

# Broadband-Wireless Community Best Practices

A W2i Report

Based in part on the proceedings from the Broadband-Wireless  
Local Stakeholder Briefing Session in Seattle



## Abstract

The W2i Broadband-Wireless Local Stakeholder Briefing Session at the Seattle Westin Hotel, September 13, 2006, gathered together leading local-government IT officials from the Greater Seattle Area to reflect and brainstorm on how broadband infrastructure, applications and services can best be planned and implemented in their cities and communities.

Based on the proceedings of the session, this paper provides local-government stakeholders with an introduction to the broadband-wireless opportunity for local communities and a process overview of the implementation stages for metro-area broadband-wireless solutions, including a local needs analysis, building a business case and community consensus, public-private partnerships, funding, and network management.

The paper discusses a number of ways to cost-justify the infrastructure by improving the efficiency of specific job functions or eliminating recurring costs through the addition of broadband wireless.

## Credits

Prepared by the Wireless Internet Institute, LLC, an independent think tank bringing together local-government stakeholders around the world to accelerate the adoption of broadband and wireless technologies in support of social and economic development. W2i Digital Cities is a global conference and publication series exploring win-win solutions for planning and implementing broadband networks, applications and services for better managed communities.

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First printed January 2007.

The Broadband-Wireless Local Stakeholder Briefing Session was underwritten by:



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# ▀ The Need for Broadband

In the early 21st century, citizens and businesses around the United States are placing higher expectations on local authorities to make available the information-age services and e-Government applications that can enable them to compete successfully in the global economy and improve quality of life in their communities. In increasing numbers of cities and counties, local authorities are responding by exploring the social and economic opportunities presented by low-cost broadband-wireless technologies and the applications and services they support.

These increasing local expectations are driven partly by a global trend toward easy and affordable availability of high-speed broadband connectivity—one that, by certain measures, sees the United States falling behind its neighbors. In a 2004 ranking of broadband penetration by country, the United States stood at 20-25% in contrast to penetration rates of as much as 35-65% in many Southeast Asian countries and Canada.

Reasons for this state of affairs in the U.S. include poorly coordinated policy implementation, the multi-tiered system of government, and inhibitory regulatory frameworks. The country's large size and large areas with low population are also perceived as barriers to widespread broadband service provision.

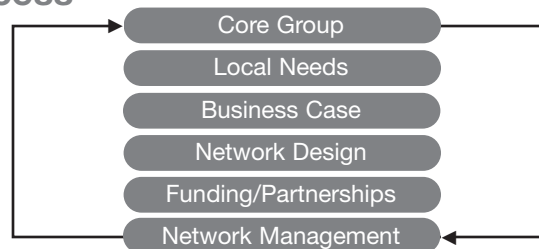
Not helping matters is that 90% of broadband service providers in the United States cater to households with an annual income of \$75,000 or higher, leaving local authorities to find their own solutions to address broadband shortages in their communities. The challenge before them is large, complex, and occasionally controversial. Which technology? Can it be deployed sustainably? Is this legal?

Despite pressure from its local incumbent telecommunication service provider, the City of Miami Beach (7.1 square miles) took matters into its own hands to provide free ubiquitous broadband-wireless access to citizens, visitors and businesses. Local authorities felt it was a mandate, on a national level, to make available portability for entrepreneurs to prosper, and the city devised a plan to pay for the network and to have it built out. Miami Beach is basing its procurement on the applications and public benefit the network could bring, including a return on investment on meter reading and parking. In a Wi-Fi enabled environment, a parking meter will reset after a car departs which generates more revenue for the local government.

Many cities are basing their procurement on the applications and public benefit the network could bring, including a return on investment on meter reading

**Figure 1: Stages for Success**

In planning a broadband-wireless community, a series of overlapping stages can repeat as more resources become available and new priorities emerge.



## Comparing Kilobytes

Both the cost and defined speed of broadband service can vary dramatically from one country to another. While the FCC defines broadband as 200 Kbps, in Canada it is 1.5 Mbps. A more useful way to compare countries may be to measure the cost of 100 Kbps per month, which can range from 6 cents to \$10.50, depending on the country. In the United States, 100 Kbps would cost about \$1—or 40 times as much as in South Korea. ☺

## Miami Beach Mayor: “This Is a Good Thing”

Mayor David Dermer of Miami Beach, Florida, speaks firmly about serving the public good with broadband wireless and characterizes state and local opposition to cities rolling out these networks: “A good argument can be made that government is basically the concerted effort to provide public money to private industry, and in many ways that’s the case. Is that going to change tomorrow? No. But at least if we do that, we should do it in a way that benefits the entire public, for the public good, and this type of budgeting, in cities across America, I think, is for the public good.... There’ll be competitive bidding that goes on, and it’ll be fierce to be able to get these contracts.

“At the same time, the legislatures are trying to do everything they can to prevent cities from putting this through. The arguments against doing this are mired in a web basically of technical arguments, arguments about, well, it’s really not going to be competitive. It’s going to decrease quality of service. But I’ve got to tell you, this is a good thing. It’s good for the future of our city, and I hope we have it, and I hope other politicians out there see it that way.”

