Connect America Cost Model Virtual Workshop Questions and Comments Posted as of February 1, 2013

OVERVIEW

Comments

- **Donald K. Stockdale, Jr.**

On behalf of the United States Telecom Association, AT&T, CenturyLink, Frontier Communications, Verizon, and Windstream Communications (collectively the ABC Coalition):

The ABC Coalition welcomes the opportunity to comment on the Bureau's discussion questions for the Cost-Model Virtual Workshop. Our full comments are available from the Commission's Electronic Comment Filing System a thttp://apps.fcc.gov/ecfs/docum... . For convenience, the following is a brief summary of the Coalition's views.

As an initial matter, the Coalition wishes to stress the critical importance of selecting a model design that will allow CAF Phase II to be implemented as expeditiously as possible. The interim support available to carriers while the cost model is being prepared is far smaller than the amounts budgeted for CAF Phase II, and many traditional sources of support that carriers rely on are rapidly being phased out. The growing delays in implementing the cost model and disbursing CAF Phase II support result in substantial hardship for carriers and pose a significant obstacle to the deployment of broadband service to rural areas. Therefore, when evaluating alternative design options, the Coalition urges that—other things being equal—the Bureau select the design option that can be implemented most expeditiously.

The key element in designing a sound forward-looking cost model should be the selection of a green-field, rather than brown-field, deployment. As the Coalition has previously explained, a brown-field approach is unacceptable for legal, policy, and practical reasons. The brown-field options in the CQBAT and CACM models do not address the problems we have identified. In fact, the "quick and dirty" approach to estimating a brown-field model, adopted in both the CQBAT and CACM, starkly illustrates many of these problems. Among other issues, the brown-field option in both models ignores variation in the age and quality of existing plant and neglects the associated capital expense that carriers must recover to remain whole, and it makes no allowance for the actual network adjustments, replacements, and augmentations required to achieve 1 Mbps upstream speeds over existing copper wire. Those problems are not easily solved: at a minimum, it would require massive data inputs that are not presently available and significant modifications to the model. Even if these data could be collected, it likely would result in years of delay and a model too complex to comply with the criteria the Bureau has set forth. The only feasible way to meet the Bureau's stated goals is to model a green-field deployment.

With respect to the specific questions posed by the Bureau, the Coalition's position is as follows:

* Customer Locations: In the absence of actual geo-code data, the Bureau should adopt the methodology used by CQBAT for determining customer locations. The CQBAT model is consistent with current best practice and has been tested in a variety of contested proceedings.

* Clustering: The Coalition believes that the CQBAT model's approach to clustering is appropriate and knows of no reason to deviate from this approach.

* Routing: The Coalition supports the CQBAT routing algorithm, which is superior to the approach taken by HCPM and which has been used in other wireline models.

* Capturing Variation by Geography: The Coalition believes that three density zones provide for sufficient variation in model assumptions based on density. Although the HCPM used nine density zones, the additional rural zones do not appear have much effect on the model's precision, and other important geographic variations in cost—such as for labor or materials costs—are captured through other variables.

The Coalition believes that the potential benefits in terms of slightly increased precision resulting from adding additional rural density zones do not outweigh the costs of delay.

* Inter-Office Transport: The Coalition believes that CQBAT's approach to modeling inter-office transport costs is reasonable for a green-field model and does not require modification. If the Bureau decides to adopt a brown-field model, however, then significant modifications will be required, because a brown-field model cannot assume either that no inter-office network exists or that the existing inter-office network is adequate. The problem of calculating inter-office transport costs using available data is another reason to prefer a green-field model and not a brown-field model.

* Voice Capability: The Coalition agrees with the Bureau that voice capability should be included in the model if voice is a supported service. If a green-field model is employed, the Bureau may simply assume that there will be one soft-switch per state and that carriers will use SIP signaling. If a brown-field model is used, however, the Coalition rejects the Bureau's proposal to estimate the cost of voice service by calculating the cost of providing VOIP in a green-field model and subtracting the associated capex. That approach wrongly assumes that carriers will retain their circuit-switched voice equipment and fails to acknowledge that circuit-switched equipment has higher operating costs. The cost of providing voice service in a brown-field network cannot be accurately estimated without significant changes to the model and extensive input data that is likely unavailable.

* Wire Center Facilities: The Coalition generally agrees with the Bureau's proposal for estimating the costs of wire center facilities, and if a green-field model is used, we support adoption of the cost categories used in the CQBAT model.

* Sizing Network Facilities: The Coalition agrees with the Bureau's view that the general approach to network sizing taken by CQBAT is reasonable, and does not believe there is any reason to deviate from it.

* Use of Company-Specific Values: The Coalition believes that the Bureau should use nationwide average values with regional adjustments to capture variations in labor and materials costs, rather than company-specific cost inputs. The Commission previously—and, in our view, correctly—rejected the use of company-specific input values in the HCPM because there is no administratively feasible means to collect such data (and certainly not in a reasonable timeframe) and because it would not be consistent with estimating the forward-looking costs of an efficient provider.

* Calculating Opex: The Coalition believes that the CQBAT approach to calculating operating expense is reasonable and that there is generally no reason to deviate from it. We recognize, however, that modifications may be necessary to address out-of-state Internet backbone interconnection arrangements and to reflect any additional costs that may be unique to a particular geographic region.

* Determining the Annualized Cost of Capital Investments: The Coalition does not support modifying the economic-life assumptions that were adopted for the HCPM. These economic lives were approved by the Commission and have been used in the HCPM model, by state public utility commissions in UNE pricing proceedings, and in previous versions of CostQuest models. Moreover, it would be enormously complicated, burdensome, and time-consuming to attempt to establish new values now, and doing so would delay implementation of the model possibly for years. If the Commission decides to review existing economic lives, it should initiate a separate rulemaking proceeding, since economic lives and regulatory depreciation have implications that extend beyond the CAF Phase II proceeding.

* Determining the Sharing Factor for Outside Plant: The Coalition believes that the sharing factors used in the CQBAT model, which are very close to those used by the HCPM, are reasonable and that there is no reason to deviate from them. The Coalition is opposed to adjusting the CQBAT sharing factors to assume that, wherever there is a cable operator, three entities will share structure costs. This assumption is frequently inaccurate as a matter of practice—often the assumption of three providers sharing plant is too high, and other times it is too low—and the proposed modification will only affect results in cases where feeder or distribution pass through a cable operator's franchise area but then terminates to locations outside that area. Given the questionable basis for this change, and because modifying the programming code of the model to accommodate this change is likely to involve significant time and effort, the Coalition believes that any small benefits from such a change are greatly outweighed by their costs and delay.

* Plant Mix: The Coalition believes that the CQBAT approach of using carrier-specific plant-mix data where it is available is reasonable. We further support the decision to use national default values where carrier-specific data are not available, particularly given the need to implement the model expeditiously.

* Labor-Cost Adjustment Based on Location: The Coalition supports CQBAT's use of labor-cost adjustments based on data from R.S. Means. The R.S. Means data on regional variations in construction costs, which are based on a large national survey, are widely recognized and used in numerous contexts, and therefore provide an objective and reliable basis for adjusting inputs to reflect regional differences in wage and materials costs.

* Calculating Average Per-Unit Costs/Take Rate: The Coalition cannot support the proposal to calculate unit costs on a per-location basis until the Bureau reveals what other changes it intends to make in the thresholds, take-rate assumptions, etc., and what the implications of those changes will be for support levels.

* Assigning Shared Costs: The Coalition opposes the Bureau's proposal to assign common costs using a modified subtractive approach. Not only is the subtractive approach conceptually flawed and the modified approach logically inconsistent, but implementing this approach would significantly delay adoption of the model and disbursement of CAF Phase II support.

* Additional Functionalities and/or Capabilities: The CQBAT model, when deploying FTTD technology, currently only ensures upstream speeds of 768 Kbps. The CQBAT and CACM should be modified to ensure upstream speeds of 1 Mbps to conform to the requirements set forth in the USF/ICC Transformation Order.

Finally, because the Bureau has yet to provide documentation cataloguing and explaining the differences between the CQBAT model and the CACM model and the Coalition has not had an adequate opportunity to examine the logic of the CACM, the Coalition cannot yet comment on the CACM or on whether there are any other functionalities or capabilities that should be added to the CACM platform.

Respectfully submitted,

/s/ Donald K. Stockdale, Jr.
Mayer Brown LLP
1999 K Street, N.W.
Washington, DC 20006
(202) 263-3000

- **Tom Navin**

Puerto Rico Telephone Company, Inc. ("PRT") takes this opportunity to participate in the Wireline Competition Bureau's virtual workshop on the ABC Coalition's CQBAT Model. As PRT repeatedly has demonstrated, and as detailed again in the letter we filed today on ECFS, the current CQBAT Model will not provide sufficient Connect America Fund Phase II support to Puerto Rico. Accordingly, and consistent with instructions in the 2011 USF Transformation Order, the Bureau should maintain existing universal service support for Puerto Rico and other similarly situated insular areas until it adopts an alternative model that accounts for the unique circumstances of these areas. To aid the Commission, PRT plans to file a Puerto Rico-specific model before the end of this year to better guide the Commission. PRT also includes with the letter it is filing today responses to the specific questions posed in the virtual workshop about the CQBAT Model. PRT's responses show exactly why the current CQBAT model does not meet the needs of Puerto Rico.

-Tom Navin, Counsel for PRT

DETERMINING CUSTOMER LOCATIONS

Background

Hybrid Cost Proxy Model: When adopting the HCPM, the Commission concluded that it should use geocode data to the extent available for determining customer locations. The Commission later affirmed this conclusion, but found that "no source of actual geocode data has yet been made adequately accessible for public review." The Commission expected that a source of accurate and verifiable actual geocode data would be identified in the future for use in calculating federal support.

In the absence of such data, the Commission used road network information as the basis for locating within a census block boundary customers whose precise locations were unknown. This approach entails associating customer locations with roads and excluding some road types or road segments (e.g., interstate highways, bridges, and on- and off-ramps) that are unlikely to be associated with customer locations. The Commission used an algorithm proposed by PNR Associates to distribute locations uniformly on road segments (based on Topologically Integrated Geographic Encoding and Referencing (TIGER) data). The PNR Associates' National Access Line Model is used to estimate the number of customer locations within census blocks and wire centers. The PNR Associates model's information sources include: survey information; the Local Exchange Routing Guide (LERG) database; Business Location Research (BLR) wire center boundaries; Dun & Bradstreet's business database; Metromail's residential database; Claritas's demographic database; and U.S. Census Bureau estimates.

CQBAT: The CQBAT model estimates the number of customer locations using multiple sources. These include obtaining the number of residential locations from commercial data (GeoLytics) and obtaining the number and distribution of business locations from commercial data (GeoResults). CQBAT also determines the type (SIC code) and size of businesses (used to estimate the bandwidth required at each location) from the US BLS Economic Census at the ZIP-code level, using the commercial data to distribute ZIP-level counts to census blocks. The model distributes locations randomly along roads, excluding some road types and road segments (e.g., interstate highways, bridges, and on- and off-ramps). CQBAT's approach to placing customer locations randomly along roads appears to be consistent with current best practice and represents an improvement relative to the HCPM. This distribution has the effect of putting more customer locations in areas with higher road density—i.e., more homes near a town grid and fewer along open rural roads. This approach is similar to the approach used in the Commission's Broadband Assessment Model, used during the National Broadband Plan, and to the approach used in the National Broadband Map (to estimate coverage in blocks greater than two square miles).

Question(s)

1) Is there any reason to deviate from CQBAT's approach? Are there any improvements to this approach that would be beneficial to incorporate?
2) An alternative approach is to determine customer locations by only using commercial data from GeoResults that provides actual and estimated customer locations. Does this approach offer any significant advantage over CQBAT's method?

Comments

- **Donald K. Stockdale, Jr.**

On behalf of the United States Telecom Association, AT&T, CenturyLink, Frontier Communications, Verizon, and Windstream Communications (collectively the ABC Coalition):

In the absence of actual geo-code data, the Coalition believes that the Bureau should adopt the methodology used by CQBAT for determining customer locations. CQBAT’s approach to determining customer locations, which is described in the CQBAT Model Description, essentially uses a combination of data sources to estimate residential and business customers by zip code and then distributes those customers randomly along the roads in the census block.

As the Bureau notes, the CQBAT model is “consistent with current best practice” and is an improvement over the HCPM. Moreover, CostQuest’s wireline models have been used in a variety of contested proceedings, including unbundled network element pricing proceedings, universal service proceedings, interconnection arbitrations, and ad valorem tax studies. These models, which use the same methodology for determining customer locations as the CQBAT model, have been filed and examined in numerous states, including Alabama, Georgia, South Carolina, Kentucky, Mississippi, Louisiana, Florida, Texas, California, Nevada, Missouri, Oklahoma, Kansas, Arkansas, Wisconsin, Michigan, Massachusetts, Iowa, Virginia, Delaware, Maryland and Wyoming. In addition, a CostQuest model was used to support the FCC’s National Broadband Plan. Given the extensive testing and acceptance of these CostQuest models and the customer location algorithm, it appears reasonable to adopt the approach taken in the CQBAT model.

- **Robin Tuttle, counsel for ACS**

Proponents of the CQBAT model have not enabled visibility into most of the underlying assumptions driving the model’s results. The loop length and customer location assumptions being used for particular areas – such as in the territories served by the ACS LECs – are prime examples. It is impossible to ascertain whether the model uses reasonable assumptions as to customer locations. However, because the CQBAT model as it is currently configured produces counter-intuitive results for companies serving insular areas such as the ACS LECs, the Commission cannot conclude that the model’s approach is reasonable.

Analysis of the currently available public version of the CQBAT model shows that projected support for Alaska would be reduced from current levels by 67%, while the majority of the remaining price cap carriers would receive significant increases. This disparity is indicative of the model’s inability to accurately estimate costs for insular areas. The model’s approach to customer locations is one of many reasons. For example, given that loop costs constitute a significant portion of broadband costs, the model’s flawed approach to customer location -- based on assumptions about road miles and random distribution of customers along roads according to road density -- causes the model to significantly understate broadband costs for Alaska. In many locations in Alaska, unserved customers live off the road system entirely. Further, using national average loop lengths is inappropriate in insular areas, where loop lengths and customer locations vary significantly.

