

## ULTRA BROADBAND AND SMART GRID – BOOSTING QUALITY OF LIFE AND ECONOMIC DEVELOPMENT

Situated next to the major university city of Auburn, close to Columbus, Georgia and a bit over an hour from Atlanta’s international airport, Opelika is part of a greater metropolitan area with approximately 110,000 residents. In 2013, Opelika, Alabama has joined the ranks of the world’s most advanced cities for communications infrastructure, boasting a municipally owned 1Gbps fiber-to-the-home (FTTH) network that not only provides infrastructure for a smart grid project, but already is giving residents and businesses the access to high-quality triple play services and is bringing social-economic benefits gains to the city.



The city had three goals: to upgrade its electrical grid, provide more broadband choices for residents and further strengthen its economic platform to attract new businesses and diverse employment opportunities in the years ahead. Opelika completed a feasibility study for the project in 2009, proving its viability. That was followed by a public hearing and city-wide referendum in the summer of 2011 in which citizens approved the initiative.

The triple play services are managed by the municipally owned utility called Opelika Power Service (OPS) and are offered in several tiers, with 1Gbps expected to be available for residential and corporate customers by this month. The service passes by 16,000 homes

and already is generating millions in revenue annually, according to city officials. Thanks to its advanced, city-wide broadband network, Opelika is now well positioned to compete in the new millennium, and expects to earn back its investment within five years.

This issue of GridTalk looks at how Opelika can be a model for communities everywhere that are ready to boost not only their energy efficiency, but their economic platform and quality of life. Four experts provide their perspectives on the economic, social and technical considerations that go into such an initiative, identifying key challenges, highlighting their own experiences and providing a blueprint for the future.

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# COMMITTING TO THE CITIZENS: OPELIKA'S BROADBAND GAME-CHANGER

WITH GARY FULLER, MAYOR OF OPELIKA, ALABAMA

## HIGHLIGHTS

- Opelika's Ultra Broadband network – the most advanced in Alabama – will enhance every aspect of the community's social fabric, now and in the future.
- Opelika is banking on its broadband network supplying an advanced communications platform that will attract new businesses to the area.
- The FFTH network extends to all parts of the city in order to provide valuable service to lower-income areas.
- Opelika expects its triple-play services to become a significant income generator, allowing it to improve on the US \$3 million it already contributes annually to area schools above and beyond their tax-based budgets.

Frustration with the local cable television service in the late 2000s set Opelika Mayor Gary Fuller on a path that has resulted in a new Ultra Broadband network – the most advanced in Alabama – that will enhance every aspect of its social fabric, now and in the future. “The citizens here have owned Opelika power for over 100 years, which has made our rates very attractive”, he says. “However, we had only one cable television provider, with high prices and poor customer service.” Fuller looked to bring in a commercial competitor, but it was a slow go, with no commitments.

“The internet speed is a big deal to the young people, so we think that we are going to be attracting a younger demographic to our community.”



Then, in 2008 the city started looking for ways to improve its electrical distribution system. Fuller attended a conference in Washington where he ran into a former colleague who was now managing a successful municipal broadband network in Tullahoma, Tennessee, and that provided the needed synergy. “It became clear that the capacity of fiber is such that we needed to fully utilize it with video, ultra-high-speed internet and television service,” says Fuller. “So we did a feasibility study in 2009 and determined that it was possible. We started building a couple of years ago, resulting in 425 miles of fiber carrying triple play across the city today.”

Opelika's triple play services have helped to bring down rates and increase service, and other providers can't touch them on the higher speed levels. “There is a huge difference in the Internet service,” Fuller notes. “The internet speed is a big deal to the young people, so we think that we are going to be attracting a younger demographic to our community, which will be great because it will infuse us with new energy and vitality. This is a real improvement for everyone.”

## BUILDING A STRONG ECONOMIC PLATFORM

Opelika is banking on its broadband network supplying an advanced communications platform that will attract new businesses to the area. “We have numerous industrial parks here that already have drawn several large successful businesses, and we feel that fiber can be a tool to attract more,” says Fuller. “When businesses look at a community in which to invest, they look at education, the libraries, and certainly having that fiber as well will be

a tremendous calling card. Fiber and broadband is now certainly in the top ten reasons for why companies want to relocate to a certain location, and this gives us something that no other city in Alabama has."

