

Running the Numbers for Fiber

How do you decide whether a FTTH build makes economic sense? Here's an elegantly simple spreadsheet devised by a financier who funds FTTH projects

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Financing a fiber-to-the-home network presents a unique challenge to municipal utilities. When they want to upgrade their electric power plants or water purification systems, they can point to proven revenue streams. But when they talk to investors about FTTH, they have no financial statements, customers or cash flow to demonstrate. The technology is unfamiliar to them, and they may be facing a competitive environment for the first time. "It's like being a startup business – it's a culture shock," says Fred Cornwall, president of Municipal Capital Markets Group, a specialty investment banking firm in Dallas.

The easiest – and least expensive – financing option is for the municipality to issue general obligation bonds, which are secured by its taxing and borrowing powers. Nearly as desirable are bonds backed by revenues from a dedicated tax or from the utility's other services. But when state and local laws bar these financing methods, municipal utilities find themselves in what Cornwall calls "essentially a venture capital situation," with much higher capital costs.

Despite the risks and costs, municipal projects can obtain private financing, and can succeed financially. In a

presentation at the FTTH Conference, Cornwall explained what lenders and investors look for when they evaluate proposals by municipal utilities.

To approve a municipal FTTH project, financiers have three major requirements: managerial capacity; community commitment; and a credible business plan. In order to demonstrate the capacity to build, manage and market a FTTH network, a utility must hire specialists in each of the services it plans to offer (typically voice, video and Internet access). Though its existing managers may have years of experience delivering, say, electric power, few of their skills are transferable to new lines of business.

Community commitment is demonstrated by contributions of cash, assets (such as a fiber backbone that is already serving government offices and schools) and, if possible, by dedicated revenue streams. Additionally, government agencies can become "anchor tenants" for the new system by agreeing to "take-or-pay" contracts.

The business plan is usually set out in long and enormously detailed spreadsheets that show the costs of constructing, financing and operating the system as well as the likely revenues over the first several years.

Cornwall emphasizes that system planners can't take shortcuts – the 100-page spreadsheets really are necessary, both for the municipality and for the financier. But it's also useful to prepare a short, simple spreadsheet that summarizes all the details from the full business plan into a coherent snapshot. The municipality can use the summary spreadsheet as a way to introduce the project to potential financiers. Lenders and investors who are impressed by the summary spreadsheet will delve deeper; those that aren't can save themselves the trouble of reading the full version.

A Walk Through the Spreadsheet

Cornwall's spreadsheet is shown as Figure 1; a live version of the Excel spreadsheet can be downloaded from the Broadband Properties Web site at www.broadbandproperties.com

The company whose project is summarized in the spreadsheet is proposing to invest a total of \$25 million – 80 percent of it borrowed – to build out a fiber-to-the-home system. The buildout will take three years, but most of the money will be spent in the first year (Line 6). Lines 9 and 10, the components of Line

6, show the cost to pass homes and the cost to connect homes. Investment during the first year is mostly for passing homes, while in the second and third years it is mostly for connecting homes. Not only is the total cost front-loaded; even the cost to build out the network is front-loaded because central office equipment must be in place before even a single home is passed. Thus, the cost to pass a single home falls from \$1,518 in the first year to \$1,008 in the third year (Line 15).

The cost of connecting homes (Line 9) is based on assumptions about the number of subscribers (Line 5). In this case, the network builder is projecting a low take rate of 20 percent at the outset, rising to 40 percent in the third year (Line 18). Take rates for FTTH typically rise over time as the enthusiasm of early adopters inspires others to sign up, and as residents' existing contracts with competing providers expire.

Lines 21 and 22 show the borrower's assumptions about the financing terms available in the current investment climate. The next section (Lines 25 through 30) shows how these values translate into debt service per subscriber. The capital cost per subscriber is the cost per home passed, divided by the take rate, plus the cost per home connected. Eighty percent of the capital cost will be borrowed, and a one-time fee of 8 percent will be added to the amount borrowed in order to cover fees associated with the debt issue. The debt service is based on a payout schedule that fully amortizes the debt over the 15-year term specified in Line 21. Because the number of subscribers is expected to grow over the three-year period, the debt service per subscriber falls from about \$89 per month to \$35 per month.

