

# **Municipal Telecommunications and the Digital Divide**

A White Paper by



**THE SHPIGLER GROUP**  
STRATEGY MANAGEMENT CONSULTING SERVICES

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***Today, many small municipalities are finding it valuable to pursue telecommunications opportunities absent investment through the private sector. These “munis” are finding opportunities to lead their communities across the digital divide and offer real economic development – and at times, offer a greater breadth of services than those found in considerably larger cities. Now, we can establish how these efforts offer positive financial returns for these communities.***

### ***1. Overview of the Telecom Market and the Drive to Establish Municipal Operations***

Only a few years ago, telecommunications operators were only too eager to deploy massive buildouts of network infrastructure in what might be called a “land grab” strategy. Given the imminent explosion of customer demands for data transmission, they reasoned, every provider would need to develop their own capabilities to serve the burgeoning customer demand before competitors would capture the value. Initially, extensive long haul capacity backbone networks were built out by new providers like Williams, Global Crossing, and Qwest in order to support the need for cross-country and even trans-world transmission of data that many felt could not be supported by the existing legacy networks of incumbents. However, much of the fiber deployed during this construction phase now lies dormant as much of the anticipated demand failed to materialize. At the same time, tremendous advances in technology including the development of DWDM equipment meant that the already excessive supply relative to demand was now even more excessive. As a result, pricing for capacity on these routes has fallen in dramatic fashion and many of the providers themselves have either filed for bankruptcy or find themselves in perilous financial condition.

While tremendous overcapacity was being built on long haul routes, there was a definite shortage of fiber infrastructure within the metro region. The need to access critical points within the metro including data centers, collocation facilities, carrier hotels, ILEC wirecenters, telco PoPs, and large enterprise facilities remained as an opportunity for a new breed of builders. The first of these metropolitan area network (MAN) builders was MFN but was soon followed by others like Looking Glass. Newer providers still like Yipes,

Telseon, and Cogent brought a new business model featuring a “lease n’ light” strategy to the metro as well. In all, the operating path for many of these operators was similar – they went to where the greatest opportunities were – the largest Tier 1 markets. Very quickly, markets like New York, San Francisco, and Chicago featured fiber builds with literally thousands of strands of fiber running through conduit to offer intra-market connectivity. In time, the effects of competition took hold and these operators also found themselves fighting a most challenging battle. The initial and most aggressive MAN builder, MFN, recently filed for bankruptcy.

While fiber networks in Tier 1 markets were being built up, smaller cities found less attention being paid to them. It can be argued that there exists a fiber glut in New York City – however, the same cannot be said for places like Pittsburgh or Minneapolis or Salt Lake City. In many of these cases, a market with 50% of the population of a Tier 1 market finds itself with less than 10% of the fiber infrastructure. Today, there are other infrastructure developers seeking to capture the value within these markets. American Fiber Systems and Global Metro have focused on bringing the MAN to smaller Tier 2 markets. New technological tools are being utilized by operators like CityNet (fiber laid by sewer robots) and Sempra Links (fiber-in-gas) to reduce the costs of traditional builds. The success or failure of these operators will depend upon the maintenance of a balance of supply and demand for fiber as well as their ability to achieve operational effectiveness.

However, while all of this is happening in major markets, smaller municipalities are being left behind. Given the funding constraints currently being experienced by telecom players, network operators are choosing to focus their efforts and scarce resources on the largest markets rather than venturing into smaller communities. Despite the inherently lower levels of competition that are found in these smaller venues, the lack of critical mass they offer to a telecom operator make the business case difficult to support. As a result, many of these communities are feeling the loss – the loss of access for the community, the limitations placed on opportunities to attract and retain businesses that depend on infrastructure, lower productivity, and for those communities that have some operations, the inability to check the pricing and services offered by providers unfettered by the market forces of competition. In short, all of these lead to a continuation of these small communities being left on the wrong side of the “digital divide”.

