

only seeks to estimate costs, and not to replicate the operation of competitive forces in an efficiently operating marketplace. For that reason, using cost proxy models to set prices can stifle or distort the normal development or operation of a competitive market to the detriment of consumers.

Moreover, without adjustments the cost models being examined in this case are not even useful as an input into pricing decisions, since they do not estimate the expected costs of real market participants. Rather, the models estimate the forward-looking costs of an optimally configured hypothetical firm, whose estimated costs are thereby substantially lower than the actual costs that any market participants will likely incur. As such, rates set based upon forwarding-looking costs are not appropriate for a competitive market because they provide insufficient potential economic incentives to drive competition and investment.

The Commission further should not at this time seek to develop a single model for a multiplicity of tasks. No such multipurpose model currently exists and there is no reason why the Commission should devote the limited time available before implementation of the universal service fund seeking to develop one. This is particularly true here since, given the diverse cost characteristics of the industry, it is highly unlikely that such a multipurpose proxy can be developed that will accurately estimate the costs of all areas, carriers and services with enough precision for use in pricing.

For these reasons, the Commission should initially focus only on the possible use of cost proxy models in establishing the universal service fund recommended by the Federal-State Joint Board because that application simply entails identifying high cost versus low cost areas, a task that does not require a high level of precision.

Ameritech agrees with the Commission Staff that any cost proxy model must be validated through rigorous testing of its assumptions, input data, algorithms, and its results. But, the Commission also should continue to consider other options for universal service funding, such as a competitive bidding mechanism recommended by the Joint Board, which do not depend on unreliable assumptions and input data.

## **II. Rates Should Not Be Set At Cost.**

### ***A. Setting Rates Based Solely on Costs Distorts Efficient Competition.***

It is axiomatic, that the goal of regulatory ratemaking should be to facilitate the action of a competitive market or, in the absence of competition, to replicate the pricing results of a competitive market. Use of the cost proxy models to establish prices does not meet this objective because pricing at cost does not replicate the dynamics of a competitive market, nor does it duplicate the outcome of a competitive process. In fact,

mandatory pricing at cost can stifle competition and lead to economic inefficiency.

In a market economy, the link between prices and costs is not a simple one. While it is true that in a competitive market, in the long run, total expected revenues should move toward total costs (including the cost of capital) of the higher-cost firms in that industry, that also means that all other participants are expected to generate revenues in excess of their costs.

<sup>3</sup> The incentive to capture industry profits is the mainspring for innovation, investment and competitive entry. Indeed, it is the profitability of the lower-cost firms that motivates less efficient firms to reduce their costs and impels potential entrants to displace the higher cost firms over time. For these reasons, forcing firms to price at or below their cost, with no prospect of economic profit, removes the incentive for innovation, investment, and entry.

Moreover, the informational demands of a pricing system based on cost studies (or cost proxy models) are too great to be successfully implemented. For, not only must prices in the aggregate reasonably be expected to generate revenues to cover costs, but each rate and rate element should be correctly determined so as not to inhibit efficient entry.

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<sup>3</sup> Firms can leapfrog one another so that different firms at different times represent the high-cost firms on whose basis overall price levels will move toward.

***B. Prices Should Never Be Set At Forward-Looking Costs.***

The Commission Staff proposes that the cost proxy models be exclusively based upon forward-looking costs. However, pricing at forwarding-looking costs, as implicitly defined by the cost proxy models, is particularly destructive to the development and efficient operation of a competitive market.

Based upon the methodology and assumptions of the cost models being considered in this proceeding, forwarding-looking costs will systematically be set below the expected costs of even the most efficient actual market participant.<sup>4</sup> According to these models, and as applied recently in the telecommunications industry, the term “forward-looking costs” has become shorthand for a particular hypothetical scenario that assumes a “hyper-optimal firm.” That is to say, the firm is assumed to operate under a set of assumptions that do not conform to reality, but are intentionally designed to produce the highest conceivable level of productivity. Examples of unrealistic assumptions that can underlie a “hyper-optimal firm” are that it can instantaneously and ubiquitously build or re-build its network using the newest technology; it will incur no removal costs for old facilities and equipment; it can perfectly forecast demand; and

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<sup>4</sup> Normally, forward-looking incremental costs are used to establish a price floor to prevent cross-subsidy and stand alone costs (i.e.: the costs of a firm that only provided the service in question) are used to establish a ceiling.

it will serve the entire market.<sup>5</sup> Even a casual review of reality confirms that such a hypothetical hyper-optimal firm is mythical.