Fuller also believes that the network will be a great asset for existing businesses. "Our largest employer here is the East Alabama Medical Center. In the past, they did not have an efficient way to send large diagnostic files such as MRIs to other distant healthcare facilities such as Johns Hopkins. At some point we'll have the medical center as part of our network. The same with our schools, our community college and prospective new industries. It will make us attractive for business such as data centers," he says.

"Having broadband is critical for a city these days, having the same impact as the railroads, the airlines and the Interstate Highway System one did."

"Having broadband is critical for a city these days, providing the same impact as the railroads, the airlines and the Interstate Highway System once did. This technology is the future, and I think that the full impact will be greater five or ten years from now than it is today, because it's going to be ever more critical for companies to have that speed of communications. This is the new interstate."

### REACHING OUT TO ALL

In designing and deploying its broadband network Opelika has not focused selectively on affluent neighborhoods where it could get higher-value subscriptions, instead committing to go to all parts of our city. "Our commitment was to serve all of our citizens" says Fuller. "We don't have the earnings pressure that a private sector company would have, so we can do some things purely because they're good for the community."



Fuller points out that broadband is going to be important for helping those low-income areas with better educational resources and economic success going forward, working more closely with Opelika city schools and their communities to bring them all of the benefits of high-speed broadband. "They have lots of computers at the schools, but at some point maybe there's a way we can make notebook computers or tablets available to them in their homes and churches. Right now our citizens can go to the library to do that."

### CITIZENS RESPOND TO NETWORK'S BENEFITS

"The citizens of Opelika own this telecom, so if you take the triple play services you're doing business with yourself, and that seems to resonate with a lot of folks," Fuller says. "We appropriate US \$3 million each year to city schools above and beyond the property tax revenue they get. Part of that we can do because of the income that we have from Opelika Power Services (OPS). And one of these days this telecom/triple play will become a profit center, and we'll be able to do even more for our schools, our libraries, recreation, public safety and all of those other things citizens want their community to provide to them. It absolutely has an impact in keeping our already-reasonable property taxes in check."

Opelika's triple play offerings also have benefited its citizens in the area of customer service, according to Fuller. "With the incumbent provider you would call up and be put on hold for 10 or 20 minutes, and then they'd tell you they'd be there

Friday afternoon between one and five, so you squander your whole afternoon waiting for them to show up. I recently had a friend tell me that he called the help desk at OPS on Sunday saying that he had lost the sound on the HD channel for Fox NFL football. She directed him to the SD channel and said that if he would check back in about 10 minutes it should be repaired, and sure enough that happened. He told me that the best thing about the experience was that they answered on the second ring. They solved the problem quickly, and also there's a comfort factor when the person you're talking to could be your neighbor." Fuller adds that with such local service dissatisfied customers can directly call the mayor or council and get to the decision makers fairly easily.

### READY FOR THE FUTURE

"In our county we have about 110,000 people. Auburn has about 60,000, plus 25,000 university students. Columbus Georgia and Fort Benning is only about 30 miles to the southeast. We can be at the Atlanta Airport in an hour and fifteen minutes. The new Kia plant in Westport GA is only 18 to 20 miles from Opelika and we're less than 60 miles from the Alabama capital in Montgomery," Fuller says. "When we were planning this, we kept the diversity of the larger metropolitan area in mind. I think that we now have the infrastructure in place so that we can serve many more customers than those in the Opelika city limits. When the timing is right, a few years from now, we can look at what's next and where we want to go. I think we have a lot of opportunities."



# COMMUNITY-WIDE BROADBAND: PLANNING FOR A CONNECTED FUTURE

WITH JIM BALLER, PRESIDENT OF THE BALLER HERBST LAW GROUP

## HIGHLIGHTS

- **Communities can start planning for their connected future by considering a common set of economic factors.**
- **Municipal utilities have several resource advantages for getting a community-wide broadband project off the ground.**
- **Public-public partnerships are becoming more popular.**
- **Municipalities should consider four levels of regulation when assessing the feasibility of community-wide broadband.**
- **It is crucially important to consider the regulatory environment, overstate costs, understate revenues and confirm community support for such a project.**

The extensive fiber to the home (FTTH) broadband project for smart grid and triple play undertaken by Opelika, Alabama, population 28,000, can serve as a model for communities looking to better their quality of life and support new business development. Though one size doesn't fit all, communities looking to follow in Opelika's footsteps can start planning for their connected future by considering a common set of economic factors.

