

Loveland Broadband: Municipal Utility or Public/Private Partnership

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Dear Mayor Gutierrez and Loveland City Councilors:

In 2015, I ran Loveland's political campaign to override SB-152. I didn't want to advance a political issue unless I was satisfied that it would be good for Loveland, so I built a financial model of a municipal fiber-optic network project. I wanted a sense of whether this would probably be a sound investment with a substantial, positive internal rate of return, and confidence that it could be entirely self-supporting without imposing any taxes.

I know how to do this kind of modeling. I'm a computer scientist and experienced investor. In the past, I developed and sold software to track and measure complex financial portfolios. In 2015, I didn't have numbers as accurate as the City is now obtaining from its broadband consultants, so I designed a model to evaluate the business proposition over a range of project costs, cost of capital, customer uptake rate, and other parameters¹.

This project can be assessed objectively, and with substantial confidence, by modeling its discounted cash flows. A city owned and operated municipal broadband network could work well for Loveland. A Public/Private Partnership could also work but would entail some very substantial, non-obvious risks. I'm concerned that those risks might not have been fully discussed and understood.

- The underlying cash flows and business model for a fiber-optic municipal network have the same structure whether the City builds and owns it, or a private partner does it.
- Therefore, a financial model can and should be used to directly compare these two alternatives.
- There are objective financial reasons why a city owned and operated network can offer customers the same service as a public/private deal, at a lower price.
- A Public/Private Partnership injects substantial, non-obvious risks into the project, which cannot be fully mitigated by contract language.
- Most of the project risks will be resolved once the network is built and subscribed, at which time it will be worth considerably more than original construction cost.
- Yet under a PPP deal, subscribers will continue to pay a higher service price for the foreseeable future, even after the main risks have been resolved. And the private partner will capture the much higher operating profit that will accrue after the construction debt is repaid.
- A private equity partner would have strong incentives to sell the network once it's running and subscribed. The City is very unlikely to be able to buy it at that time, even if the contract gives us a first right to purchase.
- In effect, we'd have created a dominant provider that we can influence only in limited ways.

¹ Testing Longmont's numbers, I thought their \$50 price might be a bit low. But it seems they judged correctly, because that price yielded a huge increase in the NextLight subscriber uptake rate.

Broadband objectives, from conversations with hundreds of residents

I spoke with hundreds of Lovelanders about this project: at least 200 individuals and groups at the outset of the campaign (at the Corn Roast Festival), and certainly as many more by election day. What Lovelanders said they wanted boils down to these four things:

- City-wide service
- Affordable
- Reliable
- Fast networking performance

One can debate the exact scope of “city-wide”, but people want broadband service where they live, where they work, and at school. Affordable also carries an expectation of stable pricing, not having to dicker with their ISP every year, not receiving bills with unexpected price jumps. Reliable means consistent, dependable, not intermittent. Fast means keeping ahead of the rapidly growing need for speed.

But why quibble about details? The voters’ emphatic message was: ***We want the opposite of what we’re presently experiencing.*** The existing high-priced, unreliable patchwork of commercial ISPs doesn’t meet their needs, and never will. The project justification is simply to provide excellent service to our residents and businesses, at a price that covers operation, maintenance, and natural growth. 83% of voters apparently agreed with these objectives, which came from conversations with them in the first place and were articulated very directly, simply and clearly during the 2015 campaign.

If these objectives made financial sense for commercial service providers, they’d have already built out complete networks in thousands of small cities across the nation. They have not. Yet a growing number of cities have demonstrated that a municipal utility can do it.

These objectives don’t include speculative claims such as, "Will increase business, creating jobs and economic growth." Not having excellent broadband service would be a significant competitive disadvantage, compared to surrounding communities. A municipal broadband network won’t make Loveland a tech Mecca, but it should help us stay competitive and bring improvements in other areas, such as education. And it can save Lovelanders money, month after month, for many years. Additional benefits would be a bonus, but aren’t required to justify the project.