Setting rates at the low levels dictated by this forward-looking cost methodology eliminates the economic incentives necessary to drive competitive and network investment, since no one will enter or invest in the market, if the best it can hope for is to break even. For that reason, use of the cost proxy model to set prices should be rejected because it is inconsistent with the pro-competitive and deregulatory policies of the Telecommunications Act of 1996. A policy of setting rates at forward-looking costs is also confiscatory.

### **III. The Overriding Criterion Is Accuracy.**

#### ***A. The Ability to Estimate Expected Costs of Actual Market Participants Is Key.***

Ameritech submits that the acid test of the validity of any cost study or proxy model is how well it estimates the actual or expected costs of production of real market participants. That is to say, the study or proxy model must accurately predict anticipated actual costs (both on an overall basis and for each carrier, service or area involved) with sufficient accuracy

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<sup>5</sup> In addition, such model's assumptions are utopian in that they assume a static situation where networks do not have to be designed to handle real-world events such as new housing developments, customer moves and termination of service, equipment and facility failures, etc. These unrealistic assumptions of a static market allow for the use of spare capacity and fill factors that would not be adequate for a firm to service the dynamic marketplace that actually exists. Again, the effect is to understate actual costs.

for the purpose for which it is being used. For instance, a model could predict average national costs with reasonable accuracy, but its use to establish rates for individual carriers that serve areas with higher than average costs could be confiscatory.

Because the cost models being considered in this proceeding do not even attempt to predict actual costs, they should not be used to make cost or pricing decisions for individual firms. At most, they should only be used to identify high cost areas to be targeted for universal service funding. In fact, this application was the original purpose of the BCM model. Identification of high cost areas only requires that the Commission establish relative cost relationships between areas, which requires far less precision than determining actual costs for setting rates for individual carriers. However, it is important to note that the Hatfield Model is so flawed that it is not even useful to establish relative cost relationships between areas.<sup>6</sup>

If the flaws in the models are corrected, then they might also be used on an interim basis for sizing of and calculating distributions from the national universal service fund. However, if the cost proxy models are used to quantify and distribute funds, the Commission should recognize that the models will understate expected actual costs. For this reason, the proxy

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<sup>6</sup> For example, based on Hatfield 2.2.2 results, costs per loop for Illinois are 3.2% higher than for Wisconsin (\$16.48 vs. \$15.97). However, actual cost data filed in the 1996 NECA USF Data Submission shows that loop costs for Ameritech Illinois are 21.8% lower than for Wisconsin (\$14.79 vs. \$18.91).

model's output should be corrected and only used temporarily until more reliable data is available. The Commission also should continue to consider other longer term methods for universal service funding for high cost areas (such as competitive bidding as recommended by the Joint Board<sup>7</sup>) that more closely duplicate market dynamics, and do not depend on inherently unreliable assumptions and complex calculations.

***B. The Commission Staff's Proposed Criteria Should be Re-focused on Validating the Models.***

The Commission Staff asks the parties to address what criteria should be used to evaluate the cost proxy models. The Staff correctly recognizes that in order to determine if a proxy accurately reflects costs, the model's assumptions, inputs and algorithms must be carefully examined and tested. Ameritech agrees that this bottoms up approach to validation is critical to ascertaining the accuracy of any cost proxy.

The Commission Staff also states that the output of a cost proxy should be validated against independent cost evidence. Ameritech agrees. To this end, Ameritech proposes that such top down validation be performed in two ways. First, the output of the model should be compared against actual cost evidence available from both public and private sources.<sup>8</sup>

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<sup>7</sup> The Joint Board recommended "that the Commission, together with the state commissions, continue to explore the possibility of using competitive bidding for determining the level of federal universal service support." (para 34).