Different municipalities have developed unique business cases that play to the conditions that exist in each one. Jim Baller, who as President of the Baller Herbst Law Group advises local governments, public power utilities and other entities on a broad range of telecommunications issues, notes that some communities have advantages that increase their chances of developing a successful project.

"For example, if a community owns and operators an electric utility, it will have several advantages," he says. "It will be able to leverage its need for high-capacity communications to run its core operations, including advances in smart grid technology, in metering and in sophisticated uses of the network. It will have at least a couple of potential anchor tenants – the utility itself and the local government – and possibly also the school system and other institutions, such as hospitals and airports. It will have ongoing customer relationships of all kinds – industrial, commercial and residential. It will have convenient access to poles, ducts, conduits, rights of way, towers, rooftops, etc. It will have substantial experience with

billing, customer service, and technical support. It will also probably have a high reputation in the community, earned through decades of high quality of service and good citizenship. To go from there to providing communications services is a much smaller step for such a community than it is for one that has to get all of that kind of support from the outside. Even so, there is plenty of such help available to communities that do not have their own electric utilities."

## INVESTMENT STRATEGIES AND PARTNERSHIPS

Baller notes that investment and business models for community-owned broadband continue to evolve. "Some years ago, one would do a feasibility analysis based heavily on revenues and costs from providing residential triple-play services – voice, video and high speed internet. Today there is much greater recognition of the need to bring in revenue from multiple sources," he says. "Today, community broadband networks aggressively seek revenue opportunities in a broad range of areas, including healthcare, transportation, education, public safety, high-tech manufacturing, and much more. The need for wireless is also growing by leaps and bounds, so there is much more attention to leasing and feeding towers and sites to support that technology – another example of new sources of revenues that have emerged over the last several years. "

"There are lots of pockets of funding if one knows how to look for them."

There are other funding sources as well. “Rural communities in the U.S. may be able to get support from the Department of Agriculture’s Rural Utility Service,” Baller suggests. “The U.S. Department of Commerce offers funding opportunities to support economic development. The FCC has recently solicited proposals for experimental projects in hard-to-serve rural areas. The Administration has substantially increased funding to support high-end connectivity for schools and libraries. In some areas, planning grants are available for the spade work that needs to occur initially to conceptualize and build support for projects. In short, there are lots of pockets of funding available to those who know how to look for them.”

Partnerships come in many varieties and are an important part of the broadband services and investment equation. “Some years ago, when Congress was looking into the importance of public-private partnerships, we provided them information about a municipal provider that had six private partners on its network offering, among other things, long distance telephone, wireless backhaul, security services, and services tailored to college students. In addition, the private sector is also pervasively involved in municipal projects in other ways that are often overlooked. For example, municipalities work with private consultants, private engineering companies, private lending institutions, private law firms, and private

construction firms. In other words, there’s no such thing as a purely public broadband network.”

Baller notes that public-public partnerships are becoming more popular. “Communities are increasingly forming joint action organizations or developing inter-local agreements to work with one another to provide bigger markets with greater variety and depth,” he says.

## REGULATION AND OTHER HURDLES

Baller notes that in some regions, regulation limits the business options for public entities that want to get into broadband-based telecom services. He breaks these kinds of regulation into three categories:

- 1. Authority Issues:** Baller defines these as requirements that dictate what a public entity can or cannot do. “Approximately 20 states in the U.S. have incumbent-driven laws that impose restrictions of some kind. For example, some states have flat prohibitions on some kinds of services. Some states prohibit cross-subsidization and require public entities to hold a referendum, create an enterprise fund for communications services, and/or impute into their rates the taxes and other costs that a private entity would incur. Some impose various other kinds of obligations. What these laws all have in common is that they reflect the incumbent carriers’ intent to make public projects as costly and unattractive as possible for the communities involved,” he says.
- 2. Organizational and Development Issues:** “Once you get past the authority issues, you must address the legal issues that surround the organization and deployment of your project. These range from routine registration and reporting requirements to the more complex issues posed by the need to choose the right kind of business organization (e.g. branch of local government, non-profit, cooperative, etc.), environmental issues,



access to additional infrastructure, access to video programming and other content, access to customers (particularly in multi-tenant environments), and project finance. For example, some states require revenue bonds on projects of certain kinds, while others allow general obligation bonds or certificates of participation. There are also a wide range of financing tools, such as Tax Increment Financing, that may be available to network developers,” Baller says.

