5.2 ECONOMICS OF DEPLOYING MUNICIPAL NETWORKS

The economics of deploying municipal networks depends on a number of factors including the technology to be used, the geography/topography of the location, the market to be addressed, the services to be offered and the level of competition. All of these factors are interrelated, in that the type of services to be offered will depend on market demand and this will to a great extent dictate the technology platform that has to be used. The provision of high−speed Internet services can be accomplished using a number of platforms, whereas, a "triple−play" service of broadband Internet, video and telephony currently requires a wire line network. However, the current fashion of a "triple−play" offering has been fashioned around the capability of existing copper (DSL) and coaxial networks and in most cases involved an analogue rather than digital video service. The types of services that can be offered are driven by both the willingness and the ability of local consumers to pay for them.

5.3.1 Wireline Networks

Until recently, the deployment of locally owned access networks has been based on copper and fibre based wire line systems. These networks have been predominately in the United States where they have been built and operated primarily by local government owned telephone and utility companies. In the last five years, local governments in Europe, most notably in Sweden and the Netherlands have begun to deploy FTTH systems on a community−wide basis.

The cost of copper and fibre based networks are significant and the economics of deploying and operating them are very much dependent on the revenues that they can generate and the period of time which is assumed for the economic life of the investment. This in turn is impacted by the demand for the services and the degree of competition that exists in the market, particularly where the network is operated on a closed access basis where a shorter investment life is usually adopted. The U.S. systems are operated primarily as retail operations in competition with local service providers, whereas, the European networks are all based on an open access model where the end consumers and service providers are the users of the network.

The cost per household passed for wire line systems is no cheaper for copper based twisted pair and coaxial cable than for fibre, but the actual cost of the system depends on a host of other demographic and geographic factors and the existing telecommunications infrastructure that the local government already owns. It is clearly cheaper on a per household basis to deploy a network in a community that is predominately multi−tenanted dwellings, as is the case in many European cities, than in small towns in the U.S. where much of the housing stock is single detached dwellings.

Information on the actual costs of local government wire line networks does not tend to be well documented and is often difficult to obtain. Table 5.1 provides a sample of available costs for coaxial, HFC and fibre systems that have been deployed in both the U.S. and Europe.

The main barrier to entry, until fairly recently, in deploying FTTH has related to costs. The cost per unit for deploying FTTH has dropped from $ 7,500 per home in the mid 1990s to $1,600 in 2002, to $1,350 in 2004. The estimates today vary between $750 and $1000.**[i]**

The cost information presented in Table 5.1 is for systems that were built at differing times, therefore the average cost per subscriber passed at are not strictly comparable. Given the dramatic decline in the cost of installing fibre networks, it would be expected that if many of these systems were being deployed today, the overall cost would be less.

Because of the costs of constructing and operating these networks, their ability to be self−supporting should be given very specific consideration in the development of the business plan. There is a certain amount of evidence from the U.S. that in some of the original business modelling, the estimated deployment costs may have been underestimated and the projected revenues may have been overestimated, as the result of subscriber projections not being met and the pricing response from competing carriers.

TABLE 5.1 – Profiles of Local Public Access Wireline Networks [ii]

City/Region	Population	Owner	Operator	Cost	Business Model	Comments
Ashland, Oregon	18,700	City of Ashland Electric Department (MOU)	AFN (MOU)	$5 million	Open access	HFC
Cedar Falls. Iowa	36,000	Cedar Falls Utilities (MOU)	Cedar Falls Utilities	$8.3 million	CATV, closed access	HFC
Bristol, Virginia	17, 367	Bristol Virginia Utilities (MOU)	BVU OptiNet (MOU)	$30 million	Triple play, closed access	FTTH – BVU has 15,300 customers and now passes 80%
Dalton, Georgia	27,912	Dalton Utilities (MOU)	OptiLink (MOU)	$30 million	Triple play, closed access	FTTH with 49% take
Grant County, Washington	79,981	Grant County Public Utilities District	Zipp Network (GCPUD)	$120 million budgeted	Open Access	FTTH, 2/3 of network built, but halted due to revenue shortfall
Kutztown, PA	5,067	Hometown Utilicom (MOU)*	Hometown Utilicom (MOU)	$5.8 million	Triple play, closed access	FTTH
	8,227			$9 million		FTTH

