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Mike Monson
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Re: Analysis of Financial Feasibility of Accepting the Grant

Gentlemen:

Following is a report that describes the work that CCG Consulting performed in the analysis of the grant fiber business plan in Champaign and Urbana. Specifically we looked at the business plan that would result if the cities accept the ARRA grant. A separate report will be issued that looks at other business plans including a business plan if the cities were to become retail providers of services for all of both cities, a wholesale business plan where the cities would build a network and then invite others to provide service on your fiber network, and finally, separate business plans looking at the feasibility of each city getting into the fiber business alone without the other city.

Please call me at 202 255 7689 if you have any questions or comments about this report.

Doug Dawson
President
CCG Consulting LLC

Executive Summary

Following are some of my conclusions / findings about the grant business plan:

1. The business needs a general manager from day one to be successful. While the network may get paid for by a grant, it is going to take a person with bottom line responsibility to make a new business meet financial expectations.
2. The biggest concern for the business plan is the ability to get the level of projected customers and to get them within three years so that they are paid for by the grant. The business needs to put serious effort into developing a good sales model. Sales are never easy. Passive sales methods are not going to get you enough customers quickly enough.
3. The model as prepared for the grant has a significant cash shortfall over a ten year horizon. The annual shortfall looks to be between \$200k and \$300k annually after considering capital replacement issues. There are several ways to get more revenue including charging more to government entities, selling wholesale access to the network, selling more dark fiber and selling to businesses located near to the fiber. We think that there is a very good chance that you can generate this much extra revenue using some or all of these ideas. We do caution that selling to businesses outside the grant area will require additional capital from the cities.
4. We think the network has been over designed. If you don't get funded in the first round of grants, we think you should design a more cost effective network and file again in the second round.
5. We are concerned that the grant plan includes the use of Nortel/LG electronics, which we think is a cutting edge technology. We caution all of our clients to avoid cutting edge technology whenever possible and we would urge you to take another look at this equipment choice. We are not saying this is a bad choice or a bad technology, but there are a number of red flags associated with cutting edge equipment that need to be considered.
6. Overall, we believe that there is certainly a good chance that this business can succeed, even if it never grows past the grant areas. However, success is not automatic and this business is going to have to be run smartly to achieve profitability. You are going to need a good general manager and you are going to need to be aggressive in generating revenues greater than what is generated in the grant business plan. In the end you will be in competition with incumbent providers and you can expect them to compete with whatever you offer. This is going to be a competitive business and one should never automatically assume success in a competitive environment. Probably the most important thing for a new competitive business is to not stumble out of the blocks. Your network needs to operate flawlessly and the customer service has to be better than the competition if you are going to succeed. Do one of those two things wrong and the business might fail.

Grant Business Plan

Initially the cities hired me to review the business plan created by the University for the grant application. In reviewing that plan I found it easiest to create a business plan of my own as the easiest way to compare and contrast to the original plan.

The grant business plan sells only data services in the census blocks covered by the grant. On first glance the grant business plan is not self-sustaining over the long run. In my opinion, the business plan as currently created might be able to support itself for 5 to 7 years, but it will eventually require a significant cash infusion by the Cities. There is not enough revenue generated to cover expenses and to also cover needed future capital. There are ways that can close that gap that I will discuss below.

Definition of Breakeven. The first issue to discuss is to define how any municipality defines profitability in a telecom venture. We all know that big public telecom firms look at net income, which is defined as all revenues less all expenses. However, for a municipal business we define breakeven as any venture that can cover operating expenses, capital expenditures and the cost of debt. When I talk about the degree of success of any business plan I will be using this definition. A different way to restate profitability for a municipal venture is that it must generate enough cash so that it does not need any cash subsidy from outside – the cash from revenues need to cover all of the cash outlays.

Operating Structure. The original business plan developed by the University did not have a general manager operating the business. The business being created is a retail business, and any retail business needs a general manager in order to prosper. You cannot operate a retail venture by committee and instead need a general manager who is responsible for making the daily decisions needed to make a venture successful. I am recommending that if you get the grant that you create a position that is half general manager and half technician, a position that is not unusual in a small commercial ISP business. This general manager/technical position will cost more than a normal technician and I have included that extra cost in my analysis of the business. The current organizational chart has an Infrastructure Committee overseeing the various employees. I would insert this general manager between the Infrastructure Committee and the other employees.