In addition to debt service, financiers want to know about projections for income and operating expenses. Line 34 shows average monthly subscriber fees rising from \$82.50 to \$165.00 on the assumption that the average customer will subscribe for six months during Year 1, nine months during Year 2, and the full year in Year 3. Other monthly income (Line 35), which this provider doesn't

Fiber to the Home System Analyzer				
XYZ Project: 20% Equity/80% Debt				
		Year 1	Year 2	Year 3
1				
2				
3				
4	Total homes and businesses passed	10,000	16,000	18,250
5	Total subscribers at year end	2,000	6,000	7,300
6	Total construction cost	16,829,954	22,093,748	24,396,793
7	Equity	5,000,000	5,000,000	5,000,000
8	Debt	20,000,000	20,000,000	20,000,000
9	Total cost to purchase and install customer premises equipment	1,646,000	4,938,000	6,007,900
10	Total cost to purchase and install central office equipment, outside plant and fiber cable	15,183,954	17,155,748	18,388,893
11	Direct costs per subscriber	823	823	823
12				
13	Analysis			
14	Construction Costs:			
15	Cost to pass one home or business	1,518	1,072	1,008
16	Cost to connect one home or business	823	823	823
17				
18	Systemwide Take Rate	20.00%	37.50%	40.00%
19				
20	Debt or Capital Cost - 100% Financing			
21	Term of loan, in years	15	15	15
22	Interest rate (capital cost)	12.00%	12.00%	12.00%
23		\$1,067.49		
24	Capital Cost Calculations			
25	Capital cost per subscriber	8,415	3,682	3,342
26	Capital cost to be financed (80%)	6,732	2,946	2,674
27	Cost of issuing debt	8.00%	8.00%	8.00%
28	Debt per subscriber	7,271	3,181	2,888
29	Debt service per subscriber per year	\$1,067.49	\$467.12	\$423.96
30	Debt service per subscriber per month	\$88.96	\$38.93	\$35.33
31				
32	Cash Flow Statement			
33	Income per Subscriber:			
34	Average monthly subscriber fees	82.50	130.00	165.00
35	Other monthly income	0.00	0.00	0.00
36	Total monthly income	82.50	130.00	165.00
37				
38	Expenses per Subscriber:			
39	Cost of content	22.29	75.21	77.36
40	Payroll	19.81	21.86	19.40
41	Management	6.86	3.00	2.70
42	Debt service	68.96	38.93	35.33
43	Total monthly expenses	137.92	139.00	134.79
44				
45	Monthly cash flow per subscriber	-55.42	-9.00	30.21
46	Annual cash flow per subscriber	-665.01	-107.96	362.52
47	Annual cash flow for system	-1,330,023	-647,768	2,646,421
48	Annual EBITDA	1,069,977	1,752,232	5,046,421
49				
50	Investment Considerations:			
51	Annual EBITDA as percent of debt	5.35%	8.76%	25.23%
52	Annual EBITDA as percent of equity	21.40%	35.04%	100.93%
53	Annual EBITDA as percent of capital cost	6.36%	7.93%	20.68%
54	Debt service coverage ratio	0.50	0.63	1.63
55	Footnotes:			
56	Each year's subscribers are shown at year end, but only Year 1 revenue has been adjusted for partial year income.			
57	No investment income has been shown.			Source: Municipal Capital Markets Group

anticipate, might include ancillary items like charges for setting up home networks or providing IT support.

Operational expenses, other than debt service, consist primarily of the costs of video programming (Line 39) and the provider's own staff (40 and 41). Video programming costs per subscriber rise dramatically between Year 1 and Year 2 because the first year is not a full year and the provider expects to

start with limited content and add more as time goes on.

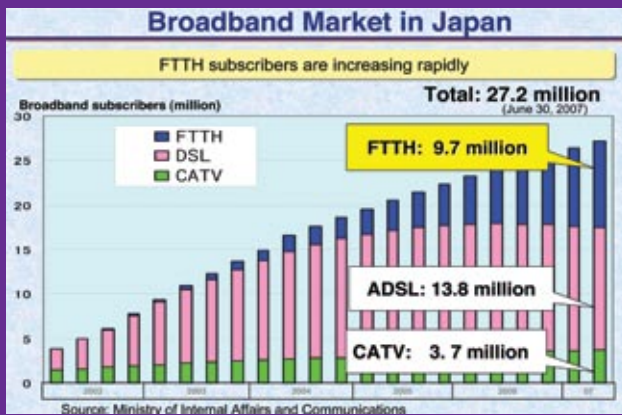
Subtracting expenses from income, we see in Line 45 that cash flow is projected to be negative for the first two years and to turn positive in the third year. EBITDA (earnings before interest, taxes, depreciation and amortization), which is in this case essentially cash flow excluding the cost of capital, is positive from the start.