Around the United States today, in communities of varying sizes and financial means, more than 300 networks are at some stage of planning and implementation, with many more in the pipeline. Given the different needs, local assets and demographics of each community, each model will be different from the next, but many suggestions and lessons can be shared and passed along. This white paper serves as a process overview of best practices, including the key overlapping stages to planning and implementing a network and the efficiency gains and cost savings to be realized.

- ▶ identifying a core action group,
- ▶ reaching out to technology providers,
- ▶ devising a business case,
- ▶ building community consensus,
- ▶ locating funding sources,
- ▶ exploring partnership opportunities,
- ▶ establishing a management model.

## Rationalizing a Plan Through Cost Savings

For many communities contemplating a wireless solution, a main goal may be to provide an alternative or low-cost broadband access option to residents and businesses—in short, to bridge the digital divide or ensure digital inclusion in the community. From Philadelphia to Minneapolis, Internet service providers are being invited into communities to provide affordable alternatives—in effect, to build or augment their businesses by providing affordable service wirelessly. The business models behind these private-sector deployments, however, are still in the early phases, and only a few major cities and high-opportunity communities—Anaheim (CA) with its Disneyland tourists, Tempe (AZ) with its ASU student population—are likely to see service providers taking on the entire risk of building and operating a citywide broadband-wireless infrastructure.

A creative plan involving the operational needs of local government can help to rationalize and even monetize the network, inserting considerable efficiency gains to make the case to decision makers and taxpayers. In this way, affordable broadband access for the community is seen as an ultimate goal rather than a primary objective—as an accompaniment rather than a plan’s cornerstone. A wireless infrastructure that supports local-government operations, eliminates recurring telecommunication costs, avoids costly upgrades, and increases services to the community may be seen as more financially and therefore politically justifiable.

The opportunity for local government here lies largely with its mobile workforce, the fastest growing segment of local-government employees. In the United States, one third of all local-gov-

## Private Network Becomes Public Good in Renton, Washington

In the late 1990s, local authorities in the Seattle suburb of Renton (pop. 55,000) needed to provide public-safety officers with more tools and a faster telecommunication infrastructure to serve the city's growing population. Police needed access to information at critical times without having to return to the station.

In 1998, the city spent \$1.5 million on a police records project, including a remote-field-reporting component for officers. The city wanted to deliver a rich set of services to patrol cars the same as they would to a desktop. "We scoured the earth for vendors to help us solve this problem," says George McBride, Renton's IS Director. The IS staff purchased Cisco equipment off the state contract, saving capital expenses and staff time by avoiding the typical government purchasing cycles.

After running a pilot in 2001, in 2003, the council gave another \$500,000 to complete the first phase of the project for public safety. The network provides online access to the police records management system, which is in turn tied into the Washington Crime Information Center (WACIC). Officers can now access mug shots, warrants, stolen property reports, missing person reports, rap sheets, and more in seconds. Online crime bulletins keep them fully apprised of major crime incidents, and significant incident logs have replaced handwritten postings in the police briefing room. Online timecard reporting replaces a time-consuming process that formerly took two entry steps and a fulltime staff member to manage, and officers now enter their reports and time sheets over the wireless network directly into the records system.

Today, about 80 percent of Renton is covered by the "City of Renton Outdoor Wireless Network," or CROWN, and access has been extended to community centers, libraries and fire stations. In the future, Renton may add a line to its utility billing for wireless network access. "We have the infrastructure in place to handle that," McBride says.⑩

(Excerpts courtesy of Cisco Systems ©1992-2006.)

ernment employees are mobile, and there is an opportunity to demonstrate real improvement in the effectiveness and productivity of these workers with ubiquitous broadband-wireless connectivity. W2i estimates that local governments in the United States could yield in excess of \$15 billion annually through workforce productivity improvements and reduction of recurring telecommunication costs with these infrastructures.

For example, city officials in Corpus Christi (TX) had been seeking a way to eliminate the recurring cost of cellular service used to support automated gas and water utility meter systems. After a city employee was attacked by a Rottweiler while reading a meter, the plan to deploy a Wi-Fi mesh network gained even more momentum. Now the city will open the network to ISPs to provide high-speed wireless Internet access to businesses, residents and visitors on a subscription basis. In addition to supporting a host of municipal applications, it will allow schoolchildren to log onto their schools' Web sites to receive and submit homework assignments.

Corpus Christi and Renton both show how a network deployed for municipal applications can meet the public need down the road. "It's this broader constituency of local-government agencies that is leading the charge," observes Berge Ayvazian, Chief Strategy Officer, Yankee Group. "Then, at some point, we look to the public and toward the residential market...and offering a competitive alternative to the broadband services now available."

One of the biggest challenges is for the community to adopt the same attitude toward wireless as it does toward lights and sewer, says Mike Dillon, Director for Safety, Security and Community Broadband, IBM. "For this initiative, cities still haven't stepped up to the plate to say we're going to acknowledge this like we do these other utilities and infrastructure."

Communities need to avail themselves of the funding that is available, Dillon says. "It requires a commitment, but the paradox is, I'm going to bridge the digital divide, but I don't want to have

**A wireless infrastructure that supports government operations, eliminates costs, avoids upgrades, and increases services is financially and politically justifiable**

any responsibility for it, and I don't care how it gets funded, and I want hands off and let other people figure it out.”