Company-specific information is a better source for modeling customer locations, loop lengths, routing, transport mileage, plant type and plant quantities in insular areas. ACS is expanding its own broadband model to estimate actual, forward-looking “last mile” costs from each Central Office to each customer premise. The ACS approach will start with the actual location of customers in Alaska.

Customer location algorithms and data sources employed in any model should be subject to public examination and verification, to ensure that the model adopted is capable of accurately estimating all costs of deploying a broadband and voice-capable network in insular areas, as required by the CAF Order and the Communications Act.

ACS has not had an opportunity to evaluate the accuracy of GeoResults data for Alaska, but ACS is not aware of any commercially available source of customer locations in Alaska. Like the CQBAT approach, GeoResults relies on estimated rather than actual customer locations. For the reasons stated above, these results are unlikely to be accurate for Alaska. The use of estimated locations introduces the potential for error into the cost estimation process, making it all the more important to verify the results, especially as they apply to insular carriers.

Typically, national data sets fail to reflect customer locations or network configurations in insular areas such as Alaska. Any such data source should be tested against the realities on the ground, as it were. Unless the results are tested to ensure that the estimated costs reflect the unique circumstances faced by carriers in the locations in which they provide voice and broadband service, there is no way to discern whether an alternative approach corrects the flaws of the model as currently configured. Therefore, if an adopted model relies on any commercial data source, the data should be available to the public for review and validation.

- **Elizabeth Gray Nunez**

The Alaska Rural Coalition posts these abridged comments here in order to participate in the Commission's Virtual Workshop model. However, we refer the Commission and other interested parties to our complete comments on the Phase II Cost Model, which were filed today, November 19, 2012, in Docket Nos. 10-90 and 05-337.

The Commission seeks comment on whether there is any reason to deviate from the Phase II Cost Model's approach to determining high-cost support, and whether there are any improvements to this approach that would be beneficial to incorporate. The ARC remains concerned that the Phase II Cost Model will not provide a workable method of determining high-cost support for Alaska and other high-cost areas. The Phase II Cost Model was designed to reflect the status quo in the Lower 48, and accordingly does not account for the unique challenges of serving rural areas. Remote and rural areas differ so greatly in terrain, population and climate that it would be exceedingly difficult to create a forward-looking model that accurately captures all relevant and necessary information.

The cost model proposed by the ABC Coalition lacks essential data inputs reflecting the actual cost of constructing or maintaining networks in Alaska. The ARC agrees with ACS that application of that model to Alaska would result in results so inaccurate that they could profoundly undermine service to high-cost areas. The ACS cost model proposed in the alternative represents an improvement over the nationwide model proposed by the ABC Coalition. However, the ACS model still understates the actual cost of constructing and maintaining telecommunications infrastructure in Remote Alaska, and was designed for larger Price Cap carriers.

Applying the Phase II Cost Model to rural Rate of Return companies like the ARC members would further undermine the stability of high-cost support in rural areas. This would devastate the future of service in rural and remote areas by further diminishing support where it is needed most, particularly considering the Model's lack of accounting for the cost of building critical middle mile infrastructure. The ARC respectfully suggests that the Commission should reconsider using the Phase II Cost Model in its current form, and should refrain altogether from applying the Model to determine support levels and eligibility for Rate of Return carriers in remote and insular areas.

CLUSTERING

Background

Hybrid Cost Proxy Model: In developing the HCPM, the Commission concluded that a clustering algorithm should group customer locations into serving areas in an efficient manner to minimize costs while maintaining a specified level of network performance quality. Efficient clustering of customers leads to a least-cost and most-efficient network design that is consistent with forward-looking modeling principles.

The HCPM limits clusters by engineering constraints. It attempts to group customers so that they are no further away than allowed by network design, and so that no more customers are attached to a digital loop carrier remote terminal (DLC) than is permitted by network design. Initially, the model groups all customer locations into one cluster, then divides the cluster if one or more of the engineering constraints is violated. The model then uses several optimization routines that reassign certain customers to different clusters in order to lower the cost of constructing distribution areas.

CQBAT: The CQBAT model largely uses the same clustering approach as the HCPM, but uses road-based routing to determine the maximum size of the clusters. Thus, clusters defined by CQBAT are likely smaller but more realistic estimates of cluster size; by using road segments in clustering, CQBAT avoids the problem of having the length of some loops along roads exceed maximum loop length.

Question(s)

1) The approach taken by CQBAT appears to be appropriate. Is there any reason to deviate from this approach? Are there any incremental improvements that should be made to CQBAT's clustering approach?

Comments

- **Donald K. Stockdale, Jr.**

On behalf of the United States Telecom Association, AT&T, CenturyLink, Frontier Communications, Verizon, and Windstream Communications (collectively the ABC Coalition):

The Coalition believes that the CQBAT model's approach to clustering is appropriate, and there appears to be no reason to deviate from it. The CQBAT's clustering algorithm derives from the algorithm used in the HCPM, but it has been improved. In particular, as the Bureau notes, CQBAT "uses road-based routing to determine the maximum size of the clusters," which results in "more realistic estimates of cluster size."[1] The CQBAT clustering algorithm is substantially the same as that used in other CostQuest models that have been examined in numerous state proceedings. The Coalition knows of no reason to deviate from this approach.

- **Robin Tuttle, counsel for ACS**

There has been inadequate opportunity for analysis of the proposed clustering approach. ACS does not believe that the clustering approach in the CQBAT model, using road-based routing, could produce results that are realistic for Alaska, but ACS has had only limited ability to assess why this is so. CQBAT does not allow access to the actual clusters created, so ACS is not able to compare the locations grouped together by the model to the ACS LECs' actual network locations, and other factors unique to Alaska. It does appear that road-based routing inherently omits significant numbers of unserved customers who are not on the road system in Alaska. The bottom line is that any model adopted must reflect Alaska-specific factors.

ROUTING

Background

Hybrid Cost Proxy Model: The HCPM builds loop plant directly to customer locations via individual micro-grids. At the time the HCPM platform was adopted, micro-grids were hundreds of feet across. This approach allowed for an error of up to a few hundred feet in determining customer locations. The model defines customer "lots" within each micro-grid based on the customer population. The model allows for spanning-tree optimization of routes, although this is recommended only in sparsely populated locations. The feeder network is built on explicit spanning-tree algorithms, with user-defined inputs to select various approaches (e.g., airline v. rectilinear distance, allow artificial junction nodes).

CQBAT: The CQBAT model builds loop plant along road segments. It utilizes a spanning tree algorithm in order to find the optimal route (i.e., the lowest cost route) to serve all customer locations along road paths—a minimum spanning road tree.

Question(s)

1) The CQBAT model appears to use a reasonable approach for estimating the plant necessary to serve customer locations. Is there any reason to deviate from this approach? Are there any changes that should be made to this approach?
2) What additional information, if any, regarding the routing algorithm and outputs is necessary to understand the model's approach?

Comments

- **Donald K. Stockdale, Jr.**

On behalf of the United States Telecom Association, AT&T, CenturyLink, Frontier Communications, Verizon, and Windstream Communications (collectively the ABC Coalition):

As the Bureau notes, the CQBAT model builds plant along roads and uses a spanning tree algorithm to find the lowest cost route to serve all customers.[1] This approach is significantly more realistic than the approach taken by the HCPM. And it is identical to the routing algorithms CostQuest used in previous wireline models that were reviewed by multiple state regulatory agencies and in the model it developed for the National Broadband Plan.

We do not believe that additional information is needed to understand the model's approach to routing. But if other parties have questions, they should submit their questions to CostQuest.

- **Robin Tuttle, counsel for ACS**

No empirical evaluation or testing has been performed to determine if the CQBAT routing process is indeed appropriate. At this time the data from the model necessary to determine if, for example, the model provisions enough fiber and copper cables and electronic equipment to make broadband service available to all customer locations in Alaska is not available. Until such data is available at the CSA level and analyzed by interested parties to determine if the quantities of cable and equipment assumed in the model are sufficient there is no way to determine if the model's routing algorithms are reasonable. Further, based on the model's results for the ACS LECs, the approach used by the CQBAT does not produce reasonable cost estimates. As such, it is premature to conclude that model's approach to routing is reasonable and should be adopted.

The quantities of cable and equipment required under the model's estimations are not yet publically available. This makes it impossible to determine whether the algorithm accurately estimates the quantities of cable and electronics required to serve a given area. For example, if the model estimated total aerial and underground facilities for a given CSA of 100,000 feet, and the actual current network contains facilities footage of 1,000,000 feet, one would want to understand this difference in order to

evaluate whether the routing algorithm was accurately estimating quantities, and ultimately costs. Because the quantities used in the model are not available to the public, this cannot be done at this time.

CAPTURING VARIATION BY GEOGRAPHY

Background

Hybrid Cost Proxy Model: The HCPM varies costs by nine density zones. Many of the inputs are the same across multiple density zones, while others show more variation among lower-density zones. The model also varies installation costs by geologic conditions, like soil type.

CQBAT: The CQBAT model varies costs according to three density zones (urban, suburban, and rural). The model as submitted in the record does not specify how locations are assigned to those zones.

Question(s)

1) Would it be reasonable to adopt a model with three zones for variation? Is it possible to capture the variations among low-density zones in the HCPM using only three zones? What parameters should be used to divide locations among areas? To the extent commenters believe there is a value in having more than three zones, they should specify the zones the model should use, the parameters for each zone, and why such proposals would be more appropriate than the three-zone approach.
2) What kinds of costs vary by geography? How can the Bureau obtain the data required to capture such variation, and how can the Bureau validate those data?

Comments

- **Donald K. Stockdale, Jr.**

On behalf of the United States Telecom Association, AT&T, CenturyLink, Frontier Communications, Verizon, and Windstream Communications (collectively the ABC Coalition):

The primary driver of variations in cost among geographic areas is differences in customer-location density, which results in differences in the length (and cost) of distribution and feeder. The CQBAT model also adjusts certain model assumptions based on geographic density zone; adjusts certain input values (for labor and material costs) based on region, specifically at the zip-3 level; and adjusts other input values based on terrain characteristics.

Although CQBAT assumes only three density zones, in contrast to the nine density zones used in HCPM, the Coalition nevertheless believes that three zones provide for sufficient variation in model assumptions based on density. Upon examining the cost differences by density zone as determined by the HCPM, one finds that there is a significant difference between the costs estimates for zone 2 (5-100 lines per square mile) and those estimated for zone 3 (100-200 lines per square mile). This suggests that zones 1 (0-5 lines per square mile) and 2 represent the more rural, high cost areas. Zones 1 and 2 in the HCPM, which account for approximately 11 percent of total customer locations, correspond to zone 1 in the CQBAT model, though CQBAT's zone 1 includes a somewhat higher percentage of customer locations.

In both the HCPM and CQBAT models, the density zones affect assumptions concerning distribution plant mix, copper-feeder plant mix, fiber-feeder plant mix, fill factor, manhole spacing, and sharing. In the HCPM model, there is no variation or little variation in the assumptions for those variables for zones 1 and 2—the rural zones. For example, there is no variation in the assumptions for copper-feeder plant mix, fiber-feeder plant mix, and manhole spacing between zones 1 and 2. As for the inputs, where there is some difference between zones 1 and 2, those differences appear small. For example, for distribution plant mix, HCPM assumes zero percent underground, 60 percent buried, and 40 percent aerial for zone 1, compared with 1 percent underground, 62 percent buried, and 37 percent aerial for zone 2. And HCPM assumes 70 percent and 50 percent fill factors for distribution and feeder, respectively, for zone 1, while it assumes 77.5 percent and 55 percent for zone 2. Given these relatively small differences, it does not appear worth the time or effort to attempt to divide zone 1 in the CQBAT and CACM models into more than one zone.

There are several additional reasons why the coalition does not support further disaggregation of the three current density zones. First, attempting to create additional rural density zones would involve arbitrary line-drawing, would require the collection of additional detailed data, and would likely significantly delay implementation of the model. Second, the density zones affect a relatively limited number of model assumptions. Other important geographic variations in cost, such as for labor or materials costs, are captured through regional variation (at the zip-3 level) based on third-party sources. And as noted previously, the primary driver of geographic differences in cost is customer location density. Given the relatively small variations in assumptions resulting from subdividing the rural density zone under the HCPM, which the Coalition members believe to be no more accurate than those produced by CQBAT, and the other adjustments for geographical cost differences contained in the CQBAT model, the potential benefits in terms of slightly increased precision resulting from adding additional rural density zones do not outweigh the costs of delay.

- **Robin Tuttle, counsel for ACS**

CQBAT uses three zones based on population density (urban, suburban, rural) but three zones are not sufficient to capture the variation in costs between areas served by price cap LECs in the Lower 48 and areas served by the ACS LECs, judging from the results of the CQBAT model. The cost characteristics in the lowest-cost zone in the Lower 48 states would not even exist in Alaska, for example. No justification has been offered for choosing a smaller number of zones than the HCPM, which used nine density-based zones. Moreover, density is only one factor in determining how costs vary by geography. As discussed below, little (if any) analysis has been done to determine what costs vary by geography, or the appropriate number of zones for a national model, or whether zones should be density-based or differentiated based on other factors. More analysis therefore is required to determine the appropriate number of zones, and how to define the zones, for a reasonable national model. Access to customer and cost data and network configurations for individual companies and locations would be needed to gain a full understanding of the factors driving cost differences between locations. Until such further analysis can be completed, it would be premature to reach a conclusion about the appropriate number and definition of cost zones, except to conclude that, in a nationwide model, three zones are not sufficient to capture Alaska-specific variations.

To ACS's knowledge, no systematic analysis has been undertaken to determine what costs vary by geography. If CostQuest has undertaken such an analysis, the results cannot be validated based on the limited information released by CostQuest. For example, CostQuest offered no justification for basing its three-zone system exclusively on population density (urban, suburban, rural). Other factors that typically affect network costs, such as soil type, or proximity to a fiber ring, are overlooked entirely. This data is available from individual companies. As noted above, LEC customer and cost data, network configuration, and location information can be obtained and should be factored into any model that is intended to reflect cost variations by geography, as the CAF Phase II model is.