Today, many of these communities are doing something about this – they are taking matters into their own hands. At a time in which the largest telecom

operators are finding it difficult to justify investing in any network construction, many municipalities are deploying aggressively in networks that offer cable TV, high speed Internet access, ISP services, web hosting, wireless LANs, and even fiber-to-the-home. The table below shows a small sample of some of these deployments<sup>1</sup>:

<i>Municipality</i>	<i>Telecom Activity</i>
Elberton, GA	<ul style="list-style-type: none"> <li>• Has 30-mile fiber network offering voice and data transport and Internet to schools and enterprises</li> <li>• Separate 2-mile network serves local utility and municipal office</li> <li>• Built out HFC network</li> <li>• Offering video and high speed Internet to over 400 residents, with more being added</li> </ul>
Foley, AL	<ul style="list-style-type: none"> <li>• Have operated CATV system for 20 years</li> <li>• Performed digital upgrade to network last year and added channels</li> <li>• Have fiber network; going through field inventory to evaluate potential extensions of network</li> <li>• Putting in capacity to serve high speed Internet</li> </ul>
Gainesville, FL	<ul style="list-style-type: none"> <li>• Have built over 100 miles of fiber through market</li> <li>• Operating as CLEC for enterprise customers</li> <li>• Offering fractional T1 and 10 Mbps, with 100 Mbps and GigE planned for the future</li> <li>• Considering offering video in the future as well</li> </ul>
Muscatine, IA	<ul style="list-style-type: none"> <li>• Built metropolitan area network in 1998 and HFC in 1999</li> <li>• Municipal operations have captured 60% of cable TV market and 90% of local broadband market</li> <li>• Serving over 2,500 customers, including 200 business accounts</li> <li>• Recently bought out competitive ISP</li> </ul>
Owensboro, KY	<ul style="list-style-type: none"> <li>• Built 96-count fiber network through town</li> <li>• Offering high bandwidth services to businesses (T1, T3, OC-1, OC-3, Ethernet)</li> <li>• Have been considering wireless Internet as a new service offering</li> <li>• New wireless service to offer 2 Mbps speeds to customers</li> </ul>
Newnan, GA	<ul style="list-style-type: none"> <li>• Built HFC network, including some extensions outside of city limits</li> <li>• Offering cable modem, direct fiber links, and web hosting to businesses</li> <li>• Offering cable, high speed Internet, telephony, and digital music to residences</li> <li>• Considering digital upgrade to network</li> </ul>
Spencer, IA	<ul style="list-style-type: none"> <li>• Built HFC network offering broadcast cable, high speed Internet, and digital cable</li> <li>• Added telephony to suite of services this year</li> <li>• Have achieved market share to date of 30% in CATV and 10% in telephony</li> <li>• Partner with 4 ISPs to serve small accounts, but handle end-to-end solution for 1+ Mbps</li> </ul>

The natural question that comes out of looking at this issue is whether these types of deployments are prudent. If private industry cannot justify investing resources in these regions to generate a profit, is it possible for a municipality to capture any value through these efforts? Having worked with numerous municipal operators as well as analyzing the quantitative aspects of the business case, we believe the answer is yes. The analysis below will show clearly the basis by which municipalities that deploy broadband solutions can create value for their constituencies.

<sup>1</sup> The Shpigler Group interviews and research

## ***2. Market Differences: On Which Side of the Digital Divide Do You Live?***

In order to see whether a municipality could create value through a broadband deployment, we wanted to first see if current data provided any indication of whether those communities that were “connected” showed any signs of a stronger economic base for the region. However, before performing a simple test for correlation between Internet access and economic production of a community, we wanted to first control for other elements. So, what drives economic production? It has long been known that increased education drives output, and in turn, salaries. We tested this, and to no surprise found a strong relationship between the educational level of the community with the economic output. Univariate regression analysis revealed that this one factor alone explained 53% of the variability of residential household income. However, this is not the only factor at hand.