Cities are taking a long and arduous path, Dillon says, “but it does require them to step up and commit the city in a serious and meaningful way. If they do that, the best circumstance is to offer to be the guarantor of their networks such that they would be successful based on a business plan to monetize the network for the general fund. It's about what makes sense to monetize the network, no matter who put it up.”

Until there are better numbers on return on investment to the community and the private sector, these debates will continue, says James Hueser, Wireless Broadband Americas Group, IBM. “Few cities have been doing this long enough to look back over 18 to 24 months to say here are efficiencies we've gained, here's the extra revenue generation, and the cost avoidance. We need more of those. If you're going to do this, you've got to have some of those proof points.”

## ▶ Pilots and Primary Drivers

Whether or not a service provider is capable of taking on the risk of building, operating and maintaining a network, how can a municipal broadband-wireless plan take shape and gain critical momentum? Moreover, how can local governments shape their plans such that a private-sector partnership could become more feasible?

Seek significant cost savings through the replacement of legacy infrastructure. The new network may replace outdated wireline systems that are slow or poorly coordinated, or it may allow cancellation of contracts with incumbents that are too expensive to maintain or upgrade. Ocean City (MD) installed a mixed Wi-Fi and pre-WiMAX network to consolidate multiple telephone systems for twenty city outbuildings into a single network. The network will further enable public-safety applications such as video surveillance on local buses during the heavy tourist month as well as delivery of data-intensive GPS maps to public-works crews in the field.

When Medford (OR) needed to upgrade its aging computer-aided dispatch system for public safety, it didn't like the expensive upgrade solution provided by the incumbent cellular provider. So Medford applied for and received Department of Homeland Security funding for a citywide broadband-wireless infrastructure. Public works crews, code enforcement officers, and building inspectors would also benefit, enabling locates and work-order access in the field and saving 20

### **Fresno, California, Uses a Pilot to Move Its Project Forward**

Since 2005, the Fresno Police Department has been rolling out a hybrid 900 MHz / Wi-Fi mesh broadband-wireless network to complement an aging 800 MHz legacy infrastructure. “We didn't want to get rid of the 800-MHz system, but we needed some fatter pipes,” said project leader and spokesman Capt. Patrick Rhames.

But the police department wrote tightly limiting specifications into its RFP. “We're policemen,” Capt. Rhames said. “We figured we knew what we wanted.” Consequently, the four responding vendors failed initial tests, largely because of a heavy tree canopy around the city. The department regrouped and wrote a second RFP, this time identifying needs and telling the industry what it was trying to achieve, asking what technologies could overcome the problems it was encountering.

A four-square-mile test area was established in Fresno ensure the police department and vendors were going down the same path. The department received responses from eight vendors, and after running several respondents “through their hoops and taking measurements,” it settled on a hybrid 900-Mhz network with an accompanying mesh solution.

“Don't make the mistake of trying to tell the industry what it is you think you need,” Capt. Rhames said. “We required a physical demonstration. Ask the industry what it has that will fit the problem you're trying to address and then ask them to show you it working.”<sup>(1)</sup>

## Seattle's Free-Access Wi-Fi Pilot and Survey

For more than a year, the City of Seattle has been operating a Wi-Fi pilot project in its university district and in the south end of town (Columbia City), as well as in four downtown parks and city hall. The network has 17 access points, deployed primarily on light poles, and includes interior premise equipment at four different sites.

The goals of the pilot are economic development (to assist small businesses and increase purchases), to improve usage of the city's Web resources, and to encourage mixed use of the parks to increase safety. The question of return on investment to the community, however, is an evolving one. This summer the city conducted its first evaluation of the technology and surveyed network users.

Since January 2006, the network has registered over 10,000 unique users (65,000 uses overall) with an average daily use of 130 individual users, including a combination of visitors and local residents. The survey revealed that half were customers, and just over a quarter were home users in the surrounding area. Some 10% were "other"—students, visiting scholars and people traveling on business. "We've seen a high percentage of first-timer users, about 1,200 per month," said David Keyes, Seattle's Chief Technology Manager.

### Businesses

When the city asked local businesses whether the network had helped them, just over half said it hadn't made a difference, a quarter didn't know, and a quarter said it had. In one district, however, almost 40% reported the network had made a difference. "To some extent, the jury is still out," Keyes said.

For most businesses, the network is not replacing other Internet access right now. About one sixth of businesses use the network to conduct business, and it's being used as a marketing tool. For example, realtors say their condos are "near the Wi-Fi zone." For some businesses, Wi-Fi is not appropriate. "They don't want Wi-Fi or folks sitting there with laptops," Keyes said. "Others are concerned with table turnover, and ask, Could they turn it off sometimes, too?"

### Customers

From the customer perspective, the network was a contributing factor to using the business district and specific businesses, with three quarters saying Wi-Fi had encouraged them that day to go into specific businesses. "People are coming in, staying longer, spending more money in some cases, combining visits, telework, job searching—a whole variety of uses," Keyes said. "There's a climate that's been developed around casual business meetings. I can hold my business meeting and make it a destination for conducting work."

Over half said it had saved them driving, which is a significant impact. About 10% said it would save driving in the future.