Validating the data used to establish cost zones for any model also will require extensive analysis. In the September FCC Cost Modeling Workshop, CostQuest mentioned that the results of its model have not been tested by outside sources other than to a limited degree with NECA data. Before adopting any model, the Bureau should require not only validation of the data required to capture the geographic variation in cost but also validation of all inputs, algorithms and results of the model.

INTER-OFFICE TRANSPORT COST

Background

Hybrid Cost Proxy Model: The HCPM sizes inter-office transport based on voice connections. The model assumes the use of state-of-the-art SONET rings. The Commission concluded there should be an allocation of a reasonable portion of the joint and common costs of the switching and inter-office functions to the cost of providing the supported services, i.e., voice telephony. Moreover, the model uses the Local Exchange Routing Guide (LERG) database to determine host-remote relationships.

CQBAT: The CQBAT model uses a tandem switch—central office switch relationship to determine which central offices tie to which aggregation points. This information comes from the LERG database. The model assumes Ethernet-based fiber connections among wire centers and between wire centers and tandem switches, including the use of reconfigurable optical add-drop multiplexers (ROADMs) and wave division multiplexing (WDM) gateways. Additionally, the model connects each hierarchy to the nearest (lowest cost) Internet access point regardless of ownership. The CQBAT model also uses routing along roads to determine the cost of deploying fiber to make connections, and includes Broadband Remote Access Servers (BRAS) and/or gateway costs.

Question(s)

1) How much of the cost of deploying fiber to provide inter-office transport should be allocated to the end-users being modeled (e.g., special access and Ethernet services)?
2) The approach that CQBAT uses for inter-office transport cost is similar to what was used for the National Broadband Plan.
    - If we adopt a green-field model, this appears to be a reasonable approach. Is there any reason to deviate from CQBAT's approach to modeling inter-office transport? Should any modifications be made?
    - If we adopt a brown-field model, what approach should be used? What should be presumed to already exist? What proportion of such costs would be appropriate to include?

Comments

- **Donald K. Stockdale, Jr.**

On behalf of the United States Telecom Association, AT&T, CenturyLink, Frontier Communications, Verizon, and Windstream Communications (collectively the ABC Coalition):

The CQBAT model constructs a fiber-based middle mile network to estimate inter-office transport costs.[1] The model assigns only a portion of these inter-office costs to the modeled broadband services, on the assumption that the transport network is built for multiple purposes, including supported broadband services. For example, by default, CQBAT assigns 50 percent of the costs associated with the middle mile network to supported broadband services.

The Coalition believes that CQBAT's approach to modeling inter-office transport costs is reasonable for a green-field model and does not require modification. If the Bureau decides to adopt a brown-field model, however, then significant modifications will be required. Under a brown-field model, one would need to know the location and nature of the existing inter-office infrastructure and how much traffic is currently being carried over that infrastructure. One would then need to identify where the existing network is likely to be insufficient for future traffic demands (e.g., if certain wire centers are connected by inter-office copper cable rather than inter-office fiber) and then add all necessary forward-looking components, including possibly additional fiber or electronics, to ensure that there is sufficient capacity for expected traffic demands. Under a brown-field approach, it would not be sufficient to assume either that no inter-

office network exists or alternatively that the existing inter-office is adequate and does not need to be augmented, since this can distort the relative brown-field costs between different areas.

- **Robin Tuttle, counsel for ACS**

What portion of inter-office transport cost should be included in the costs to be supported by CAF is not a question that may be answered without the benefit of extensive analysis. If the cost of fiber in the interoffice network must be allocated in some way, the allocation should be based on a thorough estimate of the relative volume of supported and unsupported applications that are expected to use the network, as well as the relative cost of service to supported versus unsupported end-user locations. Unfortunately, this becomes more difficult as commercial users increasingly purchase a level of bandwidth availability, rather than specific services. Moreover, such a cost allocation would require analysis of both fixed and variable costs, fill rates, and other location-specific and carrier-specific factors. At this point, no such analysis has been performed, so it would be premature and arbitrary to hazard a guess as to the appropriate allocation amount. It is not clear, however, that any portion of inter-office transport costs should be allocated to non-supported services. Inter-office transport is required to provide voice and broadband services as required by the Commission, even if other services may make use of the transport; without being fully supported, the network would not be built, and supported services would not be available. One might also conclude that, because total CAF Phase II support is capped, and carriers will be expected to recover from end-users the first $80 of cost or thereabouts, a portion of transport costs already has been allocated to non-supported services

In several respects, the CQBAT model underestimates the cost of inter-office transport in Alaska. For example, the CQBAT assumption of transport to an Internet access location at a regional tandem within the same LATA does not fit the real world situation of the ACS LECs, for whom the nearest peering location is thousands of miles away and reached via undersea cable. As another example, transport from many wire centers in the Alaska bush to aggregation points in Anchorage, Fairbanks or Juneau may require hundreds of miles of fiber or even a satellite hop, greatly increasing the cost of inter-office transport. In order for any model to accurately capture the inter-office transport costs incurred in Alaska, modifications must be made to incorporate these unique circumstances.

ACS believes a greenfield approach will be more feasible as well as more accurate than a brownfield approach. However, should a brown-field approach be adopted, the model must assess, on a carrier by carrier basis, the quantity and quality of broadband-capable plant that already exists. While the level of analysis required to make these determinations may prove to be difficult, it is the only way to accurately estimate the costs associated with construction of a network capable of voice and broadband services, and thereby result in a fair distribution of funding.

- **Dave Burstein**

I've written about broadband since 1999 and authored a book on DSL.

The cost to calculate subsidy should be the marginal cost of the upgrades needed to deliver the additional bandwidth, plus whatever the Commission decides should be included as profit. Anything else is ripping off the taxpayer.

Nearly every exchange at the major carriers was fibered years ago, mostly in the last century. So the fiber itself has been highly amortized and very little "fiber" cost belongs in the subsidy model. On the other hand, equipment to light more fiber and increase capacity may be required. Fortunately, this is very inexpensive.

The industry standard figure for the cost of adding bandwidth for a broadband subscriber is about $1/month, assuming fiber is already in place. THis has remained roughly constant for nearly a decade, as price reductions in the gear have gone down about as quickly as customer bandwidth has gone up. Since the previously unserved by broadband typically are in smaller exchanges, this price might be somewhat higher. But any figure that amounts to more than $1-4/month per subscriber on an already fibered route is typically based on inappropriate assumptions.

Any cost model for traffic that comes to more than $2-4/month in a large carrier where new fiber is unneeded should be thrown out unless specific site based costs are proven. That includes almost anywhere on the Verizon, AT&T, or CenturyLink nework.

Smaller, typically rate of return, carriers have very different costs in some cases. I address that elsewhere.

In particular, the numbers coming out of CGBAT are "a fiction worthy of James Bond" according to Pennsylvania Commissioner Jim Cawley as well as my data.

CGBAT is paid for by the telcos collecting the subsidy. If they aren't stupid, they will slant it to increase the subsidy. The leaders of the large telcos aren't stupid, so CGBAT needs to be assumed to be biased in their direction. Here's my reporting: http://fastnetnews.com/policy/...

Cawley: Big Telco ABC Plan "Fiction Worthy Of James Bond"Saturday, 06 August 2011 14:41Pennslyvania Commissioner Jim Cawley calls the Big Telco ABC plan "Beyond outrageous. It has nothing for customers except higher bills. It would raise local rates as well as the SLIC and is a one sided deal" The heart of the Big Telco Plan is a claim they are massively losing money on rural lines they have in place. It's backed up by "model" they refuse to release. The "model" is obvious nonsense for existing lines, while contradicting the AT&T filings in the T-Mobile merger, numerous Verizon statements, and common sense. Cawley, the lead state commissioner on the FCC Joint Board, recognizes "No responsible regulator would use this data until they release the actual model. It is fiction worthy of James Bond." He adds "We are going to have failed rural carriers and massive consolidation. There will be a major job loss in rural areas." Nebraska Commissioner Anne Boyle said it like it is. "A lot of state regulators agree this isn't right. The Plan has no cost analysis. Industry does not have the right to take advantage." We were at the Montana State Telecom Association meeting, which reaches out for diverse opinions. AT&T's Hulquist spoke as well. He didn't respond directly but instead simply described the plan as presented. He said that T would be open to a compromise that reduces the $2.2B the Big Telco expect to collect. Back in D.C. Hultquist and a high-powered 12 person team urged the FCC to put conditions on access to the data, including non-disclosure and high costs to access. When I got a chance for questions, I asked Hank and Jeff Lindsey of CenturyTel about what U-Verse and Century's expanding IP TV might bring to Montana. "We're kicking cable's butt and are the fastest growing IPTV provider. Cable is losing." Jeff added "I'm a U-Verse customer. It beats cable hands down." Bell Canada is similarly taking customers from Videotron Cable in Quebec. Microsoft Mediaroom is doing very well for T & Bell Canada.

- **Steve Rosenberg**

Thanks for your post. We sought comment on a number of the issues you raise here and in the Public Notice we issued last summer.
Steve Rosenberg
Chief Data Officer, WCB

VOICE CAPABILITY

Background

USF/ICC Transformation Order: The Commission determined that "voice telephony service" is the service supported by federal high-cost universal service support. All recipients must offer voice telephony service. In addition, as a condition of receiving support, all recipients must offer broadband service.

Hybrid Cost Proxy Model: The HCPM is a voice-based model. The model assumes a maximum loop length of 18,000 feet. The Commission decided at the time not to accommodate high-bandwidth advanced services by adopting a short loop length; the Commission concluded it did not make sense to burden the Universal Service Fund with the cost of delivering advanced services, i.e. broadband, when only a small portion of customers subscribed to such services. The Commission initially concluded that the model should be capable of separately identifying host, remote, and stand-alone switches and of distributing the savings associated with lower-cost remote switches among all lines in a given host-remote relationship. The Commission later decided, after no party had submitted an algorithm that could determine whether a wire center should house a particular type of switch, that use of the Local Exchange Routing Guide (LERG) was the most feasible alternative currently available to incorporate the efficiencies of host-remote relationships in the federal high-cost universal support mechanism. The HCPM also provides for the allocation of a reasonable portion of the joint and common costs of the switching and inter-office functions to the cost of providing the supported services and explicitly models the cost of signaling.

The CQBAT model does not explicitly model the cost of voice.

Question(s)

Because voice telephony service is the supported service, the model must calculate the cost of a network that can provide voice. The Bureau seeks comment on the following proposals:

1) If we adopt a green-field model, the Bureau proposes to calculate the cost of voice telephony service with the following:
    - One softswitch per market
        - How should we define the market? One softswitch per state?
        - Should we model this as a fixed cost, or a fixed cost and some variable or wholly variable?
    - Some type of signaling system
        - What type of signaling system should the model use? (e.g., Signaling System 7 (SS7), Session Initiation Protocol (SIP))
    - Backup power
        - Should the model provide for backup power in the central offices?
        - Should the model provide for batteries in the customer premises equipment if using fiber-to-the-premises (FTTP)?
2) If we adopt a brown-field model, the Bureau proposes that it would only need to capture the cost of operating and maintaining a network that can provide voice telephony service; it would not need to include any capex for a voice network. Would the most straightforward option be to calculate the total cost of providing voice as in a green-field case and remove the capex from the calculation?

Comments

- ## Donald K. Stockdale, Jr.

On behalf of the United States Telecom Association, AT&T, CenturyLink, Frontier Communications, Verizon, and Windstream Communications (collectively the ABC Coalition):

The Coalition agrees with the Bureau that it makes sense to include voice capability in the model if voice is a supported service. However, because carriers are in many cases just beginning to convert their circuit-switched voice networks to VOIP networks, it is not surprising that they are adopting a variety of strategies, including as to where they install soft-switches and how many switches they install.

With respect to switching, the coalition believes a reasonable approach would be to assume that a carrier installs one soft-switch per state, as the Bureau proposed. Both commercial and back-up power would also need to be added. With respect to signaling, the Coalition believes that the model should employ Session Initiation Protocol ("SIP"), since SS7 is a legacy of the circuit-switched world that would not be installed in a network built today. Backup power would have to be added at the customer premises if the Bureau models a FTTD architecture, but it should already be included under the FTTP option in CQBAT.

As the Coalition has previously explained, we find a brown-field approach to be unacceptable for legal, policy, and practical reasons. In addition, the Coalition finds the Bureau's proposal for estimating the cost of adding voice service in a brown-field model to be inadequate and unacceptable. The Bureau proposes to calculate the total cost of providing VOIP as in the green-field case and then to remove the capex from the calculation. By refusing to allow any capital expense for voice service, the Bureau implicitly assumes that carriers will retain their circuit-switched voice equipment. But, under this approach, one should at least include the operating cost associated with providing voice via a circuit-switched network, which is higher than the operating costs associated with VOIP. But the Bureau does not do so; rather, its approach would only estimate the much lower expected operating expense associated with VOIP service.

The proposed approach therefore is wrong on two grounds. First, as carriers are upgrading their networks to broadband, many are simultaneously transitioning from providing circuit-switched telephony service to providing VOIP. This requires that carriers incur certain capital expenditures, such as a soft-switch and possibly new signaling equipment, which should be considered. And for carriers that decide to retain their circuit-switched equipment, the model should estimate the operating expense of a circuit-switched network. But the Bureau's approach neither makes any allowance for capital expense nor properly considers the operating expense associated with a circuit-switched network. If anything, the Bureau's proposal provides another illustration of how the brown-field approach systematically and significantly underestimates the cost of providing broadband service, including voice.

Finally, according to the Bureau's December 11, 2012 Public Notice, the CACM has added voice capability. Unfortunately, because the Bureau has yet to provide any documentation describing how voice capability was implemented in the CACM, the Coalition is unable to comment on the CACM's approach to modeling voice.