There is only one fiber broadband business plan, regardless of who executes it

I’ve heard it said that the City must consider business models other than doing it ourselves. I understand the sentiment, but it’s essential to frame the problem correctly so that we ask the right questions. If Loveland wants a fiber-optic broadband network, there is only one business model:

1. Raise capital
2. Build the network incrementally, turning it on as it is built
3. Market to maximize subscriber uptake
4. Operate the network and collect revenue from subscribers, while keeping costs down
5. Retain some revenue to grow, repay capital and upgrade equipment after 5 - 7 years
6. Once eventually paid off, continue making a ton of money

Isn’t a Public/Private Partnership (PPP) a different business model? No, it’s not. The same customers would be offered the same services. The design of the network would be essentially the same, if the

engineers know what they're doing, so it would cost the same to build. Nor would operating costs be much different. It's the *same business* either way².

So, what would be different between a City owned and operated network vs. a PPP deal?

A PPP changes who owns the risks and rewards, not the business model

A Public/Private Partnership (PPP) is a contract to divide project responsibilities and asset ownership between the City and some non-governmental entity. For example, a private partner might provide some or all the capital, and design and install the network. A PPP contract would determine end-user pricing, directly or indirectly, and how the operating profits are shared. It would govern who bears the risks, insofar as the contract addresses them.

A PPP deal should be better for Lovelanders than our present situation, and likely would address our needs and objectives better than any patchwork of various ISPs and technologies. Therefore, some form of PPP alternative certainly merits consideration.

However, introducing additional participants shifts the ownership of risks and rewards. This will change project cost and end-user service pricing in various ways, and introduces potential complications.

Risk shuffling does not constitute a different business plan. It's not as if we can choose a pork roast, a turkey, or prime rib. If we want a fiber-optic network, there's only one kind of roast to cook here, and a PPP is just a way to slice the roast. Who will provide the capital, at what cost of capital³? Who will install the network? Who will expand it as the City grows? Who will market the service and absorb the uptake risk? Who will own the asset, operate it, maintain it, take the profit, maybe sell it? Who will set the customer price, and what factors will determine that price?

If our roast is sliced in a way that requires a higher price (for example, due to a private partner's higher cost of capital or need to shorten the time to repay capital costs), then Loveland residents will bear that cost every month. An accurate, detailed cost and cash flow model can determine with high confidence whether any proposed way of configuring the project is financially safe, and makes economic sense in Loveland's specific circumstances. The service price must ensure that the project is entirely self-supporting from its own revenues, with a reasonable margin of safety and no tax support.

The private side of a PPP will have significantly different motives and objectives than a municipal utility. Injecting their goals into the project introduces complications. Their investors or shareholders will watch

² If, for example, we built the network and then leased it to a commercial Internet Service Provider (ISP), that would be a different business model: our customer would be the ISP. But ISPs have little interest in operating someone else's network. It's not a good deal for the ISP, because we would need to receive most of the revenue to repay our construction loan; and after it's finally repaid, we – the asset owner – would expect to continue receiving the lion's share of profit. Telecom companies build this kind of infrastructure expecting to eventually own a very sweet revenue stream. And anyway, they're all trying to move into content.

³ Cost of capital (CoC) is the interest rate paid on money borrowed to build the project, plus bankers' fees. An investor with higher CoC will pass more interest expense into the consumer price. Municipalities typically can borrow at lower rates than commercial entities.

and compare their return in the PPP to the return on alternative uses of their capital. They will sell out if it's not good enough – discussed below.

This business is straightforward

Building and operating a fiber-optic network is not hard. Here's a BBC report about some farmers in England who grew their own: <http://www.bbc.com/news/technology-37974267>

Both PRPA and Loveland already have experience with their own purpose-built fiber optic networks.

See also this article, which documents remarkable bad judgment:

https://motherboard.vice.com/en_us/article/tennessee-could-give-taxpayers-americas-fastest-internet-for-free-but-it-will-give-comcast-and-atandt-dollar45-million-instead?utm_source=mbfb

The most important project risks are

- Underestimating build cost or time, and thus the capital cost
- Uptake rate that's too low
- Rising cost of capital, if not financed in an initial lump
- Predatory pricing by commercial competitors
- Competition for city capital for other projects, especially if the project fails

There are other risks, such as incompetence, but these five seem to be the big ones. And they're not mysterious. Successful municipal broadband networks have been built in other cities that are willing to share their experiences.

An accurate cost estimate is really a matter of careful enumeration: equipment costs, identifying where cables can run overhead or must be buried, etc. Software exists that can be used to efficiently record these details in a field survey. The estimate can be validated by a small pilot or demonstrator project.

