *Criterion Economics*, July 2001.

- Over 3,000 buildings in New York City are “fiber-lit;” that is, broadband service is provided by fiber optic cable that comes directly into these buildings. New York has more fiber-lit buildings than other U.S. cities.<sup>20</sup> Because commercial office buildings in Midtown and Lower Manhattan (where most fiber-lit buildings are concentrated) are typically larger than those in other cities, it is likely that New York City has considerably more leasable space that is fiber-lit than other cities.
- Access to residential broadband services is nearly ubiquitous in all five boroughs. Verizon reports that 85-90 percent of its phone lines in the City have access to DSL. Time Warner Cable and Cablevision report that 100 percent of the City’s households are eligible for digital cable Internet service.
- Subscription to residential broadband services is high compared to other cities. While data for New York City is not available, the New York metropolitan area ranked third among major metropolitan areas in the U.S., with an estimated 38 percent of *all households* in the metropolitan area subscribing to broadband Internet service.<sup>21</sup>
- Verizon Wireless has begun to provide third generation (3G) broadband mobile data services in New York City and several of New York City’s other cellular wireless carriers are in the process of launching similar networks. New York is ahead of many other U.S. cities in the deployment of this service.
- New York is a hotbed of innovation in local wireless network infrastructure. Innovative new services and network models are being deployed through DoITT’s poletop franchise program. Many of the City’s parks and public plazas have public Wi-Fi access, which has become a model for other cities.

## **Weaknesses**

However, some areas of weakness remain, and need to be addressed:

- Outside Midtown and Lower Manhattan, access to fiber optic infrastructure is limited, and there are far fewer fiber-lit buildings. Downtown Brooklyn has several dozen fiber-lit buildings, but lags far behind commercial areas in Manhattan. Lit buildings in Downtown

---

<sup>20</sup> Universal Access, Inc., Geo-Tel Communications, LLC.

<sup>21</sup> ComScore Networks, Inc. Based on a national average of 78 percent Internet penetration among households, and 49 percent broadband penetration within that group in the New York metropolitan area.

Brooklyn are also much less likely to be served by competing carriers than those in Manhattan.

- Outside Manhattan, and especially outside the larger business districts in the four other boroughs, the availability of DSL service can vary greatly. Verizon says it is committed to eventually making DSL available to all of its New York City customers – but has not set a timetable for doing so.
- While cable modem service is widely available to residential customers, many small to mid-sized businesses are located in commercial and industrial areas that are not served by the cable companies’ existing infrastructure.
- Residential broadband subscribership and service levels in New York City are very competitive when compared to other U.S. cities. However, New York lags behind some global competitors in both penetration and network capability. For example, in Seoul, Tokyo, and Hong Kong, well over 50 percent of households subscribe to broadband services and typical offerings are at speeds 10-20 times faster than in the United States.
- Service quality and availability issues continue to be a source of consumer frustration with cellular phone providers, but these carriers have made significant efforts to improve service.
- The New York City subway system remains one of the few global city transportation networks that lacks underground cellular phone service entirely. This shortcoming has implications for public safety as well as the City’s attractiveness as a place to do business. As business uses of wireless broadband data service proliferate in the years ahead, the issue of access in the subway system is likely to become more pressing.

---

## C. Challenges and Opportunities

### **Challenges**

As it seeks to improve access to broadband infrastructure, New York City faces certain challenges:

- Excess capacity in fiber networks built in the 1990s is still being absorbed by the market. With the notable exception of Verizon’s planned “fiber to the premises” service, it is unlikely that significant speculative deployment of network infrastructure will occur in the next five to ten years.

- There are still areas of the City that are not eligible for DSL service because of distance from Verizon’s central offices. Particularly in the outer boroughs, where lower density of construction creates larger distances between homes and central offices, there are significant pockets of unserved homes and businesses.
- Small businesses are often caught in between products aimed at residential customers and those aimed at corporate users. Service prioritization based on customer revenue means small businesses often must wait longer and do not receive the highest level of service.
- Deployment of wireless networks in New York City is considerably more expensive and time-consuming than many other American cities due to the complexity of the building environment and high geographic concentration of subscribers. Growing backlash against the perceived health effects of wireless transmitters threatens carriers’ ability to expand capacity and coverage, especially in residential neighborhoods.
- While competitive in the domestic area, the capability of residential broadband in the City is falling behind international standards, particularly in comparison to certain Asian cities.

### **Opportunities**

There are, nevertheless, several ways in which City government can work to foster a higher overall level of access to broadband infrastructure.

- Competitive fiber providers will continue to extend their networks, where they see opportunities to do so profitably. Along routes where “anchor tenants” can help offset the cost of expansion, there are opportunities for bringing service to buildings that otherwise could not justify the capital outlay.
- Specialized networks such as NYSERNet’s New York City Dark Fiber Network also have the potential to expand access to fiber in areas outside Midtown and Lower Manhattan.
- With the saturation of the corporate and residential sectors, small businesses are seeing more companies try to meet their needs. After years of focusing almost exclusively on the residential market, Time Warner has added 10,000 commercial customers since 2001 – most of them small businesses that buy the company’s \$99 per month commercial broadband Internet service. Time Warner estimates that its existing infrastructure is within reach of at least 100,000 potential business customers. It sees the potential for growth of its commercial business as being especially strong in the outer boroughs.