Long Term Capital Requirements.

The business plan created by the University looked at the capital assets required to get the business launched through the grant period. It has been my experience that any fiber business plan must also consider long-term capital needs before you can be sure the plan will be self-sufficient. There are several primary drivers of the need for future capital:

Churn. Churn is the industry term used to describe the fact that any business loses customers over time. Many customer losses are due to people moving, but customers also leave for economic reasons or to change to a competitor's product. It is hard to predict churn in a tiny sliver of a market. I have clients that have churn rates that range between

3% per year and 10% per year. In my revised model I have used a churn rate of 5%, meaning that 5% of customers will leave in any given year. Churn forces the business to grow by 5% per year just to stay even in customer counts. The effect of churn in the marketplace is that the business ends up stranding fiber drops to homes that no longer take service. The Optical Network Terminal (ONT), which is the electronics on the side of the home, can be salvaged and reused, but the business will have to build many more drops over time than there are customers at any given time. For example, in the grant business plan a 5% churn rate will add an annual requirement of \$80,000 per year to build new drops. Again, this is an estimate, and churn could be lower or higher than 5%.

Capital replacement. The sophisticated electronics and associated software needed for a FTTH system have a relatively short life, maybe 6 to 8 years. It is likely that many of the electronics will need to be replaced and/or upgraded somehow in that time frame. In the grant model I have shown an electronics upgrade needed of about \$1.3M every eight years, which equates to \$160,000 per year for needed capital. Most ventures like this establish a sinking fund where they set aside cash every year in anticipation of this kind of normal upgrade to avoid needing a large amount of cash in the upgrade year.

Wear and Tear. Assets wear out and have to be replaced. The primary assets that fit into this category in this business are test equipment, computers and ONTs. Over time PCs and test equipment will need to be replaced. My experience with fiber systems is that about 5% of ONTs will need to be replaced every year. These normal replacements drive an annual need of about \$70,000.

Customer Penetration Rate. Probably the most significant assumption made in the grant business plan is the 54% customer penetration rate. This seems like a high customer prediction based upon our experience with many other clients. CCG has over 300 clients who sell broadband and we have been able to see how these businesses do in the marketplace. There are several factors that influence broadband buying – the price, the data speeds, the other products being sold along with data, and a trust in the service provider. This business meets the price test. However, there are competitive products, albeit much slower than yours, already available in the marketplace. The data products being proposed will be the fastest products for the lowest price. However, you will be launching a new company and customers will not automatically trust the cities to do a good job – trust will have to be gained by doing a good job in the real market – meaning no technical glitches and no customer service glitches for the first few years.

There are two ways that new businesses try to predict customer take rates. The first is to conduct a statistically significant survey in the new market and to ask properly worded questions that find out the likelihood that customers there will buy a new product. It has been our experience that these surveys are fairly reliable as predictors of future customer behavior. You don't currently have such a survey, so we have to rely on what we call market segmentation. This is an analysis of a new market based upon experience in selling similar services in other markets.

I think the grant business plan took a shot at customer penetration using the same techniques used in market segmentation. The market today has around 40% broadband penetration, which is

much lower than the national average which is estimated today to be somewhere around 63%. Additionally, a quick survey by the University found that 20% of households own a computer today but do not have Internet access. The grant business plan assumes that most of these potential customers will buy broadband from the new company. Basically the business plan assumed that 90% of households with computers would buy the new product. This is probably not realistic.

Even if this new business does everything perfectly it is extremely unlikely to get a 54% broadband penetration in this particular market. I think the business plan was built on part through hearing the stories of other municipalities who have gotten as much as 65% of the market share in some communities. However, those communities and those businesses are very different than this proposed business. First, those communities started with households that want broadband. In most of the US between 80% and 85% of households now have computers, which is a much different market than the area covered by the grant. These other businesses also are selling the triple play of data, telephone and cable TV and all of these businesses will tell you that cable TV is the product that brings customers to them. Your business plan has a population with far fewer computers than average and that is only going to sell one product. That is definitely going to lead to lower penetration rates than experienced by other municipal businesses. However, we also know that if the cities get all of the grants you have requested that you will be using grant funds to get computers into homes. That second grant, if awarded, will increase the households that can buy your data product and increase your likely penetration rate.