- ## Robin Tuttle, counsel for ACS

Assuming one soft-switch per market may make sense in some parts of the nation, but not in Alaska, for several reasons. First, in many Alaska bush locations, the LEC serving areas themselves are insular, isolated from other LEC serving areas and inter-office transport or any other facilities owned by the LEC. Currently, providers of backhaul transport charge ACS and its customers for each non-local call. With a single soft-switch, where all traffic would require backhaul to the location of the switch, the transport costs would be unworkable. Second, calculating support based on a single soft-switch per market would compound latency problems inherent in satellite transport, already a factor in voice communications in rural Alaska. Third, state regulations preclude LEC changes to the first point of switching without prior state approval. These are but a few examples of the unique characteristics of providing voice and broadband services in Alaska, where local networks are separated by thousands of miles of transport, much of it satellite-dependent at this time, that have not been included in a nationwide model.

Universal Service funding should be based on the total cost, including all capital expenditures, of building as well as operating and maintaining a network that can handle all supported services, including voice as well as broadband. It would be unreasonable to conclude that LECs in high-cost areas will incur no capita expense to build voice networks; the costs of operating and maintaining voice networks are not the only costs that must be recovered. In fact, the ACS LECs today are facing certain obsolescence of their rural central office equipment: their current voice switches in a number of rural locations will no longer be supported by the manufacturer, and therefore will be more susceptible to failure. Absent sufficient support dollars, these switches may not be replaced with more modern technology. Voice capex costs thus should not be removed from the calculation as proposed by the Bureau.

WIRE CENTER FACILITIES

Background

The Bureau believes most of the hardware necessary in each wire center is captured by the requirements for voice or inter-office transport.

Hybrid Cost Proxy Model: The HCPM envisions a network that requires a circuit switch for voice calls, digital loop carriers (DLCs), and serving area interfaces (SAIs). The HCPM also includes the costs associated with the main distribution frame (MDF), the purchase and installation of power equipment costs, and appropriate engineering costs.

CQBAT: The CQBAT model includes costs for an all-IP network, including routers, Ethernet switches, and rack space, in addition to costs for buildings, land, and power. For fiber-to-the-premises (FTTP) configurations, the cost of optical line terminators (OLTs) is also included.

Question(s)

1) If we adopt a green-field model, the Bureau proposes to use the CQBAT cost categories. Is there any reason to deviate from CQBAT's approach? Are there other categories that should be added, or some categories that should not be included in a forward-looking cost model?
2) If we adopt a brown-field model, what costs should be removed or added?

Comments

- **Donald K. Stockdale, Jr.**

On behalf of the United States Telecom Association, AT&T, CenturyLink, Frontier Communications, Verizon, and Windstream Communications (collectively the ABC Coalition):

As the Bureau notes, the CQBAT model “includes costs for an all IP network, including routers, Ethernet switches, and rack space, in addition to buildings, land, and power.” And, if it adopts a green-field approach, it proposes to adopt the cost categories used in the CQBAT model. The Coalition generally agrees with this approach, though, if the Bureau decides to model voice service, it may need to create additional cost categories to reflect the equipment necessary for the provision of voice. Because of a lack of documentation, we cannot comment on any new cost categories that may have been added to the CACM to reflect the cost of installing VOIP equipment.

As previously indicated, the coalition opposes the use of a brown-field model. And, for the reasons previously explained, we find it unrealistic and unjustified to simply eliminate broad categories of capital expense based on broad-sweeping assumptions about the adequacy of the existing network.

- **Robin Tuttle, counsel for ACS**

A forward-looking network cost model should reflect the most efficient technology current available and include all equipment and facilities necessary to provide broadband service and all supported applications. ACS agrees that CQBAT’s inclusion of routers, Ethernet switches, etc., is appropriate in the case of a voice/broadband capable network. However, additional wire center facilities costs also must be included, such as, building space, power, support equipment, etc.

To the extent that carriers have already deployed routers, Ethernet switches and other equipment necessary to operate a voice/broadband capable network, and recovered the associated capital costs, such equipment would not be included in the supported cost under a brown-field approach. However, the model must accurately assess what facilities are already in place and what additional equipment would be required to meet the Commission’s standards, and therefore accounted for in the model. This will require extensive carrier-by-carrier analyses to first determine the types and quantities of existing equipment and facilities and second to determine the quantities of additional equipment required.

A brown-field approach will require the modeled networks to vary by carrier. Should one carrier currently provide broadband service using a certain technology, the most efficient course may well be to support the build-out to the remaining locations using the same or similar technology. Another carrier may be following a different path and therefore may require funding for a different technology.

SIZING OF NETWORK FACILITIES

Background

Hybrid Cost Proxy Model: The HCPM is built for a narrow-band network. Network sizing in the HCPM is a matter of ensuring sufficient capacity to handle voice calls and provide appropriate levels of call blocking (e.g., using an Erlang model, which is used in telephony as a measure of offered load or carried load on service-providing elements such as telephone circuits or telephone switching equipment).

CQBAT: The CQBAT model sizes the network according to the digital throughput required at the time of peak usage based on a busy-hour offered load. This method is basically the same approach that was taken in the National Broadband Plan modeling.

Question(s)

1) The general approach to network sizing taken by the CQBAT model appears to be reasonable (deferring the discussion about what value or values are appropriate until later). Is there any reason to deviate from CQBAT's approach? Are there other ways to properly dimension a network that the Connect America Phase II model should use instead?

Comments

- **Donald K. Stockdale, Jr.**

On behalf of the United States Telecom Association, AT&T, CenturyLink, Frontier Communications, Verizon, and Windstream Communications (collectively the ABC Coalition):

In the Virtual Workshop, the Bureau explained that the “CQBAT model sizes the network according to the digital throughput required at the time of peak usage based on a busy-hour offered load,” and it noted that this was essentially the same approach taken in the National Broadband Plan modeling.[1] We agree with the Bureau’s view that the general approach to network sizing taken by CQBAT is reasonable and do not believe there is any reason to deviate from it. The Coalition notes, however, that, if voice capability is added to the model, the peak load demands associated with voice service should be included in the sizing calculations, though we do not expect that this incremental demand should have a significant impact.

- **Robin Tuttle, counsel for ACS**

Since the publically available documentation does not include network sizing data, it is not possible to determine how these data are used in the model or the sensitivity of results to changes in both the values of the input and how they are used. However, there is no assurance that any carrier-specific or location-specific factors were taken into account in the model. For example, the CQBAT model contains an input sheet indicating that data services require bandwidth of “.44.” There is no additional information given beyond that number. This appears to be a constant applied to all carriers. The use of a constant value does not suggest that the unique conditions found in insular areas are accounted for in the model.

Further, network engineers size network facilities based on the number of customers and oversubscription assumptions, and therefore oversubscription is an appropriate variable to include. An oversubscription assumption allows network engineers to estimate the required network capacity given a specific number of customers. While the basis for the oversubscription assumptions includes busy-hour throughput requirements, it would be extremely helpful in evaluating the CQBAT model to know, first, what the throughput values are, the model’s sensitivity to changes in the values, and the corresponding oversubscription assumptions.

THE USE OF COMPANY-SPECIFIC VALUES

Background

Hybrid Cost Proxy Model: The Commission determined that nationwide default values were generally more appropriate than company-specific values. Accordingly, the HCPM uses nationwide average values for estimating plant-specific operations expenses. The Commission found that averages, rather than company-specific data, are better predictors of the forward-looking costs that should be supported by the federal high-cost mechanism. The Commission also determined that the use of nationwide averages would reward efficient companies and provide the proper incentives to inefficient companies to become more efficient over time, and that this reward system would drive the national average toward the cost that the competitive firm could achieve.

CQBAT: While the CQBAT model also does not use company-specific values to predict forward-looking costs, it does use regional cost adjustment factors to capture variation in labor and materials costs by three-digit ZIP codes.

Question(s)

1) The CQBAT approach of using nationwide average values with regional adjustments to capture labor and materials cost variation appears to be reasonable and appropriate. Is there any reason to deviate from CQBAT's approach? Are there any modifications that should be made to this approach?

Comments

- **Donald K. Stockdale, Jr.**

On behalf of the United States Telecom Association, AT&T, CenturyLink, Frontier Communications, Verizon, and Windstream Communications (collectively the ABC Coalition):

In the Universal Service Tenth Report and Order, the Commission generally adopted nationwide, rather than company-specific, input values for the HCPM. It provided two basic reasons for doing so. First, it found that nationwide values, rather than company-specific values, were more appropriate because the universal service support mechanism is “based on the estimated costs that an efficient carrier would incur to provide the supported services, rather than on the specific carrier’s book costs.” Second, it concluded that “it would be administratively unworkable to use company-specific values in the federal nationwide model.” At the same time, however, the Commission recognized the desirability of having data that accurately and objectively reflect “variations in forward-looking costs based on objective criteria,” and it stated that it was open to additional modifications of inputs in the future. As an example, it noted that it did “not adjust [the] maintenance expense estimates to reflect regional wage differences . . . because we have not found and no party has suggested a specific data source or methodology that would be useful in making such adjustments.”

Consistent with the Tenth Report and Order, the CQBAT model does not use company-specific inputs, though it does adjust for regional differences in labor/materials costs, based on objective third-party data.

The Coalition agrees with the Bureau that CQBAT’s approach of using regional adjustments to capture labor and materials costs is reasonable, and we do not see any reason to deviate from this approach. The Coalition further believes that the Bureau should not use company-specific input values. First, gathering company-specific data would be extremely complicated. For example, carriers are increasingly employing contractors as well as full-time employees. When considering labor costs, would one consider only the cost of full-time employees or also contractors, and if the latter, how would one choose among contractors charging different hourly rates? Second, gathering such data would take a significant amount of time and unnecessarily delay implementation of the model. Finally, as the Commission recognized over a decade ago, using company-specific data would not necessarily be consistent with the principle of estimating the forward-looking costs of an efficient provider.

- **Robin Tuttle, counsel for ACS**

The Commission has recognized that insular areas are different from the Lower 48 states. The use of nationwide average values clearly is not intended in the case of insular areas such as Alaska. Therefore, the use of nationwide inputs is unjustifiable on its face. The results from the current version of the CQBAT model underscore that using nationwide inputs for insular areas is problematic. Until such time as the results for insular areas are explained or corrected, nationwide values should not be used for ACS. As part of any forward-looking modeling approach for insular areas, choosing alternative inputs would require analysis to empirically show that the selected inputs do in fact lead to accurate estimates of broadband costs. Thus, any modeling approach adopted for Alaska must be based on assumptions, algorithms and inputs that have been empirically shown to accurately estimate the cost to provide broadband service in Alaska. Only if this condition is met will a model be in compliance with the Commission requirement that the unique circumstances of insular areas be taken into account.

CALCULATING OPEX

Background

Hybrid Cost Proxy Model: The HCPM takes various approaches to calculating operating expenses. For plant-specific expenses, the HCPM adopted a four-step methodology for estimating expense-to-investment ratios using revised current-to-book ratios and ARMIS data from 1997 and 1998. In other words, plant-specific opex was derived from capex figures. The HCPM calculates corporate operations, customer service, and plant non-specific costs on a per-line basis, using ARMIS data. The model uses a regression to determine the portion of expenses attributable to the supported services (e.g., excluding special access, toll minutes, with additional adjustments as needed (e.g., removing non-supported expenses)). These calculations are made on a per-subscriber basis and assume a subscription base that is stable (or even growing). The HCPM calculates costs associated with local number portability (LNP) on a per-line basis. Costs for general support facilities (buildings, motor vehicles, and general purpose computers) are calculated as a ratio to total plant in service (TPIS), and then reduced to account for the fact that such facilities are shared among supported and non-supported services.

CQBAT: The CQBAT model calculates plant-specific expenses similarly to the HCPM by calculating plant-specific opex as a ratio to capex. However, instead of ARMIS data, CQBAT uses company average figures for plant and plant-specific operating expenses from third-party data sources like the National Exchange Carrier Association (NECA) to run a regression that determines weighting factors and the impact of scale using national averages, which appears to be a reasonable approach. CQBAT has five size categories to capture the impact of scale. To calculate plant non-specific expenses, general and administrative expenses, and overhead, the model determines weightings to plant or customers based on regression of data from third party data sources. In each case, CQBAT used data provided by ABC Coalition companies to validate the regressions. We note that only the model inputs are publicly available at this time; neither the underlying source data nor the regressions have been placed into the record.

Question(s)

1) Is there any reason to deviate from CQBAT's approach to calculating opex?
2) CQBAT does not appear to capture the cost of transport, because it assumes that all price-cap carriers benefit from tier one peering arrangements. Is this an appropriate assumption? If not, what cost should be assumed for the cost of transmitting data to and from the internet?

Comments

- **Donald K. Stockdale, Jr.**

On behalf of the United States Telecom Association, AT&T, CenturyLink, Frontier Communications, Verizon, and Windstream Communications (collectively the ABC Coalition):

As the Bureau observes, CQBAT, like HCIPM, calculates plant-specific expenses as a ratio to capex. The Bureau states that, instead of using ARMIS data, CQBAT uses NECA data as well as data from the ABC Coalition companies for plant and plant-specific expenses, which are further broken down by size of company. CQBAT then runs a regression to determine weighting factors and the impact of scale. To calculate non-plant-specific expenses, general and administrative expenses, and overhead, CQBAT uses data from third party sources and the Coalition members. It then uses averages and results from the regression models to develop factors that capture the impact of scale. The Coalition believes that the CQBAT approach is reasonable and that there is no reason to deviate from it.

CQBAT also calculates and includes the cost of transporting data to an edge router at an Internet peering point. It assumes, however, that all price-cap carriers benefit from tier-one peering arrangements with Internet peering points within the state or serving area. The Coalition recognizes that modifications to the model may be necessary to address out-of-state Internet interconnection points and interconnection arrangements that are not Tier 1 peering arrangements, since these may result in higher transport costs per location. The Coalition further recognizes that the necessary inputs to reflect these additional costs

may be unique to a particular geography, study area, or state. The Coalition believes that an opex input could be added to the model, which could be invoked where a carrier demonstrates the existing model fails adequately to capture these additional costs.

- **Robin Tuttle, counsel for ACS**

The model assumes that forward-looking network operating expenses will be calculated as the ratio of expense to investment. CQBAT uses company average figures for plant and plant-specific operating expenses from third-party (NECA) data to run a regression that determines weighting factors and the impact of scale using national averages.