- The rollout of Verizon’s fiber-to-the-premises service in New York City in 2005 will begin bringing the city’s residential broadband connections up to par with the best international competitors. The addition of video and television services to Verizon’s product mix should also bring it more directly into competition with the cable companies.
- New broadband distribution technologies could quickly transform the competitive landscape for broadband. While new technologies such as WiMax and Broadband over Power Line (BPL) have serious limitations, they are rapidly deployable, and could have a powerful role in introducing competition into the broadband market for both residential customers and small and medium-sized enterprises.

---

## D. Action Plan

New York City can take action to drive the City’s telecommunications networks to higher levels of reliability.

### **Goal**

*To ensure New York City’s position as a preferred location for businesses and creative professionals that demand high levels of access to mobile and fixed broadband telecommunications services.*

Consistent with the vision described in Part V, ensuring access to broadband infrastructure should be defined as a process of continuous improvement. This will involve both:

- incremental extension and upgrading of existing network infrastructure; and
- seeking opportunities to use emerging technologies as a basis for major improvements.

### **Objectives**

Specific objectives for the next two to five years include:

1. To expand access to competitive fiber optic network infrastructure in NYCEDC’s high-priority development areas and other areas where businesses complain about lack of access.
2. To strengthen competition the residential broadband sector through extension of DSL coverage in all five boroughs, through additional facilities-based competition, and through introduction of new technologies.

3. To improve cell phone coverage and service quality.

## **Strategies**

Strategies for achieving these objectives include:

1. Working with existing institutions, and with private developers, to aggregate demand for network extension.
2. Providing access to public property for the deployment of network infrastructure.
3. Closely tracking both supply and demand for all forms of broadband infrastructure (both existing and anticipated), especially in high-priority development areas.

## **Initiatives**

There are several steps that New York City could take to encourage and facilitate deployment of the infrastructure required to expand access to broadband. The City should:

- 1.1 Utilize redevelopment projects as platforms for expansion and experimentation with broadband infrastructure. NYCEDC might, for example, encourage prospective developers to provide fiber or other high-speed connections within their buildings, and to provide wireless broadband access in public spaces.*
- 1.2 Work with current providers of broadband infrastructure and services to identify opportunities for extending their services into commercial and industrial areas that do not now have access – or only have very limited access – to broadband.*
- 1.3 Explore the feasibility of expanding portions of the NYSERNET New York City Dark Fiber Network to service key properties in high-priority development areas.*
- 1.4 Provide guidance and information to business improvement districts and other neighborhood organizations interested in establishing local wireless broadband networks, especially in areas currently under-served by DSL or cable modem service.*
- 1.5 Educate small business owners about potential uses of broadband.*
- 2.1 Continue to explore ways to expand the use of City property for the deployment of wireless network infrastructure.*



- 2.2 Enlist the cooperation of other major public-sector property owners in the City, such as the MTA, the Port Authority and the New York State Department of Transportation, in developing a common strategy for using public property to expedite the introduction of new wireless technologies.*
- 2.3 Continue to work with providers to install lateral conduit for fiber as opportunities arise.*
- 3.1 Develop and maintain (or assist other organizations in developing and maintaining) a data base on deployment of fiber and other broadband infrastructure, and on utilization of and demand for broadband among businesses in New York City.*

These initiatives are described in the following pages.

---

## 1.1 Using Major Development Projects as Platforms for Broadband Deployment

As part of its responsibility for management of major public-private development projects, NYCEDC will identify ways in which such projects can be used to promote deployment of broadband infrastructure and services, especially in the priority development areas targeted by NYCEDC. Creative and effective integration of broadband in proposed developments may become a factor in NYCEDC's selection of developers.

### **Justification**

Major public-private projects that are now being planned, or are in the early stages of development, offer NYCEDC an opportunity to encourage developers to treat telecommunications infrastructure and services as an important element of the product they are creating. High-quality fiber optic connections, creative use of wireless technologies or emerging technologies such as broadband over power line can be an important factor in "branding" a development, and in attracting a wide range of business and institutional users, as well as residents.

Moreover, major development projects sometimes provide the type of "anchor" user that can induce a carrier to extend fiber optic or other broadband connections to a location where such connections are not now available. Extension of broadband infrastructure to major development sites can in some cases make it easier for other potential users in the surrounding area to connect with that infrastructure.

### **Responsible Agencies**

- NYCEDC will have primary responsibility for this initiative.
- Other agencies and organizations likely to be involved could include ESDC, the Lower Manhattan Development Corporation, local development organizations in other priority areas and private developers.

---

## 1.2 Work with Providers to Expand Access

NYCEDC and DoITT will work with local development organizations in all five boroughs to identify commercial and industrial areas that are not now well served by existing broadband technologies (primarily DSL cable modem services), and will work with providers of those services to identify opportunities for extending their services cost-effectively.

