The Power of Local Action

At **Broadband Communities**' 2018 economic development conference, held in October in Ontario, California, participants shared stories of local successes and struggles. Following are some of the highlights of the conference sessions.

A BBC Staff Report

Smart Cities in the Golden State

John Keisler, City of Long Beach, California

John Keisler, City of Long Beach, California: Long Beach was a center for Navy logistics and aerospace, but those industries left in the 1990s, and the city had to reposition itself. The better-paying jobs were in Los Angeles and Orange County, and 78 percent of residents were commuting outside the city, so the first strategy was to connect people with opportunity by improving the transportation infrastructure – roads, light rail, the airport and the shipping port.

More recently, as opportunity moved online, the city decided to promote technology innovation and entrepreneurship. The city council adopted a fiber plan so it could partner with the private sector to expand and exploit its fiber assets. The plan called for connecting 143 city buildings; then extending fiber to the commercial corridors, where the city or private service providers could deliver fiber services to businesses; and eventually extending it to the whole city, letting private providers deliver business and residential services.

Ultimately, the city will install an internet-of-things platform and use new sensing technology to gather information, push it to the cloud and enable city systems to monitor and heal themselves. Currently, the city is dropping fiber along the light-rail line to help optimize traffic to Los Angeles. Other planned applications include monitoring and management of parking spaces; streetlights; road traffic; electric, gas and water meters; air quality; and environmental and public-safety threats.

In addition to connecting businesses, the city co-developed a business portal website to streamline processes such as permitting and licensing, and it shares the code for the website with other cities. The application has won several awards.

The city also co-developed a mobile application called StartItUp, which helps entrepreneurs and small business owners find paths to success. StartItUp represents government as an investor trying to stimulate the creation of new technology and new businesses.

David Graham, City of San Diego, California

David Graham, City of San Diego, California: The mayor of San Diego had a vision that the city could be as innovative as the people it serves. He aimed for a mix of efficiency, sustainability, and innovations that would create a more convenient city. New technology can improve decision making and bring about better outcomes.

San Diego was thinking about building a loop shuttle in the downtown area to reduce congestion. Instead, for one-quarter the cost, the city bought a fleet of electric vehicles and allowed people to ride them for free.

There are streetlights everywhere, but they had only one job – lighting. The city decided to make them energy-efficient, multi-use platforms for the internet of things. Now they can sense vehicles in the roadway and help manage congestion, optimize parking, improve public safety and reach San Diego's Vision Zero goals. The new streetlights save $2 million in energy, which finances many other projects. The streetlights operate wirelessly now but will eventually be wired with fiber so they can move more data.

Other projects include advanced metering for water meters and a one-stop portal for businesses dealing with the city.

These projects are driven by open-data efforts. We've moved to better digitization and storage of records, and we upload them to an open data portal so that residents and software developers and technologists can develop new apps.

When we held hackathons, people came up with interesting ideas, such as a food truck app and a digital cane for the visually impaired. We're now offering an app that lets a resident take a picture of a problem – a pothole, for example – send it in, and get a picture back showing that the problem has been fixed. That turns a negative interaction with the city into a positive one.

Without any city dollars, we've introduced dockless bikes and electric scooters – and now we have a last-mile transit solution. We need to accommodate these devices through regulations. We're also testing the use of drones for Amazon Prime and Uber Eats.

The electric utility built an app to predict wildfires so it could reduce its liability for wildfires, and it made the app available to fire departments. San Diego is using it and can now do predictive deployments of firefighters when the risk is high. We can be more successful at fighting fires.

Because of all these efforts, we have a growing pool of young talent, our No. 1 resource. Sixty percent of migrants to San Diego hold a college degree. They won't accept a "dumb" city.

There are still problems, though. We're working with one impoverished neighborhood to try and connect it and alleviate its problems through technology. That will be a proof of concept for the rest of the city.

As Jane Jacobs said, "Cities have the capability of providing something for everybody only because, and only when, they are created by everybody."

Towns That Work

James and Deborah Fallows' keynote presentation discussed the lessons they learned writing their new book, "Our Towns: A 100,000-Mile Journey Into the Heart of America."