In order to get at the issues relating Internet connectivity and how that might drive the economics of the community, we wanted to test for the effects of Internet penetration matched against average household income. We can easily control for the effects of education, but we were further concerned about the inherent differences between small and large markets. Of course, Internet penetration is at its highest in larger and denser communities that offer inherent infrastructure advantages since network builds are most economical for a private provider when potential subscribers are closer together. Clearly, we would need to isolate the effects of both density and education in order to evaluate the true effect of access to the Internet. Running a multivariate regression yielded very telling results. Keeping the average educational level of the community and the market density constant, the data suggests that a network deployment that results in an additional 10% of the population to access the Internet will support a growth in average household income by \$1,437 – a substantial difference. The coefficient for education was an incremental \$17,180 per household for each incremental year of education and \$27.03 per household for each additional resident per square mile.

Based on these findings, we hypothesized that the effect would be even greater for small communities alone. To test this, we first isolated 10% of the nationwide land tracts with the lowest population density and compared the demographics with those of the 10% of the land tracts with the highest densities. The results are as follows:

	<i>Average Household Income</i>	<i>Average Years of Education</i>	<i>Internet Penetration</i>
<i>High Density Markets</i>	\$67,580	13.2	47%
<i>Low Density Markets</i>	\$39,418	12.2	42%

Clearly, there is a difference of \$28,162 in average household income between the largest and smallest markets. How much of this might be caused by the inherent infrastructure disadvantages? Well, clearly not all of this effect can be explained by the presence of superior broadband and Internet access. Simply put, building broadband capabilities in Kodiak, Alaska will not make it comparable with the likes of New York or San Francisco. There are inherent differences within these disparate markets that have little to do with access to broadband or Internet. However, it is also clear that there are small markets that have built out networks and we can compare them to other small markets that have not. We again looked at the lowest density markets and found some interesting results:

- The impact of education was significantly lower than before. Within the smallest markets, each additional year of education added only \$6,800 in incremental household income. Effectively, taking the largest markets out of the analysis reduced the variability of this effect.
- Meanwhile, the impact of Internet access increased. Now, each incremental 10% of the population that accessed the Internet increased the average household income by \$1,793. Clearly, the ability of a population to access the “information superhighway” becomes a more important factor in local output and salary among small markets.

### ***3. Quantifying the Impact of a Municipal Deployment***

Given the findings above, we wanted to calculate the potential economic effect that a municipality might create by developing a broadband network. In order to do that, let’s assume a town with 3,500 households and 300 businesses is considering a cable television and high speed Internet deployment. Market research suggests that a 40% penetration for both the residential and business market is feasible within five years. Suggested

pricing of the service is planned for \$25 cable TV and \$30 Internet access with one-third of the TV subs projected to take cable modem service as well. Meanwhile, business customers will pay \$80 for their high-speed service. Based on these metrics, annual revenue from the venture would be \$703K by the fifth year; with a projected 40% EBITDA margin, the earnings impact would be around \$280K. With capital costs projected to be \$1,500 per home passed, it would require an average economic life of the network assets to be 18.7 years to break even by the fifth year of operation – a challenging figure. However, effective cost controls and operational effectiveness, particularly where there is no incumbent provider of services, would significantly improve the picture. Nevertheless, it is safe to say that no one will get rich with this plan.

However, this is only the beginning of the story. While the direct benefits may not yield significant returns, the indirect benefits are substantial. Namely, we will consider three key indirect benefits of the network deployment:

- *Job Creation* – The ability to attract and retain business in the community through improved infrastructure
- *Competitive Impact* – The benefit felt by residents and businesses due to the presence of a new service provider to keep prices low and service quality high
- *Output Effect* – The ability to generate additional output due to efficiencies created by superior infrastructure

We look at each of these effects in turn.

#### - Job Creation -

Municipalities constantly do battle to attract new enterprises to locate within their regions in order to support economic development and to create jobs within the community. For the largest cities, this effort is often focused on the availability of advanced services to attract firms dependent upon cutting-edge technology in order to thrive. For smaller towns, the lack of basic access can often close out any possibility of attracting a significant portion of the service-oriented firms and others that need broadband technology to support their business operations. Assuming a 5.4% growth in businesses<sup>2</sup>

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<sup>2</sup> City of Revelstok Fiber Optic Feasibility Study, TeleNomic Research, New Millennium Research Council, The Shpigler Group analysis

based on the businesses passed in our prototype municipality, we would expect to retain and/or attract 6.5 businesses on average that would not otherwise have been there. Based on an average of 9.3 employees<sup>3</sup> per business that we found in these markets and applying a 31% tax rate, the total amount of incremental disposable income entering the market on an annual basis by the fifth year of operation would be \$1.6 million. Economists typically apply a multiplier of 3x to income to find the total gross revenue product for the market as dollars flow through the local economy; in this case, the total benefit to the community stemming from job creation is \$4.9 million.