### Content

When given a choice, some 65% of users said they wanted local event information, and a little less wanted local business information, products and services. Interest in local government information and area maps was not as high. Only 6% said they didn't want any content—just to surf the Web and access e-mail. The network did increase usage of Seattle.gov, especially pages on jobs and city services.

In conclusion, some 90% of businesses approved of continuing Seattle Wi-Fi. Not surprisingly, many users said to continue it as well.

A technical expectation has been indoor coverage—getting deeper into the cafes and bookstores. "But interestingly, only half expected indoor coverage," Keyes said. Interference issues have arisen, and a number of users commented on coverage and reliability of the network in an uncontrolled open space. "There's a big issue around user knowledge and expectation," Keyes said. "People with a laptop can see Seattle Wi-Fi but can't connect to it." ⑩

**Table 1: Some Broadband-Wireless Communities and Their Primary Drivers**

	<b>PRIMARY DRIVER</b>
<b>Chaska, MN</b>	Digital divide for schools, businesses and residents
<b>Cheyenne, WY</b>	Traffic-signal management
<b>Corpus Christi, TX</b>	Automated meter reading for city-owned utilities
<b>Lewis &amp; Clark County, MT</b>	T1 replacement; access to remote county buildings
<b>Medford, OR</b>	CDPD replacement public safety
<b>Ocean City, MD</b>	Integrated digital, voice and video for city buildings
<b>Pirai, Brazil</b>	Municipal field-force productivity; promotion
<b>Portsmouth, UK</b>	Bus passenger information dissemination
<b>San Mateo, CA</b>	Police field-force productivity improvement
<b>Shanghai, China</b>	Police field-force productivity improvement
<b>Spokane, WA</b>	Municipal applications and e-Government initiatives
<b>Westminster, UK</b>	Video surveillance and enhanced security

crews about an hour a day each, or \$64 an hour—a \$333,000 annual savings.

An apparent and compelling need for a network, or primary driver, can serve as a pilot project to build momentum behind a full-scale deployment—a complete work process in play that is meaningful enough to measure and can create the drive to build out the entire network.

“If you start out with limited deployments and pilots, and then pick one good application that shows payback that can be recognized to lots of people in the city and possibly to customers that you serve, that’s the best way to do it,” says Bob Tinker, Director of Marketing, Wireless Networking Business Unit, Cisco Systems. “Start with one, start small, and grow from there with the success.” (See Table 1, )

The hundreds of RFPs released in 2006 for municipal broadband-wireless infrastructures squarely reflect local authorities’ increasing awareness of the opportunity inherent in these networks as communities. “Seek out the supply-chain dependencies within a community to find the efficiencies that will help you monetize the network best and help you rationalize it,” advises IBM’s Dillon.

# Broadband-Wireless Communities Best Practices

At the heart of any good community-driven plan are both a thorough evaluation of local needs and a careful assessment of the technological and financial challenges to deployment to ensure a broad-based return on investment to the community. Be sure to avoid “me too” thinking, however. Just because a neighboring community is going ahead with a network, why should you? A rigorous self-evaluation of local needs and assets to be leveraged will ensure that point solutions complement and reinforce one another [see “Local Communities Leverage Their Assets” in *The Promise of Broadband Wireless Communities*, published by W2i and UN ICT Task Force (2005)].

## Core-Group Drivers

Begin by organizing the energies of diverse players through an organized brainstorming process. Either separately or as a group, invite town officials, administrators, public-safety and public-works department heads, economic-development-board and Chamber of Commerce leaders to review the community’s IT plan with wireless in mind. Ask a few broad questions to stimulate discussion and feedback:

- ▶ What could you accomplish with such an infrastructure?
- ▶ What user groups could be supported and for what purposes?
- ▶ Is it city operations?
- ▶ Public safety?
- ▶ Community quality of life?
- ▶ Economic development?
- ▶ Education?
- ▶ Tourism?
- ▶ What would be the measurements of success?

Gather information about local demographics and population densities, broadband penetration and cost, and the hot spots for bandwidth consumption in the community. Consider conducting focus groups with local business partners, survey city residents and e-mail blast on local e-mail lists for feedback to enrich this self-discovery phase. The more you know about local-government needs, business requirements and community desires, the better positioned you’ll be when building a business case and pitching the network to decision makers (see Table 2). Reach out to Internet service providers, wireless Internet equipment manufacturers, systems integrators and others with a list of requirements for throughput and geographical area. These experts can:

- ▶ do an initial site survey,

**Table 2: Match Needs and Desires with Outcomes**

### **SERVICES FOR CITIZENS AND BUSINESSES**

- ▶ Police accident reports
- ▶ Parking-ticket payment
- ▶ Tax payments, ID Numbers
- ▶ Licensing and permits
- ▶ Utility payments
- ▶ Emergency response
- ▶ Tourism and recreation services

### **SERVICES FOR GOVERNMENT EMPLOYEES**

- ▶ Site locates/GIS maps
- ▶ Maintenance orders
- ▶ Record management
- ▶ Firefighter locator chips
- ▶ Security cameras
- ▶ Public-works work orders
- ▶ Remote video surveillance

## Citizen Task Force Evaluates Wireless in Seattle

In 2004, Seattle commissioned a Citizens Task Force in 2004 to explore how the city's assets could be used to create a broadband network. Individuals from the community and private sector met 13 times over 7 months to determine what to do with low-cost wireless.