However, the regression is not publically available, so it is impossible to validate the results. Nor is the detailed methodology used to develop the factors available. The only public information provided has been the summary discussion found in the CostQuest presentation at the September 2012 workshop. ACS is concerned about the lack of transparency in this methodology. Moreover, the use of national averages is not a legitimate way to validate the CQBAT results. As noted elsewhere, use of national average data in no way ensures that the results for Alaska or other insular areas will be accurate. Any model adopted should reflect variations between carriers and even within a single carrier's different service areas.

ACS has demonstrated through the filing of its cost model that the costs of transporting Internet traffic from Alaska to the nearest peering location is not included in the CQBAT model, and is significant for the ACS LECs. ACS believes that, for Alaska, it would be most appropriate to use the costs estimated in the ACS model.

DETERMINING THE ANNUALIZED COST OF CAPITAL INVESTMENTS

Background

Hybrid Cost Proxy Model: The HCPM adopts a straight line equal-life-group method of depreciation, using Gomerpertz-Makeham curves. These standard curves describe generalized mortality patterns and are used to determine the probable frequency of plant mortality. To estimate depreciation expenses, the HCPM uses the projected lives and future net salvage percentages for the asset accounts in Part 32 of the Commission's rules. The HCPM also selects a particular set of Annual Charge Factors (ACFs) based on a methodology that is user adjustable and reflects the sum for the three inputs: depreciation, cost of capital, and maintenance costs.

CQBAT: The CQBAT model uses the same approach as the HCPM. It adopts a straight-line equal-life-group method with expected mortality curves. The lifetimes are also set by the HCPM's values. The Bureau notes that the CQBAT model as submitted in the record does not make public the calculations used to set particular input values in the event a lifetime changes.

Question(s)

1) Some of the HCPM values (which also are used by the CQBAT model) may no longer be appropriate (e.g., a 9-year lifetime for a DSLAM). Which, if any, of the projected lives used in the HCPM are outdated and should be modified? If so, what specific modifications would you recommend, and what is the rationale for such change? What additional evidence, if any, would be needed to justify such changes?

Comments

- **Donald K. Stockdale, Jr.**

On behalf of the United States Telecom Association, AT&T, CenturyLink, Frontier Communications, Verizon, and Windstream Communications (collectively the ABC Coalition):

CQBAT uses the same economic lives that the Commission adopted for the HCPM. In the Virtual Workshop, the Bureau suggests that some of these economic lives may be outdated, and it asks which specific values are outdated and what specific modifications should be.

The Coalition recommends against attempting to modify these economic lives. First, these economic lives were approved by the Commission and have been used in the HCPM model, by state public utility commissions in UNE pricing proceedings, and in previous versions of CostQuest models. Second, it would be enormously complicated, burdensome, and time-consuming to attempt to establish new values now, and doing so would delay implementation of the model possibly for years. Third, to the extent that the Bureau believes that economic lives need to be modified, this is not the appropriate forum in which to do so. Since economic lives and regulatory depreciation have implications that extend beyond the CAF Phase II proceeding, the Commission, if it wishes to review existing economic lives, should initiate a new rulemaking proceeding to consider its rules governing regulatory depreciation in general and economic lives in particular. Fourth, the coalition believes that, to the extent that existing economic lives are inaccurate, they tend to overstate the actual economic lives today. For example, the most significant changes that have occurred in network equipment have occurred in circuit equipment, where lives have shortened. To the extent the Commission’s current economic lives are too long, this simply results in a slight, but consistent, understatement in costs, not an overstatement. Finally, the Coalition notes that support under CAF Phase II will be provided for only five years, which is significantly shorter than the economic lives at issue. Given this time horizon, it does not seem worth the expense or delay of updating the economic lives assumptions.

- **Robin Tuttle, counsel for ACS**

The safe harbor depreciation ranges are in need of updating, particularly in light of the five-year time frame for support under CAF II. The asset lives previously adopted by the Commission in 1994 and 1998 are outmoded and too long by several measures. For example, IRS MACRS rates are shorter. Moreover, if support is limited to five years, asset lives should be assumed to be no longer than five years, because ETCs will be compelled to recover their investment in that time frame.

DETERMINING THE SHARING FACTOR FOR OUTSIDE PLANT

Background

The sharing factor represents the extent to which outside plant costs are shared among multiple providers, typically local exchange carriers, cable companies, and electric utilities.

Hybrid Cost Proxy Model: The HCPM assigns the following sharing factors to local exchange carriers:

- Aerial Structure
  - Zones 1-6 (0<x<2550 lines per square mile): 50%
  - Zones 7-9 (>= 2550 lines per square mile): 35%
- Underground and Buried Structure
  - Zones 1-2: 100%
  - Zone 3: 85%
  - Zones 4-6: 65%
  - Zones 7-9: 55%

CQBAT: The CQBAT model varies sharing factors not only by aerial, buried, and underground plant, but also among structure, feeder and distribution cabling, and middle mile. The model also provides different sharing factors in some instances for the rural, suburban, and urban categories:

Structure Sharing

Density	% of cost attributed to studied carrier		
	Aerial	Buried	Underground
Rural	0.48	0.96	0.96
Suburban	0.48	0.80	0.80
Urban	0.48	0.76	0.76

Between Distribution and Feeder

Density	% of common route that shares structure		
	Aerial	Buried	Underground
Rural	0.78	0.41	0.67
Suburban	0.78	0.41	0.67
Urban	0.78	0.41	0.67

Unique Inter-Office/Middle Mile

Density	% of route that is dedicated structure

	Aerial	Buried	Underground
Rural	0.37	0.71	0.26
Suburban	0.22	0.64	0.19
Urban	0.14	0.56	0.11

Question(s)

1) Is there any reason to deviate from the CQBAT model's approach of breaking out structure inputs from cable inputs? Should the input values for each category be adopted without any modification?

2) Should the Bureau assume three providers are sharing outside plant costs in any area where the SBI data set suggests there is a cable operator (i.e., the price cap carrier, electric company, and cable provider operate in that area)? Should this vary by aerial, buried, and underground plant? Note that areas with cable broadband are not eligible for support, but there will likely be cabling to unserved areas that passes through areas with cable facilities.

3) What are the appropriate assumptions regarding sharing if the Bureau were to adopt a brown-field (DSL) model? Is it appropriate to assume that sharing will occur given that the model would assume that only limited network build-out occurs during a relatively short time horizon? Is it appropriate to assume that sharing with cable operators and electric companies would occur when a brown-field model would only assume build-out between the central office and a DSLAM? It may be that each of these differences will decrease the likelihood of sharing with cable or electric companies. Would it be appropriate to provide for sharing just for aerial cable?

Comments

- **Donald K. Stockdale, Jr.**

On behalf of the United States Telecom Association, AT&T, CenturyLink, Frontier Communications, Verizon, and Windstream Communications (collectively the ABC Coalition):

The sharing factor represents the extent to which certain outside plant costs, such as the costs of poles or conduit, are shared among multiple providers, such as local exchange carriers, electric utilities, and cable companies (to the extent that the cable network reaches a particular geographic area). In the CQBAT model, the sharing factors vary depending on whether the outside plant is aerial, buried, or underground, and on whether the plant is used for feeder, distribution, or middle mile. The sharing factors also vary with the three density zones used in CQBAT.

The Coalition believes that CQBAT's approach to sharing is reasonable and that there is no reason to deviate from it. Nor do we think that there is any need to modify specific input values for sharing factors. We note that the sharing factors used in CQBAT are very close to those used by the HCPM.

In the Virtual Workshop, the Bureau asks (1) whether the Bureau should assume that "three providers are sharing plant in any area where the SBI data set suggests that there is a cable operator," and (2) whether this assumption should vary depending on whether the outside plant is aerial, buried or underground. The Coalition believes that this proposal is unnecessary and ill-advised for several reasons. First, the CQBAT sharing factors already account for the presence of cable companies, as well as electric utilities, by adjusting sharing factors by density zone in a manner similar to that used in HCPM. Second, the assumption that there are always three providers in areas where there is a cable operator may be incorrect. For example, in some areas, there may be more than three companies sharing the cost of a pole, such as when a CLEC shares the structure. In other cases, however, the assumption of three

providers will be too high. For example, it is highly unlikely that the local exchange carrier, electrical utility, and cable company will all share the same conduit, and even less likely that they will share the costs of underground deployment. Third, even if this approach improved the model's accuracy—which, as just explained, is far from clear—the impact on funding of any changes is likely to be negligible in this case. As the Bureau recognizes, areas with cable providers will be ineligible for support. Thus, making this change will only affect results in cases where feeder or distribution pass through a cable operator's franchise area but then terminates to locations outside that area. Fourth, and most importantly, modifying the programming code of the model to accommodate this change is likely to involve significant time and effort, and will likely delay significantly implementation of the model. Given the questionable basis for this change and the minimal impact it is likely to have, the Coalition does not believe that any small potential benefits from this change outweigh the costs of implementation and delay.

The Bureau also asks whether these sharing assumptions continue to make sense if the Bureau were to adopt a brown-field model. For the reasons given above, the Coalition opposes the brown-field approach. If the Bureau nevertheless decides to adopt a brown-field approach, however, then the Coalition believes that significant changes would need to be made in the sharing assumptions. Specifically, if a brown-field approach is adopted, then the model should reflect actual facilities and network nodes as currently placed in the network, as well as the sharing that is currently taking place in the structure associated with those facilities. This will require significant changes in the sharing assumptions and require significant new data. For example, if the brown-field model requires additional fiber feeder to be built to a particular node, the carrier will not have the opportunity to share the cost of the buried structure with the cable company, since the cable companies will already have built their facilities. Similarly, additional aerial fiber feeder may be needed to the extent that distribution areas need to be rearranged to attach new network nodes that shorten distribution lengths to the extent required to achieve speeds of 4 Mbps/1 Mbps. But this incremental investment may incur make-ready costs if poles are already full, which should be taken into account. In summary, if the Bureau decides to adopt a brown-filed approach, it should use actual sharing factors rather than average sharing factors as employed in CQBAT and the HCPM.

- **Robin Tuttle, counsel for ACS**

The values proposed by CostQuest should not be adopted without modification because no attempt has been made to validate the values. Input values should be compared to carrier-specific and location-specific information. Until such time as values are shown to accurately represent forward-looking costs for each carrier whose support is to be determined by the model, no input values should be adopted.

No, these assumptions are not valid. The amount of structure cost that should be assigned to a carrier should be based on a reasonable estimate of the carrier's ability to share such cost with other utilities, based on empirical evidence of local circumstances. In contrast, far from being based on any reviewable empirical analysis, the structure sharing percentage assumptions found in the HCPM Model were based on the "Industry expertise of HAI and outside plant engineers; Montgomery County, MD Subdivision Regulations Policy Relating to Grants of Location for New Conduit Network for the Provision of Commercial Telecommunications Services; Monthly Financial Statements of the Southern California Joint Pole Committee; Conversations with local utility companies." See HAI Model Release5.0a Inputs Portfolio, page 116. No justification is offered for reliance on these two sources for the entire nation.

Structure sharing percentage assumptions should not be manipulated without empirical support, merely to achieve desired results. To insure sharing estimates are reasonable, they must be thoroughly examined and validated on a carrier-by-carrier basis. Since the ability to share structure has existed for many years, and requirements vary by state, the current level of structure sharing represents the best estimate for such sharing in a forward-looking network.

For the sake of consistency, the level of structure sharing in a brown-field model should be based on the level of sharing in the existing portions of the plant. For example, should a carrier currently have broadband service available to 50% of its customer locations, then one would expect that the level of sharing existing for the existing 50% would also exists for the remaining 50% assuming the areas are similarly situated, The level of existing sharing should be determined using the results of an analysis of a carrier's current level of sharing adjusted for any density differences.

PLANT MIX

Background

Hybrid Cost Proxy Model: The HCPM uses nationwide figures for plant mix based on the nine density zones laid out in Appendix A of the *Inputs Order*. It rejected the use of carrier-specific values and other alternatives that were available at the time.

Distribution Plant Mix*			
Density	Underground	Buried	Aerial
0	0.00%	60.00%	40.00%
5	1.00%	62.00%	37.00%
100	2.00%	68.00%	30.00%
200	4.00%	66.00%	30.00%
650	8.00%	62.00%	30.00%
850	20.00%	50.00%	30.00%
2550	40.00%	30.00%	30.00%
5000	60.00%	10.00%	30.00%
10000	90.00%	0.00%	10.00%

* The input values reflected in the chart are for illustrative purposes only

Copper Feeder Plant Mix*			
Density	Underground	Buried	Aerial
0	5.00%	50.00%	45.00%
5	5.00%	50.00%	45.00%
100	5.00%	50.00%	45.00%
200	20.00%	40.00%	40.00%

650	40.00%	30.00%	30.00%
850	60.00%	25.00%	15.00%
2550	75.00%	15.00%	10.00%
5000	90.00%	5.00%	5.00%
10000	95.00%	0.00%	5.00%

* The input values reflected in the chart are for illustrative purposes only

Copper Feeder Plant Mix*			
Density	Underground	Buried	Aerial
0	5.00%	50.00%	45.00%
5	5.00%	50.00%	45.00%
100	5.00%	50.00%	45.00%
200	20.00%	40.00%	40.00%
650	40.00%	30.00%	30.00%
850	60.00%	25.00%	15.00%
2550	75.00%	15.00%	10.00%
5000	90.00%	5.00%	5.00%
10000	95.00%	0.00%	5.00%

* The input values reflected in the chart are for illustrative purposes only

Fiber Feeder Plant Mix*			
Density	Underground	Buried	Aerial
0	5.00%	50.00%	45.00%
5	5.00%	50.00%	45.00%

100	5.00%	50.00%	45.00%
200	20.00%	40.00%	40.00%
650	40.00%	30.00%	30.00%
850	60.00%	25.00%	15.00%
2550	75.00%	15.00%	10.00%
5000	90.00%	5.00%	5.00%
10000	95.00%	0.00%	5.00%

* The input values reflected in the chart are for illustrative purposes only

CCQBAT: The CQBAT model, by contrast, has percent aerial, buried, and underground plant broken out by rural, suburban, and urban areas for the country overall, and for the 50 states, the District of Columbia, and Puerto Rico. The data has been supplied by CostQuest based on input from ABC Coalition companies. For illustrative purposes, here is a public sample of the plant mix inputs data being used by CQBAT for Alabama, Arkansas, and Arizona:

CostFam>>*		Distribution			Feeder			Inter-Office		
State	**Density**	**Aerial**	**Buried**	**Underground**	**Aerial**	**Buried**	**Underground**	**Aerial**	**Buried**	**Underground**
AL	Rural	29.29%	70.43%	0.28%	29.33%	65.82%	4.85%	29.33%	65.82%	4.85%
AL	Suburban	23.86%	75.58%	0.56%	24.09%	63.63%	12.28%	24.09%	63.63%	12.28%
AL	Urban	31.87%	65.90%	2.23%	20.74%	47.85%	31.41%	20.74%	47.85%	31.41%
AR	Rural	14.00%	85.40%	0.61%	4.74%	88.94%	6.32%	4.74%	88.94%	6.32%
AR	Suburban	18.60%	80.78%	0.62%	12.98%	77.85%	9.17%	12.98%	77.85%	9.17%
AR	Urban	23.55%	74.81%	1.63%	14.13%	64.81%	21.07%	14.13%	64.81%	21.07%
AZ	Rural	27.10%	69.17%	3.73%	25.35%	60.66%	13.99%	27.57%	58.49%	13.94%
AZ	Suburban	30.37%	64.01%	5.62%	23.74%	48.57%	27.70%	24.00%	47.65%	28.34%
AZ	Urban	38.11%	54.60%	7.30%	19.45%	40.24%	40.31%	19.51%	39.96%	40.52%

* The input values reflected in the chart are for illustrative purposes only.