### **Justification**

Research conducted during the development of this plan, as well as studies and hearings by the City Council, have identified a number of commercial and

industrial areas that now have no access – or only very limited access – to broadband. Examples may include the Hunts Point area in the Bronx and Sunset Park in Brooklyn. NYCEDC and DoITT’s recent experience in addressing the lack of broadband access in some parts of the Brooklyn Navy Yard suggests that at least in some of these cases, providers may be willing to take the actions required to extend their services, where it can be shown that a business opportunity exists. In such cases, NYCEDC and DoITT can play a useful role in bringing the parties together to identify potential solutions – and where barriers to extension of service exist, helping to overcome them.

**Responsible Agencies**

- NYCEDC will continue to work with local organizations to identify areas where there are gaps in access to broadband.
- In these cases, NYCEDC and DoITT will jointly take the lead in exploring solutions with providers of DSL and cable service.

---

### **1.3 Working with NYSERNet to Extend Access to Broadband**

NYCEDC and DoITT will work with NYSERNet and its member institutions to identify and exploit opportunities for using NYSERNet’s New York City Dark Fiber Network (NYCDFN) to expand access to fiber, especially in underserved areas. NYCDFN could be used in several ways.

- Providing very high-bandwidth fiber optic connections to additional universities, hospitals and cultural institutions; and
- Developing partnerships between NYCDFN member institutions and community organizations aimed at expanding broadband access in adjacent communities. Columbia University, for example, might provide a base for expanding access to broadband in West and Central Harlem and in Washington Heights.

Because NYCDFN’s business model relies on revenues from major institutional users to finance ongoing build-out of its network, no direct public funding should be required.

**Justification**

NYSERNet is a consortium of major research universities and other non-profit institutions in New York State that provides very high-speed Internet access to its members. In response to members’ growing demands for bandwidth, NYSERNet in 2003 launched its New York City Dark Fiber Network, which provides very high-capacity fiber connections to member institutions in Manhattan and the Bronx. NYCDFN offers a promising example of how major

anchor users can drive the extension of high-capacity fiber infrastructure into underserved areas, on an economically sustainable basis, through the use of emerging wireless technologies. Focusing on NYCDFN also makes sense because several of its member institutions, such as Columbia and CUNY, have the capacity to manage extension of network connections to community partners – and may have an interest in doing so.

**Responsible Agencies**

- NYCEDC and DoITT would take the lead in discussions with NYSERNet and member institutions.

---

## **1.4 Working with BIDs and LDCs to Expand Wireless Access**

The Department of Small Business Services (DSBS) and NYCEDC, in collaboration with DoITT, will provide guidance and information to business improvement districts, local development corporations and other neighborhood organizations interested in establishing Wi-Fi or other wireless broadband networks, especially in areas currently under-served by DSL or cable modem services.

**Justification**

The experience of the Alliance for Downtown New York and the Bryant Park Restoration Corporation shows that Business Improvement Districts (BIDs) and similar organizations can be effective partners in efforts to expand access to broadband at the neighborhood level. As Wi-Fi and related technologies continue to evolve – and with the advent of more powerful technologies such as WiMax – these organizations have the potential to improve access for a wide variety of users, especially in areas that are not now well served by DSL or cable modem service. BIDs, Local Development Corporations (LDCs) and other local organizations can also play an important role in helping educate local businesses and non-profit organizations about the potential uses of these services, and in demonstrating to broadband providers the existence of demand for their services.

The City's role in this initiative would be limited to helping local organizations explore the potential of wireless technologies for improving the availability of broadband in their neighborhoods, assisting them in developing project plans, and identifying potential service providers. DSBS and NYCEDC would select neighborhoods and organizations for initial participation in the program based

on need, innovative approaches to use of the technology, and the capabilities of the sponsoring organization.

**Responsible Agencies**

- DSBS and NYCEDC will have primary responsibility for this initiative, with assistance from DoITT.
- BIDs and other neighborhood organizations will be responsible for network deployment and management.

---

## **1.5 Educate Small Businesses in the Potential Uses of Broadband**

DSBS will develop a program aimed at educating small businesses throughout the City on the benefits of broadband, the options that are available to small businesses in New York – applications of particular interest to small businesses – and how small companies can use these tools to improve productivity and profitability, and to get new business. DSBS will provide these services both directly and through its partner organizations, such as local chambers of commerce, small business development centers, and “one-stop” workforce development centers.

DSBS will also work with more specialized business assistance organizations such as the Industrial Technology Assistance Corporation (ITAC), the Garment Industry Development Corporation, and the Regional Alliance for Small Contractors to promote knowledge of broadband applications and opportunities among small companies in particular sectors of the City’s economy.

Finally, when working with developers or owners of small and mid-sized commercial and industrial properties – as well as smaller non-profit organizations – that may be seeking City assistance in the form of tax-exempt financing, ICIP real property tax benefits, or other incentives, NYCEDC will highlight the importance of providing adequate broadband infrastructure within buildings, and will suggest how City incentives can be used to help offset the cost of such improvements.