At the Local Stakeholders Briefing Session in Seattle, IT Director and Chief Technology Officer Bill Schrier elaborated on the Task Force's findings. Schrier says that because the City of Seattle is already rich in Wi-Fi connectivity and mindful of heavy population growth projections over the next 40 years, it is putting fiber at the center of its planning. It has released an RFI for a fiber-to-the-home network.

"If you've got fiber and cable to every home and business, you can pop up Wi-Fi hotspots virtually wherever you want, and you can create that wireless cloud around the city relatively quickly," Schrier said. "So that's one reason we're concentrating on fiber first, even though Wi-Fi or mobile access is also important."

### **Schrier identified five steps to broadband:**

- ▶ clarifying objectives
- ▶ assessing the competition
- ▶ assessing assets and market
- ▶ getting elected officials' decision and support
- ▶ pursuing the goal.

### **The Task Force members identified the following user groups:**

- ▶ Consumers - triple-play, interactive gaming, two-way television, work/business at home
- ▶ Bridging the Digital Divide
- ▶ Economic Development - small businesses, spin-offs, collaboration, educated workforce
- ▶ Public Safety - mobile, video, images
- ▶ Public Purpose - government services, interaction with elected officials, education

### **And it summarized the "technology fit":**

- ▶ DSL - short term, short cable, short life
- ▶ Cable - seems on top now, won't support future two way HDTV applications
- ▶ Wi-Fi - interesting for mobile, not for TV, video, interference, expensive in wide area
- ▶ Wi-Max - new, may work for mobile, wide area
- ▶ Fiber-to-the-premise (FTTP) - the real solution, expensive, 40+ year life with new electronics

It also created a results statement: "Within a decade, all of Seattle will have affordable access to an interactive, open broadband network capable of supporting applications and services using integrated layers of voice, video and data with sufficient capacity to meet the ongoing information, communication and entertainment needs of the city's citizens, businesses, institutions and municipal government." It set a vision for this city to accomplish this over the next ten years to stay current and keep our cool factor with economic development.

Schrier said the city would determine what incentive private partners needed to invest here. Because we've got all these competing needs for public dollars, elected officials want to invest as little as possible in a broadband utility. "I'd love to change that, but there are competing priorities," he said. "Hopefully, we can develop a franchise—one or more partnerships—to do fiber-to-the-home in the city."

### **The Task Force came up with the following requirements:**

- ▶ fiber-optic to every home and business;
- ▶ provision it to allow multiple competing TV, video, telephone and data and Internet services;
- ▶ network neutrality;
- ▶ partner with private vendors and others to construct and operate.

Schrier added that the latter "could be a hard thing to get, because typically if somebody's going to spend all the dollars to build out a service, they're going to expect some exclusivity so that they can recoup that investment." ☺

- ▶ explain technologies and frequencies,
- ▶ produce a scope-of-work statement,
- ▶ make a presentation to the community.

From this early brainstorming will emerge a beginning sense of the model that's right for your community. Is it government usage, public access, or something down the middle (a hybrid)? Identifying which sphere you fall into will have a lot to do with what consensus building group you'll bring together to begin executing the plan.

## Building Community Consensus

A broadband-wireless community transforms key government processes, both internally across departments and employees, and externally to citizens and businesses. It's the collaborative spirit in which government departments, agencies, businesses and the broader community work together that can make an implementation flourish over the long term. At the same time, there may be departmental silos to overcome. Bringing constituents of different types into the same room to brainstorm and prioritize can be difficult because different actors and departments can overshadow others.

"As soon as the fire chief says, hey, let's do it this way, the wallflowers say, he's talking now so I'm not going to say anything, but the two techie guys who know more than anybody else and can bring a lot of light to bear on the problem won't say a word because they're the newest employees in the room," offers Mike Dillon, Director for Safety, Security and Community Broadband, IBM.

To avoid this outcome, it may be better to split people up into smaller groups to identify their problems and priorities. Rather than corral them into a room, it may be better to come to a plan in piecemeal fashion, glean feedback from constituents in their respective environments. You can choose a champion from each subgroup to deliver the message to the full constituency, building their contribution into the vision.

**It may be better to come to a plan in piecemeal fashion, glean feedback from constituents in their respective environments**

Next is to identify an executive sponsor—a community catalyst to work the back channels, overcoming obstacles and clearing hurdles. The sponsor must be focused on the what, not the how, nor should he or she become an evangelist for a particular hardware or software solution.

"They must be able to state a simple objective that they can go out and evangelize to get the job done," Dillon says. "They also need charisma and the formal or informal authority they yield, and at the end of the day, you need to know you've still got them so the project doesn't die because of the lack of the sponsor's presence."

Compose a vision statement: "I want to make sure my grandson lives in this city because they've got it and we don't." Recommend that all the constituents have their own reason for the project.

Selection of the technology itself can be a problem that can sidetrack the project. The decision makers are marketed to, and they may go down a path that isn't the right one. Time gets spent on what's been pre-selected rather than on making sure the purpose is mapped to the technology selection.