<sup>8</sup> "Commission Staff Releases Analysis of Forward-Looking Economic Cost Proxy Models," FCC Public Notice, January 9, 1997.

Second, the model's input data should be varied to determine if the model produces logical changes in its output that conform with experience.

The Commission Staff asks the parties to comment on six criteria that might be used to evaluate the cost proxy models.

1. Adherence to forward-looking cost to set prices.
2. Ability to measure narrowband network costs.
3. Consistency with independent cost evidence.
4. Potential for independent evaluation of model algorithms and input assumptions.
5. Flexibility to vary user input choices.
6. Ability to use the model for multiple purposes.

Ameritech will assess each of these criteria against how well it validates a cost proxy model based upon bottom up or top down analysis.<sup>9</sup>

**1. *Rates Should Never Be Set At Forwarding-Looking Costs.***

This "criterion" is not actually a criterion, but rather advocacy of the exclusive use of one type of cost model methodology -- forward-looking incremental costs. As previously discussed, since a model that estimate such forwarding-looking costs systematically predicts costs that are below the actual costs that any real market participants could conceivably actually incur, its results must be corrected upward before it is used.

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<sup>9</sup> Ameritech will discuss items 3 and 4 together.

**2. *Measurement of the Costs of a Narrowband Network Does Not Estimate Actual Costs.***

The second proposed criterion is that the cost proxy model estimate the full stand-alone costs of a narrowband network. This criterion necessarily limits the model to only one purpose -- universal service funding. The assumption of a narrowband network does not comport with the public switched network of any carrier, which are used to provide a full range of services, not just narrowband. As such, a model that assumes a stand-alone narrowband network will produce results that have no relationship with the expected costs of providing any service (either narrowband or broadband). Moreover, if a narrowband network approach is adopted, then not only must costs applicable solely to broadband service be excluded, but by the same token the significant efficiencies and cost savings resulting from the sharing of many common facilities and functions between narrowband and broadband services must also be excluded.

If the stand-alone costs of a narrowband network are to be estimated, it must be recognized that, since the model will produce expected future costs of a network that does not exist, it cannot be tested against any empirical evidence. As such, this approach opens the door to speculation and gaming by parties that seek to justify a specific outcome.

**3. *Any Cost Model Must Be Consistent With Independent Evidence.***

The third proposed criterion is that the model produce results that are consistent with independent evidence. As stated earlier, Ameritech believes that this is the acid test of any cost model or proxy. The Staff Analysis suggests several sources of independent evidence that might be used to validate a cost proxy model:

- Competitive bids for loop installations;
- Cable installation costs;
- Econometric studies;
- Actual engineering studies for a CBG;
- ARMIS data;
- Comparison of physical measures of investment between the model and reality; and
- Use input price indexes to measure the effect of changing input prices.

Subject to the limitations discussed below, Ameritech agrees that each of the above sources may provide data that is valuable in validating the results of a cost model. Ameritech also suggests two other sources that are even more valuable -- actual cost studies, and tests of the consistency of output of the model based upon varying its inputs.

First, market bids can be used to help calibrate the model as long as the model's results are not used to set prices. Otherwise, there will be

circularity between the model's results, the prices that LECs are able to charge, and the competitive prices.

Second, based upon its experience as both a cable provider and telecommunications carrier, Ameritech believes that there are significant differences between the costs of installing and operating a telecommunications network and a cable network. As such, actual evidence of telecommunications costs is more pertinent to testing telecommunications cost proxy models, than corresponding cable costs.

Third, while an econometric model or statistical method can help calibrate a cost model, such econometric models suffer from the same basic weakness as cost proxy models themselves -- both are only as good as their underlying data, assumptions, inputs and algorithms. Thus, a modeler using econometric models or statistical methods to validate a cost proxy model should provide convincing and scientific evidence that the data, assumptions techniques, and results of such econometric models are valid.