**Justification**

Lack of knowledge about broadband and its potential applications can be just as serious a barrier to increased access to and use of the technology as is the lack of a physical connection. If they do not know how they can profit from use of broadband, small business owners will not demand access; and if they do not

see strong demand for their services, providers will not make the investments that are needed to extend those services.

With an extensive infrastructure for provision of small business training and technical assistance already in place, DSBS can, at minimal cost, expand the range of that assistance to include “Broadband 101” for small businesses. Small business owners and their employees will benefit, as will providers who see increased demand for broadband telecommunications. Finally, growing the base of broadband users within the City’s very large and very diverse small business community will help spur the development of new commercial applications and new types of broadband content – areas in which there is significant potential for growth in New York City.

**Responsible Agencies**

- DSBS will have primary responsibility for this initiative, with support from NYCEDC.

---

## 2.1 Using City Property to Expand Wireless Infrastructure

Building on the recent franchising of City light poles for installation of wireless infrastructure, NYCEDC and DoITT will continue to expand the use of City property to support the ongoing development of the City’s wireless infrastructure.

**Justification**

Continued improvement in mobile phone service, deployment of new services such as 3G and the introduction of new technologies such as WiMax in New York City will require continued investment by wireless service providers in wireless infrastructure throughout the five boroughs. DoITT’s franchising of light poles shows how City government can facilitate this process by making City property available for installation of antennas and other equipment.

NYCEDC and DoITT will take the lead in exploring how other City assets – public buildings, other structures, parks, etc. – can most effectively be used to facilitate deployment of wireless infrastructure including developing and maintaining a database on City owned property (“sites”) that are available for wireless infrastructure.

**Responsible Agencies**

- NYCEDC and DoITT will have primary responsibility for this initiative.
- Other participating agencies are likely to include the Departments of Citywide Administrative Services, City Planning, Law, Transportation, and Parks, as well as the New York City Housing Authority.

---

## 2.2 Using Other Public Property to Expand Wireless Infrastructure

NYCEDC and DoITT will work with other public agencies, including the Port Authority of New York and New Jersey and the MTA, to explore ways to use agency property more effectively to expedite the development of facilities needed to improve wireless coverage in New York City, and to support the introduction of new wireless technologies.

### ***Justification***

Deployment of additional wireless antennas is essential to continued improvement of wireless phone service in New York City. Other new technologies such as WiMax will also require new infrastructure. Public agencies that own and manage property in the City can play an important role in providing sites for such equipment. Collaboration with other public agencies is also critical to the development of a coherent overall strategy for maximizing the availability of wireless services (both voice and data) in public facilities such as subway stations, airport terminals and other locations.

NYCEDC and DoITT will initiate talks with other agencies regarding the sharing of information and the development of a coordinated approach to upgrading wireless infrastructure. Working together, the agencies may also be able to identify opportunities for generating additional revenue through the leasing of sites for antennas.

### ***Responsible Agencies***

NYCEDC and DoITT will have primary responsibility for management of this initiative.

---

## 2.3 Continued Use of Streets to Expand New York City's Fiber Optic Infrastructure

Using the framework created through its award of franchises for installation of carrier neutral lateral conduit, DoITT, NYCDOT, and DDC in collaboration with NYCEDC will continue to work with providers to install lateral conduit for fiber, as opportunities arise.

|                             |  |
|-----------------------------|--|
| <b>Justification</b>        | The economics of installing and managing carrier neutral lateral conduit improve greatly if conduit can be installed when streets are already being opened for another purpose, such as street reconstruction or installation of electric, water or sewer lines. Both NYCDOT and the DDC’s streetwork coordination plans along with DoITT’s franchising process give providers the opportunity of installing conduit wherever major street work is being done and providers should be encouraged to do so. |
| <b>Responsible Agencies</b> | DoITT, NYCDOT and DDC, in collaboration with NYCEDC and the Department of Environmental Protection, will have primary responsibility for this initiative.  |

---

### 3.1 Improving Data on Fiber Deployment

NYCEDC and DSBS will develop and maintain (or assist other organizations in developing and maintaining) a database on deployment of fiber and other broadband infrastructure, including information on the availability of fiber in specific buildings, if possible. Working in collaboration with the DSBS as well as local business organizations, the managers of this database will also collect information on demand for broadband in small and medium-size firms and non-profit organizations.

|                      |   |
|----------------------|---|
| <b>Justification</b> | <p>The lack of any centralized, comprehensive and up-to-date source of information on current deployment of fiber and the location of fiber-lit buildings makes planning for extension of the City’s fiber optic infrastructure, and for improving access to broadband, more difficult. While many cities confront the same problem, the scale and complexity of the City’s telecommunications sector make it particularly critical for New York City.</p> <p>Better data on the availability of fiber connections would also assist NYCEDC and other organizations in planning specific development projects, and in marketing the City as a location for telecommunications-dependent businesses.</p> <p>By periodically (perhaps bi-annually) surveying small and mid-sized businesses and non-profit organizations, the City will be able to track trends in use of broadband, identify underserved pockets in the City, refine its strategies for improving access, and help make telecom companies more aware of potential market opportunities. The surveying process will also be an opportunity to</p> |
|----------------------|---|



raise awareness among small, medium and not-for-profit businesses about the benefits of broadband.