"You've got to think through the technology. You're transitioning from one technology to another. It depends on the use. Align technology selection with the purpose," says James Hueser, Wireless Broadband Americas Group, IBM.

## Building the Business Case

Local government can expect a benefit from a deployment almost from day one, with return on investment measured in weeks, months or a small number of years rather than in decades, as it might be for a major infrastructure provider. To galvanize the business case and speed cost recov-

ery, factor in savings and quality-of-life improvements from applications and services that meet local needs and desires (see Figure 2).

Remember that ROI for government is different from ROI from providing service to the public. Government access equates to “ROI + productivity”—not by income, but by the number of hours saved and the number of workers. A dollar figure can be tied to what your saving or avoiding in costs. Can the employee’s time be repurposed? Are you limited mandatory overtime?

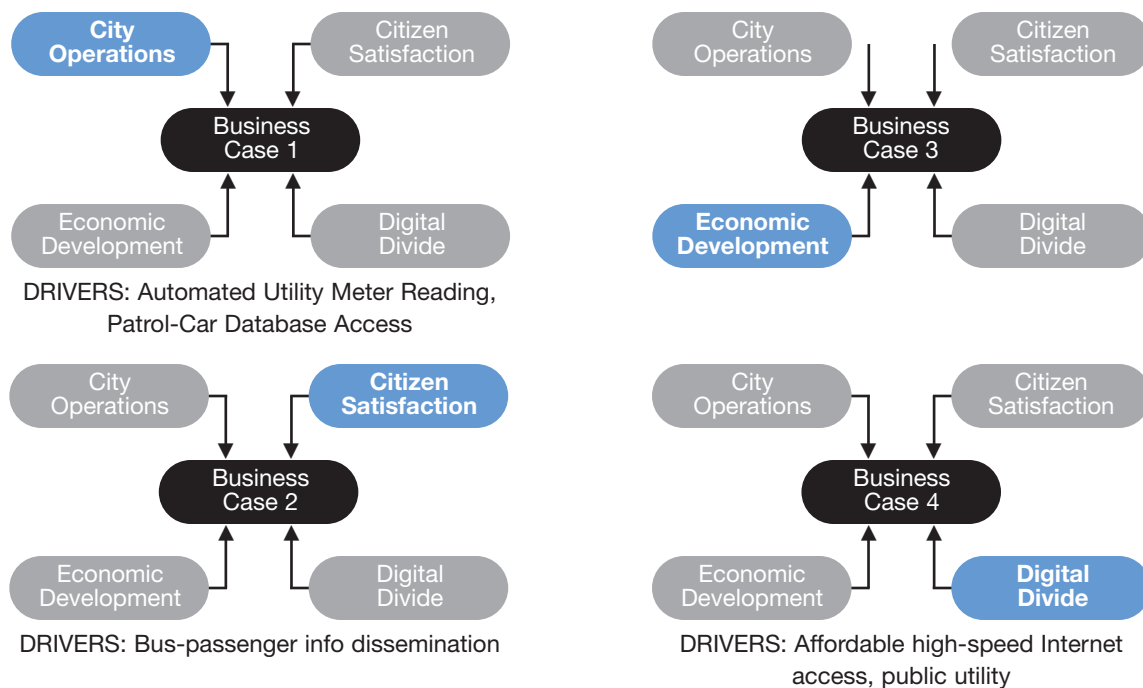
The public access model is “revenue + ROI.” How much money is coming in on a subscriber basis (wholesale and retail)? Government and the public will benefit from windfalls, and digital inclusion issues can be handled within this framework.

**Business Case 1:** Government operations efficiencies—In a broadband-wireless community, city workers can produce more because they have high-speed access to information and databases, use tablet-size PC devices for field operations, and send fresh, detailed reports back to base immediately after each call, which means they can carry out more inspections, repairs and visits per day while providing their colleagues with up-to-date information. Staff and officials can be more effective, and their services provide better value to the citizens who pay for them.

► *Estimate the efficiency gains and increased productivity in field-based operations for public safety and public works, including the addition of portability and mobility components. Ask police officers, inspectors, engineers, and field crews about the amount of time they could save by accessing work orders, filing reports, and doing locates on site-on the whole, reporting less often to headquarters. Get the numbers on paper, and you’ll be surprised how much is being spent, and how much can be saved. If video security is a foreseeable driver, factor in that broadband wireless is really the only way to enable this affordably.*

**Business Case 2:** Citizen satisfaction—Whether interacting with emergency first responders, obtaining a business license, or helping their children with homework assignments, citizens in a

**Figure 3: Building the Business Case**



Use a primary driver (blue) to justify a first-phase deployment, but factor in the broad range of applications and services that can make city operations more efficient, improve citizen satisfaction, enhance economic development, and bridge the digital divide.

## Public Safety Saving Time in Everett, Washington

To better protect the city's 100,000 permanent residents, the City of Everett Police Department had adopted a wide range of technology initiatives, including extensive intranet and Internet law enforcement tools running on the city's Cisco Systems network. But while the solutions offered many benefits, they also created new challenges.

"It's great to have access to records and be able to network to other parts of the country to look for outstanding warrants or similar unsolved crimes," says Boyd Bryant, police sergeant and public information officer for the City of Everett Police Department, and supervisor of the department's technology projects. "The difficulty is that during that process, officers are out of touch with the community. Their eyes are no longer engaged in what's happening on the street."