### 3. Federal and State Compliance Issues:

After an entity has deployed its network, it must comply with numerous federal and state regulatory requirements. These requirements tend to differ from service to service. For example, Baller notes, “Broadband Internet access is generally unregulated at either the federal or state level, while telecommunications and cable services are usually subject to a patchwork of federal, state or local requirements. Depending on the service, there may be rules governing interconnection, collocation, privacy, equal employment opportunity, access for disabled Americans, universal service obligations, and other issues. The federal and some state rules also provide for various incentives, such as subsidies under the federal and state universal service programs.”

“We’ve never had a time when the importance of access to high capacity networks was as well recognized as now.”

Internationally, requirements and incentives vary from region to region. Sweden stands out in that it encourages broadband services provided by municipalities and publicly owned electric utilities. “In countries such as Sweden, much of their global leadership is attributable to their heavy reliance on locally owned networks,” Baller notes, “while in other places this space tends to be dominated by the incumbent carriers.”

Adds Baller, “If you’re not constrained by state barriers and are going to become a provider of communications services, you are going to have to cope with a variety of legal requirements. Take heart, however, because these requirements are generally manageable. Scores of your predecessors have managed to deal with them, and you will as well.”

### TAKING THE NEXT STEP

“We’ve never had a time when the importance of access to high capacity networks was as well recognized as now. We now have hungry communities across the country seeking to take advantage

of the opportunities that high-capacity networks can give them, and there are a variety of ways in which communities are trying to build or acquire such networks,” Baller states. “High-capacity broadband networks are increasingly becoming today what electric networks were a century ago – a critical platform and a driver for just about everything that we’re going to be doing at work, at home or at play.”

For communities looking to build out broadband networks, Baller says that it is crucially important to be conservative. “Ask lots of questions, particularly of communities that have already developed their own networks. They’ll be glad to help. Get sound advice from experienced, reputable consultants. Consider the regulatory environment. In your projections, overstate potential costs and understate potential revenues. If you’ve still got a viable opportunity and the community is behind you, then this is definitely something that can offer high rewards for the community. But keep in mind that every community is different in its leadership, its resources, its business profile, its competitive environment, not to mention its ambitions, its perceptions of it needs, its population density and many other factors. In the end, if you decide to go forward, we and others will be there to help.”

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# CONNECTED: OPELIKA'S ULTRA BROADBAND SUPPORTS SMART GRID AND ADVANCED CONSUMER SERVICES

WITH DAVID HORTON, DIRECTOR OF OPELIKA POWER SERVICES, AND JUNE OWENS, MANAGER OF MARKETING AND COMMUNICATIONS, OPELIKA POWER SERVICES

## HIGHLIGHTS

- Opelika, Alabama's new fiber optic network supports a smart grid deployment and advanced consumer communications services, television, telephone and broadband connectivity up to 1Gbps.
- Opelika anticipates capturing 35 to 38 percent of 16,000 homes, and revenue this year of US \$336,480 for telephone, US \$738,000 for Internet and just over US \$1 million for video services during the first full year of its offering.
- Opelika is now well positioned to compete in the new millennium, and expects to earn back its triple-play infrastructure investment within five years.

In Opelika, Alabama (population 28,000), a new Ultra Broadband network based on fiber optic that spans the entire city has not only provided the infrastructure for a smart grid, but already is giving residents and businesses the opportunity to access high-quality voice, high-speed data and video services, including lightning-fast Internet access, IPTV and video-on-demand services.

Situated next the major university city of Auburn and close to Columbus, Georgia and Fort Benning, Opelika is actually part of a greater metropolitan area with hundreds of thousands of residents. It's also at the confluence of several major highways, a little over an hour from Atlanta's international Airport and 45 minutes from the state capital in Montgomery. For all of those reasons, the city had every reason to invest in its digital future.

"Much of our original motivation to do this had to do with economic development and competition for services so that the citizens can have good, affordable options."