Another way to look at the market is to look at the behavior of customers elsewhere. In our experience we know that 10% to 12% of households will keep dial-up, even when cheap and fast broadband is available. For some of these households price is the issue and they won't upgrade from a \$9 dial-up product to a \$20 broadband product due to cost. Other customers only use the computer to read emails and they are not interested in faster speeds. There is also a core of 15% to 20% of households in any market that won't take a computer even if it's free. Thus, somewhere between 25% and 37% of any market will not buy broadband from anybody.

Since nobody knows how many customers the business will get I decided to run a sensitivity analysis of the business plan based upon customer penetration rate. This shows how the business will perform at various levels of customers. The results of the sensitivity analysis are as follows:

Penetration Rate	Cash After 5 Years	Cash After 10 years
30%	(\$497,110)	(\$3,735,959)
35%	(\$378,735)	(\$3,391,212)
40%	(\$259,917)	(\$3,041,473)
45%	(\$142,218)	(\$2,692,785)
50%	(\$ 22,441)	(\$2,341,222)
55%	\$ 97,932	(\$1,994,497)
60%	\$217,612	(\$1,641,626)

As one would expect, the more customers the better the business performs in terms of cash generated. The two columns above look at the cash on hand for the business after years 5 and 10. As the table shows, the business can be cash positive after five years if it is able to sell data to a little over 50% of the customers in the grant area. However, the analysis also shows that the business will have a major cash deficit by year 10 regardless of the customer penetration rate.

The long term cash deficit is due to the accumulated costs of capital replacement as described earlier in this document. Our experience is that any complex electronics system is going to need a major upgrade and overhaul after 6 to 8 years, plus all systems have the normal capital requirements due to churn and wear and tear. The major upgrades are expected primarily with the FTTH electronics. The vendors of complex electronics are constantly making improvements to the technology and invariably there comes a time when they stop supporting older versions of their equipment. While the existing equipment might still be working satisfactorily in 6 or 8 years, the inability to get spare parts and technical support almost always forces networks to upgrade. In the grant network design these electronics are used to deliver services to all customers on the network, both government and residential. Thus, the upgrades are going to be needed even if the business decided to withdraw from serving residential customers in the future. However, there are engineering options that would allow you to use a different technology to serve the government locations. For example, you might construct a 100 Gb network to serve only government locations. Using something other than FTTH for government locations would allow you to isolate the upgrade issue to the residential and business customers.

Can the Business Improve Profitability?

The sensitivity analysis shows a long term cumulative cash shortfall by year 10. This shortfall varies by the success in selling data to residential customers. For example, if the business ends up with a 40% penetration rate in households, the business will be short just over \$3 Million, or about \$300,000 per year. If the business can get a 60% customer penetration this shortfall reduces to about \$160,000 per year - still a significant shortfall. There are two ways to fund this cash shortfall. One way is to create a sinking fund and set aside the money each year to be ready for the upgrades. However, I must note that the business does not generate enough cash to fund such a sinking fund, so these annual contributions would all have to come from the Cities. The other way to close the gap is to find additional sources of revenue.

Thus, the question to be asked is if there is anything that the business can do to close this cash gap?

The business plan used for this sensitivity analysis has a few sources of revenue – sales of data to customers in the grant areas, sales of data to government entities and ongoing maintenance revenues from dark fiber leases.

There are several ways that the business can improve revenues above those shown in the grant business plan. Following are some ideas that can work to improve revenues:

- 1) Charge More to Government Entities. The business plan assumes that the government entities are going to get data prices as low as those prices charged to residences. While it is a laudable goal to reduce the cost of broadband to government locations, one must also recognize that this fiber network is going to be used to deliver vastly improved data speeds to government locations. In essence the business plan assumes that government entities will get much faster data speeds for greatly reduced prices.

Almost every fiber business charges more for business services than for residential services. Your business plan anticipates serving only a very small number of businesses, but those few businesses are assumed to pay the same rates as residences. One always has to be concerned with the issue of subsidies and one can argue that while government shouldn't get subsidized rates below those paid for by businesses, government also shouldn't necessarily pay more. I would suggest raising the rates for both government and businesses.