The final section of the spreadsheet contains the numbers that financiers are looking for. For lenders, the most important number is the debt service coverage ratio (Line 54), or EBITDA as a percentage of debt service. (In other words, are operating profits sufficient to pay off the debt?) Lenders typically want to see debt service coverage ratio reach 1.5 or better by the third year – which the provider in this example does.

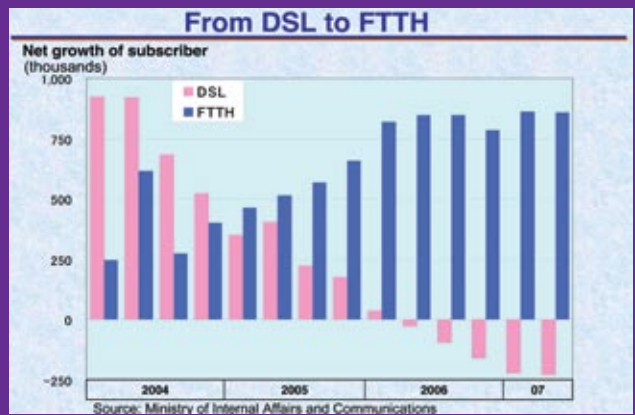
For equity investors, the relevant statistic is EBITDA as a percentage of equity (Line 52), but investors' requirements are more variable than lenders' requirements. Investors might want to see a return of anywhere from a 30 percent to 100 percent by the third year, depending on their perception of the risk. Again, in this case the proposer anticipates a 100 percent return in the third

year, meriting a request for the detailed version of the spreadsheet.

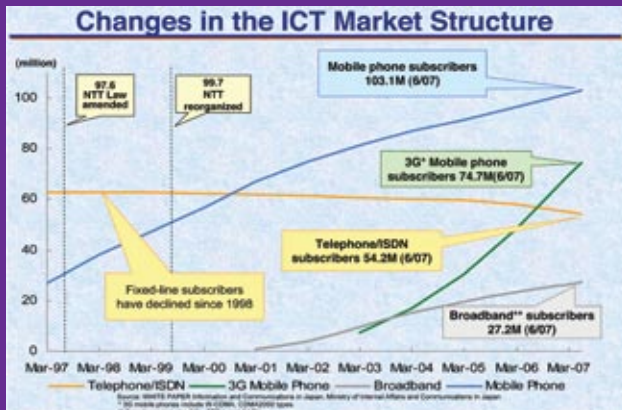
"It's not an exact science," Cornwall cautions, "but it's clearer than what cities typically bring us." Municipalities can use the spreadsheet not just to catch the attention of investors, but also to gain a better understanding of their own business plans and assure themselves that their projects really do make sense.



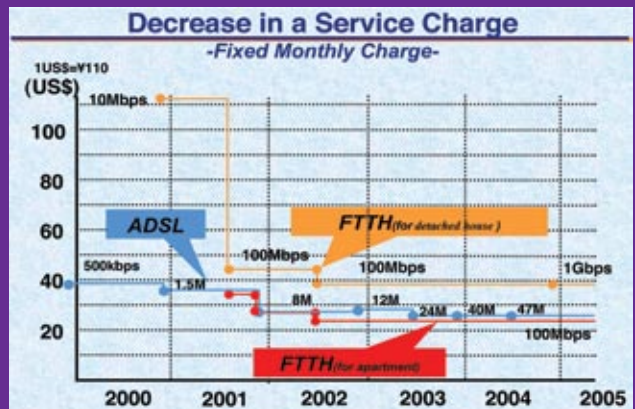
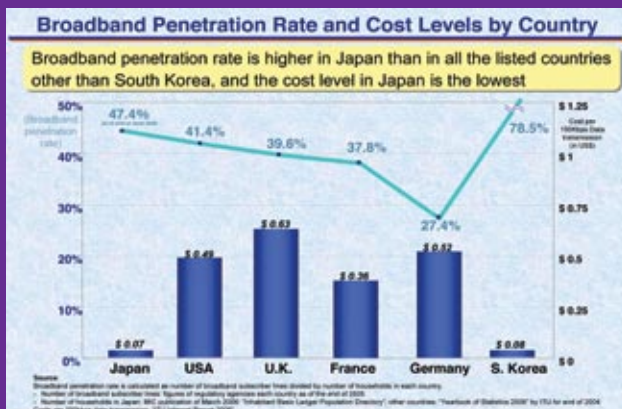
Fiber penetration is closing in on DSL in Japan. Cable is far behind.