- Competitive Impact -

We have seen large differences in the prices that incumbent providers charge when faced with competition from a municipal provider relative to when they have monopoly control over the market. In fact, it is not uncommon to see prices cut in half when the incumbent provider has to compete with the muni for customers. In a recent engagement we worked on, an incumbent cable provider facing a challenge from a municipal cable operator offered customers within the city limits price reductions as high as \$24 per month for digital cable packages compared to the bordering town where they did not have to compete for business. Every cable customer in the market therefore feels the effect of the municipal network, even those that choose to forego the municipal provider and instead choose to be served by the incumbent as they benefit through lower prices and enhanced service quality. Past experience has shown that a monthly figure of \$17 per month is a reasonable figure for estimating the savings passed on to local customers. Assuming our municipality has a 50% market share, we calculate the net savings to customers as \$570K per year.

- Output Effect -

The main argument behind the purpose for broadband is the potential to increase the opportunities for individuals and businesses and to increase efficiency of operations. The question is how can we quantify this? Initially, we looked at a Gartner finding that calculated the gross benefit of broadband as \$9,000 per year per affected population.<sup>4</sup> Applying this figure to our market shows a gross benefit of \$31.5 million. However, this figure would already include the effects of job growth we previously calculated. Also,

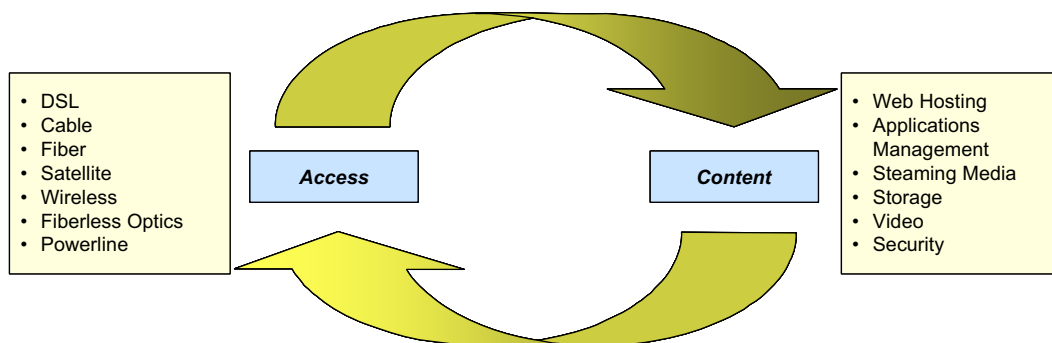
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<sup>3</sup> MapInfo, Verizon, Dun & Bradstreet

<sup>4</sup> LinkMichigan Initiative, The Garter Group, 1/02.

since the presence of municipal broadband would reduce spending by customers, we would want to add this figure back to calculate the net effect created solely by efficiency gains. Making these adjustments for our municipality, we find the net benefit to be \$27.2 million. Rather than assuming this figure to be true, we decided to pursue an alternative approach to arrive at our own figure.

Previously, we found that a 10% increase in the population having access to the Internet drove average household income upward by \$1,793. However, this figure is for Internet alone – not necessarily broadband. Given that the vast majority of people that access the Internet do so via dial-up modem rather than through a broadband connection (especially within small municipalities), we have made an adjustment for the lower access speed and the diminished service capacity created by applying a multiple of 3.9<sup>5</sup>. Assuming that a broadband deployment would result in a 10% increase in Internet penetration, this equates to an increase of \$24.6 million in local market output.