Fourth, Ameritech agrees that engineering studies can be another potential source of evidence testing the validity of a cost proxy.<sup>10</sup> Ameritech recommends that the engineering studies be done for a wide variety of configurations and conditions with different lines per square mile, different

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<sup>10</sup> This is not to advocate the use of cost proxy models in pricing, but only to say that if one wants to create a forward-looking cost proxy model, an engineering study for a selected CBG is one way to calibrate the model.

input costs (e.g. labor rates), different local government regulations for reimbursement for trenching, and in different areas of the country. A cost proxy model that is correct on average is still worthless (and is especially misleading) if it does not adapt correctly to all relevant variations.

Fifth, Ameritech agrees that ARMIS data is another source of evidence against which to test a cost proxy. However, as the Commission Staff Analysis notes, variances between the models and ARMIS may be due to many causes, such as (1) technological change that reduces the level of necessary investment and therefore possible under-depreciation of incumbent carrier's assets; (2) incorrect specification of the cost proxy models; (3) declining input prices; and (4) LEC inefficiency. Numerous other possible explanations exist, including flaws in the cost model.

The question of why a model varies from independent evidence must be fully answered before the model is used. It is not sufficient to simply assume (as some IXCs do) that any variances between a model's results and ARMIS data must be due to "LEC inefficiency". Such a conclusion is disingenuous and unscientific. In this regard, much of the alleged inefficiency results from the unrealistic assumptions that underlie the cost proxy models themselves, and do not represent inefficiency on the part of any firm. Further, an allegation that the LECs are the sole cause of any inefficiency ignores the role that regulators traditionally have played in overseeing LEC performance. Indeed, incentive regulation has created

significant incentives for efficiency. Moreover, this argument also ignores that the impact on investment and expenses of public policies, such as universal service requirements, carrier of last resort obligations, understated depreciation rate prescriptions. The impact of the costs of these public policies are not reflected in the proxy assumptions, but are real costs incurred by the incumbent LECs. Since the goal of any proxy should be to reflect actual costs, it is essential that the root cause of any variation between a proxy and independent evidence be determined, and that any appropriate adjustments be made.

Sixth, the Staff Analysis says that use of public data assists in the independent evaluation of a model. Ameritech agrees that public data is valuable, but believes that private data may be even more accurate. One of the problems of using public data is that it is often aggregated over all carriers at levels that do not reflect actual cost characteristics. To further complicate the issue, more accurate cost data for individual carriers and areas exists, but is in private hands and is often proprietary to the individual companies. If a model uses data that has the advantage of being available but is nevertheless inaccurate; the model's results are still wrong.

**4. *A Cost Model Should Have Flexibility.***

Ameritech concurs that generally cost models should be flexible enough to correctly reflect expected costs under all relevant scenarios the model is asked to address. To this end, it is the modeler's responsibility in his or her overall documentation to demonstrate why a default value was selected and what the sensitivity of the model is to changes. An abundance of changeable values does not help model users who may lack the time, knowledge, or resources to correct and program each value. Models should be correctly specified rather than burdening the user with the dubious "capability" to change them

**5. *Proxy Models Cannot Necessarily Be Valid For Multiple Objectives.***

The last proposed criterion (that models should support multiple objectives) is a policy objective promoting administrative efficiency more than it is a criterion for measuring the validity of a cost model. Ameritech agrees that in theory it is more administratively efficient to use the same cost model for several purposes. However, in no case should accuracy be sacrificed in the name of efficiency. To this end, anytime a proxy is used for a new or modified purpose, it should first be re-validated for that application.

The Staff Analysis proposes that the cost proxy model may bear on the issues of:

1. Determining the size of the universal service fund.
2. Determining where the universal funds should be disbursed.
3. Determining access and interconnection prices.
4. Determining unbundled element prices.

For the reasons discussed earlier, Ameritech does not believe that the cost proxy models should be used to set prices, and therefore believes that the cost proxy models should be used solely for universal service funding purposes.