***Responsible  
Agencies***

- NYCEDC and DSBS would have primary responsibility for this initiative, with support from DoITT, BIDs and LDCs. DSBS would collect information on the use of broadband by small and mid-sized businesses and non-profit organizations.
- An independent, third-party organization may be used to collect and maintain data from carriers and users.



## VIII. Encouraging Innovation and Entrepreneurship

---

### A. Importance

The next five to ten years are likely to see rapid and widespread innovation both in the delivery of telecommunications services and in how businesses use them. New York City is in many respects well-positioned to participate in this anticipated surge of innovation. It is important that the City do so, for several reasons:

- By maintaining its position as a leader in the deployment of new communications technologies, the City can help maintain its competitiveness as a location for industries that depend heavily on telecommunications.
- Development and deployment of new technologies will create new business opportunities – in deployment of new infrastructure, in the delivery of new services, and in the development of new information products that are specifically designed for delivery via these services. New enterprises that seek to take advantage of these opportunities could emerge as significant contributors to the growth of the City’s economy during the next five years.
- By reinforcing its identity as a leader in areas such as the deployment of new wireless broadband services, the City can enhance its ability to attract and retain the talented people on whom New York’s future economic growth depends.

However, New York City’s ability to participate successfully in the next wave of innovation in telecommunications cannot be taken for granted.

---

## B. Strengths and Weaknesses

### **Strengths**

In several respects, New York City presents an attractive environment for innovation in telecommunications.

- *Sophisticated customers.* Perhaps most important, in New York City telecom innovators and entrepreneurs have access to a very large and diverse concentration of highly sophisticated customers. They include buyers of telecommunications services in finance, the media, health care, education and many other industries; consumers who want high-quality broadband services at home; and others who simply enjoy being among the first to get into “the next new thing.”
- *The capital of “content.”* The continuing development of broadband capacity will increase demand for “content.” As a major center for publishing, other information industries, the arts and entertainment, New York could be well-positioned to play a leading role in the development of the new products and services that will fill the communications pipeline that broadband creates.
- *An infrastructure for innovation.* New York also offers a variety of other resources to support innovation and entrepreneurship. There are several universities and colleges with strong programs in telecommunications and related fields, including Columbia, New York University and Polytechnic. Universities can themselves serve as sources of innovation – and perhaps even more important, as a source of graduates who are well-prepared to work at cutting-edge companies. New York City is also home to one of the world’s largest concentrations of venture capital; and New York area regularly ranks behind only Silicon Valley and the Boston area in terms of venture capital investments in young companies.
- *Support from government.* While the private sector must be the primary source of innovation and entrepreneurship in telecommunications, government can play an important supporting role. The process through which DoITT solicited proposals for use of City light poles to provide wireless services provides a good example. The terms of DoITT’s request for proposals were broad enough to give potential respondents wide latitude in thinking about how to use these public assets creatively, and to allow several mid-sized companies to respond. DoITT, moreover, specified different

franchise fees for different areas within the City – with the lowest fees being charged in neighborhoods where a significant percentage of all households, according to the most recent census, do not have telephone service. This provided a direct incentive for respondents to use the City’s light poles to improve services in low-income areas. As a result, IDT is planning to introduce its low-cost, pre-paid wireless phone service in low-income neighborhoods in New York City.

## **Weaknesses**

New York, nevertheless, presents some serious obstacles to innovation in the delivery and use of telecom services:

- *A sophisticated user – but not a producer.* While New York City offers an unmatched concentration of sophisticated users of telecommunications technologies, it is not a major producer of those technologies. For instance, leading firms in the development of wireless technology are heavily concentrated in the San Diego area.
- *A high-cost environment.* The City can be an expensive place in which to introduce new services. The up-front cost of services that require laying new cable (such as Verizon’s new fiber-to-the-premises service) can be much greater in a dense urban environment than in suburban locations such as Keller, Texas – the Dallas suburb where Verizon first introduced its FTTP project. The more uncertainty there is about how customers may respond, the more likely it is that companies will introduce new products in lower-cost locations.
- *The perceived disadvantages of high visibility.* Large publicly-owned companies may also be reluctant to introduce new products in New York City’s “fishbowl” environment. High visibility, however, is a “plus” for smaller, entrepreneurial companies and there is no better place to get that exposure than being in New York City.

---

## **C. Challenges and Opportunities**

The challenge facing New York City during the next five years will be to use the underlying strengths cited above to encourage innovation and

entrepreneurial activity, and to help entrepreneurs overcome the difficulties that getting started in New York City can sometimes present.