"Much of our original motivation to do this had to do with economic development and competition for services so that the citizens can have good, affordable options," confirms David Horton, Director of the

municipally owned Opelika Power Services (OPS), which serves 15,000 customers.

"With the smart grid you achieve efficiencies in detecting and acting on problems, on controlling consumption and so forth, and then with the triple-play you create a revenue source."

Opelika completed a feasibility study for the project in 2009, proving its viability. That was followed by a public hearing and city-wide referendum in the summer of 2010 in which citizens approved the initiative. By that fall work began to deploy a city-wide FTTH backbone with Alcatel-Lucent's Gigabit passive optical network (GPON) technology.

"With the smart grid you achieve efficiencies in detecting and acting on problems, on controlling consumption and so forth, and then with the triple-play you create a revenue source."

The project includes full services and integration of the Alcatel-Lucent [Triple Play Express](#) solution for regional operators. To allow the City of Opelika to deliver voice, data and video to residents, Alcatel-Lucent's Optical Network Terminal (ONT) is deployed at residences, supported by the 7360 Intelligent Services Access Manager (ISAM). The 7750 Service Router provides service aggregation, bandwidth management and subscriber control, with the OmniSwitch 6850E handling aggregation system management switching. Alcatel-Lucent also is the integrator of the City of Opelika's IPTV service.

### TRIPLE PLAY LAUNCHES

Opelika's triple-play service launched on October 16, 2013 to great fanfare. "There was a huge article in the next morning's paper and we had a line outside of our front door, waiting for us to open," says June Owens, OPS's Manager of Marketing and Communication. By January 2014 OPS had signed up over 747 residents for its triple-play services. To boost general knowledge and subscriptions about the innovative project, Opelika presented

via video [typical triple play customer explaining the service's benefits](#), as well as a historical and modern perspective from [Mayor Gary Fuller and his wife, Laura](#).

"We pass by about 16,000 homes, and the studies we have done say we should capture 35 to 38 percent of those, ending up with 4,000 to 5,000 customers," says Horton. The Internet service is offered in several tiers, with 1Gbps expected to be available for residential and corporate customers by March 2014. Opelika anticipates revenue this year of US\$336,480 for telephone, US\$738,000 for Internet and just over US\$1 million for video services during the first full year of its offering.

"We pass by about 16,000 homes, and the studies we have done say we should capture 35 to 38 percent of those, ending up with 4,000 to 5,000 customers."

The triple play services are managed from within OPS. The broadband rollout increased the staff from 30 to 45 total employees, with only a few working exclusively on triple play. Owens says that most staffers focus about 80 percent of their time on either the electric or telecom side, but still divide their duties. "When you get down to it, there are only three people who are working only telecom – who aren't touched by the power end," she notes. "We do have people related to the headend, though the power side also touches them due to the network integration. We also have service technicians who handle the trouble calls on the triple play side."

The smart grid portion of the project is still in development, with test meters currently in the field. Fault detection, teleprotection, SCADA and advanced automation throughout the grid are part of the entire plan to be executed on the electric power side. "Whenever we have a problem, whether someone knocks down a power pole, or we have a piece of equipment that operates inefficiently, this will give us the opportunity to see it more quickly and respond in a faster way," Horton notes. "It will enable us to become more efficient, get to a problem area quicker, do switching without actually having to go to the scene and get people back on the grid much more quickly. It allows us to be more proactive than reactive."

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### READY TO COMPETE

Thanks to its city-wide Ultra Broadband network, Opelika is now well positioned to compete in the new millennium. "We have talked with many existing businesses



about their current limitations and how the bandwidth OPS, will allow them to be more efficient, more productive, resulting in more revenue,” Owens says. “For example, Ford mentioned that it currently takes over an hour to update a car’s computer system, and they believe with OPS they could do this in five minutes. So do the math: how many more cars could they schedule each day, resulting in how much more revenue in a day?”

“What we know today is what our infrastructure can do, it can provide bandwidth that people can only begin to imagine ways to utilize to the fullest.”

Owens also cites the many advanced services provided by Opelika’s East Alabama Medical Center, which include a cardiology unit, cancer center, diabetes

and nutrition center, imaging center, sleep, wellness and many other services. “Many of their diagnostic tests are performed at clinics that are located away from the hospital, including many in Auburn, with results transmitted across fiber that Knology leases from OPS. Going forward we would like to be a part of what the hospital is doing and do it for them in a much bigger way, providing bandwidth for telemedicine, provide real-time teleconferencing to help physicians help other physicians and patients,” she notes.

