RURAL TELEPHONE BANK PRIVATIZATION STUDY
MARKET ASSESSMENT REPORT

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RURAL TELEPHONE BANK PRIVATIZATION STUDY
MARKET ASSESSMENT REPORT

Executive Summary

The Market Assessment identifies ten key issues for consideration in the privatization plans for the RTB. This study estimated the total capital expenditure (CAPEX) needs of rural carriers and the allocation of their CAPEX needs to specific telecommunications business and technology initiatives. The study's results are based on extrapolating the results from a series of interviews with rural carriers that were considered representative of a population of over 1,300 carriers using a stratified sampling approach. Included in the total population in the survey frame were over 700 RTB borrowers. (See Appendix E for the entire market assessment report.)

1. The telecommunications industry in the U.S. has never been through a more turbulent time in history. The ongoing announcements of bankruptcies and financial instability of even the largest telecommunication firms are tarnishing the industry and impacting stock values, thus negatively impacting sources of capital.

2. Similar to larger carriers, revenues have declined for rural local exchange carriers (RLECs) as a result of a loss of access lines due to the falling economy, and a loss of access minutes due to the substitution and use of mobile phones.

3. In order for RLECs to mitigate the revenue downturn for wireline services projected in the coming years, carriers must reduce expenses, introduce new services into their portfolios, institute capital savings plans by capping investment in circuit switched based service infrastructure and equipment, and/or invest in more cost effective technologies.

4. Annual rural telecommunications capital spending is estimated at $4.8 billion. Internal funding by rural carriers is estimated to serve roughly 50 percent of this demand. The remaining 50 percent (about $2.4 billion) is considered open to the traditional rural loan market. Financing by other lending institutions such as RTFC or CoBank, and leasing arrangements serve to reduce RTB's addressable market share in this traditional market.

5. The RTB addressable rural loan market is estimated to range from 10 to 25 percent of the traditional rural loan market depending on RUS's continued support of the telecommunications program, leaving the private Bank's annual market share potential ranging from $240 million to $600 million.[1]

[1] RUS and RTB were authorized to enter into cost of money loans and issued commitments for $475 million in 2002.

6. Our survey results shows annual CAPEX spending allocation is estimated to breakdown as follows:

   - Approximately 33% for Plant Construction & Upgrades
   - Approximately 25% for Switches and Switch Upgrades
   - Approximately 14% for Overbuild/CLEC Operations
   - Approximately 12% for DSL Equipment
   - Approximately 10% for Mobil Services
   - Approximately 6% for Long Haul Connections

7. Many survey respondents indicated a need for capital funding or loans in the area of cable/video plant, mobile infrastructure and CLEC/overbuilding ventures -- areas not traditionally served by RTB or with heavy limitations. Others are providing loans for these areas and RTB may be able to further enhance its competitive position by providing more flexible financing arrangements after the Bank is privatized.

8. Additional market analysis is needed to further explore RTB's position in the rural telephony financial marketplace. A larger survey sample with more product focused information on how and where RTB could meet the CAPEX spending demand would substantiate final product development and provide emphasis, direction and plans for marketing privatized offerings.

9. RTB needs to continually understand the significant market and technological trends affecting the telecommunications industry and their impact on RLECs. It is also necessary to understand the key business directions that the rural telephone carriers are undertaking in terms of capital and operational investments for sustaining and growing their businesses.

10. Survey respondents confirmed their requirements for RTB to continue to provide low interest funding to the rural telephone communities, and stressed the importance of efficiency and effectiveness of loan application requirements and processes. They see some of RTB's current lending requirements as overly burdensome, and the process often slow in meeting their required capital commitments in a rapidly changing environment.

Background

The Rural Telephone Bank (RTB), established in 1971 by amendment to the Rural Electrification Act, has been at the forefront of providing financing for the improvement and expansion of telecommunications services in rural areas. RTB's ability to provide low interest loans with long payback terms has allowed rural carriers to develop and maintain their telecommunications infrastructure and help fund their launch into new growth initiatives, such as broadband telecommunications services. As envisioned in the legislation that established the RTB, the bank would eventually be privatized. Privatization of RTB is a multi-faceted process and therefore requires disciplined evaluation of optimal legislative, financial, technical, and organizational options and approaches. As part of its privatization initiative, RTB has commissioned this study to understand and begin to document the significant market and technological trends affecting the telecommunications industry and their impact on rural telephone carriers. It is necessary to understand the key business directions that the rural telephone carriers are undertaking in terms of capital and operational investments for sustaining and growing their businesses. To that end, this study is an initial effort to estimate the total capital expenditure (CAPEX) needs of rural carriers and the allocation of their CAPEX needs to specific telecommunications business and technology initiatives.

Objectives and Methodology

The objective of this study is to assess the market trends in the rural telecommunications segment and estimate the market demand for capital expenses of rural telecommunications carriers. As a part of this assessment, the following activities were completed:

- Developed analysis of key market and technology trends in the rural telecommunications marketplace
- Developed a 'universe' of rural telephone carriers sorted by geography, access lines, revenue, etc.
- Developed a representative sample of rural telephone carriers for detailed interviews
- Interviewed a stratified statistical sample of rural telephone carriers on current and future CAPEX needs
- Assessed the interview results to identify and estimate capital needs and their alignment with market and technology trends
- Provided recommendations on capital and technology needs of rural telephone carriers

In this assessment, Telcordia[1] conducted primary research by interviewing a sample of rural carriers, but also used secondary research from the Federal Communications

[1] Telecordia, formerly known as Bellcore, is a wholly-owned subsidiary of Science Applications International Corporation (SAIC) that serves primarily the commercial telecommunications market.

Commission (FCC), National Exchange Carrier Association (NECA) and additional rural telephony and telecommunications publications. In addition, Telcordia used internal studies and subject matter experts in the areas of telecommunications industry analysis and financial modeling.

The Status of Telecommunications Carriers in the United States

The telecommunications industry in the United States has never been through a more turbulent time. The ongoing announcements of bankruptcies and financial instability of even the largest telecommunication firms are tarnishing the industry and negatively impacting stock values. Existing wireline carriers are facing financial shortfalls partly due to the overall economic decline, but more specifically due to the reduction in the number of access lines and access minutes, which directly correlates to the proliferation of mobile services.[2] This decrease in access lines and minutes ultimately decreases revenues and profits—which then cascades down to reduced CAPEX and operational expenses (OPEX) for carriers.

Figure 1 graphically depicts the future revenue trends of all telecommunications carriers, including rural carriers, indicating that wireline voice will become a much smaller part of the revenue stream and carriers will have to develop and rely on wireless voice and data and next-generation services such as broadband for revenue growth.[3]

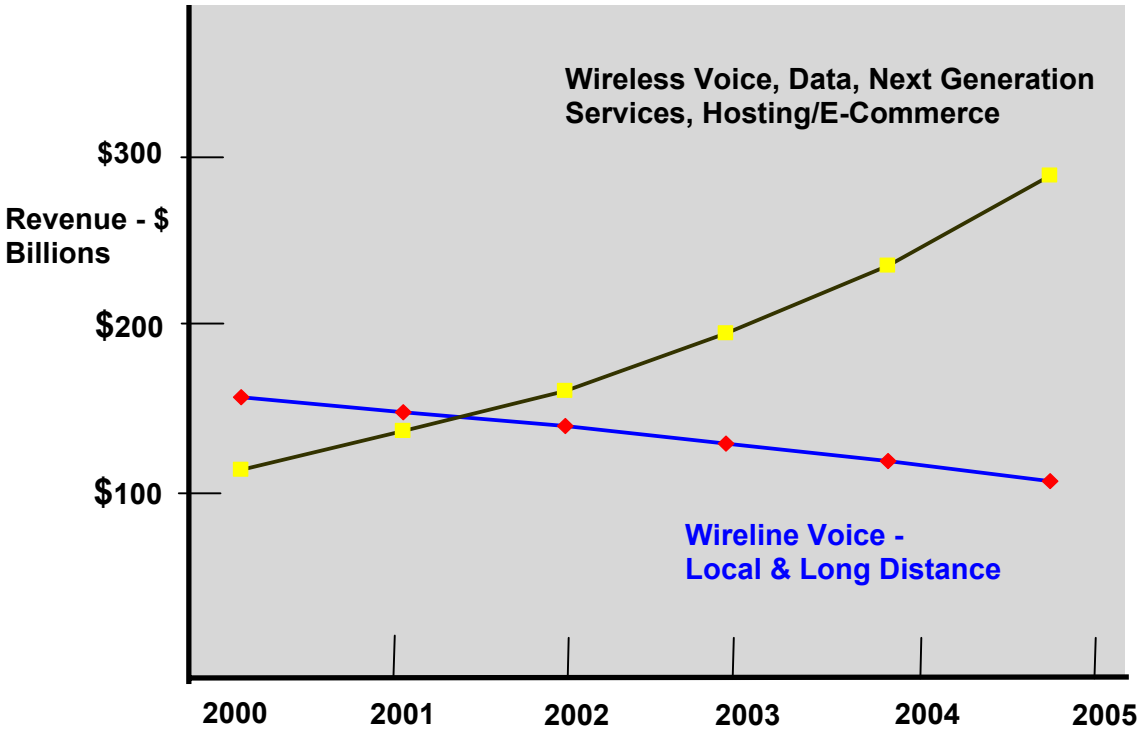
In order to mitigate the financial downturn projected for wireline services in the coming years, carriers are faced with the following business decisions: a) reduce operational expenses; b) increase revenues by deploying new services; and/or c) achieve capital savings by capping investment in circuit switched infrastructure and equipment and investing in more cost effective technologies such as internet protocol (IP).

The Status of Rural Telecommunications Carriers in the United States

Rural carriers in the United States have been relatively less affected by the telecommunications turbulence due to their smaller economies of scale and less dependency on business customers (where large carriers derive a large amount of their revenues.) Similar to larger carriers, revenues have declined somewhat for rural local exchange carriers (RLECs) in the areas of access lines due to the slumping economy and

[2] For an overview of Mobile Telecommunications, see *Telcordia White Paper* " *Business Challenges and Opportunities in Tomorrow's Mobile Networks"* in the Appendix Section.

[3] For additional analysis, see *Telcordia Issue Brief 3 – The Next Generation Network: What will the Telecommunications Marketplace of Tomorrow Look Like"* in the Appendix Section



*Sources: Frost & Sullivan, PHB Hagler Bailly, Yankee Group, Forrester, Bear Sterns, IDC, Nielsen Research

Figure 1. Projected Revenue from Traditional Wireline Sources Versus New Sources

access minutes due to the substitution and use of mobile phones. To address the loss in revenues, RLECs have launched broadband services, developed mobile systems partnerships, and started to develop competitive local exchange carrier (CLEC) operations in neighboring territories.

The decline in minutes and access lines, financial troubles and bankruptcies of large carriers could directly impact smaller carriers through reduced payments into the Universal Service Fund (USF). Specifically, the increased financial instability and declining fixed line revenues of large carriers negatively impacts how much money is contributed to the USF—a fund that RLECs are heavily dependent on. In the future, rural carriers may need to develop alternative methods of CAPEX funding—either through profits from new services, increased pricing, or specialty telecommunications loans with economically efficient terms to deal with the potential loss or decline of USF.

Rural Carrier CAPEX Needs

Telecommunications is a very capital-intensive industry; in addition to the expensive equipment all carriers need to possess, rural carriers have to absorb the increased expense of serving areas in which the economies of scale work against them. RLECs need longer loops, digital loop carriers (DLCs), and additional equipment to serve their geographically diverse, low-density communities. As a result, the cost per line to

maintain and operate their voice network is most often more expensive than for suburban and urban carrier lines.

The advent of the Internet and the resulting demand for broadband connections has added additional costs to RLECs through the need to upgrade their infrastructure to be broadband ready. NECA estimated that in 2001, 65% of all rural lines were broadband ready and that to upgrade the rest of the rural lines would cost over $10 billion. The longer loops and cost to add fiber to the voice infrastructure to make the copper plant broadband ready is very expensive.[4]

Rural carriers need additional funding for broadband initiatives, as well as funding for high-speed access to tier 1 backbones to backhaul internet traffic to the rest of the world. The potential decline, or even the loss of public funding such as USF, will increase the need for additional funding avenues to address their CAPEX needs.

CAPEX Assessment for Rural Carriers—Survey Methodology

To estimate the CAPEX needs of rural carriers, this study developed a survey that included nearly all of RTB's borrowers as well as other rural carriers. Over 1,300 rural carriers were included in the survey frame, using the USF/USAC definition of rural carriers. This included 715 of RTB's borrowers. The following methodology was applied to develop the survey sample and the assessment results:

Step 1. Developing The Sampling Frame

A list of rural telephone companies was obtained from the USF web site, using the file "HC01 Support by State by Study Area" at http://www.universalservice.org/overview/filings/default.asp. This file shows information for 1,451 study areas or exchange carriers. Of these, 87 are denoted as "Non-Rural." An additional 51 study areas appeared to be non-local providers because they received only interstate-access USF funds. Eliminating these non-rural, non-local study areas left 1,313 study areas or exchange carriers, which were taken to be the sampling frame (the population of study areas from which we drew our sample).

Step 2. Developing the Stratification

Stratified sampling is used when one wants to a) ensure that important groups are represented in the sample, and b) ensure that the full variability of the universe is represented. In this study, the study areas vary from those with just a few access lines to those with tens of thousands of access lines. In addition, the rural study areas vary from those that receive just a few USF fund dollars per access line per month to those that receive over $100 per access line per month. This variability is shown in Figure 2. In this figure each dot represents a rural study area or exchange carrier. The horizontal or 'X'

[4] For detailed analysis on Network Evolution and Economics, see *Telcordia White Paper* " *Economics of Internet Offload and Voice/Data Migration"* in the Appendix Section.

axis shows the number of loops, and the vertical or 'Y' axis shows the monthly USF funds received per loop. The rectangles shown within the graph are the strata.

Figure 2 actually shows the vast majority of the rural study areas. There are more points off to the right (indicating many more loops/access lines) along the 'X' axis and up the left (indicating higher USF funds per loop) along the 'Y' axis. Changing the figure to show these study areas would cause too much crowding in the lower left.

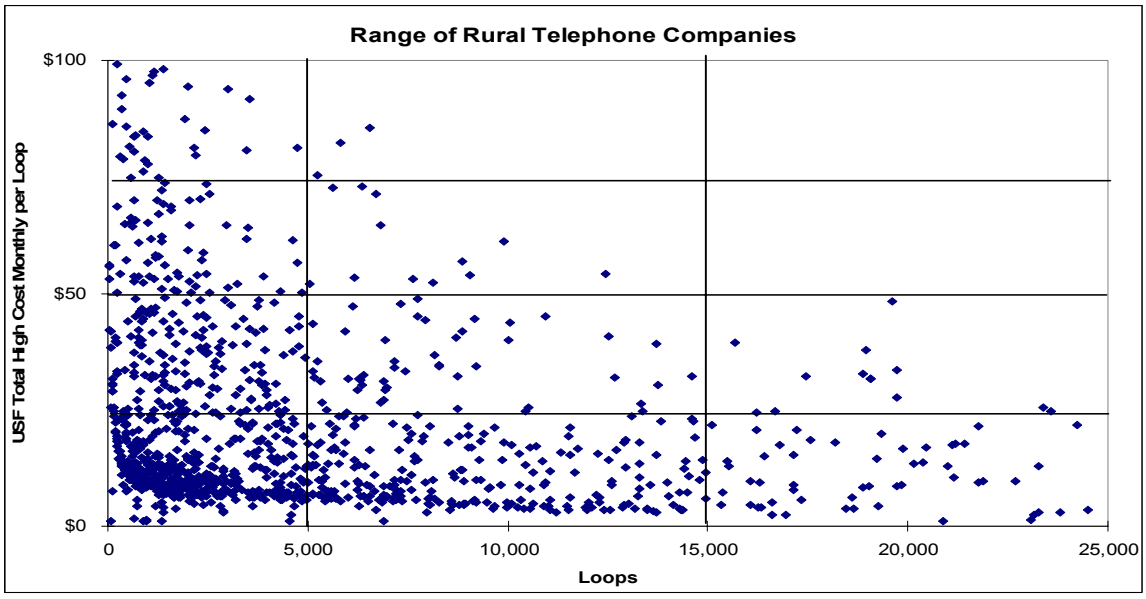


Figure 2. Study Areas Stratified by High-Cost of Money & Number of Loops

Step 3. Choosing the Sample

Figure 3 shows the number of companies in each stratum and the number of exchange carrier interviews actually conducted. (Note that although three strata did not conveniently fit on the chart, as discussed above, they were not ignored and interviews were conducted in two of the three strata.)

Because of the exploratory nature of this survey, it was felt that a cooperative sample was more important than a strictly random sample. To this end, the first 5 sample rural exchange carriers interviewed were those of members of the Board of Directors of RTB. To schedule the remainder of the interviews, the following steps were taken:

- A target number of interviews for each stratum was developed.
- A random sample from each stratum was developed that was several times larger than the target number of interviews. For example, if in a stratum of 100 a target of 2 was developed, then a sample of 10 out of the 100 was drawn.
- Across all strata, the sampled exchange carriers were further filtered to identify those that might be cooperative and also to balance the final interviews across the states to include all regions of the United States.

- In each stratum, the sampled exchange carriers were ranked according to the results of the previous bullet.
- The highest ranking exchange carriers in each stratum were contacted, interview appointments set up, and the interviews were conducted.

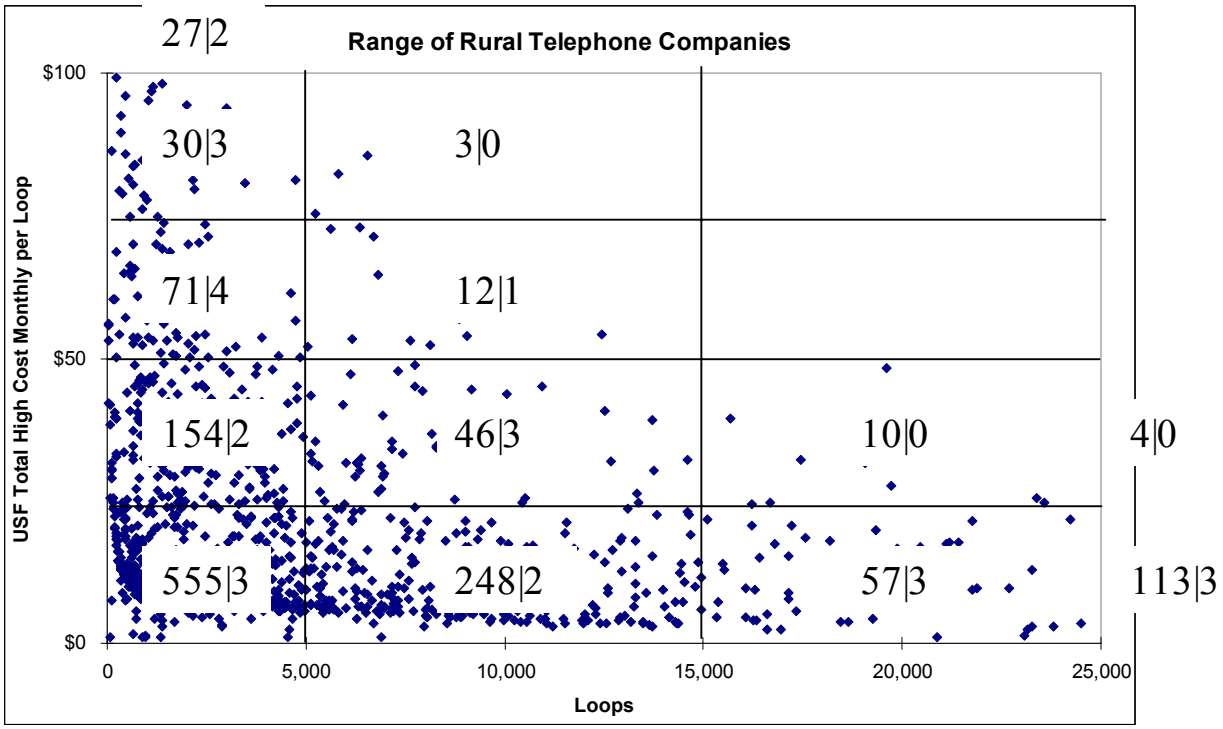


Figure 3. Stratum Count / Number of Interviews

Step 4. Conducting the Interviews

In an informal telephone interview format, the general condition of the interviewee carrier was probed to provide background information for understanding the CAPEX data that was desired. Eventually, the following questions were asked of each interviewee. (A copy of the detailed questionnaire can be found in the Appendix 1.)

1. What is your average annual capital budget?
2. How much do you spend for capital each year on
   a. DSL?
   b. Outside plant?
   c. Switch upgrades?
   d. Long-haul connections?
   e. Overbuilding/CLEC activities?
   f. Cellular facilities?

In cases where average CAPEX were not known, current-year CAPEX were accepted as being representative of that carrier and others like it. In some cases, the cost of a specific

project was given, and this was divided across the estimated duration of the project if it was a multi-year project.

Step 5. Analyzing the Data

Each interviewed rural exchange carrier was assumed to be representative of the other carriers in its stratum. This was achieved by assigning each interviewee a weight equal to the number of carriers in the stratum divided by the number of interviewees in the stratum. For example, in the lower left stratum, 3 interviewees represented the 555 exchange carriers, and each interview received a weight of 555/3 = 183. Thus, all results are weighted sums (or averages) of each respondent's answer times the appropriate weight for that respondent. Where averages are needed, as in estimating percents, the sum is divided by 1,313, the sum of the weights.

Table 1 shows a portion of the data to illustrate the calculations. Each row of the table contains information about and from one interview. The first column in the table indicates the parameters of the stratum that the interview came from. The second column shows the size of the stratum, the same sizes given in Figure 2 above. The third column shows the interview weight, i.e., the number of exchange carriers that row represents. The fourth column gives the number of access lines for that exchange carrier. The last column shows the information from the interview – estimated total average capital budget (in $000).

The final three lines illustrate the weighted calculations. The total of 1,313 is the sum of the weights above it. The weighted totals are the sum of the products of the weight column and either the number of access lines or the estimated annual capital budget. For example, the 11,105,678 lines is the sum (starting at the top) of (185*621) + (185*1,250) + (185*2,700) + (77*950) and so on. Thus, the weighted totals row are the total estimated number of access lines (11.1 million), and the total estimated annual capital budget ($4.8 billion).

The last line shows the estimated 95% confidence interval width for the numbers above it. This means we can say with 95% confidence that the 1,313 RLECs estimated capital budget falls between $4.6 billion and $5.0 billion with its center at $4.8 billion.

Table 1. An Illustration of the Calculations Used In The Analysis

Stratum Parameters: loops, USF$/loop	Stratum Size	Interview Weight	Access Lines	Estimated Annual Capital Budget (000s)
0-5K, <$25	555	185	621	200
0-5K, <$25	555	185	1,250	3,600
0-5K, <$25	555	185	2,700	3,500
0-5K, $25-$50	154	77	950	0
0-5K, $25-$50	154	77	3,100	7,100
0-5K, $50-$75	71	17.75	160	300
0-5K, $50-$75	71	17.75	2,750	2,850
0-5K, $50-$75	71	17.75	4,700	6,350
0-5K, $50-$75	71	17.75	13,500	3,700
0-5K, $75-$100	30	10	2,400	2,350
0-5K, $75-$100	30	10	3,000	2,600
0-5K, $75-$100	30	10	3,000	2,350
0-5K, >$100	27	13.5	97	2,600
0-5K, >$100	27	13.5	164	8,000
5-15K, <$25	248	124	13,000	5,500
5-15K, <$25	248	124	15,000	1,800
5-15K, $25-$50	46	15.33	6,000	1,300
5-15K, $25-$50	46	15.33	4,000	8,000
5-15K, $25-$50	46	15.33	9,000	7,000
5-15K, $50-$75	12	12	12,000	5,500
15-25K, <$25	57	19	15,000	3,700
15-25K, <$25	57	19	18,000	6,000
15-25K, <$25	57	19	24,700	16,000
>25K, <$25	113	37.67	34,000	5,050
>25K, <$25	113	37.67	35,000	8,000
>25K, <$25	113	37.67	50,000	7,500
total		1,313		
weighted totals			11,105,678	4,831,083
95% confidence interval width				205,791

CAPEX Assessment for Rural Carriers—Total and Addressable Market for RTB

Therefore, based on current survey results, the projected annual CAPEX needs for rural carriers is $4.8 billion. The major areas of CAPEX expenditure were estimated as follows:

- Outside Plant Construction and Upgrades – $1.6 billion
- New Switches and Switch Upgrades – $1.2 billion
- Overbuild/CLEC Activities – $0.7 billion
- DSL – $0.6 billion

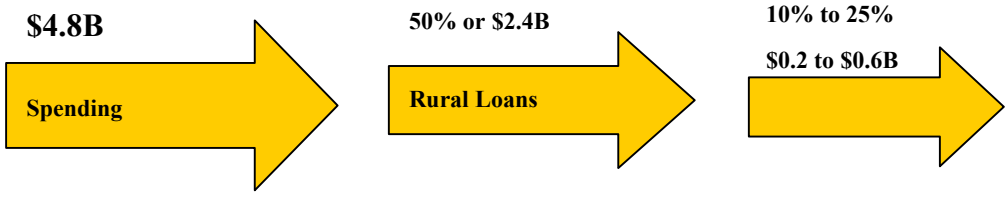
- Cellular Towers and Other Mobile Infrastructure – $0.5 billion
- Long Haul Connections – $0.3 billion

Some rural telephone companies are not eligible to borrow from RTB under the current rules. Eliminating this group of companies from the survey reduces the total CAPEX estimate to approximately $4.4 billion for RTB–eligible companies. In addition, RTB typically does not provide financing for CLEC overbuild and mobile construction – eliminating these categories brings the total market down to approximately $3.4 billion dollars.

Based on the current survey, an initial view of RTB's market share in the rural telephone-financing marketplace has been extrapolated. It should be noted that the total market does not all present itself to RTB. Internal funding by rural carriers, financing by outside lenders such as RTFC or CoBank, and leasing arrangements all reduce RTB's addressable market. Based on initial assumptions discussed below, this study estimates the following:

- Approximately 50% of the $4.8 B total market is projected to be financed through a combination of various means: self-financing through debt or equity and/or leasing arrangements. Several survey respondents indicated self-financing as their current option.
- Other lenders, most notably RTFC and CoBank, finance a major segment of the total "Rural Loan" market. There are also local banks that provide a small amount of financing to rural carriers. These sources are estimated to serve between 75% and 90% of the remaining requirements. Thus, we estimate 10% -25% of the total "Rural Loans" market of $2.4 billion could be financed by RTB and/or the Rural Utilities Service (RUS) telecommunications program. Based on the $2.4 billion that is estimated to be financed through these sources, it is estimated that RTB could advance traditional rural telecommunications loans or $240 million to $600 million per year depending on the continuing level of RUS participation in the market as shown in Figure 4.
- These assumptions and estimates must be tested with further market research.

Figure 4. RTB's Loan Market: Initial "Waterfall" View



CAPEX Needs by Technology/Business Needs: Where's the money going?

Capital Spending for Outside Plant

Survey results indicate that 33% of all CAPEX and the largest share of investment ($1.6 billion) will be used by RLECs for upgrading outside plants. Expenditures include converting plant trunks to fiber, laying fiber to the curb in some areas or new communities, and other basic outside plant upgrades. A portion of this expenditure directly relates to the deployment of DSL—the investment in fiber to the curb and fiber trunks is to increase the capacity of the outside plant to handle broadband services such as high speed internet and video services. In some cases, the outside plant was recently acquired or "adopted" into the RLEC's territory and terribly outdated—warranting modernization for some voice services.

Capital Spending for Switches

The capital needed for switches is approximately 25% of the RLEC CAPEX market, $1.2 billion. The primary driver for switch expenditures is adding DSL capability to the switches. Additional switch expenditures include upgrading or replacing switches due regulatory mandates such as CALEA and Local Number Portability as well as adding additional capacity or functionality such as STPs (signal transfer points.) Many RLECs are completely replacing their switches and some are trialing or planning to purchase softswitches.[5]

Capital Spending for Overbuilding/CLEC Operations

Many rural carriers have developed CLEC operations in neighboring communities that are considered underserved by the incumbent carrier—usually an RBOC. The survey estimates that approximately 14% or $0.7 billion of CAPEX will be needed for RLECs to develop or maintain their overbuild/CLEC operations. In most cases, RLECs have found that it is more advantageous from a technology and service standpoint to completely overbuild rather than purchase and refurbish existing ILEC plant—making their CLEC ventures more capital intensive. RLECs choose their overbuild communities very carefully and many have found success and high penetration rates in their CLEC territories.

Capital Spending for DSL

According to survey results, 56% of rural carriers provide DSL services today (although in some cases in only one exchange or a small area of their territory) and an additional 19% of carriers are planning to launch DSL services soon. Approximately 12% ($0.6B) of all CAPEX spending is on DSL equipment such as DSLAMs, retro-fitting DLCs for DSL, routers and other DSL equipment. The spending just for DSL, however, is not indicative of how much is actually being spent by rural carriers for DSL services. Plant

[5] For additional information on Softswitches, see Telcordia Issue Brief 8 – "*The Next Generation Network – Call Agents, Softswitches and Network Intelligence – The Open Services Environment of Tomorrow."*

and switch upgrades and fiber buildouts are also necessary in most cases for a RLEC to provide DSL services in their territory. Some of the costs estimated in the DSL category pertain to video services and the equipment necessary to provide video over DSL, services to compete with cable TV offerings.

Capital Spending for Mobile Services

Approximately 10% of CAPEX or $0.5 billion will be spent next year by RLECs to develop and/or maintain mobile services infrastructure. In order to diversify their service and operations portfolio, many RLECs have developed joint ventures or partnerships, either with other RLECs or large mobile carriers to serve often underserved market in terms of mobile services and coverage. Basic expenditures for mobile include building tower sites, obtaining licenses/ spectrum, and other mobile equipment.

Capital Spending for Long Haul Connections

An estimated $0.3 billion or 6% of total CAPEX is being used to long haul fiber routes. These fiber connections are being used to connect central offices within an RLEC territory or provide a robust bandwidth link from the rural community to a tier 1 backbone point of presence to backhaul internet traffic. Fiber links within a territory and connecting to more populous areas is necessary to connect the rural community from within and to the rest of the world.

Conclusions

The rural telephony market is very CAPEX intensive. We estimate that approximately $4.8 billion will be needed over the next year. The major spending area for RLECs will be in the area of broadband through specific DSL equipment expenditures, but more importantly and more costly, upgrading outside plant with fiber, upgrading or replacing switches and developing long haul fiber connections to backhaul internet traffic. The revenue decrease in PSTN voice traffic has motivated RLECs to develop new services such as broadband to mitigate the revenue loss but with very high CAPEX infrastructure augmentation. Many survey respondents reported that the broadband infrastructure to be put in place would hopefully become a major source of revenue by providing the pipe for high speed data voice and video services in the future.

Other areas of concern for RLECs is the potential fluctuations in the USF pool due to the decline in the overall fixed voice market and financial troubles of large carriers. Rural carriers will need to develop alternative methods of CAPEX funding—either through profits from new services or different terms on telecommunications loans to deal with the potential loss or decline of USF.

Overall, survey respondents conveyed the importance of RTB in the past and potentially in the future as being an important partner in building and maintaining PSTN infrastructure to provide services to their often overlooked communities. Most, if not all, respondents were favorable to RTB and their role in rural telecommunications, but many

felt that some of the loan application, approval, and/or reporting processes were cumbersome and labor intensive.

Many survey respondents indicated a need for capital funding or loans in the area of cable/video plant, mobile infrastructure and CLEC/overbuilding ventures -- areas in which RTB does not traditionally loan money for or does so with heavy limitations. RTB's competitors are providing loans for these areas and RTB may be able to further enhance its competitive position by providing more flexible financing in these areas after the bank is privatized.

Additional market analysis is needed to further explore RTB's position in the rural telephony financial marketplace. A larger survey sample with more product focused questions on how and where RTB's loans could benefit the CAPEX needs of RLECs would help to further clarify the above findings. Based on this study, the projected rural CAPEX market is $4.8 billion. RTB needs to understand through a more intensive market survey just how much of that CAPEX could be addressed by RTB versus others. It will also be important to gauge the reaction of current and future clients on the idea of a privatized RTB -- to understand their willingness to do business with or their thoughts on the potential success of a privatized RTB.

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