I have not seen any analysis of what your government entities are paying for data today, but I would assume it is significantly higher than the fees used in the business plan. Some of my municipal clients starting new networks have found a solution that is worth considering. I know several instances where the government entities agree to pay the same rates on the new network as they paid before the network. For that same price they are getting much faster data speeds. This idea essentially makes the government entities an anchor tenant on the network and an agreement to pay more than the going rate is a compromise that helps to make sure the business will succeed. In most cases there is a time limit on paying higher rates that lasts from 3 to 5 years. After that, the government rates are dropped to rates similar to what businesses pay.

- 2) Sell Wholesale Access to the Network. The University has already had a discussion with at least one entity that is interested in selling voice and cable service over the network. In my experience it would not be unreasonable to charge an access fee to a wholesaler provider of between \$10 and \$15 per customer per month for getting access to each customer for these products. These fees could close much of the cash shortfall shown in the model.

Note that the decision to open up the network to a wholesaler has some consequences that must be considered. I'd point out that the grant rules mandate that the network will be open access, meaning that the Cities will have to allow other service providers access to the network. Such a service provider would have the ability to use any portion of the network constructed with grant money in order to reach a customer. The federal rules say that any wholesale service provider must pay a 'fair' rate for access to the network, but the rules are not explicit enough to suggest what such a rate might be. With these open access rules it is probably impossible for the City to turn down a request for getting access to the new network. One issue that might arise is that such a wholesaler will also want to provide retail data services to customers. In such a case, adding wholesale customers to the network might end up reducing cash, rather than increasing it if the

Cities have to compete with outsiders selling data. It might not be possible to restrict a wholesaler to selling only telephone and cable services.

Second, there is an operational complication if more than one wholesaler wants access to customers. I know other networks that operate open access networks serving multiple wholesale networks, and their experience shows that allowing more than one wholesaler on a network creates significant additional cost. The business would need to develop software and routing systems that would allow any wholesaler to get to any customer – something that sounds easy but that can get very complicated.

- 3) Sell More Dark Fiber. The grant business plan already includes the sale of dark fiber to a few government and private entities as a way to raise the matching funds for the grant. It is certainly possible that one or more additional buyers of dark fiber can be found over time. Typically, a sale of dark fiber includes a significant one-time payment followed by annual maintenance fees.
- 4) Sell Data to Businesses Outside the Grant Area. The network being constructed with the grant passes through many parts of both cities and my understanding is that the network passes near a number of businesses. The new business could expand its scope and sell data services to businesses that are near to the fiber.

However, the grant funds cannot be used to pay to get to residents or businesses located outside of the grant areas. Thus, selling to businesses outside the grant area is going to require a capital infusion. It is probably going to cost somewhere in the range of \$2,000 to \$2,500 to add a new business customer to the network. This cost could be even higher if you sell to businesses that are a block or more off the new network. The further a business is from the network, the more it is going to cost to get them onto the network.

I know the idea has been floated of charging each new business a fee to cover the cost of being added to the network. I can tell you in my experience that *this will not work*. I would guess that we can count on one or two hands the number of businesses in the City that would pay \$2,500 to get connected to a fiber network. If the cities want to sell to businesses you must realize that you are operating a competitive network business. Just like any other competitive fiber provider, the new business is going to have to come up with the capital funds needed to expand the network and will not be able to get this from customers. There needs to be a simple cost benefit analysis done to make sure that adding business customers will pay for the cost of adding these customers to the network. The quick math says that the cities will need to come up with \$250,000 for every hundred businesses added to the network. My experience tells me that this is a good idea, but it is always safer to do the analysis before making this kind of decision.

A Few Other Issues with the Grant Business Plan

There are a few additional issues to discuss concerning the grant business plan.

Sales. It is not clear to me that the business plan has a clear concept of how sales will be conducted. The grants are only going to pay for the physical connection to connect customers who are added to the network within three years of the date of the grant award. Thus, it is going to be very important for this business to add customers quickly to reach the needed penetration rates. Failure to sell quickly will increase the need for cash. For example, the cash shortfalls listed above in the sensitivity analysis assume that the penetration rates shown will be achieved within 3 years of the start of the project. If it takes longer to get to these penetration rates then the cash shortfall will be greater since the grants will not be paying to connect customers to the network after the end of year 3.