- **For the project to be conservatively, economically viable**, the financial model (incorporating detailed cost information) should demonstrate that if roughly 40% of possible subscribers take the service, then the cash flows would repay the debt and cover operations and necessary equipment upgrades. The project should have an initially modest operating profit that would become very substantial after the original construction debt has been repaid. Its running cash balance should be continuously positive, so it never requires any tax support.
- **If these viability conditions are met**, then the subscriber price of a City owned and operated network can be substantially lower than it would be if a private, third party partner builds and owns it. There is no magic that would enable a private partner to do the same thing, cheaper.

If the City owns and operates the network, our subscriber price can be lower than commercial offerings because of our lower cost of capital as a municipality; because we would not face investor demands for growth beyond Loveland's natural expansion rate; and because we can tolerate a longer payback time than a growth-oriented, commercial enterprise.

Only the last risk listed above - needing capital capacity for other projects - is an external factor that cannot be modeled. Capital competition is a political judgment. Presumably the project would be organized as a municipal enterprise. Its debt would be backed by assets and revenue. A successful project that is funded by its intrinsic cash flows shouldn't impinge on other public works.

How debt repayment time affects subscriber uptake rate

The time to repay the original construction bonds can be many years, if the project is done as a municipal utility designed to serve almost everyone at a modest, unsubsidized price. Being able to tolerate a long debt retirement is an advantage of a municipal utility over commercial entities. The repayment time should be no longer than necessary, targeting an Internal Rate of Return⁴ (IRR) on the order of 2.5% to 4%. If it's much lower than 2.5%, a higher subscriber price is probably required for financial safety.

This long payoff time would be a stretch for commercial or private equity investors, who have alternative uses for their capital and whose shareholders expect growth and dividends. And a 2.5% - 4% rate of return looks truly boring to commercial investors; it's a high-tech project that pays like a grocery store. That's not even enough free cash flow to pay dividends, but it's perfectly reasonable for a municipal utility, and excellent value for Loveland's citizens.

We should expect that the consumer service price offered by a PPP will be higher, to make the project more attractive to outside investors, and any construction loans will be retired faster than if the City builds and owns the network. A higher consumer price will also make the project riskier by reducing the number of subscribers.

Commercial providers or private equity can't carry enough debt to do this for every small city, unless each project really pays for itself AND is better than alternative investments. That's one reason (though not the only reason) why they haven't done it already: alternative investments in more densely populated locations pay off faster. Note that if the network pays for itself at commercial cost of capital, then it will more than pay for itself at a lower, municipal bond CoC.

A municipal utility can accept a longer payoff time, a lower IRR, and offer a lower service price which will attract more subscribers (reducing the uptake risk). These factors create an economic sweet spot.

Alternative technologies risk

Alternative technologies, *if priced at their true cost*, don't pose strong competitive threats:

- *DSL, the telephone company solution, copper all the way:*
Performance falls off very rapidly with distance from the exchange, and extremely limited bandwidth is shared by many users. This very old technology is not even a contender.
- *Fiber backbone + copper coaxial cable to the home, the TV cable solution:*
Performance falls off with length of copper. Upload speed is typically about eight times slower than downloads; shifting this balance reduces service capacity. There is a potential for competition in the form of aggressive, short-term pricing of a lower quality, lower performance service over existing copper cable installations. But coaxial cable is a legacy technology.
- *Small cell wireless:*
Requires large number of very small, very high frequency cells, fed by optical fiber; theoretically cheaper to install because you don't have to run a physical connection to each home, but will be

⁴ The Internal Rate of Return (IRR) is the interest rate that the same amount of invested money would have to earn, to produce the same stream of cash flows as the project and its assets. If the IRR is positive, the project is an intrinsically sound investment. Projects with a negative IRR are net losers. For technical reasons, a variation called "Modified IRR" is used to model projects like this one, but the idea is the same.

slower under load than fiber-to-the-home; has poor penetration into building structures; wireless may offer weaker security, not ideal for businesses; higher maintenance expense; at least five years off.