There are several telecommunications technologies, and several segments of the industry, that could represent especially promising areas of opportunity for New York City. They include:

- *Mobile broadband services.* During the next few years, much of the anticipated innovation and entrepreneurial activity in telecom is likely to occur in the mobile broadband segment of the industry. Wireless phone companies are introducing 3G technologies that allow their customers to send and receive larger volumes of data, and do so more quickly than they can with existing technology. Both the major carriers themselves and smaller entrepreneurial companies will seek to develop new services that will take advantage of this capacity. The next few years could also see the continued proliferation of Wi-Fi hot spots around the City, as well as next generation mobile broadband networks – WiMax and 3G cellular.

All of these technologies will present opportunities for business development on several levels.

- Development of the infrastructure required to support these new technologies;
  - The delivery of telecommunications services over that infrastructure;
  - The provision of information products and services to mobile broadband users.
- *Wired and fixed wireless broadband.* Deployment of hard-wired and fixed wireless systems will also provide opportunities for growth. Verizon, for example, will be seeking to provide new services and programming that will differentiate its fiber-to-the-premises service from the package of services now offered by cable television companies. This will mean new demand for the various types of “content” in which New York specializes.

The next five years could also see the proliferation of new fixed wireless services. These could range from highly sophisticated, specialized wireless back-up systems for large corporate and institutional users to relatively low-cost WiMax-based services that

compete directly with DSL and cable for residential and small business customers.

---

## D. Action Plan

Building on the strengths cited above, New York City can seek to take advantage of the opportunities for growth that the next five years can offer.

**Goal** *To maintain and continually reinforce an environment that supports and sustains innovation and entrepreneurship in telecommunications and related industries.*

**Objectives** Specific Objectives for the next two to five years include:

1. Encouraging the development of new telecommunications ventures in New York City, including infrastructure developers, telecom service providers and providers of information products and services.
2. Supporting the pilot testing of new broadband technologies in the City.
3. Accelerating the commercial deployment of new broadband technologies in New York City.

**Strategies** Strategies through which the City will seek to achieve these objectives will include:

1. Strengthening the “infrastructure of innovation” that supports entrepreneurial development in telecommunications.
2. Actively promoting New York City as a site for piloting and early deployment of innovative technologies and services.
3. Ensuring that City government policies, practices and procedures continue to support innovation and entrepreneurship in the development, delivery and use of telecommunications.
4. Integrating the ongoing development of New York City as a center of innovation and entrepreneurship in telecommunications into the City’s marketing efforts.

## **Initiatives**

In line with the strategies outlined above, New York City will undertake the following initiatives aimed at encouraging innovation and entrepreneurship.

- 1.1 Support and encourage university-based initiatives that target new opportunities in telecommunications.*
- 2.1 Work with the private sector and other public agencies to develop and implement projects that would test innovative approaches to delivery of broadband services, including commercial use of WiMax and broadband-over-powerline technology.*
- 3.1 Continue to ensure that franchising, leasing and procurement policies and procedures are flexible enough to include small and mid-sized entrepreneurial companies along with larger, more established firms.*
- 3.2 Work with providers of broadband services to ensure that their offerings to residential customers are flexible enough to meet the needs of home-based businesses.*
- 4.1 Promote New York's identity as a center of innovation through participation in industry events, and through a targeted media campaign.*



---

## 1.1 Supporting University-based Programs

NYCEDC will work with local universities that have particular strengths in telecommunications and digital media – including Polytechnic, New York and Columbia Universities – to identify ways in which these institutions can more effectively support the translation of academic research and development work into the creation of new businesses. Such measures might include, for example, the development of incubator or “accelerator” programs for start-up companies in fields such as mobile broadband. Possible funding sources include New York State’s NYSTAR program and federal agencies such as the Economic Development Administration and the National Science Foundation; and the institutions themselves.

### ***Justification***

University-based “technology transfer” programs have in recent years become increasingly effective at encouraging and supporting the commercialization of university research. A City-led, multi-university effort could accelerate the development of new businesses engaged in bringing new technologies, products and services to market.

### ***Responsible Agencies***

- NYCEDC would take the lead in working with local universities and the New York City Regional Technology Development Center, the Industrial & Technology Assistance Corporation, and in helping them obtain public funding for new initiatives.
- Universities would be responsible for detailed project planning and implementation.

---

## 2.1 Encouraging Deployment of New Broadband Technologies

NYCEDC and DoITT will work with companies interested in undertaking pilot projects to test new approaches to delivering broadband telecommunications services, or in early commercial deployment of new technologies. Examples could include:

- An expanded, multi-building test of the use of broadband over power line (BPL) technology to provide broadband connections within multi-tenant buildings.
- Testing technologies that combine fiber optic cables with new water and sewer lines.
- Early deployment of WiMax technology.

### ***Justification***

Several companies have expressed interest in undertaking or expanding pilot tests in New York City. The most critical factor in attracting such projects may be the designation of a single agency as being responsible for orchestrating whatever City actions are needed to allow projects to move forward.