“What we know today is what our infrastructure can do, it can provide bandwidth that people can only begin to imagine ways to utilize to the fullest. People ask the question ‘Who would need a gig?’ Until it becomes available to them, they won’t know. The possibilities are now abilities. When you think of how crucial it is for someone to get MRI results immediately rather than taking hours to download. It could be the difference

in quality of life if a physician can react quickly to an emergency situation. Something we believe in is that this network will allow people to test and develop ideas they have.”

“The excitement from our team and the people and businesses we serve already has been rewarding.”

“The excitement from our team and the people and businesses we serve already has been rewarding,” says Horton. “When you grow up in a community like this, you really have a great desire to create a place where, after your children leave home and go to school, they can come back, find a decent-paying job and raise their own families. The fiber network is the opportunity to bring diverse industry with good pay and a great environment to help make that happen.”





# SUCCESS STRATEGIES: MAKING MUNICIPAL ULTRA BROADBAND WORK

WITH MARK MADDEN, REGIONAL VICE PRESIDENT, NORTH AMERICAN UTILITIES,  
ALCATEL-LUCENT

## HIGHLIGHTS

- **Municipal Ultra Broadband network provide numerous benefits when it is leveraged to support both utility and consumer services.**
- **Fiber is future-proof, providing a 30-year infrastructure which otherwise wouldn't have existed.**
- **The largest challenges for deploying municipal broadband are political and financial.**
- **Effective partnerships are key to achieving success in planning, financing, deploying and operating municipal broadband.**

Municipal Ultra Broadband can provide a better quality of life and competitive advantages – especially when it is leveraged to support both utility and consumer services. In Opelika, Alabama, a Gigabit fiber to the home (FTTH) network originally conceived for the power utility already is generating millions in additional triple play revenue, demonstrating that the model can be highly effective for mid-sized cities. In a larger market, such as Chattanooga, Tennessee, the economic benefits are magnified. There, a regional Gigabit passive optical network (GPON) has attracted both capital and a new population of computer programmers, entrepreneurs and investors, creating about 1,000 jobs in the last three years, plus:

- \$100 million per year in improved grid efficiency
- Improved service reliability that saved \$40 million per year saved through new reclosers and being able to negotiate better rates from the Tennessee Valley Authority
- \$4 billion worth of business investment in the region.

Following in Opelika's or Chattanooga's footsteps is an alluring prospect. Still, how do you get it done? Mark Madden, Regional Vice President, North American Utilities, Alcatel-Lucent, spoke recently with GridTalk about the benefits and challenges facing municipally owned utilities looking to build their own success stories with advanced fiber networks.

**GRIDTALK:** What factors make the business case for a Utelco broadband network buildout especially attractive now?

**MADDEN:** It starts with the whole smart grid story – being able to deal with distributed energy resources, being able to provide reclosers – all of those devices need the underlying communications. You may or may not improve the cost structure for electricity and other services, but within the utility itself there are substantial monetary savings to be had by being able to do load management, demand-side management / shaving off peaks – all enabled by this kind of communications capability. Back in the 1990s fiber was overbuilt, but now all of the consumer applications are conspiring to increase demand, so once again there is a market to go after that business. There is this mad scramble to put bandwidth out there, and anyone who doesn't have it is fundamentally disadvantaged. And fiber is future-proof. If you can find a way to pay for the fiber to every home out there, you've put in a 30-year infrastructure which otherwise wouldn't have existed.

“There is this mad scramble to put bandwidth out there, and anyone who doesn't have it is fundamentally disadvantaged. And fiber is future-proof.”

**GRIDTALK:** How can a municipal broadband network improve the economic platform of a smaller city?

**MADDEN:** Companies are looking to get to that lower labor cost found in smaller communities, but they also want the ability to attract the most highly skilled people,

as well as provide advanced services for themselves. The community benefits by growing the population with a higher income demographic and improving its overall tax structure, which leads to better roads, better schools, and eventually builds on itself. We have several existing mid-sized customers who already have gone down that path successfully, including Opelika, Bristol Virginia, Lafayette, Louisiana and Holland, Michigan.