Probably the biggest mistake that I have seen from my clients over the years is an assumption that sales of their products will be easy and that new businesses will quickly get to the desired penetration rates. In a nutshell, this is not usually the case and selling is always hard.

Thus, it is going to be vital that the business hire a general manager who understands the importance of sales and who understands how to sell. Probably the biggest risk the business faces is a failure to reach the desired customer penetration rates.

The business plan includes funding a group of help desk employees through a different grant. It is assumed that these help desk people will be the primary method of sales. One risk faced by the business is that the grant to fund this group will not be awarded. Another risk is that the kinds of employees who are good at helping customers with technical issues are probably not the kind of employees that will be good at selling. If these employees are unwilling or unable to make the needed sales, then the business plan will need to fund additional salespeople for the first three years who are not currently in the plan numbers.

In my experience there is only one sales model that will meet the goal of getting a lot of customers in a very short period of time. This is door-to-door sales. Door-to-door selling is the method that was used by the cable companies when they were new companies back in the 70's. The cable company would send out salespeople a few weeks ahead of the construction crews. This method of sales has always been successful, and the situation of the cable companies is very analogous to you rolling out a new network.

This business is not going to be successful with any sort of passive sales campaign that would include such things as mailers, phone calls or community referral programs. This business needs to get the customers on board quickly and the only proven way to do that is have a plan to talk to each potential customer individually.

Initial Capital Costs. The capital costs used in the grant request are a lot higher than what we normally see. This is due to two issues – prevailing wage and overdesign of the network.

The grants require that the projects pay prevailing wage. One would think this is a very straightforward requirement, but there is a ton of room for interpretation of the prevailing wage rules. There is no one-on-one correlation between the categories listed in the prevailing wage rules and the actual jobs that are required for fiber construction. This may change over time, but

in the past there have been very few telecom projects that have required prevailing wages, and thus telecom jobs are not listed in the job categories. This means each contractor is going to have a lot of leeway in determining which prevailing wage category fits each job. One would assume that you will go out for competitive bid on the construction, and it is my expectation that the actual prices for construction under competitive bid will come in lower than the costs you were quoted in preparing the grant application.

I would note that your area seems to have a pretty wide gap between the official government prevailing wages and the rates that are paid today by telecom contractors. I am currently working with other communities on the grant process and in some of those area there is very little gap between the prevailing wage and the current market wage. This gap in wages is a major reason why your network is so much more expensive than what we normally see.

In addition to the above issues, it is also our opinion at CCG that your network has been oversized. If for some reason you don't get funded in the first round we still think there can be a significant drop in the required fiber cost by designing the network to normal industry standards. Offering a lower network cost in the second round of grants would increase the chance for successfully getting a grant. Some of the issues we see with the network:

- a) Far too many rings. One can debate the exact number of rings in your network design, but there are at least seven distinct rings designed in the backbone fiber network. We believe that if you were to start fresh and design a FTTH network to serve all of both cities that you probably would put only one large ring in each City. Your engineer Bob Miles told us that this was the initial design that he had suggested to you, and this is how we also would design the network and how almost all commercial networks are designed today.

The design for a typical FTTH network would place all neighborhood huts along the two main fiber rings. The purpose of the ring design is to provide full redundancy should the main fiber ring be cut. This network would be self-healing, meaning that the network would automatically reroute traffic if the fiber was cut so that there would not be any interruption in service at any neighborhood huts. This is important because in a full FTTH network, all fibers going to customers start at the huts. If fiber service to a hut is cut off, all of the customers served from that hut would lose service.

The network designed by the grants does not offer self-healing redundancy, even with these multiple rings. The grant network design anticipates that the electronics for the network will be housed at one central location somewhere on the University. Thus, the traffic leaving the hub at the university will be customer traffic. This means the network does not have a real backbone. The grant design does not provide the same kind of redundancy that is afforded on a true backbone network between huts. In your network, should there be a fiber cut, it would be possible to reroute traffic, but this would involve a manual process to reroute each customer path. It is likely that the fiber cut can be repaired faster than customer fiber paths can be rerouted. The network as designed has no automatic redundancy, but has the option of manual rerouting of paths. Honestly this is not a very valuable benefit since most fiber cuts are repaired within a day. Designing a

network will this many rings looks to us to be solving a problem that we never see in real network.