Model Design Public Notice: The Bureau proposed to use provider-submitted plant mix data. Noting that variations in the costs to build plant have "a significant impact on the model," the American Cable Association argues that carriers should be required to document their plant mix. The National Association of State Utility Consumer Advocates (NASUCA) also agrees, suggesting that "state commission[s] could verify a stratified sample of the information." NASUCA urges the Commission to similarly de-average the expense calculation, claiming that "if the Commission retains national average expenses using carrier specific plant mix [this approach] could bias the resulting estimates."

Question(s)

1) Is there any reason to deviate from the input values the CQBAT model uses for plant mix?
2) Is CQBAT's use of national defaults for plant mix in some areas where there is no existing carrier-specific data reasonable? Is there any feasible means to fill in such data in the near term?
3) Does the use of national defaults in some areas introduce any systemic bias (upwards or downwards) that would result in support amounts that are materially inaccurate for any particular states (and the providers who operate in them)? Are there ways to address any such problem in the near term?

Comments

- **Donald K. Stockdale, Jr.**

On behalf of the United States Telecom Association, AT&T, CenturyLink, Frontier Communications, Verizon, and Windstream Communications (collectively the ABC Coalition):

Based on data supplied by Coalition members, including the update attached to the Coalition's January 11, 2013 filing, CQBAT has developed plant mix percentages for aerial, buried, and underground plant, broken out by three density zones (rural, suburban, and urban) for the country as a whole and for the fifty states, the District of Columbia, and Puerto Rico. Where CQBAT lacks carrier-specific data, it uses national default values.

The Coalition believes that CQBAT’s approach of using carrier-specific data to develop plant mix percentages is reasonable. The Coalition further believes that it is reasonable to use national average data as a default where carrier-specific or state-specific data are unavailable, particularly given the need to implement the model expeditiously.

Without knowing the missing data, the Coalition is unable to assess whether the use of national defaults introduces any systematic bias. The Coalition believes, however, that any errors that may result from the use of national defaults are likely to be small and are outweighed by the need to implement the model expeditiously.

- **Robin Tuttle, counsel for ACS**

The values proposed by CostQuest should not be adopted without further study, because no attempt has been made to empirically validate the values. Until such time as the values are shown to accurately represent the forward looking environment for each carrier whose support is to be determined by the model, no input values should be adopted.

National defaults in general are not reasonable for predicting costs and thus support needs.

The data used in a model to determine support amounts must be accurate in order to lead to accurate cost estimates and ultimately reasonable support levels. Short cuts should not be taken in the interest of expediency. The only alternative to developing carrier-specific input values would be to stratify carriers and assign those carriers without data the average values of similarly situated carriers. In the case of insular areas such as Alaska, there are likely no similarly situated carriers; producing useful data therefore would require an analysis be undertaken to develop company-specific values. This is especially critical in insular areas given the counter-intuitive results of the current version of the CQBAT model.

By definition, the use of national average cost inputs will understate cost for some carriers and overstate it for others. For any individual carrier, however, there is no way to answer the question with certainty because it currently is impossible to validate the results of the model. For insular carriers who would see support drop significantly under the current version of CQBAT, while others see large increases, it is clear that the currently modeling approach leads to a systematic bias.

LABOR-COST ADJUSTMENT BASED ON LOCATION

Background

Hybrid Cost Proxy Model: When adopting the HCPM, the Commission discussed the possibility of adjusting costs due to regional variation in the context of plant-specific operating expenses. The Commission ultimately did not make those adjustments, however, because it could not determine how much of the variation among providers and areas was due to inefficiency by those providers as opposed to differences in labor rates. In addition, Commission noted that "it would be preferable to use an index [of regional wage variation in determining operating costs] specific to the telecommunications industry."

CQBAT: The CQBAT model includes a cost adjustment based on the three-digit ZIP code of every area of the country. These cost adjustments are based on construction cost variations and are applied to capital costs—i.e., labor and materials.

Question(s)

1) Is there any reason to deviate from the CQBAT model's approach of adjusting labor costs based on differences in construction costs, while maintaining operating expenses at a national level?

Comments

- ### Donald K. Stockdale, Jr.

On behalf of the United States Telecom Association, AT&T, CenturyLink, Frontier Communications, Verizon, and Windstream Communications (collectively the ABC Coalition):

Using data from R.S. Means concerning building construction costs, CQBAT develops a cost-adjustment factor that is applied to capital costs—specifically labor and materials. These regional adjustment factors are broken down to the three-digit Zip code level for every area of the country.

The Coalition believes that CQBAT's approach is reasonable and should not be changed. In the Tenth Report and Order, the Commission stated that it had "tried to account for variations in costs by objective means," but then explained that it was not making adjustments to "reflect regional wage differences . . . because we have not found and no party has suggested a specific data source or methodology that would be useful in making such adjustments."[3] The R.S. Means data governing regional variations in construction costs, which is based on a large national survey, is widely recognized and used in numerous contexts. The Coalition believes that these data provide objective and reliable data for adjusting inputs to reflect regional differences in wage and materials costs.

The Coalition does not believe that there is any inconsistency between adjusting labor costs based on regional differences in construction costs and maintaining operating expenses at the national level. As the Bureau noted, CQBAT basically calculates operating expenses as a ratio to applicable plant investment.[4] Thus, to the extent that investment in plant is higher in one geographic area than another due to higher labor costs, this will translate into correspondingly higher operating expense. The two approaches—that of adjusting capex to reflect changes in regional labor costs while calculating operating expense at the national level—are thus logically consistent because of the way that opex is derived.

- ### Robin Tuttle, counsel for ACS

ACS supports a construction cost adjustment to the extent that the model accurately captures both labor and material cost differences that are specific to Alaska. It is not likely that CQBAT's use of 3-digit ZIP codes achieves this result, however. While construction cost variations may be available for the major population centers in the state, they are unlikely to be published for rural Alaska, where ACS experiences labor costs for construction and maintenance that are many times those of more densely populated

areas. Any model must take into account unique local factors. Particularly because of the opacity of the CQBAT methodology, it is impossible to validate the CQBAT model's approach at this time.

CONNECT AMERICA COST PLATFORM

Background

On December 11, 2012, WCB announced the availability of version one of the Connect America Cost Model. Version one of the model provides the ability to calculate costs using a variety of different inputs and assumptions, allowing the Bureau to choose among different network deployments to serve funded locations (e.g., fiber to the premises or fiber-fed digital subscriber line), different assumptions about the amount of existing facilities assumed to exist (e.g., green-field or brown-field deployments, the mix of aerial, buried or underground plant), as well as different assumptions about unit costs for capital and operating expenses.

While version one of the Connect America Cost Model is similar to the CQBAT model submitted into the record by the ABC Coalition, it contains a number of key differences, including an estimate of the cost of providing not only broadband services, but also voice services, and an updated calculation of brown-field costs to include replacement capital expenditures. The Bureau anticipates that a second version of the Connect America Cost Model will be available in the coming weeks and will include an update to 2010 census geographies and updated SBI data. The Bureau expects to adopt the final version of the Connect America Cost Model, with specific inputs, in 2013, which it will use to set Phase II support amounts to be offered to price cap carriers.

Question(s)

1) Are there any functionalities or capabilities not included in version one of the Connect America Cost Model platform that should be addressed in or added to subsequent versions of the model?

Comments

- **Donald K. Stockdale, Jr.**

On behalf of the United States Telecom Association, AT&T, CenturyLink, Frontier Communications, Verizon, and Windstream Communications (collectively the ABC Coalition):

In both the December 11, 2012 and December 17, 2012 Public Notices, the Bureau asks whether there are additional functionalities or capabilities that should be added to the model.

As the Coalition previously pointed out, the CQBAT model, when deploying FTTD technology, is designed to ensure a minimum of 4 Mbps downstream and 768 Kbps upstream. In order to achieve 1 Mbps upstream speed to all locations, carriers will need to use pair bonding. The pair bonding will require additional pairs as well as the use of two ports at the DSLAM. The model needs to be modified to recognize these costs in the green-field build mode.

Finally, as previously noted, because the Bureau has yet to provide documentation cataloguing and explaining the differences between the CQBAT model and the CACM model and the Coalition has not had an adequate opportunity to examine the logic of the CACM, the Coalition cannot yet comment in detail on the CACM or on whether there are other functionalities or capabilities that should be added to the CACM platform.

- **Robin Tuttle**

The Bureau indicates that version one of the CACM provides the ability to calculate costs using a variety of inputs and assumptions. The Bureau notes that the CACM is similar to the CQBAT model submitted by the ABC Coalition but adds the capability to estimate the cost of providing voice services (in addition to broadband services) which the CQBAT model lacked, and includes replacement capital expenditures in

the brown-field model calculation. The Bureau asks whether any additional functionalities or capabilities should be added to the CACM. See Public Notice DA 12-2011 (WCB rel. Dec. 11, 2012). ACS appreciates the improvements to the model made by the Bureau, but the CACM appears to suffer from many of the same infirmities as the CQBAT model, which ACS has identified on a number of occasions. In particular, it is not yet possible for ACS to verify whether the added capabilities noted by the Bureau meaningfully improve the accuracy of the model, due to the lack of transparency in the CACM. The Bureau has not provided sufficient visibility into the specific network configuration and cost assumptions, for example, so it is impossible for third parties such as ACS to determine what assumptions drive particular results. Similarly, the results of the CACM indicate that support would be lower under the Bureau's fiber-to-the-premises (FTTP) model than under the CQBAT fiber-to-the-DSLAM (FTTD) model – results that appear counter-intuitive – but it is not possible for ACS to test the assumptions that produced this result. In previously analyzing the CQBAT model, ACS pointed out that many of the cost inputs used by the ABC Coalition were not verifiable. For example, as far as ACS is aware, there has been no systematic analysis of what costs vary by geography, a factor that ACS believes highly relevant to accurately predicting its own costs delivering voice and broadband services in Alaska. The information concerning the CACM made available thus far does not appear to do any better at factoring in geographic-specific cost variations. ACS previously has noted that the costs of inter-office transport in Alaska as well as Internet connectivity can greatly exceed those of carriers based in other states; the CACM would not be complete if it did not factor in these geographically distinct cost differences. For all o these reasons, ACS believes that the CACM may indeed require additional functionalities and capabilities, but it is impossible at this time to thoroughly evaluate the model or test its results. ACS urges the Bureau and USAC to provide greater visibility into all of the model's assumptions and inputs before requiring comment on the second version of the model.

- **Russell M. Blau**

Virgin Islands Telephone Corporation ("Vitelco") d/b/a Innovative Telephone, submitted an ex parte communication through the Commission's electronic filing system earlier today. In its filing, Vitelco argued that version one of the Connect America Cost Model fails to incorporate cost characteristics unique to price cap carriers serving territories outside the contiguous United States. Vitelco also stated that it is developing an alternative cost model for the U.S. Virgin Islands that will address these shortcomings, and submitted a preliminary description of the model's proposed input requirements. To view the complete filing, please see http://apps.fcc.gov/ecfs/docum....

- **Thomas Cohen, Counsel to ACA**

1. Provide the ability to separate Opex/Capex expenditures in the reporting module. This could be accomplished by (1) adding a toggle to include/exclude Capex and a toggle to include/exclude Opex, or (2) showing these costs as separate reporting fields, in addition to the existing total modeled cost per geographic area. The inclusion of this information would facilitate new analysis on which portion of the costs represent ongoing operational expenditures versus capital expenditures. This type of analysis could be performed to determine whether locations require support for (1) depreciation associated with capital expenditures, (2) the cost of maintaining service, or (3) both.

2. Provide the ability to include/exclude "Telco Served" locations with a new reporting toggle (e.g., locations that currently have "Telco" provided broadband that meets the FCC speed requirements of 4/1 Mbps). This would facilitate more detailed analysis of the cost of supporting locations that already have "Telco" broadband versus locations without existing broadband.

3. Provide the ability to exclude capital expenditures for all locations that are "Telco Served". As discussed in the ACA's October 23, 2012 ex parte filing, one support estimation approach that should be considered is to provide capex and opex support for high cost locations that have no existing broadband, while only providing opex support for locations that have existing telco broadband. By adding functionality to exclude capital expenditures from "Telco-Served" locations in the modeling process, the required support for this type of scenario could be more accurately estimated.

