Engineering a Lucrative DSL Financial Model

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As the general manager of an independent operating company (IOC), how would you answer the following DSL-related business questions?

Do 25 percent or more of the subscribers in my serving area purchase broadband Internet services?

Is our DSL revenue equal to or greater than our R1 (regulated voice) revenues?

Is the gross margin for the de-regulated DSL service 30 percent or more?

For rural IOCs, the answers to each of these questions should be "yes". If this isn't the case, your company is missing out on an important revenue source. DSL provides an excellent business opportunity for a variety of reasons, including:

- A large, untapped market for broadband Internet services.
- New NECA DSL rates that encourage investment.
- Margins INCREASE as the number of subscribers grows.

Too often, independent operating companies (IOCs) don't have the service-specific insight they need to properly price their DSL services. As a consequence, they set DSL prices higher than they may need to be and penetration rates suffer. Ironically, the remedy may lie in reducing retail DSL prices, albeit in a very structured, disciplined way.

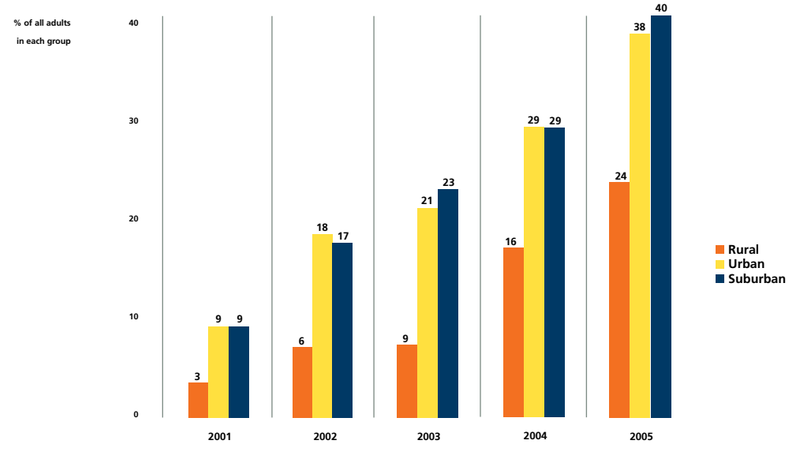
This white paper discusses the steps that you as an IOC can take to engineer a lucrative DSL financial model. Starting with an estimate of the addressable market for broadband Internet services in your serving area, we will also estimate the underlying costs of offering broadband services. We will carefully consider the competitive environment for broadband Internet services, as well as your company's business and financial objectives. Armed with this insight, you will be able to determine whether your current retail DSL prices should be changed and, if so, by how much.

Estimating Rural Markets for Broadband Services

The number of Americans using the Internet today is impressive. It's estimated that 74 percent of all Americans are Internet users and that a full 68 percent of Internet users connect to the Internet with broadband.. However these nationwide market estimates do not accurately reflect Internet usage in rural communities.

The Pew Internet & American Life Project ("Pew") has shown that Internet use in rural communities differs from other parts of the country. Pew estimates rural Internet use lags the national average by approximately 8 percent and the number of rural Internet users with broadband connections lags the national average by 14 percent. However, as Figure 1 indicates, Pew reports that over the last five years **rural broadband penetration has exhibited growth rates similar to the national average, but the growth has been delayed by a couple of years.**

Figure 1. Home Broadband Penetration by Community Type



(Source: Pew Internet & American Life Project)

For instance, rural broadband penetration in 2005 is nearly equal to the broadband penetration in urban and suburban communities in 2003, and this same trend has occurred in rural markets since 2003.

More importantly, this trend provides a clear indication that rural broadband penetration is expected to grow significantly over the next two to three years.

Another interesting market trend that bodes well for rural communities is the shift from cable modems to DSL in broadband market share. Over the last year, DSL growth has outpaced cable modem growth, fueled in part, by lower prices. According to Pew DSL prices have dropped from $38 to $32 per month over the last year, while cable modem prices have held steady at $41 per month. This information is particularly relevant in rural communities where, on average, the household income is less than in urban or suburban areas.

Pew also found that 62 percent of rural users did not know whether or not broadband services were available in their communities. This is in stark contrast to the fact that IOCs currently offer broadband in more than 90 percent of their CSA.

NECA ADSL Tariff Rates

NECA has done a superb job over the past few years of restructuring its DSL rates and charges to encourage rural broadband investment. Under the new DSL Wholesale Rate Plan (WRP), which was introduced April 1, 2006, the organization has reduced its wholesale DSL tariff rates by 20 percent opening the doors for IOCs to deliver DSL more cost effectively.