The network that Bob Miles originally suggested had two large rings along with spurs going to government locations. We believe that is probably the right network to build and is certainly the network that would be designed by any commercial company. In effect you are building more fiber for the grant than you need.

- b) Multiple and Separate Conduits. Probably the most costly nature of the grant network is that the fiber from each ring is designed to be put into separate conduits. We have never seen a fiber network designed in this way. Certainly this kind of design adds a little protection, in that when one conduit is cut the neighboring conduit might survive. But no commercial or municipal network we have ever seen uses this costly design and we believe the small amount of network protection that is afforded by this design cannot be supported by the extra cost. Under the grant design, when multiple conduits are laid along the same street path, these conduits must be drilled and installed separately. This greatly adds to the cost of construction for a very marginal improvement in safety – after all, the routes aren't automatically redundant as designed anyway.

We are certain that if this project was being funded by the cities directly instead of with grants that you would elect the same design standards that every other network builder uses. The reason we are pointing out these cost issues is that the cities ought to redesign the network for the second rounds of grants if you don't get funded in the first round.

- c) All Buried Construction. The grant network puts all of the fiber underground. Certainly there are good reasons to want this, and I think any fiber provider would want a network that is all underground. However, when we look around in the real world we never see networks built this way. In every network we have ever seen built we see that most of the fiber construction follows the same path as existing utilities – when those utilities are on poles the fiber is put on poles, and when the existing utilities are buried the fiber is buried. This decision is made on the basis of cost. Again, if you were paying for this network using City funds we are certain that the economic reality of paying for the project would have you design a network that follows the existing other utilities, some parts aerial and some parts buried. There is always a trade-off between the ideal network and the network you can afford to build. If the grants happen to fund this network as you have designed it, then of course you can build it this way. What I am suggesting is to consider re-engineering a more cost effective network if you aren't funded in the first round of grants.

Use of Cutting Edge Electronics. We also feel compelled to mention your choice of using Nortel/LG FTTH electronic equipment for the FTTH delivery. We classify this as cutting edge equipment, meaning that is the newest variation of FTTH equipment and it is just hitting the market.

Let me first briefly explain the difference between the Nortel/LG equipment and the FTTH equipment used in other networks in the country. Almost every other Passive Optical Network (PON) network currently uses GPON technology. This technology provides a 2.4 Gbps data pipe that is used to feed up to 32 homes and/or businesses. This is a tremendous amount of data capability and so far we don't know of any FTTH network that has come close to exhausting or stressing the delivery of data to customers with that large data pipe. (As a contrast, a typical cable modem network delivers 45 Mbps to 250 – 400 homes). The Nortel/LG technology uses a separate lightwave to deliver 2.4 Gbps second to each household, a 32 times greater amount of data than a GPON network. This technology is being referred to as DWDM PON.

In theory we have no problem with the concept of using different wavelengths as offered by the Nortel/LG equipment. In fact, when you talk to all of the other PON manufacturers, they will tell you this is probably going to be their next upgrade in technology. This is certainly going to eventually become the preferred way to design PON electronics. However, there have been millions of homes deployed using GPON and it is a very tried and tested technology. One cannot yet make the same claims for DWDM PON technology.

The issue for us is one of using cutting edge technology in your network. We believe that this is probably far too risky, and we say this from experience. It has been the experience of our clients that any cutting edge technology is going to cause problems in a deployment. The first couple of networks to deploy a new technology in effect become the troubleshooting laboratory for the manufacturer. CCG's clients have a very bad experience using cutting edge technologies. We can't think of one case where a client deploying a cutting edge technology did not experience costly problems and delays, and where their customers did not suffer through the problems associated with equipment that did not work properly. In a few worst cases we have had clients go bankrupt due solely to the use of a cutting edge technology – the manufacturers were unable to fix the problems in a fast enough time to maintain a good name for our client in the marketplace. We know from experience that you only get one chance to convince your community that you know what you are doing. If you stumble with technology problems in the first year or two and if your customers perceive that your network is not reliable, you won't be able to sell products at any price.