In principal, Ameritech believes that the size of the universal service fund and disbursement from it should reflect actual costs.<sup>11</sup> However, because data based upon actual experience with the fund is not yet available, temporary use of the cost proxy models may be justified. However, as stated earlier, the Commission should recognize that use of a model based upon forward-looking costs will produce estimated costs that are below what will likely be experienced by real carriers. For that reason, the models must be corrected to reflect expected actual costs, and as actual data become available, further refinements should be made. However, in the long term the Commission should consider other alternatives to determining distributions from the fund, such as competitive bidding, that do not depend on cost models.

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<sup>11</sup> Such funds should be made available to the extent necessary only to those firms serving high-cost areas and bearing carrier-of-last-resort responsibilities.

**C. *Ameritech's Proposed Criteria For Validating The Cost Proxy Models.***

Ameritech believes that objective testing against independent evidence is the primary basis for evaluating cost proxy models. However, the criteria proposed by the Staff Analysis and described in the Public Notice mix policy objectives with validation of the model itself. Ameritech proposes that these two objectives be separated. To that end, Ameritech submits the following alternative criteria which exclusively focus on evaluating the validity of a cost proxy model. The following criteria implement the suggestions Ameritech has made throughout its Comments.

1. Does the model accurately reflect all relevant inputs?
2. Is the model internally consistent and based on sound economic theory?
3. Are all of the model's assumptions reasonable?
4. Is the model open and understandable?
5. When tested against the full range of possible inputs, are the proxy's results logical and consistent with experience?
6. Does the model's output comport with the best available independent public and private data?

**IV. *The Models Are Flawed And Have Not Been Validated.***

Ameritech agrees with the Commission Staff that the models have serious flaws, and that none of them thus far adequately addresses the questions posed by the Commission Staff. Any proxy model is only as good

as its underlying structure, assumptions, and inputs. As with any model, certain assumptions and inputs have a greater impact on the output than others (e.g. depreciation rates, capital structure, fill factors, expense levels). However, all of the inputs are important and must be thoroughly verified before any proxy model can be used for even universal service purposes. Beyond that, Ameritech has the following specific observations.

**A. Existing Wire Center Approach is Best.**

Cost proxy models need at least one point of contact with reality. The “scorched node” assumption of use of existing fixed wire center locations provides that point of contact (although an inadequate one) for the cost proxy models. However, ultimately the “scorched node” approach will not satisfactorily model the costs of both the incumbent and the new entrant where new entrants do not use the incumbent LEC’s network configuration. For example, new entrants may place switches where they can optimally serve portions of multiple existing wire centers, even though the resulting wire centers do not mirror those of the incumbent. A proxy model that assumes the existing wire center locations may not therefore accurately estimate the costs of a new entrant that does not adopt the same wire center boundaries. On the other hand, a model that assumes some other network topology may not accurately estimate actual cost of incumbent LECs, and has the further disadvantage of being wide open to

speculation. Thus, it may be infeasible for a single proxy model to accurately predict the cost of both incumbents and new entrants.

The FCC is also correct in noting that the use of wireless technology needs to be considered. Currently, none of the models do an adequate job of modeling wireless technology, and are not useful for that purpose.

***B. The Geographic Unit of Analysis Should Reflect Cost Characteristics.***

There are tradeoffs between the level of disaggregation in a model and the accuracy of the model. On the one hand, finer units of geography tend to mitigate against errors that occur when costs are not uniformly distributed throughout a geographic area (as each of the models assume). On the other hand, accurately forecasting demand for small geographic areas is very problematic. Errors in demand estimation will lead to errors in network requirements, thus either over or under estimating costs. The key is to predict demand at the same level of disaggregation as costs vary between geographic areas. None of the models are currently able to do so with sufficient accuracy.

***C. The Models Should Reflect Demand for All Relevant Services.***

The Commission Staff is correct in noting that, with any of the proxy models, there are problems with estimating business versus residence line demand. Ameritech agrees that accurate estimates of business and

residence line demand are important, since fill factors differ between business and residence, and business loop lengths tend, on average, to be shorter than residence.