NECA DSL tariff rates are the wholesale prices used by regulated service providers to provide broadband DSL or fiber connections to de-regulated companies. These broadband connections span from the regulated service provider's DSL connection point to their subscribers. While de-regulated companies can use these broadband connections for any type of application, these connections are most commonly used to provide Internet access, video service or both.

The following paragraphs provide a brief overview of the NECA DSL Wholesale Rate Plan. For more information on how to use the plan, please consult NECA or your financial consultant.

The NECA DSL Wholesale Rate Plan:

- Reduces the monthly wholesale ADSL line charge to as low as $11.25 on access lines that are used to provision DSL and voice services.
- Reduces the serving wire center charges.
- Offers additional, volume-based line charge discounts as part of a new Volume Pricing Commitment Plan.
- Increases the ADSL downstream transmission rate from 1.5 Mbps to 6 Mbps.

The following table, Table 1, shows the NECA ADSL WRP line rates. WRP line rates are determined based by 1) whether or not the ADSL access line supports both voice and data or data only; 2) the monthly recurring wire center charge; and 3) the term commitment. The tariffed line rates can be further discounted based on volume thresholds within an IOC's study area. WRP rates and charges are based on the services provided on individual access lines and are used regardless of the underlying access network technology.

Note that the NECA tariff rate essentially triples when purchasing wholesale ADSL services for data-only subscribers. The base rate for voice-data DSL subscribers is as low as $11.25 per month and increases by $22.70 if the subscriber does not subscribe to a regulated voice service.

Table 1. NECA ADSL Tariff Wholesale Rate Plan

ADSL Line Charges	Retail	WRP Monthy	WRP Opt A 1 year	WRP Opt A 3 year	WRP Opt B 1 year	WRP Opt B 3 year	Installation
Voice/Data	$29.77	$29.06	$20.38	$16.75	$15.95	$11.25	$95.00
Data Only	$51.22	$50.51	$43.38	$38.40	$37.95	$33.95	$281.00
Difference	($21.45)	($21.45)	($23.00)	($21.65)	($22.00)	($22.70)	($186.00)

Opt A - $100 per month charge for each Serving Wire Center (SWC charges only apply to SWC's listed in NECA's tariff #4)
Opt B - $500 per month charge for each Serving Wire Center
Volume Pricing Commitment Plan (VPCP) discounts:
500 or more lines - Additional 5% discount on line charges
2,500 or more lines - Additional 10% discount on line charges
5,000 or more lines - Additional 15% discount on line charges

There are other DSL-related tariff charges in addition to line charges. NECA has simplified and reduced the wire center charge by introducing two wire center options as shown in Table 1. Wire center "Option A" calls for a $100 per month wire center charge and "Option B" calls for a $500 per month wire center charge. The corresponding line rates for "Option A" are higher than the line rates associated with "Option B". NECA advises that the "Option A" $100 wire center rate is less expensive only if there are less than 73 subscribers per wire center, and that "Option B" is the more cost effective rate plan when there are 73 or more DSL subscribers per wire center. There is also a corresponding charge for connecting the ports at the DSL Serving Wire Center to the Internet or the source of video content. These network connections are provided using a traditional trunk port (DS-1, DS-3, OC-3, etc), ATM UNI or NNI port or Ethernet UNI or NNI port.

These tariff rate reductions have a significant impact on a service provider's DSL business model. NECA's current DSL rates are structured to encourage service providers to re-double efforts to promote broadband services by reducing the associated DSL tariff rates as subscriber volume increases, while the organization's original DSL rates were intended to help IOCs launch DSL services.

The DSL Business Model

The DSL business model has two distinct components: the "de-regulated" business, which packages and sells the broadband service to subscribers, and the traditional regulated business, which provides the wholesale broadband network.

Deregulated DSL Business Model

To provide a complete overview of the deregulated DSL Business Model, we have developed an expense model as shown in Table 2; a revenue model that assumes recurring subscriber revenue of $35 per month; and a DSL income statement as shown in Table 3 that combines the expense and revenue models.

Expense Model

In the de-regulated DSL business model the major cost to consider is that of wholesale DSL rates being paid to an underlying regulated company. Other DSL-related costs that must also be considered include costs associated with the network connection to the Internet, the cost to provide e-mail and technical support services, management support and the cost of installation. Although there are other secondary costs, such as advertising and depreciation, for simplicity's sake, we will create the DSL business model with only the primary costs.