None of these alternatives would be better for end-users than a well-done fiber network. Light has the overwhelming advantage that you can shine multiple colors of light down a single fiber simultaneously, and the signal that each color carries won't interfere with the others. Fiber-optic networks are extremely reliable. The cost of putting down 128 fibers in a cable is little more than the cost of only 10 fibers in the same cable, so there is enormous scope to build a "future-proof" network with plenty of excess capacity, which could also be used for other City purposes. Given a choice, most consumers should prefer fiber service at a comparable price.

Specific concerns about a PPP approach

A PPP deal would be better for Lovelanders than not doing the project at all. The question is whether, and why, it would be better than owning and operating the network ourselves.

Under a PPP, someone else might (depending on the deal's terms) own the financial losses if the project fails. A PPP deal could avoid asking voters to approve a large bond issue. The network operator would deal with customer complaints. All this sounds like an easy response to uncertainty and doubt. But a PPP brings some non-obvious risks, and would impose unnecessarily high service prices upon subscribers for the foreseeable future. This project would be more financially challenging for a private partner than a municipal utility.

Investment professionals recognize that shifting risk from one party to another is a form of insurance. Insurance is never free – one way or another, someone will pay for it. The insuring counterparty will charge dearly for that service. It's easy to carelessly bestow valuable gifts upon one party at the expense of others by not thinking through the contingencies, or failing to correctly recognize the future value of the asset.

When you want insurance, it is usually better to price and buy it outright, and only for the period when it may be needed, than to embed it forever in the service price. A PPP deal would incorporate this hidden insurance into the end-user service price, which is not likely to ever be reduced.

A private partner would bring in adequate but presumably more expensive capital (because of the tax advantages allowed to municipal bonds). Even a partner with plenty of capital already in hand will price our use of that capital according to alternative uses for the money. This higher cost must pass into the consumer price, and fewer people will subscribe to a more expensive service.

It's safe to assume that an experienced network builder will successfully install the network, but there might be a temptation to underprice the service, to increase uptake. It doesn't make sense for Loveland to accept a private partner's proposed service price that is demonstrably too low for a commercial provider, or would force the builder to eventually sell the asset. Therefore, any PPP deal must expose full cost details so the City can assess whether the proposed end-user service price is sustainable.

Once built and subscribed, the network will be more valuable than its original construction cost:

- It's an operating asset; the risks are effectively out at that point.
- Potential for bundling content (all telecom companies are now trying to get into content).

- Potential to sell subscriber data (which a muni network would never be allowed to do).
- Potential to lower operating costs by selling to / merging with a larger operator.
- Potential to repay debt early, getting that fat post-payoff revenue and profit stream sooner.
- Once installed, easy and cheap to upgrade for even more capacity.
- Potential to raise prices.

Economists recognize this kind of project as a natural monopoly, with a tendency to aggregate and grow. A small player in a natural monopoly has a strong motivation to sell the asset once its value steps up. There is little protection in a contract clause that promises the City first right to buy, because of the time required to raise money, and because voters must agree to raise the buyout capital.

- If it's a failed enterprise, why would voters buy a failure?
- If a successful enterprise, voters not likely to approve because it's now even more money.
- The City might ask voters to pre-approve issuing bonds against this possibility, but there's no way of knowing before the event how much money would be required.

A buyout option at "fair market value" is also of questionable utility when there are only a few potential buyers. The price in this situation would be whatever some large company (that previously declined to build our network on their own dollar) is willing to pay. That would depend on the buyer's alternative uses for capital, and ability to exploit pricing. The sale price should ideally be the value of a monopoly-in-place, but it is not pleasant to be a seller in a thin buyer's market. The City would be bidding against players with more money and more motivation.

A contract provision which limits future price increases may also be not very useful. If the business is sold to a buyer who later determines it can't be operated without raising the service price, then the price will go up one way or another, because otherwise the asset would be stranded.

So, a PPP deal would install a dominant provider that we can influence only in limited ways, and things could happen to make Loveland really regret that lack of influence. In contrast, a municipal network offers customers several advantages.

- If the utility fails to address some customer problem, the issue can be raised with City government instead of dickering with yet another monopoly provider.
- Can be operated to make a reasonable profit without being exploitative. Without any competitive need to grow faster than the City's intrinsic 2% annual growth, and with a lower cost of capital, municipalities can do it cheaper. A municipal utility is operated for its customers, not for growth oriented investors with alternative opportunities.
- Suppose Loveland has a 40% uptake rate; Longmont's is now at 51%, two years in. If we have 28,000 endpoints, 40% is 11,200. For each \$10 we can price service below a commercial partner, that saves residents about \$1.34M annually - a number that will grow with our population and uptake rate.

