

1 **3. *Embedded vs. Economic Cost***

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3 **Q. Please turn to the third section of your testimony. You have just indicated that**
4 **the KUSF should be cost-based. Would you please explain the term "cost" and**
5 **briefly distinguish between "embedded" and "economic" costs?**

6 A. Yes. The term "cost" is applied in a variety of different contexts (and by different
7 individuals) with different meanings. It is, therefore, useful to distinguish some of the
8 different versions of this concept.

9 Embedded cost data is recorded in the books and records of a firm. It
10 measures historical costs, based upon a uniform set of rules, which has largely been
11 developed by accountants. Embedded cost data is often used by managers, investors,
12 regulators, and economists in understanding and interpreting a firm's historical financial
13 performance.

14 Economic costs, on the other hand, tend to be more forward looking and more
15 theoretical in nature. Economists have developed a comprehensive set of theories
16 concerning cost, which they use to describe, explain, and predict the behavior of firms
17 and individuals (e.g., consumers). While embedded cost data has its advantages—it's
18 often quite practical to use, it tends to be readily available, and it's fairly consistent from
19 firm to firm, it also has its limitations. For instance, embedded cost data is not
20 particularly amenable to "what if?" type analyses, and it is backward looking. Economic
21 cost data, on the other hand, is more difficult to develop, but it is often more useful in
22 analyzing complex issues and making critical decisions.

23

1 **Q. What options does the Commission have regarding development of cost studies**
2 **for Universal Service purposes?**

3 A. Costs can be calculated in more than one way, hence, the Commission must decide the
4 type of cost data it will rely upon. While there are many options available, the
5 fundamental dichotomy is between embedded cost studies and forward looking
6 economic cost studies. The former approach has generally been used in rate base, rate
7 of return regulation, while the latter approach has increasingly gained favor with
8 regulators as the industry has trended towards increased competition.

9 At the federal level, the FCC decided that “the proper measure of cost for
10 determining the level of universal service support is the forward-looking economic cost
11 of constructing and operating the network facilities and functions used to provide the
12 supported services...” [May 8th *Universal Service Order*, ¶ 224]. The FCC reasoned:

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14 [In the long run, forward-looking economic cost best approximates the
15 costs that would be incurred by an efficient carrier in the market. We
16 concur with the Joint Board's finding that the use of forward-looking
17 economic costs as the basis for determining support will send the
18 correct signals for entry, investment, and innovation [Id.].
19

20 The FCC delayed implementation of support based on forward-looking costs for rural
21 carriers pending further review by the FCC, the Joint Board, and a Joint Board-
22 appointed Rural Task Force, but at least until January 1, 2001 [Id., ¶ 252-256]. In the
23 meantime, the FCC continues to rely upon embedded cost studies in determining the
24 amount of federal universal service support provided to rural carriers. Nevertheless, the
25 FCC has expressed a strong preference for forward looking economic costs, and has
26 decided to use a forward looking cost model to determine federal high cost support for
27 SWBT and other non-rural carriers, beginning as early as July 1, 1999.

1 **Q. Do you agree with the FCC’s preference for forward looking cost studies, over**
2 **embedded cost data?**

3 A. Yes. This type of information is absolutely vital, particularly in the context of universal
4 service funding. There are at least five reasons why embedded cost data will not be
5 adequate in developing a cost-based USF mechanism for Kansas.

6 First, embedded costs involve the accretion of capital investments and their
7 depreciation over a period of many years. Accounting records over this lengthy period
8 of time are sometimes fragmentary, and they weren’t necessarily recorded in the detail
9 necessary to identify the specific costs incurred in specific wire centers, along specific
10 feeder routes, or within specific distribution areas. Due to inadequate record keeping, it
11 becomes difficult, or impossible, to track embedded costs to the level of geographic
12 detail necessary for USF purposes. While wire centers are important structural features
13 of the network from an engineering perspective, they have much less relevance from a
14 financial or administrative perspective, since a carrier’s workforce, and many aspects of
15 its operations tend to be centralized. Accordingly, a carrier with numerous wire centers
16 may not maintain detailed records of the specific costs incurred in each part of its
17 network. For some carriers, it might be possible to gather or reconstruct useful
18 embedded investment data at the wire center level. But this will not be uniformly
19 practical for all carriers, and it will tend to be a time consuming and difficult process,
20 which is likely to leave serious gaps or anomalies that reduce the value of the resulting
21 data. For instance, fiber cable may have replaced copper cable along some feeder
22 routes, but both investments may remain on the books.