In this model, the de-regulated DSL expense for an Internet access service as shown in Table 2 below is constructed as the expense portion of an income statement and reflects all of the primary DSL expenses except installation costs, which will be considered separately. Monthly recurring DSL expenses are normalized on a per subscriber basis for 250, 500, 1000, 1500 and 2500 subscribers. As you look at Table 2 it's clear that the **cost per DSL subscriber *decreases dramatically* as the number of DSL subscribers increase!**

Table 2. De-Regulated DSL Recurring Expenses

Number of DSL Subs	250	500	500	1000	2500
Wholesale ADSL Expense					
Line Charge	$11.25	$10.69	$10.69	$10.69	$10.13
Wire Center Charge	$2.00	$1.00	$.50	$.33	$.20
Wire Center Port Charge	$2.40	$2.00	$1.39	$.92	$.55
ADSL Exp Per Sub	$15.56	$13.69	$12.57	$11.94	$10.88
ISP Trunk Expense					
Trunk Cost(total)	$1,200.00	$1,600.00	$2,000.00	$2,000.00	$2,000.00
ISP Port Charge (total)	$350	$650	$1,000.00	$1,000.00	$1,000.00
ISP Trunk Exp Per Sub	$6.20	$4.50	$3.00	$2.00	$1.20
E-mail/Tech Support	$5.00	$4.65	$4.33	$4.00	$4.00
Accounting/Overhead	$20.00	$10.00	$5.00	$3.33	$2.00
Monthly cost per DSL sub	$46.85	$32.84	$24.90	$21.28	$18.08

The estimates of the wholesale DSL cost per sub shown in Table 2 were based on the following assumptions:

- Each subscriber continues to purchase a regulated local voice service and qualifies as a "voice-data" DSL subscriber.
- The de-regulated company makes a three-year term commitment for each DSL line.
- The de-regulated company purchases wholesale DSL services using "Option B" and pays a monthly recurring $500 wire center charge.
- The wire center port charge assumes that the ISP trunk capacity is based on one DS-1 for every 100 DSL subscribers.

Using NECA's new lower rate structure and the volume discounts, Table 2 shows that the wire center cost per subscriber is reduced as the number of subscribers increase. **Clearly, these DSL wholesale cost estimates show that NECA is encouraging service providers to grow their DSL subscriber base by providing volume discounts.**

Wire center port costs are estimated using NECA's $199.61 monthly recurring cost per DS-1 port. The number of ports increases as the number of subscribers increases. The number of ports assumes 100 DSL subscribers per DS-1, and, in instances where there are 1,000 or more DSL subscribers, the model assumes that the wire center port used to connect to the Internet is a DS-3. This estimate does not reflect any non-recurring port charges that may apply.

(Please note that NECA's new WRP redefined a DSL wire center to be a central office location as defined in the NECA Tariff 4. As a result, some wire centers defined in previous DSL tariffs no longer need to be classified as wire centers. This may help reduce the DSL tariffs for some IOC's with multiple DSL wire centers per study area by reducing their DSL wire center costs.)

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ISP trunk costs are estimated primarily on ISP trunk capacity and are also sized assuming one DS-1 per 100 DSL subscribers. In instances where there were one thousand or more DSL subscribers, the model assumes that the trunk used to connect to the Internet is a DS-3. Actual ISP trunk costs will differ by service providers and will depend on how far the service provider is from the ISP's point of presence. Nonetheless, the estimates clearly show the economic advantages of increasing the number of subscribers and the capacity cost reduction inherent to larger circuits.

E-mail and technical support expenses reflect the market price for providing e-mail and technical support through a third party. The market price for these services ranges between $4 and $5 per subscriber per month. The model assumes that service providers with more subscribers will be able to negotiate better rates.

Accounting and overhead costs cover management, bookkeeping and customer support expenses. These costs will vary significantly from company to company and are assumed to be $5,000 per month. Once the DSL service is turned up, the amount of day-to-day management required is minimal.

To put these DSL expense estimates in context, assume that the expenses reflect the DSL-related expenses for a de-regulated company serving a community with 5,000 access lines.

It is also interesting to note that the underlying DSL expenses are essentially independent of line speed; the cost to provide a 6 Mbps Internet access service is essentially the same as providing a 256 Kbps Internet access service.