Japanese government data graphically documents the quarter-to-quarter decline of DSL connections as FTTH/FTTB gains.

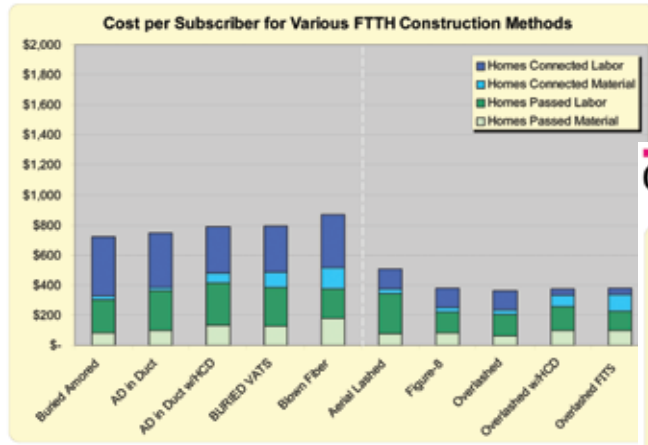


Foretelling the future: Japanese data show the familiar decline in landline use, and huge growth in mobile use, that we're just beginning to see in North America. Mobile is where the money is.



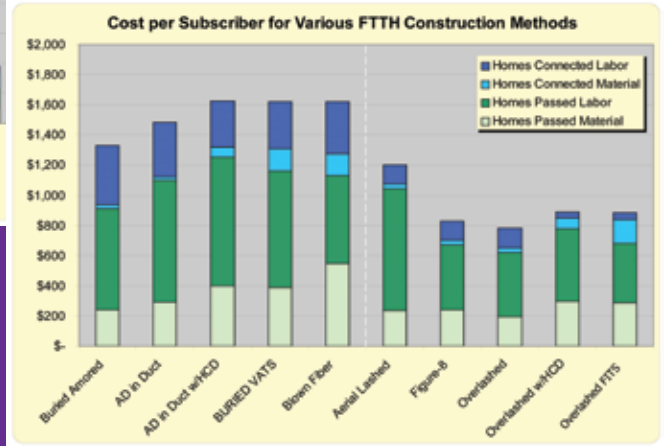
In Japan, more bandwidth has been accompanied by lower monthly fees; Japan's fees are now the lowest in the world, on average, per Mbps delivered.

BaseLine Case--Cost Model

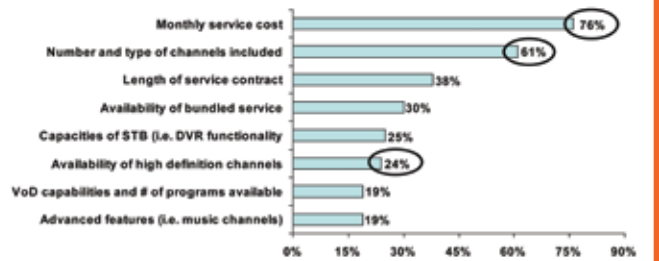


Detailed cost models from Prysmian show how take rate affects costs of various technology options differently.

Cost Model with Lower Take Rates



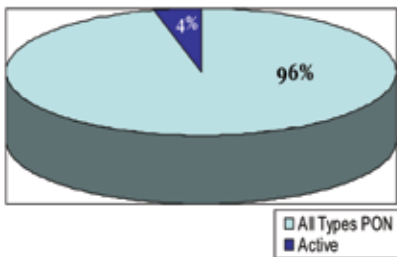
Content Has Strong Importance



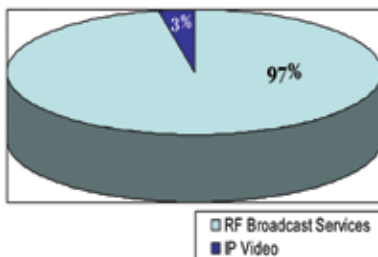
Primer for new video quality improvement technologies, from Tony Stanley, Director, FTTP Networks, Scientific Atlanta.

Tony Stanley, Director, FTTP Networks, Scientific Atlanta, says consumers mention content-related issues more than any other features when choosing a video provider.

North American FTTH Deployments By Architecture



North American FTTH Deployments By Type of Video Offered



Tony Stanley, Director, FTTP Networks, Scientific Atlanta, put active point-to-point Ethernet at 4 percent of all deployments. Because point-to-point is popular in muni systems, and because muni systems tend to be larger than typical non-RBOC local exchange carriers, the percentage of homes passed with active is higher.