According to Boyd, the average police officer spends about four hours per 12-hour shift in a police station. "About one third of our workforce is persistently out of touch with the community for a third of their workday," he says.

For Sgt. Bryant, the solution to this issue was obvious: make those network-based police tools mobile, and help enable every officer on the beat to be more efficient and do the same work from their car that they would normally do at the station. But the department's existing mobile networking infrastructure was extremely limited. The city had invested in laptop PCs for each squad car, but network connectivity relied on 900 MHz voice radio modem technology.

"The traditional mobile system is text only and operates on a very limited bandwidth," says Sgt. Bryant. "That means a driver's license check could never include things like a quality photograph associated with the computer query results." The department was also concerned that these older technologies would not continue to be technically supported in the future.

The police department needed a new mobile wireless strategy with a networking infrastructure that could support rich applications and services and keep officers fully connected in the field.

The city placed equipment with the county radio service on the highest points it could put them on—water and radio towers and its own buildings, and it used existing infrastructure where it had bandwidth to boost its footprint over the city. "We had negligible cost of installing any backhaul—another model piece you find with most successful projects," Bryant said. Today, about 30 percent of the city is covered.

More than just improving efficiency, however, Sgt. Bryant also believes that the solution will increase the safety of the city and its citizens.

"We'll be able to put our officers back in contact with the public, giving us additional eyes and ears in the community," he explains. "And, with the ability to access driver's license photos, booking photos, outstanding warrants, and the future potential of remote fingerprint scanning services, officers will be much better equipped to identify and apprehend criminals.

"The change here is fundamental, and you've got to demonstrate this with some force." ①

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wireless community will perceive that government is operating efficiently and effectively, and is creatively addressing the challenges of 21st century life. Citizens can pay bills, obtain government licenses and access information about local traffic problems, events and leisure activities. Schools, hospitals, city offices, libraries and community centers leverage one another's resources and infrastructure, enabling citizens to contribute to their communities and communicate with their local governments.

► *Citizens will be able to share the network, bringing themselves for the first time to the doorstep of e-Government, a bonus that may strengthen the business case through further cost savings in city operations.*

**Business Case 3:** Economic development—Cities can make themselves more attractive to businesses and potential citizens through advanced communications networks and services. With a more computer-savvy populace, wireless communities can attract more of the burgeoning services sector, replacing lost manufacturing jobs and raising the standard of living. Tourism is enhanced as well, because visitors can get online more easily.

► *While the impact of broadband networks on economic development can require a long-term measurement over years, the need for high-speed Internet connectivity can present itself overnight. The business case will include a range of projections for job retention, job creation, new-business attraction and increasing the tax base. Survey local businesses for their broadband infrastructure needs and promote the network to attract IT and service-sector employers.*

**Business Case 4:** Digital inclusion-Ubiquitous wireless infrastructure brings the worldwide community to citizens through Internet-based communication and education. The increased availability of information and services online drives demand for PCs and mobile computers. The local economy benefits as more households invest in a PC and Internet access. This not only increases citizen satisfaction but creates new job opportunities by raising workforce skills and equipping workers for success in the global knowledge economy.

► *What are your community’s needs? Conduct a market assessment and outline availability and affordability gaps. Local governments and stakeholders are poised to develop new models that could also guarantee high-speed connectivity as a new essential good of the 21st century.*

The business case will include the selection of appropriate technologies and a thorough examination of deployment and maintenance costs. Prepare a cost-benefit analysis, examine cash flows, funding, financing requirements, and external sources of revenue, including leasing bandwidth across the city-owned architecture to local service providers.

## Public-Private Partnerships

Interest in public-private agreements and partnerships to support citywide broadband-wireless deployments has increased dramatically in the past couple of years. In these agreements, local authorities typically agree to provide “vertical assets”—right-of-way to towers and utility poles—and incentives to the private sector to develop a network that is responsive to the requirements of local government, institutions and underserved areas of the community.

Local government can help to maintain continuity of vision, leverage a variety of funding mechanisms, and promote the new service to the community. For its part, the private sector can provide innovative solutions, entrepreneurial drive, service-level agreements, and private capital. Scalability, innovation and effectiveness are all intrinsic to these partnerships.

At the same time, perceived barriers can stall projects and keep them from getting off the ground. A September 2006 W2i/Yankee Group survey of conference attendees found that 55% of local-government representatives feel that lack of both technical know-how and funding are the primary roadblocks for deployment, while 56% of the private-sector attendees believe that lack of political consensus and regulatory hurdles are the key barriers.

“Consequently, the survey results strongly suggest that emerging service providers and local authorities can break through these perceptions with teamwork approaches to network planning, including public-private agreements, dual funding mechanisms and facilitative policy changes at the local level,” said Berge Ayvazian, Chief Strategy Officer, Yankee Group.

While the variations on the theme are many, a typology takes into account who will own and/or operate the network:

<b>City Owned City Operated</b>	<b>Privately Owned City Operated</b>
<b>City Owned Privately Operated</b>	<b>Privately Owned Privately Operated</b>

**Publicly Owned:** In Allegany County (MD), Chaska (MN), and Corpus Christi (TX), government owns and operates the network. But it requires a certain approach and dedication

on the part of local authorities to want to run that activity alongside their own operations. To forestall the departure of two major local industries, the rural community of Scottsburg (IN) (Pop. 6,000) took it upon itself to provide broadband to businesses and residents on an urgent deadline basis.