The subscriber number metrics of 250, 500, 1,000, 1,500 and 2,500 reflect DSL penetration of 5, 10, 20, 30 and 50 percent of the available access lines. In all probability, the 5 and 10 percent penetration rates reflect those of many DSL service providers today. **The 20, 30 and 50 percent penetration rates clearly point out the addressable rural DSL market as projected by the Pew market research.**

Revenue Model

The revenue component of this model assumes that the recurring subscriber revenue will average $35 per month, the average of 2004 and 2005 DSL prices according to Pew Internet & American Life Project research.

Income Model

The revenue and expense portions of the DSL income statement are combined in Table 3 to calculate an income statement. At $35 per month, the DSL business at low subscriber densities per wire center is abysmal and dramatically shows why rural DSL prices are often much higher than the national average. Conversely, **with projected gross margins ranging from 29 percent to 48 percent, the DSL business is very attractive when the subscriber density per wire center is 1,000 or more subscribers.**

Table 3. DSL Income Statement

Number of DSL Subs	250	500	500	1000	2500
Ave Monthly DSL Revenue	$35.00	$35.00	$35.00	$35.00	$35.00
Monthly cost per DSL sub	$46.85	$32.84	$24.90	$21.28	$18.08
Income	($11.85)	$2.16	$10.10	$13.72	$16.92
Gross Margin	-34%	6%	29%	39%	48%
Est Install ROI (months)	N/A	55	12	9	7

Considering Installation Costs

Up until this point, this DSL business model has not focused on "cash flow" per se, nor considered any installation-related costs. De-regulated DSL installation costs can be as high as $120 for each new subscriber. Service providers typically are compelled to give away DSL modems at a cost of approximately $60 each. One or two hours of installation labor for each new DSL service is common in rural areas, even with DSL self installation kits. The $120 installation cost estimate assumes that the fully burdened cost of a truck roll is $60 per hour and that half of the installation time can be allocated to the regulated network. Service providers with questions regarding the classification of labor resources should consult NECA or their financial consultant.

Service providers with low DSL penetration have a very difficult time recouping their de-regulated installation costs. For instance, as Table 3 shows, it will take a service provider with 500 DSL subscribers per wire center almost five years to recoup its DSL installation costs. On the other hand, service providers with 1,000 or more DSL subscribers per wire center are projected to recoup their DSL installation costs in a year or less!

Regulated DSL Business Model

The regulated business case depends on the regulated service provider's financial structure. If a regulated service provider is a NECA cost company, the DSL business case is compelling. DSL is considered an interstate service and, as a result, cost companies are reimbursed for all of their regulated DSL-related capital investments and expenses.

A NECA average schedule company is also reimbursed for its DSL-related investments and expenses. However, their DSL-derived settlement revenue is based on the tariff revenues they collect. As a result, average schedule companies have an extra incentive to market their DSL services to their subscriber base and, additionally need to ensure that the DSL tariff revenue it receives covers its DSL infrastructure investment.

Broadband Internet Service Definitions and Pricing

For many service providers, introducing a tiered DSL services is an excellent way to price DSL services. A tiered DSL offering allows the service provider to create a variety of DSL services that can be used to target different customer segments.

For instance, introducing a relatively low-priced, entry level DSL service with a data rate of 256 Kbps (sometimes as low as 56 or 64 Kbps) can be effectively used to target dial up subscribers. DSL expenses are not related to end user data rates as long as the downstream data rate is less than 6 Mbps. As a result, offering higher-speed service tiers from the service provider's perspective is essentially a no-cost or low-cost capability and enables the service provider to increase margins for little or no added expense. Table 4 provides an example of a tiered DSL service offering.

Table 4. Tiered DSL Service Offering Example

Data Rate	Take Rate	Price
256 Kbps	40%	$29.95
512 Kbps	10%	$34.95
1.5 Mbps	40%	$39.95
3.0 Mbps	10%	$44.95
	100%	$35.95

For modest increases in price, second, third and fourth service tiers can be added that provide successive speed increases. Creative service providers can market these additional service tiers to other segments of residential subscriber base (e.g., Internet enthusiasts or gamers) or business subscribers. Additionally, a tiered pricing structure enables a service provider to price the service tiers to entice current DSL subscribers who may be paying higher than market price for their current DSL service, to continue paying their current subscription rate in exchange for a higher speed service.

When considering how to structure a DSL service offering and its associated pricing strategy, IOC's should keep the following points in mind:

What is the business objective or strategy?