Don't take this warning as any slur on the Nortel/LG equipment. We are just not aware of any sizable deployments of this equipment in the US. We strongly advise our clients not to be among the first three of four major deployments of any new technology – rather they should let somebody else work out the bugs first. The right way to try a new technology is in a very small trial, like deploying it on one or two streets in the network. It is far too risky, from a business plan perspective to be taking chances with a cutting edge technology over the whole network.

In addition to the issue of this technology being cutting edge, one also has to look at the other aspects that are important in choosing an electronics vendor. We find that service after sales, warranties and local support are all important aspects of picking the right equipment solution. A vendor needs an active sales staff working in the US. They need to have good reliable support for the product including the ability to get help quickly when there is a problem. The good vendors will also use sales channels and there are a number of resale houses in the US where one can get

an additional level of support in addition to that offered by the manufacturer. We don't know enough about LG to know if they are going to offer the same level of US support that we know comes with the other vendors of FTTH equipment. We point these out as important issues to be clear on before making the final equipment choice. It has been our experience that if the equipment is put out for competitive bid with a well written RFP that the right choice for equipment will be made. We would advise the RFP process for the cities for these electronics. Such an RFP needs to look at all aspects of the equipment including price, referrals from existing deployments, the level of support available, long term costs, maintenance contract costs, etc. You may still choose this equipment even after an RFP, but our guess is that if you look at all of the issues fully that you will choose one of the other vendors of PON equipment.

The Competition

One thing that always must be considered in any business plan is the expected reaction by the incumbent providers. In this case, you will be competing against both AT&T and Comcast for the provision of data services. Already today AT&T has some products that cost in the same price range as your proposed products. While your products will offer faster speeds, some customers can be expected to stick with the AT&T products for reasons other than speed. First, some customers don't care about speed if they only use the computer for emails and simple tasks. Second, some customers are going to be unwilling to change if that means changing their email addresses. We see some customers in every market stay with inferior products due to these types of issues. Finally, you have to consider the issue of customer ennui. Many people are very passive in their buying decisions and getting customers to change an existing product is always hard, even if the new product is superior. This is another way of saying again that sales are always hard. Many customers just cannot be bothered to go through the effort to make a change.

One can also expect the incumbent providers to push back against your new venture. They are going to do this in a number of different ways. One thing they can do is to bundle their data product with other products to create the illusion that their product is a better deal than yours. They also can be expected to offer specials where they will do things like offer half price services for a one or two year contract commitment.

It is always hard to predict the behavior of the incumbent providers. In some markets they compete very aggressively and in others they are somewhat passive. Probably the biggest issue will be if they see this grant project as a threat in terms of expanding outside the grant areas. If they think you are going to build fiber everywhere, then you can expect them to compete heavily in the grant areas as a way to dissuade you from expanding.

What Happens if the Project Fails?

Any time you consider a new business venture a good question to ask is: what happens if this doesn't work as expected? Are there foreseeable ways for the City to unwind this business if you never get enough revenue to cover costs?

There are several factors that affect that answer. First, note that the grant rules make it difficult for you to sell the network to somebody else for ten years. It also looks to me like the grants are going to require that you sell low cost bandwidth to customer at least through the end of three years.

With those few restrictions there are probably several ways you could change this business if it wasn't performing up to expectations (probably meaning that the cities are subsidizing it):

- 1) You can probably back out of the residential broadband business. This would still allow you to keep the government revenues and the dark fiber revenues. This would allow you to get rid of most the employees, and it's possible that a small group of people could successfully serve the government entities without needing a subsidy.
- 2) It's also possible that you could sell the residential customers to somebody else. The federal grant rules prohibit you from selling the network, but I don't see any specific restrictions against selling off parts of your business, which is something separate from the network.
- 3) While the grant rules say you can't sell the network for ten years, I think it would be possible to petition them to allow you to sell the network. I'm not sure the government can mandate you continue to lose money. As an alternative to this, one other option would be just let the network go dark. This would force the government entities to go look for a new source of bandwidth, but it would stop the need to subsidize the network.
- 4) Finally, my analysis done outside the scope of this report suggests that you can make a profitable venture by expanding the fiber network to everywhere in the two cities and offering retail services. If the grant areas aren't making money, a launch of the largest business would absorb any losses in this small part of the business.