**Privately Owned:** In contrast, numerous examples of private ownership and operation have emerged, where government use is secondary. In Anaheim (CA), Brookline (MA) and Grand Haven (MI) service is geared to the public, local government is a beneficiary.

In one recently forged major public-private partnership, the City of Minneapolis assigned an economic value to the services that it would use from the network and translated that as a prepayment to the operator in advance as the city's commitment to the network. By prepaying those fees, Minneapolis is "ponying up," and as the services are delivered, those costs are returned to the city by way of services. This agreement stands in sharp contrast to what they would have to pay to other commercial providers.

Following a call to action by Mayor John Street, the City of Philadelphia began its broadband-wireless journey with the intent to fund and own its own network. Project champions faced unprecedented criticism, however, and initiated a bidding process to support of a public-private partnership. Ironically, two years later, Boston is moving ahead with a nonprofit model, following the recommendation of citizen task force.

Sometimes a local water or electricity utility will take on a deployment. Utilities already understand how to build and manage networks and can treat them as another city service. Toronto Hydro Telecom, for example, is using dark fiber and city light poles to expand broadband access to citizens, businesses, and residents.

When engaging in a partnership, it's important to remember that local government and the private sector work on different time lines, and a partnership should examine how to accommodate the pace and style of both. Any negotiation will carefully consider who controls the network, which can affect the flow of investment dollars and revenues. Private-sector service providers simply seeking a service provision agreement with local government should also be mindful of the latter's expectations. For local governments not intending to spend a dollar, the destiny of the network will be left to the entrepreneurial entity and its financial and technical wherewithal.

"When you're into new territory, new technologies, new concepts, new business models, there's got to be a shared risk-and-reward mentality," says James Hueser of IBM. "It's important that your private business partner sit down and have a discussion. We're going into this hand in hand here. You need to cooperate, and there's an opportunity for that."

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## Funding for Deployments

Local government may seek a variety of funding solutions both within local coffers and through external sources to get a first-phase deployment off the ground. Wealthier communities may make the lion's share of the investment up front, while resource-poorer communities will need to get creative. Try searching for redevelopment funds within city budgets.

How does the broadband budget fit into the municipal budget? How does it compare with the roadwork budget? Which one gets priority? Consider promoting a set-aside fund for wireless community initiatives.

With a convincing business case and community consensus, the core group can make the case for funding to a range of government-operations and technology agencies supporting homeland security and intelligent transportation systems, port security and firefighting. Look into the Department of Commerce's Technology Opportunities Program and the Department of Agriculture's Rural Broadband Access Loan Guarantee Program. The more people with a stake in

the project, the better: Partnerships among diverse governmental agencies at the local, state, and federal levels can mean a sharing of the financial burden and speed the magic point of cost recovery.

Try hiring a consultant to identify grants that best fit your situation. When applying, remember the phased aspects of deployment and moderate your initial expectations. A first phase showing an immediate benefit can build momentum for future funding. Look at grants that connect Parks & Recreation, libraries, schools, and transportation. Here, again, sharing the network among different community agencies can make monies go farther. Additional sources may include venture-capital firms, equipment bonds, interagency loans, and private-sector partnerships. Consider a wholesale leaseback model or private financing. And be creative with capital and operational expenditures. With a broadband-wireless solution, you can make the case for a one-time capital expenditure versus the recurring costs of telecom leased lines.

## Managing the Network Infrastructure

The network makes available infrastructure to enable multiple service providers to compete on an equal footing, which:

- ▶ lowers costs,
- ▶ ensures diversity and breadth of services,
- ▶ addresses a broad range of constituencies' needs.

Moreover, how the network is managed links directly to how it has been planned. A basic operations support system will allow Internet access with very simple authentication procedures. But a more sophisticated platform enables greater control and the layering of services like voice-over IP, video downloads, gaming, and the Internet.

A sophisticated software-support solution is where planning comes full circle as applications and services are integrated and rolled out across a single software platform to support:

- ▶ mixed use for public and private users, where public-safety personnel access their own separate network requiring only a MAC laptop address or USB authentication key while residents and visitors share the same infrastructure through a login page;
- ▶ bandwidth monitoring, allocation and prioritization, which is especially important during emergency first response, and for providing the best bandwidth service to the most preferred customers;
- ▶ back-office billing to monthly subscribers and 24-hour visitors or, in a public-utility model, for bandwidth delivery;
- ▶ city-government, local-business and community splash pages tailored for different user groups and city functions (utilities, zoning, public safety, etc.);
- ▶ SSL-encrypted registration and authentication for secure, encrypted access to one's local-government LAN3.

The software should enable smooth communication across the network, including auto-provisioning capabilities and remote upgrades when new features are added. These can be sent remotely to upgrade any of the gateways or controllers in the field, which reduces operating expenses and the amount of staff needed to maintain the system. While most of the cost analysis is in bringing wireless hardware into the city, don't forget to drill down into operations and maintenance to find more cost savings.⑩