WiMax could serve multiple needs in New York City – providing an alternative “last mile” connection in areas not now well-served by DSL or cable, increasing competition in the delivery of broadband service, sharply increasing the capacity of mobile broadband services and providing increased backhaul capacity for mobile phone services. Early deployment would also help build New York City’s identity as a center of innovation in telecommunications, and encourage local entrepreneurs to begin developing new products and services designed to take advantage of the capabilities WiMax would offer. Companies will be responsible for funding pilot projects and commercial deployment of new technologies.

### ***Responsible Agencies***

- NYCEDC and DoITT would jointly take the lead in discussions with companies, and with other City agencies as needed.
- Other participating agencies and organizations might include the Department of Environmental Protection, the New York City Water Board, the Department of Buildings, Con Edison and the New York State Public Service Commission.
- Individual companies would be responsible for cost and implementation.

---

### **3.1 Ensuring That Entrepreneurs Can Do Business With City Government**

NYCEDC, DoITT and the DSBS will work to ensure that the requirements of City franchising, procurement and other governmental processes are flexible enough to accommodate small and mid-sized entrepreneurial companies, and innovative approaches to delivering and using telecommunications services.

***Justification***

Historically, one of small business owners' most common complaints about government has been that policies and practices in areas such as purchasing, contracting and licensing tend to favor larger, more established firms. Through the efforts of DSBS and other agencies, New York City has in recent years made substantial progress in overcoming this bias. DoITT's solicitation of proposals for use of City light poles for wireless services a good example – DoITT's request for proposals was notably free of any requirements or limitations that might have effectively limited the bidding to larger, more established firms.

This type of flexibility is likely to become more important in the future, as young companies bring to market innovative products and services that take advantage of advances in areas such as mobile broadband technology. City agencies will be able to use these products and services to improve both productivity and the quality of City services. As an “early adopter” of new technologies, the City can also reinforce its image as a center for innovation in telecommunications – and in some cases, help young New York City companies grow, and gain visibility in the broader telecommunications market.

***Responsible Agencies***

NYCEDC, DoITT and the DSBS will be jointly responsible for this initiative.

---

### **3.2 Supporting the Development of Home-based Businesses**

NYCEDC and DSBS will work with providers of broadband telecommunications to ensure that the services they offer to residential customers are responsive to the needs of home-based businesses.

***Justification***

For the past fifteen years, one of the strongest trends in New York City's economy has been the growth of self-employment, and the growth of home-based businesses has been an important part of this trend. The widespread availability of broadband connections to residential customers – via either DSL or cable – greatly enhances the feasibility of doing many types of business from home. As home-based businesses develop, they may need services that go

beyond those normally provided to residential customers. NYCEDC and DSBS can work with carriers to help ensure that their services are responsive to this segment of the market.

**Responsible Agencies**

NYCEDC and the DSBS will be responsible for this initiative.

---

## 4.1 Promoting New York City as a Center of Innovation

As part of its ongoing business marketing efforts, NYCEDC will focus on building the City’s visibility as a center of innovation and entrepreneurship in telecommunications. These efforts might include:

- A targeted “earned media” campaign, aimed at increasing the visibility of new developments in the City both in specialized industry publications and in more general business media; and
- Participation in industry organizations and events.

**Justification**

New York City’s ability to attract the entrepreneurial talent, start-up companies, deployment of new technologies and investments that will drive the growth of its telecommunications-based economy during the next five to ten years will depend in part on its ability to reinforce its image as a center for innovation and entrepreneurship in telecommunications. Given the intensity of competition in this sector from areas like Silicon Valley, the Pacific Northwest and northern Virginia, New York City cannot afford to take its reputation for granted. An active marketing effort will be required.

**Responsible Agencies**

- NYCEDC will have primary responsibility for this initiative.
- NYCEDC will seek to enlist other organizations and agencies – such as the ESDC, the Alliance for Downtown New York, NYC Marketing, NYC & Company and the Partnership for New York – in this effort.