23 Second, an embedded cost analysis will reflect the construction and
24 maintenance of networks developed mainly during the period of traditional rate of return
25 regulation. A classic weakness of ROR regulation is that it can be vulnerable to

1 goldplating or inefficiencies that translate into higher than necessary investment levels.
2 Like any cost-plus system of compensation, ROR regulation can create perverse
3 incentives, since the more you spend, the more you make, and inefficiencies are not
4 necessarily penalized. One of the arguments against using embedded costs is that this
5 data may be distorted for some carriers to the extent their data reflects the impact of
6 inefficiencies or gold plating. Unless these excess costs are identified and eliminated
7 from the embedded cost calculations, the effect would be to increase the KUSF above
8 the minimum necessary level. Admittedly, this problem can be ameliorated with
9 adequate auditing and regulatory scrutiny, however, the Commission's experience with
10 regulatory review of embedded costs is largely limited to statewide aggregates. Auditing
11 the embedded costs incurred within particular wire centers or "high cost areas" will be
12 much more difficult and time consuming than the type of auditing and scrutiny which
13 typically occurs in an ordinary rate case.

14 Third, if a carrier's actual, embedded costs are used for universal service
15 funding purposes, there will be strong incentives to shift costs into "high cost" areas in
16 order to maximize a carrier's draw from the KUSF. Universal service support will be
17 maximized by increasing the stated cost of high cost areas; offsetting reductions in the
18 stated cost of low cost areas will not have an offsetting downward impact in the amount
19 of KUSF payments received by a carrier, thus, the higher the estimated cost to serve
20 selected areas, the higher the funded amount. This provides incentives for carriers to
21 manipulate their cost records, mis-allocate costs, or otherwise shift costs from their
22 lower cost areas to their higher cost areas. This parallels a problem already familiar to
23 regulators--the incentive for integrated carriers with both regulated and unregulated
24 operations to load as many costs as possible onto the regulated parts of their firms,
25 while minimizing the costs attributed to the unregulated operations. If the KUSF

1 mechanism were built around embedded cost data, a carrier would have an incentive to
2 record as much of its costs as possible within its rural, high cost areas, and to minimize
3 the costs attributed to its low cost, urban areas. While it is easy to see in principle how
4 this could become a severe problem, it would not be easy to accurately detect or fully
5 solve this problem in practice.

6 Fourth, the embedded approach doesn't work very well in a competitive
7 market with multiple carriers, regardless of whether the system is based upon the
8 incumbent's costs alone or the embedded costs of each individual carrier. In a
9 multicarrier environment, it doesn't make much sense for a single carrier's embedded
10 costs to drive the funding system. Why should carrier B be reimbursed for the cost of
11 providing service in rural areas based upon carrier A's costs? If the KUSF is based
12 upon the incumbent carrier's costs, the system will tend to be skewed in favor of the
13 incumbent—the payment levels will be perfectly tailored to its needs, but will not
14 necessarily fit the needs of other carriers. Other carriers will tend to be
15 overcompensated or under compensated, depending upon how their costs compare to
16 the incumbent LEC's costs.

17 There are two ways the system can be modified to be competitively neutral.
18 One option is to apply a generic, neutral measure of cost to all carriers, including both
19 incumbents and competitors. This is the approach endorsed by the FCC. Alternatively,
20 different payment amounts could be developed for each carrier, based upon their
21 embedded costs. If the system is based on the embedded cost of each carrier, a
22 different set of problems arise. For instance, the administrative complexity and auditing
23 problems will grow as the number of carriers increases. If each carrier "self reports"
24 what it claims are its costs, there will be strong incentives to overstate cost data, as well
25 as incentives to shift costs away from low cost areas onto "high cost" areas, thereby

1 maximizing the funds the carrier can receive from the KUSF.

2 Fifth, as competition develops and market shares shift between carriers, a
3 funding system based upon embedded costs could become unstable, requiring
4 constantly rising funding levels. This is true regardless of whether the system is based
5 upon the embedded costs of just the incumbent carrier, or the embedded costs of all
6 carriers.

7 Consider what would happen if carriers receive funding based upon the
8 incumbent's embedded cost per line. As the incumbent LEC's market share declines,
9 its embedded investment and other fixed costs will be spread over fewer lines, raising
10 its per-line costs and increasing its per-line draw from the KUSF. If the competitive
11 carriers draw from the KUSF the same per-line amount as the incumbent, their funding
12 amount will increase even more rapidly, as they receive an ever-increasing amount per
13 line multiplied times an increasing number of lines. Taken to the extreme, this could
14 result in an extremely large USF amount. For instance, consider what would happen if
15 the incumbent's market share in a particular high cost area were to decline to 10% of its
16 initial number of lines, while its total embedded costs remain largely unchanged. As a
17 result, its embedded cost per line would increase nearly ten-fold while the total dollars
18 the incumbent draws from the fund would remain largely unchanged. Meanwhile, each
19 of the competitors would also receive nearly ten times more per line, therefore the
20 amount they draw from the fund would increase astronomically.