James Fallows

James Fallows: We wanted to visit the sort of places that don't get media attention unless something goes wrong, and we put out a query looking for towns that had addressed their problems in a significant way. We got about 1,000 responses, and we visited about 25 towns in depth and others for shorter periods.

Our biggest finding was the contrast between national politics in this troubled time and local politics, which is inventive, creative, practical and looking for ways to develop. At the same time there is paralysis and division at the national level, there is renewal and healthy activity at the local level. When people talk about their lived experiences, they have a nuanced view, and they feel that things are progressing; when they talk about what's happening elsewhere, they are fearful. There are still local problems, but it felt as if these towns were moving forward rather than backward.

An incidental surprise was the reverse talent migration from cities to smaller towns. There's an archipelago of opportunities based on connectivity. Connectivity of all kinds is increasingly important, including transportation and local consciousness – an acute sense of "This is our town, and we care about it."

The lived reality of immigration and ethnic change contrasted with the national discourse. We saw the process of absorbing new people going on pretty much the way it always has. It's never problem free; it's always dislocating; but in the end, the United States always absorbs people.

From the interstate, all these towns look the same. Inside the towns, they all look different. We saw many different ways to fund projects, reinvent institutions and refashion life.

Deborah Fallows

Deborah Fallows: Public libraries are the heart and soul of communities. They respond to communities' wants and needs and fill in the gaps in services. They'll tell you it's all about the children. In one town, librarians look on the streets for new babies in strollers and give them books and library cards.

In Columbus, Ohio, librarians put baskets of books on school buses. In Redlands, California, the library sponsors a historical tour of the town for all fourth-graders. In Los Angeles, people get their GEDs in the libraries, and the mayor celebrates with them.

We saw adult literacy programs in the libraries, as well as maker spaces – some modern, some homemade. In Dodge City, a young man created a maker space with sewing machines,

Libraries are resources for Wi-Fi access, health information, job applications, job counseling, and ESL and citizenship classes.

electronic pencils and leftover recording equipment. In Newport, California, we heard about entrepreneurs getting started in libraries. (The librarians just want them to remember where they got their start.) In Columbus, we saw job seekers using the library computers because they didn't have internet access, computers or even knowledge of how to use them. One person tried to fill out a job application on the screen with a marking pen.

Some libraries have technology that doesn't work – the equipment is broken, or no one knows how to use it. In Ajo, Arizona, the library had the only Wi-Fi in town. In Kansas City, so many people want to use the library computers that they have to take numbers.

Libraries are profoundly democratic. Homeless people go there during the day to be safe, comfortable and respected. In Erie, Pennsylvania, refugees make up 10 percent of the population, and their first stop is the public library, where they get library cards and can stay in touch with those they've left behind. They get free tutoring in English as a second language and free citizenship lessons.

In Charleston, West Virginia, the librarian told us, "We are the first stop for people with health issues. They do research on their own because they can't afford to go to the doctor."

In Bend, Oregon, librarians joined civic organizations to find out what they could do to help the community. They joined forces with Goodwill to offer training and job counseling.

James Fallows: Here are some patterns in towns that work:

1. Practical mindedness. Ask about local issues, and you'll get a nuanced answer.
2. Local patriots. There are people who feel responsible for creating something.
3. Public-private partnerships. People can point to actual projects or buildings that resulted from these partnerships.
4. Knowing the city story. Everyone knows the narrative, even if it isn't fully true.
5. Downtowns. There aren't just malls; there is also local shopping, and old buildings are being revived.
6. Nearby research university. This is the equivalent of having a seaport or fertile land.
7. Community colleges. These are crucial educational institutions today, and towns that work take them seriously.
8. Innovative schools, mostly public. We saw an elementary school of engineering in a low-income neghborhood of Greenville, South Carolina.
9. Open communities. Community leaders are interested in attracting new people of different races, national backgrounds and languages.
10. Willingness to make big plans. Though this is hard to do on the national level, communities think ahead.