What if we build it and the project fails?

It would be extremely surprising for this project to fail in the build phase. Given an accurate cost estimate with a supportive cash flow model that shows positive IRR etc. as described above, the capital can be raised and the network will be built. Other than incompetence, the only real failure mode would

be a too-low subscriber uptake rate, which could force a service price increase that would further reduce the number of subscribers.

That is, however, the opposite of Longmont's experience. Longmont's uptake rate is far better than the minimum they anticipated, and has increased steadily during the built-out. They had to work hard to achieve this, but they did it. A better subscriber price than commercial providers is key. Trusting the City more than incumbents is also very important.

If Loveland raises the capital, those bonds would probably be backed by our electric utility's revenues. Failure would require an electric rate increase to pay off the bonds, and we can calculate the worst-case amount. But the worst case won't happen – the uptake rate will not be zero.

If a third party operates the network, might that staff turn out to be isolated, local, and mostly remote contractors? Would they be right there, and will they be competent, in an emergency?

An operating, city-wide network would be worth more than the build cost. It could be sold. Any sale would be into a market with few buyers, but a private partner would face this same problem.

Conclusions and recap

Nobody should downplay the fact that we're talking about a lot of money. But the revenue stream is also large, so the most important thing is to be sure the numbers are honest. Council has hired experienced consultants to determine detailed, accurate numbers. I haven't seen those numbers, but project construction cost will be whatever it is, regardless of who builds the network.

Measured against what voters are hoping for, a PPP is not the best we can do. A partnership – if we can find one – injects risks and costs that are very real, even if they're not obvious. The consumer price would be higher than a City owned and operated solution. That accumulated, monthly price differential over 10 to 15 years could add up to a large fraction of the original project cost. The higher end-user price would also make the project riskier by reducing the uptake rate, so fewer Lovelanders would benefit.

Part of the partner's service price and profit margin would be a hidden insurance premium for allaying our fears and risk avoidance. Once the project succeeds, Lovelanders would continue paying that premium for a long, long time.

If we enter a PPP deal, the network might eventually be sold to some large, commercial ISP, so that the original private partner can recoup its capital sooner for new ventures. Our network could thus fall into the arms and charms of one of today's unsatisfactory providers.

If the completed, functioning and therefore more valuable network is put up for sale, the City will not, realistically, be able to buy it. It would be sold into a thin market. A sale might force customer pricing higher, regardless of original contract provisions, if that is required for commercial viability in the buyer's overall business model.

Finally, consider that after the network is built, it will be important to keep operating costs down. Fort Collins, Loveland and Longmont should join their network projects to create a Northern Colorado municipal broadband utility. Platte River Power Authority, which owns most of Loveland's existing fiber-optic infrastructure, is the living, successful example of this strategy.

Joining forces would reduce the risks and operating costs for all three cities' broadband networks. It's an opportunity to do well by doing good for our citizens and businesses. Cooperation would also enhance our Northern Colorado "brand" as a place where communities work together to solve practical problems. That's a powerful message to businesses that want to attract employees and take advantage of services across our region.

The neat thing about this project is that you can let the data guide you. If the consultant's cost numbers and financial model are convincing and supportive, Council can make a clear, confident decision in favor of a municipal broadband utility. Otherwise, don't do it. But if the answer is No, it should be for substantive, quantifiable reasons.

Look for a positive Internal Rate of Return, and a running cash balance that stays always substantially positive. At a service price that would capture at least 40% of potential subscribers, that would be a good deal for Loveland and you can be comfortable proceeding with a pilot project.

Assuming the project is financially sound, Loveland can avoid complexity and hidden risks by creating a municipal enterprise. I believe that most of the 83% of electors who voted Yes in 2015 would cheer a clear, affirmative decision backed by data. After all, they are the beneficiaries. Your clarity and support can launch a decisive success. Leadership is the crucial ingredient.

With kind regards,

Roger Ison

A handwritten signature in blue ink that reads "Roger E. Ison". The signature is written in a cursive style and is underlined with a single horizontal stroke.