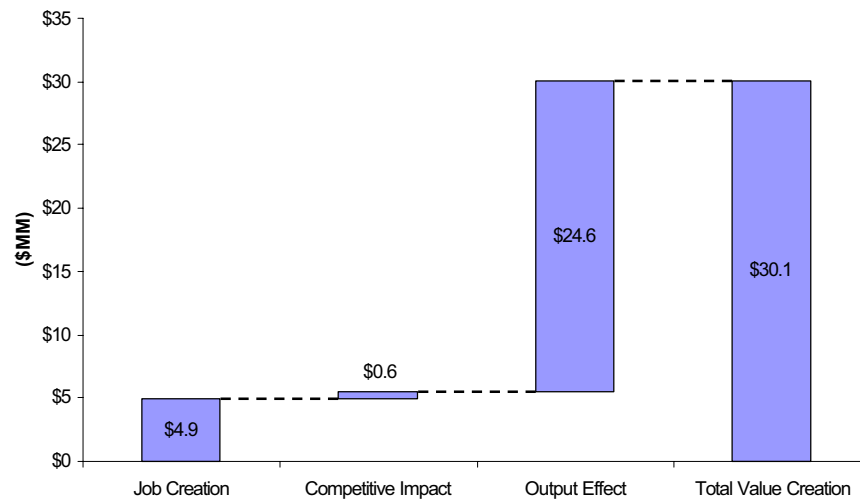


Our calculations may be conservative as increased access has a dynamic potential to fuel incremental services of value to the community. As the accompanying content carried over the network grows in size and complexity, it in turn creates a need for additional access mechanism, thus supporting an ongoing growth opportunity. In the Gartner report, they cite an annual growth opportunity for the U.S. as \$500 billion with widespread broadband deployment and an annual \$44 billion growth for the state of Michigan alone through the LinkMichigan initiative.<sup>6</sup>

<sup>5</sup> LinkMichigan Initiative, The Garter Group, 1/02, The Shpigler Group analysis.

<sup>6</sup> LinkMichigan Initiative, The Garter Group, 1/02.

Sample Municipal Telecommunications Value Creation



#### 4. Conclusion

Municipalities are becoming more and more involved in telecommunications, and based on our analysis, are creating value for their markets in the process. As the bursting of the telecommunications bubble continues to prevent new builds from occurring, a new breed of providers has emerged – ones that are more insulated from the market fallout. Among these are electric and gas utilities, regional economic development agencies, and municipalities themselves.

We fundamentally believe that as market forces begin to turn, there will exist opportunities to build infrastructure in Tier 2 markets that have been overlooked by the market to date. While network builders will need to prove their business case with greater detail than was demanded previously, investors will also need to recognize the fundamental difference from overbuilt long haul and Tier 1 markets.

Ultimately, however, the greatest opportunities for small markets to cross the digital divide exist through self-action. There is no doubt that it will be a very long time before private enterprise begins to aggressively deploy capital into the smallest of markets that desperately need the development. In order to capture the value promised by these buildouts, municipalities will need to become proactive about their level of involvement. As this increases, we anticipate a new way in which competitive battles will be waged; rather than fighting for market share, an increasing number of private telcos will seek to challenge would-be municipal telecom operators with legal and regulatory

challenges to try to ward off the threat. Nevertheless, we predict the current trend of increasing municipal telecom involvement will increase. And, as time goes on, we further expect to see creative private-public partnerships that will allow private enterprise to re-enter the muni while offering local markets a chance to build a base for economic development while outsourcing much of the operational requirements. In any case, small market municipalities will need to get involved and become proactive and aware of the options available to them.



# THE SHPIGLER GROUP

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The Shpigler Group is a leading strategy management consulting firm focused on the telecommunications and technology sector. The Shpigler Group works with utilities, municipalities, telecom service providers, and infrastructure and technology developers in solving complex issues involving strategic assessment, market analysis, business case development, economic evaluation of network design, and competitive and partnership assessment. For inquiries, please refer to the contact information below:

The Shpigler Group  
15 North Mill Street  
Nyack, NY 10960  
(845) 348-3181  
[info@shpigler.com](mailto:info@shpigler.com)  
[www.shpigler.com](http://www.shpigler.com)