Reedsburg, Wisconsin		Reedsburg Utility Commission	Reedsburg Fiber Connection		Triple play, closed access	
Sallisaw, Oklahoma	7,989	Sallisaw Municipal Authority (MOU)	DiamondNet (MOU)	$7 million	Triple play, closed access, but telephony provided by private company	FTTH 450 customers and waiting list of 149 (Sept 2005)
Windom, Minnesota	4,500	Windom Utility (MOU)	WindomNet	$8.6 million	Triple play, closed access	FTTH
Nuenen, NL	23,000	ONS Net Co−operative	Ons Net	15 million euros	Triple play with open access	8,000 homes and businesses 97% penetration
Västerås	131,000	Mälarenergi, a council owned utility	Mälarenergi Stadsnät AB	N/A	Triple play with open access	FTTH – network still under construction
Sollentuna	59,000	Sollentuna Energi – council utility		SEK 93 million	Triple play with open access	6100 users in Feb. 2004

* MOU – Municipal Owned Utility

5.3.2 Wireless Networks

Wireless is becoming a major focus of attention in the development of new municipal networks. The majority of these networks have been developed using Wi−Fi (802.11b) because of the standardisation of the technology, it is relatively inexpensive and quick to deploy and there is available unlicensed spectrum. It is also much easier for entry by local governments that do not have existing communications infrastructure.

The interest in building these networks, particularly in larger cities has often been driven by cost considerations in reducing communications expenditures for essential public services. Once established, they can be used to provide broadband access to residents and businesses, such as in the case of Corpus Christi and Granbury, Texas. The motivation to provide retail services to the public in larger cities appears to be a desire to extend services at a more affordable rate and in some instances, as a possible revenue generating opportunity. In many rural areas, the primary concern has been over extension of high−speed Internet services. The system in Buffalo, Minnesota, was the first municipal wireless system that was deployed in the U.S. for this primary purpose, as the local operators were unwilling to provide service.

TABLE 5.2 – Profiles of Local Government Public Access Wireless Networks [iii]

City/Region	Population	Owner	Operator	Cost	Business Model

Allegany County, Maryland	60,000 (267 sq km)	AllCoNet2 (Public agencies)	AllCoNet2	$4.8 million	Open Wholesale to ISPs
Chaska, Minnesota	18,000 (41 sq km)	City	Chaska.net City ISP	$800,000	Closed Retail services to public
Buffalo, Minnesota	50,000 (15 sq km)	City	BWIG. Net City ISP	$750,000	Closed Retail services to public
Granbury, Texas	6,000 (26 sq km.)	City	Frontier Broadband −private ISP	$250.000	Closed Retail services to public
A	8,600 (23 sq km)	City	Neighborhood Link − private ISP	$40,000	Closed Retail services to public
Scottsburg, Indiana	6,000 (12 sq km)	City	City MOU	$384,000	Closed Retail services to public
Waupaca, Wisconsin	5,700 (15 sq km)	City	City	$320,000	Closed Retail services to public

Table 5.2 provides a sample of the costs of deploying local government wireless systems in the U.S. that provide wholesale and retail access for the provision of high−speed Internet services. They represent a mixture of business and operational models; however, the dominant model is still that of a closed access model either operated by the local government or by an ISP on an exclusive basis.

5.3.3 Other Technologies

Satellite and Broadband over Power Lines (BPL) technology are other alternatives that are being used to provide high−speed Internet services in communities.

Satellites have the advantage that they provide access to the most remote regions and using wireless for local distribution, they can provide basic high−speed Internet services to entire communities. These types of systems have been successfully operating in communities all around the world and they are relatively inexpensive to deploy. However, the cost of satellite bandwidth is expensive and these systems are limited in the bandwidth that can be provided to individual users at an affordable price.

There are a number of BPL installations throughout the world that have been either piloting the service or providing it on a commercial basis for several years. BPL technology will be piloted in the Municipality of

Tshwane and the City of Johannesburg in the deployment of their local government access networks.

The City of Manassas, Virginia, is the first community in the U.S. to deploy a BPL system to serve the entire city of 35,000. As of October 2005, the system had passed all 12,500 residences and 2,500 businesses and had 1,200 customers either connected or signed up to receive the service.[iv]

The City of Manassas through its municipal owned utility has deployed this BPL network in partnership with Communications Technologies (COMTek), a private sector firm. Under the agreement, COMTek is responsible for funding the BPL equipment and its deployment and in return, it has an exclusive franchise to provide high−speed Internet services to all the residents and businesses in the City.

In a presentation[v] made by COMTek Technologies on its BPL deployment in Manassas, it noted that the cost to pass each building or home was $75 with an additional $40 − $150 for Customer Premise Equipment. Other studies from the U.S. have indicated a possible range of between $50 and $200 per residence passed.[vi]

The BPL technology platform has a number of constraints in that current generation technology has limited bandwidth capability and to date, it has only been used to support high−speed Internet access and VOIP applications. Unless there are significant technological advancements, it is a platform that may have a limited use, as broadband applications become more bandwidth intensive.

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References

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[vi] http://www.thenmrc.org/archive/bpl_report022405.pdf