Ameritech believes that cost proxy models should reflect total demand for all relevant services, since many network facilities are shared. Thus, capturing demand for all relevant services is essential to capturing the economies of scope in the network. To that end, even if only residence and single line business lines are being supported, it is important to know what demand will arise for multiple business lines, since these lines will share distribution and switching facilities, and thereby impact the cost of residence and single line business lines.

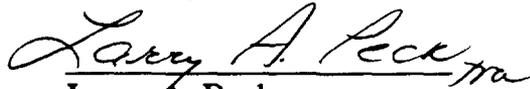
***D. The Proxy Models Assumptions Must Be Consistent With Reasonable Quality Standards.***

It is equally as important that any proxy model reflect inputs and assumptions that capture all the costs of providing service at required levels of quality. For example, fill factors must be estimated at levels necessary to support prompt response to requests for new service and repair; the default prices chosen for cable, fiber, and other loop-related facilities, such as drops, pedestals, and network interface devices must be equal to the actual market prices of those inputs; and a realistic mix of aerial, buried and underground cable and the appropriate amount of structure sharing must be assumed in the model.

**V. Conclusion:**

For the above reasons, Ameritech recommends that the Commission correct and validate the proposed cost models and then use them to identify areas that should be eligible for disbursements from the universal service fund. If the proxy models are used to quantify and disburse funds, at most they should only be used on an interim basis and the model output should be corrected upward to reflect actual expected costs. However, in no case should the cost models be used to set prices, since the models do not estimate actual costs and do not in any way duplicate the dynamics of a competitive market. In fact, setting prices at levels produced by the models will stifle competition and network investment.

Respectfully submitted,



Larry A. Peck

Michael S. Pabian

Attorneys for Ameritech

Room 4H86

2000 West Ameritech Center Drive

Hoffman Estates, IL. 60196-1025

(847) 248-6074

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CCB/CPD No. 97-2

COMMENTS

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## **EXECUTIVE SUMMARY**

The Common Carrier Bureau seeks comment on a staff report regarding cost proxy models. These comments first describe the Hatfield model's approach to modeling the local network, including a description of the changes reflected in Hatfield Model Release 3.0, and then addresses the specific issues raised in the staff report regarding verification of the results, public versus proprietary data, switching locations and costs, specification of demand, fill factors, structure costs, capital costs, and estimation of operating expenses and overhead expenses.

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**COMMENTS**

The Common Carrier Bureau seeks comment on a staff report regarding cost proxy models. These comments first describe the Hatfield model's approach to modeling the local network, including a description of the changes reflected in Hatfield Model Release 3.0 (hereinafter Hatfield 3.0), and then addresses the specific issues raised in the staff report regarding verification of the results, public versus proprietary data, switching locations and costs, specification of demand, fill factors, structure costs, capital costs, and estimation of operating expenses and overhead expenses. We have not had sufficient time to review the other cost proxy models submitted, including the Benchmark Cost Proxy Model (BCPM), but expect to make further comments on those models in our reply.

**I. THE HATFIELD MODEL**

The Hatfield Model calculates the costs of universal service, carrier access, and unbundled network elements (UNEs). The UNEs modeled by Hatfield 3.0 include:

Network Interface Device (NID)

Loop Distribution

Loop Concentrator/Multiplexer

Loop Feeder

End Office Switching

Common Transport

Dedicated Transport

Direct Transport

Tandem Switching

Signaling Links

Signal Transfer Point ("STP")

Service Control Point ("SCP")

Operator Systems

Public Telephones

Taken together, these UNEs are capable of providing carrier access and the services recommended by the Joint Board for universal service support, i.e. single-line, single-party access to the first point of switching in a local exchange market, usage within a local exchange area, including access to interexchange service, touch tone capability, a white pages directory listing, and access to 911 services, operator services, directory assistance, and telecommunications relay service for the hearing-impaired.

The definitions of the components of the local loop reflected in the Hatfield model are: