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June 8, 2005

Ms. Marlene H. Dortch, Secretary
Federal Communications Commission
445 12th Street, S.W., TW-A325
Washington, D.C. 20554

Fe: *Ex Parte* Notice
Federal-State Joint Board on Universal Service, CC Docket No. 96-45

Dear Ms. Dortch

Pursuant to Section 1.1206 (b) of the rules and regulations of the Federal Communications Commission, attached for filing is an ex parte presentation provided at a meeting of some of the Joint Board on June 7, 2005. The meeting was attended by Commissioners Kathleen Abernathy and Michael Copps (via telephone) of the FCC, Commissioner Tom Dunleavy of the New York State Public Service Commission, Commissioner Bob Nelson of the Michigan Public Service Commission, Commissioner Elliott Smith of the Iowa Utilities Board, Commissioner Ray Baum of the Oregon Public Utility Commission, and Billy Jack Gregg, Director of the West Virginia Consumer Advocate Division. The following staff members also attended: Michelle Carey (FCC, Office of Chairman Martin), Jessica Rosenworcel (FCC, Office of Commissioner Copps), Lauren Belvin (FCC, Office of Commissioner Abernathy), Carl Johnson (NY PSC), Orjiakor Isiogu (Michigan PSC), Peter Bluhm (Vermont PSB), Andrew Margeson (Oregon PUC), Joel Shifman (Maine PUC), Jeff Pursley (Nebraska PSC), Greg Fogleman (Florida PSC, via telephone), Lori Kenyon (Regulatory Commission of Alaska, via telephone), Aram Shumavon (California PUC), Eric Seguin (Oklahoma Corporation Commission), Brad Ramsey (NARUC), David Dowds (Florida PSC, via telephone), Mike Lee (Montana PSC, via telephone), Phil McClelland (Pennsylvania Office of Consumer Advocate, via telephone), Earl Poucher (Florida Office of Public Counsel), Narda Jones (FCC, Telecommunications Access Policy Division (TAPD)), Ted Burmeister (FCC, TAPD), Katie King (FCC, TAPD, via telephone) and Greg Guice (FCC, TAPD, via telephone).

The attached material and related issues were discussed in the meeting.

Sincerely,

Dale E. Lehman

Comments before the Joint Board on Universal Service
Dale Lehman
Director, MBA Program in Telecommunications Management
Alaska Pacific University
June 7, 2005

High Cost universal service support for rural ILECs should continue to be based on embedded cost, not on forward-looking economic cost. This conclusion results from a number of practical factors, notwithstanding the theoretical deficiencies of embedded cost. I will use the FCC cost proxy model (the HCPM) as an example, but my criticisms of FLEC remain valid for alternative models.

The theoretical case for FLEC, and against embedded cost, results from the observation that efficient economic decisions are based on opportunity costs – a forward-looking construct – and not on embedded costs, which are sunk costs. Basing decisions on sunk costs generally leads to inefficient decisions. In the present case, many parties suspect that FLEC is lower than embedded cost due to technological progress (although this can be debated , particularly in the case of loops provided by rural ILECs, where many costs have been increasing (labor, installation, buildings, etc.). If FLEC is indeed lower than embedded cost, then these parties assert that the use of the latter for USF purposes makes the fund too large, provides little incentive for cost reduction, and does not mimic competitive results.

I do not agree with these assertions and will discuss several misconceptions associated with the efficiency standard and cost incentives, the level of costs and cost variability, and CETC and study area issues

<u>The Economic Efficiency/Competitive Standard and Incentives for Cost Reduction</u>

Care must be exercised when using an efficiency standard to judge USF methodology. Universal Service, as embodied in the Telecom Act is not intended to be efficient and if section 254 outcomes were produced by a competitive market, then section 254 would be unnecessary. So, the role of efficiency must be reduced to the idea that provision of universal service should minimize cost, subject to the adequate provision of service ("specific, predictable, and sufficient" according to section 254). The use of FLEC fails this standard on a number of grounds:

1. FLEC measures, such as HCPM, vary in inexplicable and inappropriate ways from embedded cost. Data for rural carriers is not generally available since the HCPM requires customer specific geo-coded location data. We can

compare HCPM results with embedded loop costs for the RBOCs, however. Figure 1 shows the state-by-state comparisons. While the average level of loop costs is quite close (0.4% difference, on average), the variability across states is large and does not follow any understandable pattern. The deviations do not depend on population density, state size, particular RBOCs, or any other factor I have been able to identify. Since RBOC practices do not vary substantially across states, it is especially difficult to understand how an RBOC can operate with embedded cost substantially higher than FLEC in some states (for example, 38% higher in AZ) and substantially lower in others (e.g., 28% lower in IA)..

2. There is a fundamental flaw in all FLEC models. They are static and certainty models: model networks are constructed instantaneously and in full knowledge of customer locations. Real networks, on the other hand, are constructed over time, subject to considerable uncertainties, and under carrier-of-last-resort constraints. This structural problem means that FLEC models are likely to understate true network costs. I am not aware of any work that has estimated the size of this cost underestimation (primarily due to the complexity of building dynamic network models). To some extent this problem can be overcome through the appropriate choice of inputs (e.g., by using somewhat lower fill factors). However, it is not possible to determine how much adjustment is necessary. The only valid benchmark to use for comparison is embedded costs and this largely undermines any advantage that might have resulted from using a FLEC model. Since FLEC models have this necessary simplification from reality, validation against reality is necessary before a cost model may be trusted.

3. Embedded cost should differ from FLEC, but the differences can be analyzed and should be validated in this manner. Yesterday's forward-looking costs become today's embedded costs. This permits simulation of how the two cost measures may diverge over time, as technology changes, and based on established regulatory practices regarding depreciation and the cost of capital. For loop costs, the difference should be expected to be less than 10%. As Figure 1 shows, it is easier to get the average across states within this range than to get the disaggregated results to make any sense.

4. Divergences for the rural ILECs are likely to be larger and harder to rationalize. The RTF work (well-documented in White Paper #4) shows that the HCPM produces results that vary in unacceptable way across rural areas. Many model errors will average out across geography but small companies serve too few areas for this averaging effect to take hold. To cite just one example of many: the HCPM model has inputs for underground structure costs that vary by 3 rock types, 9 density zones, and according to whether it is for feeder or distribution facilities. Engineers find it hard to accurate reflect

underground structure costs with only these dimensions – the real world has many more factors that affect these costs. Across 100 wire centers errors in accurately modeling these factors will tend to average out. In a single wire center, there is no opportunity to average out mistakes or model inaccuracies. The only way to deal with this is to carefully fine tune each input in HCPM to the particulars of each rural ILEC. While this may be possible, it will be administratively costly. One rural ILEC (Matanuska Telephone Association) has been working with the HCPM intensively (in an interconnection proceeding) and has already spent close to $1 million getting the model to produce reasonable results. With around 800 study areas receiving USF loop support, such extensive experience with the HCPM model will probably be required for around 500 companies. This translates into $500 million in additional administrative expense if USF is based on the HCPM (or any other FLEC model, for that matter).

A related small-company issue underscores the difficulties of using a cost proxy model to estimate costs for the rural ILECs. Some forward-looking cost data is simply unavailable. Examples might include switching investments and some outside plant investments (such as DLC installations). Many small carriers may not have any recent history from which to draw accurate forward-looking cost estimates, or their recent jobs may not be representative of the forward-looking costs of reconstructing their entire network. Use of data from other companies will not generally be accurate. Large companies have a larger sample of recent investments on which to base forward-looking estimates. As a result, difficulties with cost estimation are likely to be magnified in the case of the small carriers.

5. Extensive adaptation of numerous model inputs will be required in order to get the HCPM to perform reasonably for rural ILECs. But variability in model inputs across companies will raise additional questions. If the value of using FLEC is its ability to model efficient operations, the question will be whether each company-specific input values represent efficiency or inefficiency. This will translate to intervention in the regulatory process and additional administrative costs. A cursory look at the experience with FLEC in interconnection proceedings suggests just how large these costs can become.

6. It is claimed that support based on embedded cost results in inefficient incentives – rural ILECs have no incentive to reduce their costs. While embedded costs do not provide cost-reducing incentives, in themselves, there are a number of mitigating factors that need to be considered:

- Embedded costs are subject a number of levels of regulatory and capital market oversight.

- USF support is less than 100% of cost, so rural ILECs bear some residual responsibility for recovering higher-than-average loop costs.
- There is competitive pressure, particularly from inter-modal sources on rural ILECs to operate efficiently.
- There is a time lag (on the order of 2 years) between new investment costs and recovery from the high cost loop mechanism.
- Cost efficiency is not a direct requirement of the Telecom Act. To the extent that support is insufficient as a result of erroneous cost modeling, support will endanger future investment in rural areas. This is clearly inconsistent with the requirements of the Act.

7. Strong cost reducing incentives do not require the use of FLEC. Any support mechanism that detaches support from actually incurred costs will provide strong incentives to reduce cost. Even embedded costs can be used to set an initial support level and will provide equally strong incentive to reduce costs if future support is not tied to actual performance. So, it is not the level of costs that affects incentives – it is the degree to which it is tied to actual cost performance. It is certainly possible to use support mechanisms with stronger cost reducing incentives than the current embedded cost mechanism. However, any purported advantage of strengthening incentives for cost reduction must be weighed against:

- the potential for the mechanism to provide insufficient support to maintain and enhance universal service;
- the fact that cost minimization may be at odds with other universal service principles (e.g.,, cost minimization may undermine the incentive for rural ILECs to provide broadband ubiquitously in the face of uncertain, and potentially low, demand);
- the necessity of careful monitoring to ensure that any support received that is based on FLEC is actually used to provide universal service. In fact, any USF mechanism that is divorced from actual cost experience runs the risk of support being received without an actual investment or expenditure to provide universal service. <u>There is an inevitable tension between providing incentives for cost reduction (which require divorcing support from actual costs) and ensuring that support is used to provide universal service (which requires tying support to actual expenditures).</u>

8. The history of incentive regulation provides some perspective on the value of using embedded costs. All price cap plans used rates set on the basis of embedded cost as the starting point for setting prices. Essentially, price cap regulation recognizes that the cost *changes* over time are likely to vary less across companies than the cost *levels*. As a result, initial prices are established based on the existing rates and it is the future changes that are governed by the price cap mechanism. Most importantly, the movement to

incentive regulation was recognition that regulators had imperfect information for setting price levels. Using FLEC to establish the costs for providing universal service is a step backwards – to be accurate, it requires exactly the sort of information that regulators do not have and that led to the adoption of incentive regulation plans to begin with.[1]

9. Forward-looking switching costs may be expected to vary more from embedded costs than will loop costs, due to the significant technological progress in switching technologies. This raises a number of new concerns, however. According to the data provided by Bill Jack Gregg, embedded switching costs for the ARMIS companies average 154% above the switching costs estimated by the HCPM. While it can be debated whether this is an accurate representation of the divergence between forward-looking and embedded costs, I will accept for the moment that technological progress has been rapid enough to produce such a difference. The result raises the question of whether efficiency requires compensation at the much lower FLEC level. As a matter of economic theory, it does not. The problem is that this technological progress means that the embedded switching costs should have been more fully recovered prior to the present time. Depreciation has been inadequate. More generally, in the face of continuing technological progress, efficient (and competitive) prices will evidence a decline but must begin at a higher level or investments will never be undertaken. The HCPM produces levelized prices over time – this is not what happens in competitive markets where rapid technological progress is present. One paper (David Mandy, "TELRIC Pricing with Vintage Capital," *Journal of Regulatory Economics*, 2002) has estimated that the HCPM overestimates switching costs for an 18000 line switch by 24% as a result of this single factor. It is hard to reconcile the "reasonable predictability" standard for USF with the use of FLEC under continual technological progress.

10. It is not that the prior investments in switching were imprudent. It is simply that the technology changed. Unless prior prudent investments are recovered, there will be a chilling effect on future investment. So, while the decline in switching costs may be debated, the issue it raises remains. Failure to recognize cost recovery of previously made investments will jeopardize future investment in rural areas.

11. Switching costs provide an example of another major problem with FLEC as the basis for USF support. Views of FLEC vary significantly depending on

[1] This is not an endorsement of using price cap regulation for rural ILECs. I have written extensively on the problems of implementing price cap regulation for small carriers (see D.E. Lehman, "Universal Service and the Myth of the Level Playing Field," OPASTCO/NTCA White Paper, available at www.ntca.org).

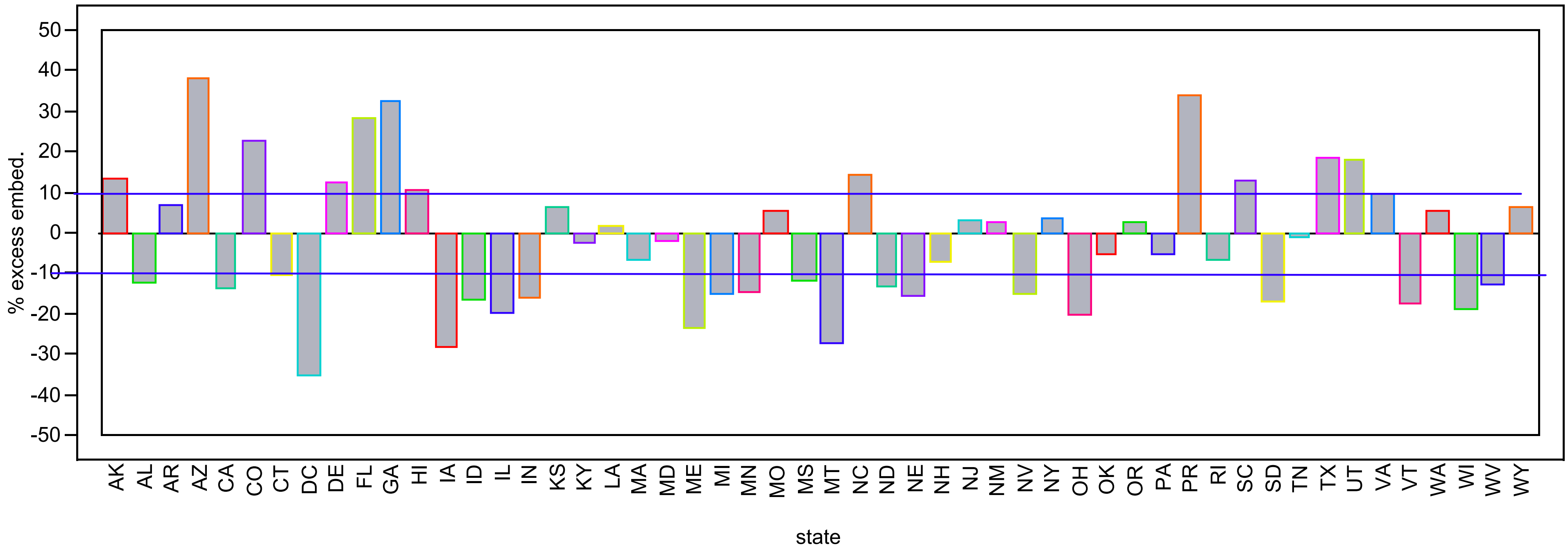
the model and its inputs. The next table shows some switching cost estimates for Cable & Wireless, Jamaica using different cost models.

Model/Analysis	Estimated Switching Cost/Line (US$)
C&WJ	300-400*
HAI	100-200
BCPM	200-300
FCC HCPM	100-200
OFTEL	200-300
NTT	150-250

Regulatory Proceeding for Determining costs for Cable & Wireless, Jamaica: available at http://www.our.org.jm/pdf/principlesandmethodsC&WJ.pdf

The differences are substantial. It is precisely the subjective nature of FLEC models that undermines most of their theoretical values. Substantial speculation about costs accompanies the FLEC exercise. At a minimum, this means a costly administrative process, significant threat of litigation, and likely *un*predictable USF support.

Figure 1: % excess of embedded cost over HCPM loop costs by state



Data is from the 2004 HCPM results from the FCC and 2003 NECA data.
The horizontal lines show a 10% variation of embedded cost from HCPM, a “reasonable range” based on theoretical considerations.

Cost Levels and Cost Variability

Many incumbents are concerned that the HCPM will result in systematically lower loop costs than actual, while many other parties worry about the reverse. The data, at least for the RBOCs (Table 1) show little systematic variation between embedded and forward-looking cost, but large variations for particular study areas. It is not clear whether the same pattern holds for the rural ILECs. The RTF White Paper #4 shows that the HCPM generally appears to overstate outside plant costs for the companies in their sample. More recently, Matanuska Telephone Association data shows HCPM loop investment costs roughly half of their actual costs. After significant adjustments to the HCPM model so as to obtain more reasonable results, the following table shows how investment in feeder, concentrator, and distribution facilities compare under the default HCPM inputs and the MTA-modified inputs:

facility	HCPM – default inputs	HCPM – MTA inputs	Ratio of HCPM/MTA investment
Feeder	$ 9,841,224	$ 28,207,305	.35
Concentrator	$ 18,618,279	$ 33,653,446	.55
Distribution	$ 56,566,013	$ 70,639,156	.80
Total	$ 85,025,516	$132,499,907	.64

For MTA, loop investment from the default HCPM was only 64% of what they feel is an accurate forward-looking estimate. Notably, all categories were too low in the HCPM, with feeder investment showing the largest divergence. So, the evidence appears to be mixed regarding whether the HCPM default outputs produce estimates higher than or lower than embedded cost.

As it turns out, the absolute level of costs is largely irrelevant. The total size of USF support does not depend on the level of costs but on its variability. Individual company support does not depend on their level of costs but on their level relative to that of other companies.

To understand this, imagine that all study areas had the same loop costs. Since the high cost loop fund provides support for study areas with costs above benchmark levels determined as percentages above the national average cost per loop, nobody would receive any support – all study areas would be at the national average. In this case, it would not matter whether a cost model produced numbers that were twice as high as they should be or only half as high – in both cases total support would be zero. It is the variability of costs across companies that determines both total fund size and individual carrier support, not the absolute level of costs.

I simulated several scenarios of high cost loop support with changes to individual study area costs.

Scenario	Effect on the total High Cost Loop fund for rural ILECs
10% higher costs in each study area	10% higher total support
10% lower costs in each study area	10% lower total support
Double costs in each study area	Double total support
Halve costs in each study area	Halve total support
$25/year higher costs in each study area	4.7% lower total support
$25/year lower costs in each study area	3.4% higher total support
$267/year higher costs in each study area (essentially double the average)	27.5% lower total support
$133.50/year lower costs in each study area (essentially half of the average)	23% higher total support

The first four scenarios are driven by the fact that the variability of costs across study areas changes proportionately with the change in costs. Doubling costs doubles the variability in costs. It is not due to the change in cost levels. If each company's costs were to double, the national average would also double, and the benchmarks for support levels (e.g., 115% of the national average, 150% of the national average) would also double. The effect on the fund results from the increased variability of study area costs.

At first, this makes the last four scenarios appear strange. Adding or subtracting a fixed amount to each study area's costs will not change the variability at all, yet the total support does change. This occurs because the benchmark support levels are calculated as a percent of the national average while each study area's costs are being changed by a fixed amount. For example, adding $25/year to each study area's costs (10% on average), will raise the 115% benchmark to 116.5% of its former level (115% of an average that is now 110% of what it was). Since each study area's costs have only risen by $25, this is less than a 10% increase for the higher cost (supported) study areas. So, fewer companies would receive support, and support levels will be lower.

This exercise illustrates some important points. We can think of the scenarios as either representing systematic errors in cost models or as simulating the effects of weaker or stronger cost reducing incentives in the way USF is structured. In either case, we will find cost levels changing – either increasing or decreasing, with changes that may be relatively fixed in size or roughly proportional to study area costs. What the results demonstrate are two things:

- It is variability of costs across study areas that determines total support.
- Changes in costs (or cost estimates) can have subtle effects on the overall size of the fund. Cost increases can decrease the size of the overall fund and vice versa.

Since cost variability is the critical variable, what does this say about the HCPM versus embedded cost? It appears that the HCPM model results in less variability of costs across study areas than evidenced by embedded cost. The following table shows the means and standard deviations for a number of cost models for the RBOCs:

Model	RBOC mean loop cost (national weighted average)	Standard deviation (unweighted)
Embedded cost (2001)	$21.99	5.0
Hatfield 3.1	$17.20	4.73
BCPM (default inputs)	$34.54	9.93
BCPM (Joint Board inputs)	$28.68	7.24
Embedded costs (2003)	$21.33	4.80
HCPM (2004)	$21.43	4.44

Cost proxy models will have a tendency to reduce geographical variability since they use a reduced number of inputs to represent a more complex reality. By necessity, inputs will tend to be averages that are not entirely accurate at a disaggregated level. Despite this property, not all cost models exhibit reduced variability. Notably, the HCPM does. Reduced variability would lead to a reduced fund size but it would be hard to describe the support as either sufficient or predictable. It is precisely the inability of the cost proxy models to accurately estimate disaggregated costs that is its greatest shortcoming – so reliance on its estimate of cost variability would be unwise. Since the model also produces costs that vary greatly from embedded costs at the study area level (as shown in Figure 1), a shift from embedded cost to the HCPM would result in significant winners and losers as well as a change in the overall size of the fund.

Further evidence is available concerning cost variability in the HCPM. Matanuska Telephone Association has estimated costs using the HCPM across their 11 wire centers. They used both the default inputs and their modified inputs. The next table shows the ratio of the standard deviation of investments across their wire centers under both scenarios:

facility	Ratio: standard deviation across MTA wire centers using MTA inputs divided by standard deviation using default HCPM inputs
Feeder	2.95
Concentrator	1.64
Distribution	1.28

It appears that the HCPM produces costs that do not vary sufficiently geographically.

CETCs and Study Area Issues

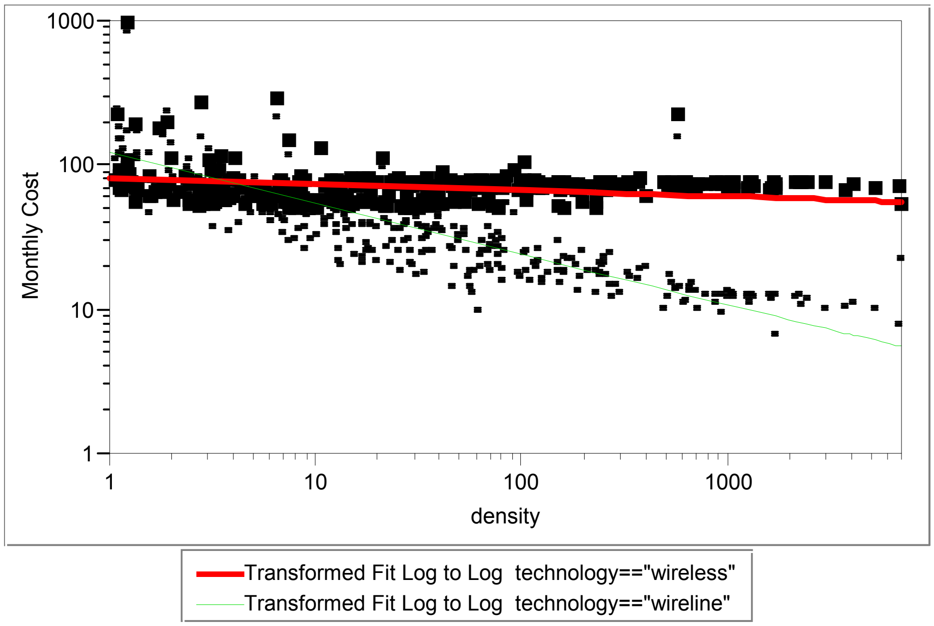
The basis for CETC support is a different but related question. Current FCC policy is that CETCs receive the same per line support as incumbents (the "identical support rule"). The same criticisms of FLEC for determining support would apply here as with the rural ILECs except for one. The administrative costs may be lower using FLEC for CETCs than for rural ILECs since there is no established accounting system for embedded costs for CETCs as there is for ILECs. Aside from this, however, there is no reason to believe that a cost proxy model will be any more accurate for CETCs than it is for ILECs.

This does not mean, however, that FLEC is inferior to the identical support rule. ILEC support may be an even more inaccurate guide to CETC costs, particularly if the CETC uses a different technology. Wireless technology does not possess the same economies of density as do wireline services. It is unclear the extent to which ILEC high cost areas are also high cost areas for wireless carriers. In fact, early evidence suggests that wireless costs are largely invariant over a wide range of population densities – only the very sparsely populated areas show significant cost increases at all. While a FLEC model may not be as accurate as embedded costs for wireless carriers, it is likely to be more accurate than using ILEC costs as a surrogate for CETC costs.