**GRIDTALK:** What is the largest challenge facing a community looking to go this direction?

**MADDEN:** Probably the largest challenge is political. Regulations in some US states make it very difficult for a municipality to enter into a competitive situation. In such cases there may be an opportunity for a utility to provide open access, but not commercial service, even though utilities have long been in the business of providing backhaul and bandwidth for telcos. On the local level, there needs to be somebody within the community who is a sponsor or advocate, and you need to be able to convince your taxpayers that this is actually a good investment.

**GRIDTALK:** What are the creative solutions for funding projects such as these?

**MADDEN:** There are a lot of creative ways to get funding. We've got one utility right now that is floating municipal bonds that will be paid back down through fees. We also have a customer where the city has given the utility money, and the city will get that money back as payments in lieu of taxes. In many less-dense areas, the business case for the local telephony provider or a startup Internet Service Provider has challenges – especially with reaching customers, so that also presents creative options for the utility in helping them do that through the fiber network. It certainly contributes to the business case for both parties, which by themselves may not have been able to make it work. In rural places you potentially could see cooperation between a utility providing backhaul services back to the carrier in

order to convince them to put an LTE macro cell out to provide that service.

The Rural Utility Service often provide low-cost loans, and the Federal Communications Commission (FCC) in US has taken some of the Universal Service fund and put it aside into something they call the Connect America Fund, which is primarily for providing high-speed internet service to rural areas and communities that ordinarily would never see it, opening up educational opportunities, connecting hospitals and government entities and generally improving communications, knowledge and information-sharing.

**GRIDTALK:** What should a utility consider in terms of network architecture for a successful project of this type?

**MADDEN:** Scalability, flexibility, reliability and security are the most important technical considerations. There are technologies that lend themselves to those kinds of things, and you reach a point where the scalability of GPON overwhelms point-to-point architectures. You need to look at

how many people you're serving, how far it needs to go, what's the density and what applications are you going to provide over it. The FCC is looking for letters from rural utilities on how they would deploy Gigabit service should they get money. So go with the architecture that allows scaling for your future needs. And, remember that it's not just about the fiber, but about the actual electronics that are put on it.

“You need to look at how many people you're serving, how far it needs to go, what's the density and what applications are you going to provide over it.”



**GRIDTALK: What should a utility look for in its technology and business partners?**

**MADDEN:** Partnerships can take a lot of different directions, particularly if a utility is going to provide triple play services. Typically you need to partner with a content provider and somebody who has an existing headend if you're not going to provide that content yourself. We see utilities in partnerships where one party might own and operate a headend, while the infrastructure and the customer relationship remains with the other. We also need to be able to partner with the electronics vendors to bring testing and evaluation to provide the solutions that are going to work reliably.

Fundamentally, any municipal broadband venture is a partnership between the city, the city-owned utility, and in most cases they've created a city-owned telco in order to get around that political process. So that's a partnership just within the municipality itself. The city has funds

or a way to get them, the utility has the physical infrastructure and operates it, the telco operates the contents and the active electronics to serve the consumer. Outside of North America, we've got companies such as St.Gallisch-Appenzellische Kraftwerke AG (SAK) in Switzerland, which supplies electricity to about 450,000 people, over 90 local resellers and over 170 industrial plants. Under an open access model, all service providers have access to the network and can provide their telephone, Internet and TV services to the residents of nearby cantons.

**GRIDTALK: Overall, what advice would you give to utilities looking to enter the marketplace for broadband and telecom services?**

**MADDEN:** Find a development partner who can help you navigate through the complexities of building out the financial model, working with you to understand what services you should and are able to provide, and then be able to work with

you to provide and deploy the technology. There are a lot of people out there who are selling the pieces of it, but you really need somebody who understands the entire solution. Generally speaking those skills are not going to be in house. You also need to start examining your opportunities for funding. You need to understand the kinds of services you need to provide for your community so that the payback period becomes palatable to you and whoever is helping with the financing.

**GRIDTALK: What does the future of municipally owned broadband networks look like to you?**

**MADDEN:** There is a lot of active interest in this right now. If there is a definite push by the political entities, whether at the national or regional level, to make these services available, then I see a lot of utilities getting into it because they already have the customer base and the needed infrastructure. The political environment is a key factor. That's fundamental.

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