4. Provide for inclusion of the existing download/upload speed data for each geographic area from the national broadband map in each of the detailed reporting module reports. This would facilitate analysis of the broadband speed improvement expected to be achieved under various policy scenarios.

5. Provide a toggle to exclude Alaska from the calculations. It is generally acknowledged that different modeling methodologies may be necessary to accurately estimate costs in the state.

6. Provide a new summary report that shows expected annual capital expenditure cash flows by asset category for each year (i.e., 0-40 years – the number of years should match the economic life of the longest-lived asset). While the current levelized costs shown in the reporting module are useful to determine the required amount of ongoing support in various a scenarios, a cash flow report would facilitate a detailed analysis of the required costs of deployment, which could be used to further assess one-time support mechanisms, such as CAF phase I.

7. Provide new fields in the support model detail report indicating which census blocks were previously eligible for USF support, and the amount (if any) of funding provided in 2011. This would help determine which locations are receiving new support (i.e., locations that have not historically been subsidized), and which locations will continue to receive support. These fields will also facilitate a comparison between historical and proposed support levels under various policy proposals.

CALCULATING AVERAGE PER-UNIT COSTS/TAKE RATE

Background

Hybrid Cost Proxy Model: The HCPM calculated the average cost-per-line in use by dividing the total cost of serving current customer locations within a wire center by the number of lines in use, as determined by National Exchange Carrier Association (NECA) data. Because it used current lines, the Commission used the number of households (i.e., occupied housing units) as a proxy for current residential customer locations, rather than the number of housing units (i.e., occupied and unoccupied housing units). At the time, the Commission observed that "as long as there is consistency in the development of total lines and total cost, it makes little difference whether households or housing units are used in determining cost per line."

The Commission found that if it were to calculate the cost of a network that would serve all potential customers, it would not be consistent to calculate average cost-per-line by using current demand, and it declined to estimate future demand because "[t]he level and source of future demand . . . is uncertain." The Commission was "concerned that including such a highly speculative cost . . . may not reflect forward-looking cost and may perpetuate a system of implicit support."

Although the HCPM did not explicitly use a take rate, it effectively assumed a 100 percent take rate, because unit costs were calculated by taking total costs (which were calculated based on deploying plant to the number of occupied locations) and dividing by the number of lines in use, as determined by NECA data. At that time in the late 1990s, the number of lines in use was equal to or greater than the number of occupied locations due to the prevalence of second lines for dial-up Internet and fax machines.

Connect America Cost Model: The first version of the CACM (CACM v.1) has been designed to calculate the average cost-per-subscriber by dividing the total cost (the fixed cost of passing all locations in a given area plus the variable cost associated with serving active subscribers) by the number of active subscribers. Unlike the HCPM, CACM v.1 has the ability to calculate variable cost (e.g., the amount of success-based capital investment and the capacity of network links) based on an assumed level of demand.

Question(s)

1) The Bureau believes that it is reasonable to design the CACM so that it includes the total cost of passing all locations and the cost of actually serving subscriber locations in its calculation of per-unit cost. The Bureau proposes to modify CACM v.1 to calculate all unit costs on a per-location-passed basis, rather than on a per-subscriber basis. We seek comment on this approach. The Commission's objective is to ensure access to modern networks to all homes and businesses in a funded area; and the cost-per-subscriber, given the impact of take rate, may not always provide a means of comparing those costs. We note that as take rate varies, whether across different areas in a given model run or across different model runs, the cost-per-subscriber can change dramatically even if the total cost changes very little. As shown in the simplified example below, using cost-per-location-passed would lead to unit costs that are more stable and more reflective of the total cost of the network (i.e., varying little based on take rate).

   To illustrate the point, imagine an area with 10 homes (locations) in it. In this area, the fixed cost to build a network to pass all those homes is $1,000 while the variable cost to connect each home is $10. If one assumes a 90 percent take rate, there would be nine subscribers, the total cost would be $1,090 and the cost-per-subscriber would be $121 ($1,090 divided by nine subscribers). If, on the other hand, one assumed a 50 percent take rate, there would be only five subscribers; the total cost would be $1,050 and the cost-per-subscriber would be $210. Thus while total cost decreased by less than 4 percent with the lower take rate, the cost-per-subscriber would increase by more than 70 percent. Comparing these unit costs across different runs, or between similar areas with different take rates, would be complicated by the dramatic change in per-subscriber costs. On the other hand, if one determines the cost-per-location-passed, the difference in unit

costs is small, similar to the change in total cost. In the first case, with a 90 percent take rate, the cost-per-location is $109 ($1,090 total cost divided by 10 locations); and in the second case, with a 50 percent take rate, the cost-per-location is $105.

2) The Bureau intends to explore adjustments to the take rate in CACM v.1 to determine the impact of varying assumptions on calculated support per-location. Setting the take rate at 90 percent of all residential and business locations passed (as proposed by the ABC Coalition in the CQBAT model) would effectively assume that all occupied locations take both voice and broadband service. The Bureau recognizes that in areas eligible for Connect America Phase II support, some number of customers could opt for mobile services for voice, while relying on a Phase II-supported carrier for fixed broadband. In addition, even in the presence of latent demand, it likely would take some time for customers to adopt a newly available service like fixed broadband. If the CACM ultimately adopted by the Bureau were to calculate costs on a locations-passed basis, is a 90 percent take rate a realistic assumption for price cap territories? How, if at all, should the Bureau take into account the fact that more than 30 percent of households do not subscribe to landline voice service at all? How, if at all, should the Bureau take into account the possibility that not all locations that have broadband newly available will subscribe to that service, unlike historical trends for voice service, and therefore variable costs will actually be lower? What adjustments to the take rate, if any, should we make to reflect the possibility that some people may choose to subscribe to mobile broadband, but not fixed broadband services, and some may not subscribe to broadband service at all during the five-year term of Phase II support? Would a blended-across-time take rate of 50 percent reflect a reasonable average for demand for broadband services over a five-year period? How, if at all, should the Bureau take into account that different locations may subscribe over time, leading to incremental additional cost for the provider? Would it be appropriate, for example, to over-estimate take rate on the assumption that while only 50 percent of subscribers might purchase a service at any one time, that closer to 1.5 x 50 percent of locations will subscribe at some point over the five-year period?

Comments

- **Donald K. Stockdale, Jr.**

On behalf of the United States Telecom Association, AT&T, CenturyLink, Frontier Communications, Verizon, and Windstream Communications (collectively the ABC Coalition):

In the Virtual Workshop, the Bureau observed that the first version of the CACM ("CACM v.1") model calculates "the average cost per-subscriber by dividing the total cost (the fixed cost of passing all locations in a given area plus the variable cost associated with serving active subscribers) by the number of active subscribers." The Bureau proposes to "calculate all unit costs on a per-location basis, rather than on a per-subscriber basis," and it observes that doing so would reduce the variability in average-cost per location as the penetration rates for voice and data vary. The Bureau further indicates that it will explore "adjustments to the take rate in CACM v.1 to determine the impact of varying assumptions on calculated support per location."

The Coalition understands why the Bureau is considering a shift to calculating per-location unit costs. But, if the Bureau changes to a per-location cost basis, it must then modify its thresholds. Moreover, depending on the take rates the Bureau assumes, this could change relative costs among areas by changing the per-subscriber variable cost.

The Coalition cannot support this change until the Bureau makes clear what other changes it intends to introduce (with respect to thresholds, take rates, etc.) and until the Coalition members have an opportunity to assess the impact these changes may have on eligible census blocks, support levels, and build-out requirements.

- **Robin Tuttle**

Question 1 Response:

The Bureau should reconsider its proposal to modify CACM v.1 to calculate all unit costs on a per-location-passed basis, rather than on a per-subscriber basis. As shown below, given the fact that carrier cost recovery is accomplished through a combination of support plus revenue received from subscribers, the Bureau's proposal would lead to the under-recovery of cost.

The purpose of the Universal Service Support Fund is to provide funding for carriers to provide broadband services in relatively high cost areas at reasonable rates while still recovering all associated costs, including a reasonable return. Underlying the USF is the concept that support should be provided in areas where broadband service would not otherwise be provided because expected customer revenues would be insufficient to justify the investment in the absence of support. Practically, this means that support must be provided in areas where costs per subscriber relative to the expected revenue per subscriber (based on market prices) is such that a carrier would not expect to recover its total costs, including a reasonable return on capital, without the support. In short, cost recovery is accomplished through the combination of the revenue paid by the subscribers plus the amount of support provided – per-location costs of the overall network are irrelevant if subscriber revenues for that carrier reasonably can be expected only at a fraction of the locations passed.

To ensure that carriers are able to recover total cost, unit costs must be based on a realistic estimate of the likely number of their subscribers for the total investment. Consider the example posed by the WCB as part of the question:

10 Locations
$1,000 Fixed Cost
$10 per Subscriber Variable Cost
90% Take Rate
Total Cost = $1,000 + ($10 x 9) = $1,090
$109 = Cost per Location
$121 = Cost per Subscriber

In this example, the Commission requires that CAF II recipients pass all customer locations requiring total cost to equal the fixed cost to build to all locations plus the variable cost of the subset of locations expected to subscribe to the service.

In this example, total cost is equal to $1,090. As a result, support must be sufficient that when added to the revenue anticipated to be received from actual subscribers the total is equal to or greater than $1,090. Only through the use of each carrier's subscribers as the demand unit used to calculate unit costs will this criterion be met. Expanding on the FCC's example and calculating the total recovery under both demand unit assumptions will illustrate this result.

Locations as Demand Unit for Unit Cost
Rev = Support + Subscriber Revenue
Support = Unit Cost – Benchmark
Where Benchmark = market price per subscriber = $80
Support per Unit = $109 - $80 = $29
Total Support = Support per Unit x Locations = $29 x 10 = $290
Subscriber Rev = Subscribers x $80 = $720
Rev = $1,010

Subscribers as Demand Unit for Unit Cost
Rev = Support + Subscriber Revenue
Support = Unit Cost – Benchmark
Where Benchmark = market price per subscriber = $80
Support per Unit = $121.11 - $80 = $41.11
Total Support = Support per Unit x Locations = $41.11 x 9 = $370
Subscriber Rev = Subscribers x $80 = $720
Rev = $1,090

The example shows that when using total locations passed as the demand unit in the cost calculation, the carrier will not fully cover its costs even with support. Full cost recovery is only achieved when subscribers are used as the demand in the unit cost calculation. This will hold under any take rate assumption. Because a carrier's full cost recovery depends on support plus revenue from its subscribers, the demand unit in the cost calculation must also be subscribers.

The number of a carrier's expected subscribers must also be used to calculate the per-unit support amount in order to achieve the appropriate support level. As the above example illustrates, when the cost per unit is derived using the carrier's subscribers as the demand variable in deriving total support, each carrier's total recovery will be in line with its total costs.

Question 2 Response:

Alaska Communications Systems: As the Bureau has noted, the take rate has a significant impact on the per-unit cost of provisioning service. This impact is especially acute in remote, insular areas such as Alaska. The Commission has recognized that geographic, economic and demographic differences between Alaska and the rest of the United States result in take rates for fixed broadband services that are significantly lower than take rates in the rest of the country. Based on current subscriber numbers, ACS estimates that the take rate in the currently unserved portions of its wireline service territory will be less than 50%. As demonstrated above, only if the expected number of subscribers is figured into the per-unit cost calculation could a carrier be expected to fully recover its broadband deployment costs. As a result, a 90% take rate may be appropriate for some companies, but it is inappropriate for use in the support calculations for Alaska. Given the documented differences between the contiguous United States and remote, insular areas such as Alaska, the use of a fixed take rate assumption across all price cap carriers should not be adopted. Rather, subscribers should be factored into the cost calculation based on current take rates for individual carriers.

- **Puerto Rico Telephone Company**

Question 1 Response

The Bureau should reconsider its proposal to modify CACM v.1 to calculate all unit costs on a per-location-passed basis, rather than on a per-subscriber basis. As shown below, the Bureau's proposal would lead to the under recovery of costs because it does not adequately appreciate that carriers recover costs through a combination of support plus revenue received from subscribers.

The Connect America Fund (CAF) is supposed to provide funding for carriers to provide broadband services in relatively high cost areas at reasonable rates while still recovering all associated costs and a reasonable return. Underlying the CAF is the concept that supported areas would be those where broadband service would not otherwise be provided without support. Practically, this means that support must be provided in areas where costs relative to the market price of the service are such that a carrier would not expect to recover its total costs, including return, without government support.

Service providers recover their costs through the combination of the revenue paid by subscribers plus the amount of support provided. Thus, to ensure that carriers recover their total costs, the demand units used to calculate unit costs in the CACM v.1 support calculation must be subscribers. Consider the example posed by the WCB as part of the question:

10 Locations
$1,000 Fixed Cost
$10 per Subscriber Variable Cost
90% Take Rate
$1,000 + ($10 x 9) = $1,090
$109 = Cost per Location
$121 = Cost per Subscriber

Under this example, the Commission requires that CAF II recipients pass all customer locations and also requires that total costs equal the fixed cost to build to all locations plus the variable cost of the subset of locations expected to subscribe to the service. In this case, total cost is equal to $1,090. As a result, government support must be large enough that when added to the revenue anticipated to be received

from actual subscribers the total is no less than $1,090. Only through the use of subscribers as the demand unit used to calculate unit costs will this criterion be met. Expanding on the FCC's example and calculating the total recovery under both demand unit assumptions illustrates this result.

Locations as Demand Unit for Unit Cost
Rev = Support + Subscriber Revenue
Support = Unit Cost – Benchmark
Where Benchmark = market price per subscriber = $80
Support per Unit = $109 - $80 = $29
Total Support = Support per Unit x Locations = $29 x 10 = $290
Subscriber Rev = Subscribers x $80 = $720
Rev = $1,010

Subscribers as Demand Unit for Unit Cost
Rev = Support + Subscriber Revenue
Support = Unit Cost – Benchmark
Where Benchmark = market price per subscriber = $80
Support per Unit = $121.11 - $80 = $41.11
Total Support = Support per Unit x Locations = $41.11 x 9 = $370
Subscriber Rev = Subscribers x $80 = $720
Rev = $1,090

This example shows that when using locations as the demand unit in the cost calculation the carrier will not fully recover its costs even with support. This result—in which full cost recovery is only achieved when subscribers are used as the demand in the unit cost calculation—will hold under any take rate assumption. Because a carrier's full cost recovery depends on support plus revenue from subscribers, the demand unit in the cost calculation must also be subscribers.