## Telecommunications Policy Advisory Group Members

| <b>Name &amp; Title</b>   | <b>Organization</b>   | <b>Representing</b>  |
|---|---|--|
| <b>Mitchel Ahlbaum</b><br><i>Senior Regulatory Counsel for<br/>Regulatory and Legislative Affairs</i> | New York City Department of<br>Information Technology and<br>Telecommunications | City of New York   |
| <b>Kate Ascher</b><br><i>Executive Vice President</i>   | New York City Economic<br>Development Corporation                               | City of New York   |
| <b>Robert Atkinson</b><br><i>Director of Policy Research</i>  | Columbia Institute for Tele-<br>Information                                     | Columbia University  |
| <b>Jonathan Bowles</b><br><i>Research Director</i>  | Center for an Urban Future  | Center for an Urban Future                                   |
| <b>Jane Builder</b><br><i>Senior Manager, Government and<br/>Community Relations</i>                  | T-Mobile  | T-Mobile   |
| <b>Tanessa Cabe</b><br><i>Director, Telecom Policy</i>  | New York City Economic<br>Development Corporation                               | New York City Economic<br>Development Corporation            |
| <b>Agostino Cangemi</b><br><i>Deputy Commissioner and General<br/>Counsel</i>                         | New York City Department of<br>Information Technology and<br>Telecommunications | City of New York   |
| <b>Barbara Chang</b><br><i>Director</i>   | NPowerNY  | NPowerNY   |
| <b>Fernando DeGuia</b><br><i>Special Assistant to the Deputy<br/>Commissioner</i>                     | New York City Department of<br>Information Technology and<br>Telecommunications | City of New York   |
| <b>Thomas A. Dunne</b><br><i>Vice President, Public Policy and<br/>External Affairs</i>               | Verizon   | Verizon  |
| <b>Victoria Galsterer</b><br><i>Special Assistant to the Chairman</i>                                 | Public Service Commission   | State of New York  |
| <b>John Gilbert</b><br><i>Chief Operating Officer</i>   | Rudin Management Company  | Lower Manhattan Telecom Users'<br>Working Group; ABNY; REBNY |
| <b>Shirley Jaffe</b><br><i>Vice President, Economic<br/>Development</i>                               | Alliance for Downtown New York,<br>Inc.   | Alliance for Downtown New York,<br>Inc.                      |
| <b>Franklin Madison</b><br><i>Technology Program Director</i>   | Industrial & Technology<br>Assistance Corporation                               | Industrial & Technology<br>Assistance Corporation            |
| <b>Patricia Noonan</b><br><i>Vice President, Research and Policy</i>                                  | Partnership for New York City   | Partnership for New York City                                |
| <b>Gil Quinones</b><br><i>Senior Vice President for Energy and<br/>Telecommunications</i>             | New York City Economic<br>Development Corporation                               | New York City Economic<br>Development Corporation            |
| <b>Bruce Regal</b><br><i>Senior Corporation Counsel</i>   | New York City Law Department  | City of New York   |
| <b>Dan Reingold</b><br><i>Telecom analyst</i>   | Independent consultant  | Self; Columbia Institute for Tele-<br>Information            |
| <b>Julie Richardson</b><br><i>Managing Director</i>   | Providence Equity Partners, Inc.  | Providence Equity Partners, Inc.                             |
| <b>Andrew Schwartz</b><br><i>First Deputy Commissioner</i>  | New York City Department of<br>Small Business Services                          | City of New York   |
| <b>Saul Shapiro</b><br><i>Vice President for Media and<br/>Telecom</i>                                | New York City Economic<br>Development Corporation                               | New York City Economic<br>Development Corporation            |
| <b>Howard Szarfarc</b><br><i>Senior Vice President/General<br/>Manager</i>                            | Time Warner Cable   | Time Warner Cable  |
| <b>Kirk Watson</b>  | Flushing Community Access<br>Network  | Flushing Community Access<br>Network                         |





# Acknowledgements

On behalf of Mayor Michael R. Bloomberg, we would like to acknowledge the members of the Telecommunications Policy Advisory Group (TPAG) who volunteered their time and expertise during the development of this plan.

In addition to the TPAG members, many other people made vital contributions to the development of this plan: Ann Barre, New York Wireless Access Coalition, Eric Deutsch, Brooklyn Navy Yard Development Corporation; Charlie Dickson, New York State Public Service Commission; Martin Dodge, University College of London, Centre for Advance Spatial Analysis; Bernard Dushman, Brooklyn Navy Yard Development Corporation; Andrew Flamm, Alliance for Downtown New York, Inc.; Donald Giampietro, DSBS; Bruce Hamer, Los Angeles Department of Power and Water; Michael Hecht, DSBS; Ralph Hilario, Brooklyn Navy Yard Development Corporation; Carl Hum, Mayor's Office of Industrial and Manufacturing Businesses; J.S. Hwang, Korean Information Strategy Development Institute; George Jee, Consolidated Edison Company of New York; Meredith Jones, NYCEDC; Sarah Kaufman, NYCEDC; Vance Kundakci, Columbia University; Bruce Lai, New York City Council; Timothy Lance, NYSERNet; Elliot Matts, Brooklyn Navy Yard Development Corporation; Greg Patenaude, New York State Public Service Commission; Bharat Rao, Polytechnic University; Kerri Rogers, Harlem Commonwealth Council; Jonathan Rudes, Winokur Realty; Scott Shostak, NYCEDC; Jim Stuckey, Forrest City Ratner; Dennis Taratus, New York State Public Service Commission; Thomas Turnquist, Port Authority of New York and New Jersey; Edmund Wilson, FiberTower, Inc.; Jennifer Zeller, Metro Atlanta Chamber of Commerce.

Special thanks to our consultants from Appleseed, Inc.: Hugh O'Neill, Nicole LaRusso, Deirdre Bane, and Anthony Townsend.

We gratefully acknowledge the contributions of time, effort and expertise that helped us gain a better perspective on the City's telecom infrastructure issues now and for the future.

Kate Ascher  
*Executive Vice President, NYCEDC*

Gil Quiniones  
*Senior Vice President for Energy and Telecommunications, NYCEDC*

Agostino Cangemi  
*Deputy Commissioner/General Counsel, DoITT*

Andrew Schwartz  
*First Deputy Commissioner, DSBS*