TECHNOLOGY TRENDS

Joanne Hovis, CTC Technology & Energy

Joanne Hovis, president of CTC Technology & Energy, explained the history of all the major broadband technologies and offered some predictions about what comes next:

- Cable companies are getting into mobile services. Using unlicensed spectrum, along with their existing wires, poles and attachments, and routers in cable modems, they'll be able to create a huge Wi-Fi mesh. They'll support roaming among one another's services and perhaps even with cellular services. This is great news for consumers because it means increased competition. It's a great new business for the cable companies as well. This is more important than 5G service from the telephone companies.
- Fixed wireless is reaching the point where it may be competitive with DSL, cable and even FTTH. However, it won't work everywhere, and in most cases, it doesn't really change the economics of broadband. It requires massive amounts of fiber (in San Francisco, three fiber-connected small cells per block will be needed), and signals are interrupted by foliage, windows, walls and weather. The operating costs are much higher than for fixed broadband. And it's doable only if you don't have to serve everyone. You might be able to serve one side of a building, say, but not the other side. Verizon is putting a ton of money into it, but it may work only in limited cases.
- If you're building fiber infrastructure but not wireless, do you have to worry about 5G wireless as an existential threat? The answer is complicated. 5G wireless will be your competitor, but your fiber infrastructure will be the platform for 5G.

10.5 Craft breweries. We don't know why, but craft breweries seem to flourish in towns that work.

In summary, the United States has always had economic troubles, migration and adjustment. Community efforts to provide connectivity, opportunity and quality of life are what make a difference.

RUS Broadband Pilot Program

Robert Tse, USDA

Robert Tse, USDA: Since 2010, the Rural Utilities Service has awarded $6.2 billion in loans and grants for rural broadband. Funding streams include the telecommunications infrastructure loan program, the Farm Bill broadband loan program, the distance learning and telemedicine grant program (which just got a new infusion of funds to address the opioid crisis) and the Community Connect grant program. Now there's a new funding stream, the broadband pilot program appropriated by Congress in fiscal year 2018. RUS is writing regulations for this $600 million program. By using a combination of loans and grants, RUS expects to leverage the $600 million to $1.2 billion. It will issue regulations early in 2019 and hopes to announce the first awards in fall 2019.

The fact that Congress, on its own, added this program to the spending bill tells you the importance to legislators of broadband for rural America. This is the only bipartisan issue here.

When RUS asked for comments on the regulations, it received two to three times the normal amount of comments. The largest number of comments was from individuals – which is also unusual – but state and local governments, rural telcos and co-ops, trade associations, broadband nonprofits and technology companies also filed comments. Everyone agreed that broadband was needed in rural areas and that there was insufficient access today – the level of dissatisfaction was 88 percent. Eighty percent of commenters said affordability was an issue.

About 50 percent of commenters said new infrastructure should be fiber because reliability is so important. Wireless providers thought the new infrastructure should be wireless, and satellite companies thought it should be satellite. A few technology companies thought TV White Space spectrum should be used for farm fields.

Commenters offered opinions about allowable speeds, and most suggested 50 Mbps/50 Mbps, 100 Mbps/100 Mbps or even symmetrical gigabit service to meet future needs or current business needs. Most comments supported overbuilding existing networks even though the law does not allow funds to be used for that purpose. Everyone rejected the National Broadband Map and suggested alternative ways to test existing service.

Other comments included these:

- Funds should be awarded as block grants to states.
- Alaska should be in a separate category.
- Latency and other measures should be considered in addition to speed.
- The program should fund open-access networks focused on business needs.
- The program should fund underserved as well as unserved areas and focus on building systems to meet future needs.
- Utilities, including irrigation districts, should be explicitly listed as potential recipients.
- Fairgrounds should be able to serve as emergency communications centers.
- Because new agricultural technology depends heavily on broadband, the program should include a demonstration project for farms.

Communities and Partnerships

CC COMMUNICATIONS: A 129-YEAR-OLD MUNICIPAL NETWORK

Mark Feest, CC Communications

Mark Feest, CC Communications: In 1889, the city of Fallon, Nevada, faced a problem: Western Union left town, and no private company wanted to buy the telegraph line. So Churchill County bought the system and upgraded it to telephone. In 1907, the state legislature told the county it had to make the network a separate financial entity and could not issue bonds for network infrastructure.

The cable company put broadband into Fallon before anywhere else, and suddenly we found ourselves in a competitive environment. So we started a fiber build in the mid-2000s, and our network is now mostly fiber to the home.