However, the number of subscribers must also be used to calculate the per unit support amount in order to achieve the appropriate support level. As the above example illustrates, when the cost per unit is derived using subscribers as the demand variable, the use of subscribers as the demand unit in deriving total support will bring total recovery in line with total cost.

Question 2 Response

As the Bureau notes, take rates significantly impact the per unit cost of provisioning broadband service. This impact is especially acute in insular areas such as Puerto Rico, Alaska, and the US Virgin Islands where geographic, cultural and economic differences between these areas and the mainland U.S. result in take rates that fall well below take rates in non-insular areas. Indeed, service providers in each of these areas have emphasized in the CAF proceeding that the expected take rates for broadband service in their insular areas—even with federal support— fall well short of 50%.

As a result, the 90% take rate proposed in the CQBAT model is totally inappropriate for use in the support calculations for insular areas. In fact, given the documented differences between mainland and insular areas, the Commission should not adopt a one-size-fits-all fixed take rate for all price cap carriers. Further, the Bureau's alternative proposals to adopt a 50% "blended" take rate or use a 1.5 "gross-up factor" are equally concerning and far inferior to using current take rates—at least as the starting point for developing a take rate input value

ASSIGNING SHARED COSTS

Background

The Commission required that the HCPM calculate the average cost of serving lines to at least the wire center level. The *USF/ICC Transformation Order* requires that the Connect America Phase II cost model be capable of calculating cost "on a census block or smaller basis"—a much more granular level.

Connect America Cost Model: To allocate costs within a census block, the first version of the CACM (CACM v.1) uses a "cost causation" allocation method where the fraction of shared costs is allocated according to the number of customers attached to each line.

In the *Model Design Public Notice*, the Bureau proposed to model the costs associated with the entire network, and then assign shared costs between eligible and ineligible areas. The Bureau sought comment on the appropriate methodology for allocating costs between these areas. The Bureau noted in the *Model Design Public Notice* that cost allocations can be problematic, and the "subtractive" method—determining the costs of supported areas by taking the cost of both supported and unsupported areas and then subtracting the cost of the unsupported areas—could be too complicated to calculate. Although some commenters urged the Bureau to adopt the subtractive approach, none have proposed a computationally tractable method for actually implementing such an approach.

A potentially workable approach to the subtractive method may be the following. First, use a cost allocation method like that used in CACM v.1 to define the following three footprints: (1) areas that are commercially viable, (2) areas that are eligible for the Remote Areas Fund, which are too high in cost to be supported through Connect America Phase II, and (3) areas that are eligible for Phase II support. These footprints would be determined by setting two thresholds and using the cost-per-block calculated using the allocation method. Then, using the subtractive approach to calculate the support amount in each area could be relatively straightforward, requiring only two calculations (commercially viable alone and commercially viable + eligible areas).

Depending on the thresholds that are chosen to set the three footprints, the cost of serving eligible areas may exceed or fall short of the $1.8 billion budget once the subtractive method is applied. If this occurs, it would be necessary to use different thresholds to determine the three footprints and re-run the subtractive method.

Question(s)

1) Is there any reason to deviate from a "cost causation" allocation method like that used in CACM v.1 to calculate the support amount in each area?
2) Should the Bureau adopt the subtractive method proposed above in the final version of the Connect America Cost Model?

Comments

- **Donald K. Stockdale, Jr.**

On behalf of the United States Telecom Association, AT&T, CenturyLink, Frontier Communications, Verizon, and Windstream Communications (collectively the ABC Coalition):

In the June 8, 2012 Public Notice, the Bureau sought comment on how it should assign the shared costs of the network between eligible and ineligible areas. It proposed to use what it called a subtractive approach, though it acknowledged concern about whether such an approach was computationally tractable. In the Virtual Workshop, the Bureau proposed a variant of this subtractive approach. Specifically, the Bureau proposed:

“First, use a cost allocation method like that used in CACM v.1 to define the following three footprints: (1) areas that are commercially viable, (2) areas that are eligible for the Remote Areas Fund, which are too high in cost to be supported through Connect America Phase II, and (3) areas that are eligible for Phase

II support. These footprints would be determined by setting two thresholds and using the cost-per-block calculated using the allocation method. Then, using the subtractive approach to calculate the support amount in each area could be relatively straightforward, requiring only two calculations (commercially viable alone and commercially viable eligible areas).

“Depending on the thresholds that are chosen to set the three footprints, the cost of serving eligible areas may exceed or fall short of the $1.8 billion budget once the subtractive method is applied. If this occurs, it would be necessary to use different thresholds to determine the three footprints and re-run the subtractive method.”

The Coalition opposed the subtractive approach in its July Comments, and we continue to oppose this approach, even as recently modified by the Bureau. As we explained in greater detail in the July Comments, the subtractive approach is conceptually flawed and will result in insufficient levels of support. Moreover, despite the proposed simplification, the modified subtractive approach remains computationally extremely complex, which is likely to delay significantly implementation of CAF Phase II.

1. Common Costs Should Be Allocated and Recoverable.

As explained in our July Comments, it has long been recognized that, because of the extensive common costs associated with telecom networks, setting prices or support on the basis of incremental cost will not result in the recovery of the total costs of the plant. Because of this, regulators have adopted various methods of allocating common costs in a way that reflects cost causation. As we explained, the subtractive approach departs from this long tradition because it would assign all the common costs of the network to census blocks that are ineligible for support.

2. The Subtractive Approach Is Conceptually Flawed.

As we explained in the Coalition’s July Comments, the subtractive approach is conceptually flawed for a number of reasons.

First, because the subtractive approach only allocates the incremental portion of shared plant to eligible areas, the carrier will break even (i.e., recover its total cost of the network) only if it can earn revenues equal to or greater than the stand-alone cost of providing service to the ineligible census blocks. But to the extent that the revenues are greater than the stand-alone cost, this means that we are assuming that subscribers in the ineligible areas will be cross-subsidizing subscribers in the supported areas. Not only is this inefficient and undesirable from a policy perspective, but it is unsustainable in competitive markets.

Moreover, as we explained in the Coalition’s July Comments, there is no reason to believe that a carrier will be able to earn revenues that at least equal the stand-alone cost of providing service to ineligible areas. In cases where a carrier is not currently providing broadband service in an ineligible area, we can infer that it was not economical to provide service in that area and thus that revenues will not exceed the stand-alone cost. But even where the carrier has already built out broadband throughout the ineligible area, this does not necessarily mean that the LEC was breaking even (much less recovering its stand-alone costs) over that infrastructure. Instead, the LEC may have been able to provide the service only because of the heavy explicit and implicit subsidies from legacy USF and ICC systems. Thus, there is no basis to assume that a carrier will be able to generate revenues in its ineligible census blocks that exceed the stand-alone cost of serving those census blocks. If it cannot, then supplying the carrier only enough support to cover the incremental cost of service to the ineligible areas will not be enough to make it economical to build out broadband in the study area. Accordingly, the support required for carriers to accept CAF Phase II funds must be greater than the mere incremental costs that the subtractive approach would offer.

3. The Modified Subtractive Approach Remains Conceptually Flawed, Computationally Complex, Logically Inconsistent, and Will Delay Implementation of CAF Phase II.

Recognizing the complexity of the subtractive approach, the Bureau in the Virtual Workshop proposed a modification which it claims will simplify the computation of support levels using the subtractive approach. Although its explanation is not completely clear to us, the Bureau apparently would set the two cost thresholds (for eligibility for the CAF Phase II Fund and for the Remote Areas Fund) and then use the current cost-causation allocation methodology of the CACM to identify which areas are (1) below the lower benchmark and therefore ineligible for support, (2) above the lower benchmark and therefore

eligible for CAF Phase II support, and (3) above the higher benchmark and therefore eligible for Remote Areas support. The Bureau would then change cost allocation logic in the CACM to assign common costs on the basis of the subtractive approach to the ineligible areas and then calculate support as the difference between the newly calculated costs for the eligible areas and the cost threshold. The Bureau acknowledges, however, that the "cost of serving eligible areas may exceed or fall short of the $1.8 billion budget once the subtractive method is applied," and that if it did, then both thresholds would need to be adjusted.

There appear to be a number of practical and logical problems with this approach. First, implementing this hybrid approach, which employs both the cost-causation and incremental approaches to allocating the common cost of shared plant, is likely to involve significant and time-consuming modifications of the model logic. Once these changes were introduced, the Bureau would then need to provide sufficient opportunity for parties to review the model logic. As a result, adoption of the model and implementation of CAF Phase II is likely to be delayed significantly.

Second, there is no reason to expect that the Bureau will be able to set the correct thresholds initially. If it does not, the process will need to be repeated—possibly many times—which will require multiple model runs. This likewise could significantly delay implementation of CAF Phase II.

Finally, there appears to be a logical inconsistency between identifying eligible and ineligible areas using a cost-causation allocation methodology, which assigns common costs to both eligible and ineligible areas, and then determining support based on only the incremental cost of the eligible census blocks. One would expect that, if one were consistent in applying the subtractive methodology, both in identifying eligible and ineligible census blocks as well to determining support levels, the list of eligible census blocks would likely differ significantly from those generated by this new hybrid approach, as would the levels of support.

It simply makes no sense to significantly delay the implementation CAF Phase II in order to adopt a conceptually flawed, computationally complex, and logically inconsistent methodology for allocating common costs and determining support levels. Simplicity, administrative feasibility, and theoretical consistency all favor retaining CostQuest's current cost-causation approach for allocation the common costs of shared plant.

- **Robin Tuttle**

Question 1 Response:

Alaska Communications Systems: There is no reason to deviate from a cost-causative methodology for those segments of a broadband network that are shared across geographic areas. Specifically, ACS supports a cost-causative methodology based on the number (proportion) of customers associated with the network facility in question. Other methodologies designed to distribute costs for the electronics or interoffice and feeder facilities of the network that are used by locations within single or multiple census blocks would be subjective at best and, at worst, would introduce unnecessary distortions into the modeling process.

The problem of the allocation of the cost of shared network facilities is one that has been faced by regulators from the industry's beginning. Over the past seventy-plus years no alternative to the simple but effectively accurate cost-causative allocation method has been found. The Commission's own cost accounting rules, consistent with cost-causative concepts, have traditionally used a two-tier system to separate costs between services. Those costs that can be directly assigned to a particular service are so assigned. Those that cannot be directly assigned are considered shared and then allocated based on a relative measure such as the fraction of customers associated with each particular facility.

Separating costs between services is conceptually no different from separating cost within and between already served and un-served census blocks. First, directly assign those costs that are clearly incurred to provide service for a single un-served census block, and next, allocate a fraction of the shared costs that remain in proportion to the number of customers associated with the particular facility in question. There is no reason to think that an alternative methodology superior to the tried and true cost-causation

methodology could be developed in the context of this proceeding without introducing a large degree of uncertainty and unnecessary complexity.

Question 2 Response:

Alaska Communications Systems: The Bureau should not employ a subtractive costs method to allocate shared costs between eligible and ineligible areas. All costs – shared and direct - should be allocated based on a cost-causative methodology, as discussed above. Any allocation method adopted must be capable of validation through testing against real-world data. The subtractive approach described by the Bureau is needlessly complicated and cannot be validated because it is inherently circular.

The issue of shared cost allocation takes on increased importance as a result of the Commission's requirement that modeling be done at the census block or lower level. One of the results of attempting to estimate broadband costs down at a census block or lower level is that the proportion of costs shared between eligible locations will increase as the size of the geographic unit decreases. Thus, the proportion of total cost that will be shared between eligible and ineligible census blocks is likely to be large, a condition dictating that great care be taken in developing the methodology used to allocate shared costs on a cost-causative basis.

CONNECT AMERICA COST MODEL (Version 2)

Background

On December 11, 2012, WCB announced the release of version one of the Connect America Cost Model. Version one of the cost model allowed the Bureau and interested parties to examine various options for different network deployments to serve funded locations (*e.g.*, fiber to the premises or fiber-fed digital subscriber line) and different assumptions about both the amount of existing facilities assumed to exist (*e.g.*, green-field or brown-field deployments, the mix of aerial, buried or underground plant) and unit costs for capital and operating expenses.

Version two of the Connect America Cost Model augments version one in a number of key areas, specifically with regard to input data sets. Version two utilizes 2010 census boundaries and December 2011 broadband map data, as well as the latest available version of GeoResults wire center boundaries. Additionally, version two incorporates updated consumer location and business location counts.

The Bureau expects to adopt a final version of the Connect America Cost Model, with specific inputs, at a later date in 2013, which it will use to set Phase II support amounts to be offered to price cap carriers.

Question(s)

1) Are there any modifications to functionalities, capabilities, or data sets, not included in version two of the Connect America Cost Model platform that should be addressed in or added to subsequent versions of the model?

Comments

- **Donald K. Stockdale, Jr.**

On behalf of the United States Telecom Association, AT&T, CenturyLink, Frontier Communications, Verizon, and Windstream Communications (collectively the ABC Coalition):

In both the December 11, 2012 and December 17, 2012 Public Notices, the Bureau asks whether there are additional functionalities or capabilities that should be added to the model.

As the Coalition previously pointed out, the CQBAT model, when deploying FTTD technology, is designed to ensure a minimum of 4 Mbps downstream and 768 Kbps upstream. In order to achieve 1 Mbps upstream speed to all locations, carriers will need to use pair bonding. The pair bonding will require additional pairs as well as the use of two ports at the DSLAM. The model needs to be modified to recognize these costs in the green-field build mode.

Finally, as previously noted, because the Bureau has yet to provide documentation cataloguing and explaining the differences between the CQBAT model and the CACM model and the Coalition has not had an adequate opportunity to examine the logic of the CACM, the Coalition cannot yet comment in detail on the CACM or on whether there are other functionalities or capabilities that should be added to the CACM platform.