How does this affect competition in rural areas? The identical support rule is neither necessary nor is it desirable for efficient competition. To the extent that ILEC embedded costs represent the waste and inefficiency that its critics claim, then provision of this support to competitors is unnecessary – their greater efficiency means that they require less support than the ILEC. Even in the absence of ILEC inefficiency, the identical support rule will not level the playing field if CETC costs are different from ILEC costs. The goal of universal service is to provide "comparable rates and services" in rural and urban areas. CETC support required to achieve this goal must be based on the relative costs of serving different areas for the CETCs, not those costs for the ILEC.

Figure 2 is taken from an October 13, 2003 ex parte filed on behalf of NTCA. It illustrates how wireless and wireline costs vary with population density according to Hatfield models for each technology (using the state of WA as an example). While I have many concerns about the accuracy of the Hatfield models, they do attempt to capture the basic cost structures in the two technologies. As is evident from the figure, wireless costs are not dramatically affected by population density in the way that wireline costs are. Thus, use of ILEC costs to provide support to CETCs is unwarranted.

Figure 2: Monthly Wireline and Wireless Costs by Population Density: WA wire centers



Note: the larger points and thicker line represent the wireless costs; the smaller points and narrower line represent the wireline costs.

Study area definitions are another area of controversy. In theory, support will be most accurate and adequate if support is calculated on the smallest unit of geography that is practical. This is to avoid the averaging effect – the more that lower cost customers are averaged with high cost customers, the less support will be provided. In the extreme, areas receive no support although they may be high cost areas. This is the case in many RBOC areas – most RBOC study areas receive no support although they may include high cost subscribers and communities. This results from two sources: first, the high cost support is calculated differently for rural and nonrural carriers, and secondly, nonrural study areas are much larger so that the high cost areas may be lost in the averaging with low cost areas.

From the point of view of a rural subscriber or community, it does not make sense to receive support differently depending on whether your carrier is rural or nonrural. Moving nonrural support to the same basis as rural support would dramatically increase the size of the fund, however. The history of the rural and nonrural support mechanisms may provide some guidance concerning whether such a change is warranted. Nonrural carriers have historically been willing to serve high cost areas under the nonrural mechanism. They are relying on an internal support mechanism that rural carriers do not have. Increasing competitive pressures may strain this arrangement but nonrural carriers have remained willing to serve rural areas in some cases. In other cases, they have sought to sell rural exchanges to other carriers. This may be the best way to provide adequate support for all rural communities – sales of exchanges from nonrural to rural carriers could be facilitated. This would provide more equal support for rural communities but avoid the shock to the size of the fund that would accompany emerging the rural and nonrural mechanisms.

The important point is that it is the nonrural high cost mechanism that is deficient, not that the rural mechanism needs adjusting. If anything, disaggregating support from the study area level to the wire center level would lead to more accurate and adequate support, even for rural carriers.

This does not mean that disaggregation of current support levels to the wire center (or below) would be an improvement. Many rural carriers do not have sufficiently disaggregated embedded cost data. So, to disaggregate support to the wire center (or below) would require use of a cost proxy model, with all the attendant problems I discuss above. The accuracy of these models becomes more questionable the smaller the unit of geography. So, disaggregating rural high cost support according to such a model is likely to produce unpredictable results. This may make sense on a case-by-case basis where carriers voluntarily agree to use such a model. Mandatory use of these models for this purpose is dangerous.

In any case, use of disaggregated cost estimation to distribute high cost support, but without calculating required support at this level, does not make sense. The main argument for calculating support on a disaggregated basis is to provide sufficient support (reducing the cost averaging problem). Current FCC rules permit deaveraging of support but with a requirement that total support to a study area not increase. This only takes an inadequate level of support and distributes it differently. In a competitive market with portable support, this is an invitation to jeopardize "specific, predictable, and sufficient" universal service support.

<u>Conclusion</u>

Embedded cost remains the best cost measure for determining high cost support for rural areas. FLEC may offer lifetime employment for consultants and a convenient system for handing out support to multiple and diverse carriers, but at the expense of supporting universal service. Shifting from embedded cost to FLEC will result in some big winners and some big losers but the pattern will not correspond to any real need for support to provide comparable rates and services in high cost areas. The increased uncertainty in the funding mechanism would jeopardize rural investment. In fact, the use of FLEC detaches support from actual investment so that further investment is not guaranteed.