The challenge of the municipal model is scale and scope; that's why partnerships are important. We had access to only 26,000 customers, so we tried to increase our scale by operating as a competitive provider outside our territory. First we offered service to an industrial park between Fallon and Reno. There was no middle-mile network to connect to, so we had to build all the way to larger cities. Then we transitioned to moving traffic among data centers and between the data centers and their business customers. We're looking at the whole regional market instead of just at unserved customers. We're finding

partnerships with those who have operated in a competitive environment.

The company continues to invest to produce better products and the next generation of services. That's how we're different from a utility.

CULVER CITY, CALIFORNIA

Michele Williams, City of Culver City

Michele Williams, City of Culver City: We've just launched Culver Connect, a dark fiber network, as an economic development initiative. The city made a significant investment in commercial-grade infrastructure to bring in additional connectivity options for the business community. We allow other ISPs to license the infrastructure. We have executed a contract with one ISP, and we're in negotiations with three or four others.

Culver City started this project because the business community expressed dissatisfaction with its internet options. We reached out to businesses to find out about their needs and the service gap, but we recognized early on that we didn't have the skill sets and resources to build and operate a network, so we found someone who did. We contracted with MOX Networks in 2014. MOX did the initial analysis, design configuration and project management. We're just on the cusp of operational mode. MOX will operate the network.

A number of our processes needed to be shaken up to operate a commercial-grade network open to the community. We may be good at managing rights-of-way and permitting, but to run an entrepreneurial network, we had to change and be flexible. This was a top-down initiative for the city, so when we explained to the city manager and city council why we needed to change, they were supportive.

One of the goals was to reduce construction in the right-of-way. Because this utility is available, there's a lower cost of entry for providers, who don't have to make that investment. We have "dig once, dig smart" policies. We work with those who come to the counter [for permits], asking them if they know the city has this dark fiber asset that they can license. If they don't want to use it, we can still streamline the processes for them.

There's a lot of value to having an industry expert sit at your right hand, but this is not a traditional public-private partnership. Traditionally, a private firm is looking for high risk and high return. We deviate from that. This network is wholly owned by the city; it's a capital investment that the city made. MOX is the operator.

We're joined at the hip with MOX. There's constant communication. We've learned how many individuals it takes to make this project work – even inside city hall, we have public works, finance, IT and legal. It's all about communication and working together. Just because the answer is, "We've never done it that way before" doesn't mean we can't do it today. Dealing with other municipal entities can be hard – we had to cross the train tracks, and that took a year. It puts things into perspective! ❖

CONVERGING FTTH AND 5G NETWORKS

John George, OFS

John George, OFS: Between 50,000 and 80,000 small cells are in place today; to cover only the top 25 U.S. metropolitan areas with 5G will require 10 million small cells and 1.4 million miles of fiber. Clearly, this buildout will take decades to complete. But there are ways to make the process more efficient by combining it with other efforts. For example, if a city is upgrading its streetlights, it has an opportunity to add small cells at the same time.

In addition, building out FTTH and 5G together creates efficiencies. New technology makes it possible to converge the fiber networks that serve businesses, homes and cell sites. Verizon and AT&T are doing this, and smaller operators, including municipalities, can follow their lead.

Innovations that will help deployers handle massive fiber counts include:

- Compact fiber cables, including rollable ribbon cable that doubles the number of fibers that can fit into a space but is still easy to splice, as well as ultrathin fiber for small cells
- Microcables that can be blown into duct in microtrenches
- Better ways of mounting cables, including versatile strand-mounted terminals
- Plug-and-play terminals and end points.

Kevin Wynne, Comsof

Kevin Wynne, Comsof: We conducted simulations using the FiberPlanIT design software to calculate the savings that would result from deploying FTTH and 5G wireless together in a dense urban area. Using FTTH deployment as a baseline, deploying a converged FTTH/5G network would increase the cost about 16 percent, and deploying a wireless network separately would increase the cost by about 60 percent.

How to power the small cells in a 5G wireless network is an issue that needs to be considered. It can be accomplished via Power over Ethernet, but in some cases the cost of power may jettison the business case for 5G.