21 Analogous problems could also arise if each carrier receives its own embedded
22 costs. The incumbent's funding amount per line could increase rapidly as it loses
23 market share, for the reasons just given. While the amounts paid to competitive carriers
24 wouldn't necessarily increase in tandem with this amount, they could, nevertheless, be
25 quite substantial—particularly in the early stages of competition before the new entrants

1 gain much market share. In fact, for new carriers with large fixed investments spread
2 over a small number of customers, many urban and suburban areas may have “high
3 costs” simply because the carrier hasn’t yet achieved adequate economies of scale.
4 Moreover, there would be strong incentives for misallocation or shifting of costs to high
5 cost areas. Needless to say, it would be much more costly, and potentially impossible,
6 to deal with these problems through auditing and regulatory scrutiny when numerous
7 competing carriers are drawing from the KUSF. However difficult it would be to solve
8 these problems through auditing of an incumbent carrier, it would be far more difficult to
9 solve the problem with numerous competitive carriers, particularly if these carriers are
10 not rate base regulated for rate setting purposes.

11 For all of these reasons, I don’t believe embedded cost data will be adequate
12 for KUSF purposes over the long term. Accordingly, I recommend the Commission
13 focus its attention on long run economic costs in revamping the KUSF.

14
15 **Q. You have argued that the KUSF should not be based purely on embedded cost**
16 **data. Is there any value in having the local exchange carriers file embedded**
17 **cost data?**

18 A. Yes. While it may not be practical to establish a KUSF mechanism entirely based upon
19 embedded cost data, such data can be very useful to the Commission. For example,
20 embedded investment data could be helpful in evaluating and refining an economic cost
21 approach—particularly if the carriers can provide data for their individual wire centers or
22 small groups of wire centers (e.g. exchanges). In fact, with small carriers, even the
23 company-wide data can be useful, when the carrier only serves a handful of wire
24 centers. Furthermore, those wire centers are typically small, and they are likely to all
25 have above-average costs.

1 Furthermore, the embedded data for such carriers may prove useful in
2 evaluating the forward-looking estimates produced by computerized models.
3 Experience shows that the difficulties encountered in computer models (i.e., the degree
4 to which their estimates become inaccurate) tends to increase as the size and density of
5 the wire center declines. The most serious modeling problems seem to arise in small
6 wire centers and in rural areas. Embedded data from companies that only serve a
7 handful of wire centers can be very helpful in detecting problems and gaining a better
8 understanding of the weaknesses in a computerized cost model. In turn, this can
9 potentially lead to improvements in the input data used in running the model, or
10 improvements in the model itself.

11 Also, embedded cost data can be helpful in evaluating claims that changes in the
12 KUSF amounts received by particular carriers should be partially or entirely offset by
13 changes in other revenue categories. For instance, a carrier might claim that a change in
14 the KUSF mechanism would result in an unjust or unconstitutional reduction in its
15 revenues from the KUSF. Embedded revenue and cost data can be helpful in evaluating
16 the merits of complaints of this type.

17 Finally, I would note that the Commission could also potentially rely upon some
18 hybrid mixture of embedded and forward-looking economic cost data. For example,
19 the Commission might primarily rely upon a computerized cost model, but it could
20 constrain the model results to ensure that they do not exceed a specified percentage of
21 embedded cost. Depending upon the specific manner in which this was accomplished,
22 the problems with embedded cost data that I identified earlier could be greatly reduced,
23 and some of these problems might be eliminated.

24 This Commission has recognized the potential usefulness of embedded cost
25 data, and required SWBT to file an embedded cost study in connection with the KUSF

1 in docket 98-SWBT-677-GIT. In its Order No. 7, dated November 6, 1998, the
2 Commission explained its reasoning as follows:

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4 The Commission concluded in Order No. 6 SWBT should file a fully
5 distributed cost study. The Commission reasoned that the data
6 presented in a fully distributed cost study will assist the Commission in
7 its evaluation of the appropriate KUSF support SWBT should receive.
8 Furthermore, if the Commission determines the KUSF should not be
9 based on a fully distributed cost study but rather a forward-looking cost
10 study, the information obtained through the embedded cost study will
11 provide the Commission with a reference point to evaluate the results of
12 a forward-looking cost analysis. The Commission should receive and
13 consider all evidence that may have a relevant bearing on its decision.
14 *See Southwestern Bell Tel. Co. v. Kansas Corp. Comm' n*, 192
15 Kan. 39, 65 (1963). The Commission also stated that, although it
16 draws no conclusions about the validity of a takings claim, the
17 Commission should obtain the relevant evidence to make the factual
18 determinations necessary to evaluate such claims. [¶ 18].
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