Who is the competition?

What are the current DSL prices?

DSL service pricing decisions need to be made in the context of the service provider's overall business strategy and prevailing market conditions. For instance, if the existing DSL prices are relatively high and the competitive environment is relatively benign, it may make sense to price the DSL service tiers higher than the example shown in Table 4. An existing or pending service bundling promotion may be another reason to price "ala carte" DSL service tiers higher—DSL is a perfect service to discount as part of a bundle (DSL is an especially convenient service to bundle if the current DSL prices are higher than the prevailing market rates).

Conversely, a service provider may choose to "forward price" its DSL service tiers to meet a strategic objective, for example, as part of a bundle to help sell video subscriptions or to counteract a serious competitive threat. "Forward pricing" a service implies that the service is priced below the corporate margin targets in the hope of quickly increasing the service market penetration or achieving some other strategic business objective. "Forward pricing" DSL can be very attractive since margins are expected to improve as the number of subscribers increase.

Since Pew's market research clearly indicates that many rural subscribers are unaware that DSL services are available, it is important to develop an effective marketing campaign to build awareness of DSL availability. With increased market awareness, service take rates should increase at rates similar to those seen by Cable MSOs and RBOCs in urban and suburban areas. It is no coincidence that targeted marketing and aggressive selling has been standard procedure for cable companies and large ILECs over the past 3+ years.

Summary

DSL offers service providers an excellent business opportunity that can make a very significant financial contribution to the bottom line. With the advent of lower NECA tariffs and new, lower cost technologies like Ethernet and IP, an IOC can now take advantage of the predicted growth of DSL in the underserved rural market to create a lucrative financial model.

In order to fully exploit the DSL service market potential, service providers need to carefully calculate the underlying costs of building a broadband network that can effectively deliver DSL and other high bandwidth services as well as the right pricing delta. When calculating the pricing delta, it is important to take into account the company's business and financial objectives and to align retail prices with prevailing market conditions. Additionally, IOCs should consider pricing alternatives such as tiered pricing, "forward pricing" and service bundling that provide customers with a variety of options. Raising awareness of DSL availability in an IOC's customer service area also promises to increase the number of DSL subscribers and thus increase a company's margins.

About Occam Networks

Occam Networks leads the market in creating access networks that make it easier to support higher DSL subscriber take rates. With the company's BLC 6000 you can cost-effectively build an access network that can grow as your DSL subscriber base grows. Ethernet- and IP-based, the BLC provides all the bandwidth you need to deliver the most bandwidth intensive services with the ease, flexibility and economy that only Ethernet and IP can provide.

The Occam BLC 6000 integrates the functions of an NGDLC, DSLAM, OLT, Optical Mux, VoIP line access gateway, line test system and Ethernet switch into an environmentally hardened loop carrier system. The system includes plug-in blades, high capacity and stackable chassis, cabinets and an Element Management System. It supports standard lifeline POTS telephones, DSL modems and GigE ONUs. The BLC 6000 connects POTS and VoIP to a traditional Class 5 via TR-08 or GR-303. In addition, it can support IP IADs, terminal adapters or IP phones as well as connect POTS into next-generation IP softswitches.

The BLC 6000 enables you to provision DSL services for a large percentage of your subscribers – in many cases 100 percent – from a centralized point in a network without costly truck rolls. With the industry leading BLC 6252 Blade, which combines POTS and DSL on every port, the provisioning of large numbers of POTS and DSL subscribers is very simple and inexpensive.

Widely deployed in the IOC market, the BLC 6000 is a tested, proven product in use today by regulated and non-regulated (CLECs) service providers to help lower much of the capital and operating expenses of delivering DSL. Find out how Occam can help you create a network that can easily and cost-effectively support increasing numbers of DSL subscribers at **www.occamnetworks.com.**

Occam Networks solutions accommodate a broad range of network design strategies and system requirements.

Serving more than 170 telephone service providers, Occam leads the industry in the application of IP and Ethernet technologies in carrier access networks.

Founded in 1999, Occam Networks, Inc. develops and markets innovative Broadband Loop Carrier networking equipment that enables telephone companies to deliver voice, data and video services. Occam's equipment allows telecommunications service providers to profitably deliver traditional phone services as well as advanced voice-over-IP, residential and business broadband, and digital television services through a single, all-packet access network.

Occam Networks is based in Santa Barbara, California, with offices throughout the United States. Occam Networks is publicly traded under the symbol OCNW.

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