6712-01

FEDERAL COMMUNICATIONS COMMISSION

47 CFR Part 54

[WC Docket Nos. 10-90, 05-337; DA 14-534]

Connect America Fund, High-Cost Universal Service Support

AGENCY: Federal Communications Commission.

ACTION: Final rule.

SUMMARY: In this document, the Wireline Competition Bureau (Bureau) finalizes decisions regarding the engineering assumptions contained in the Connect America Cost Model (CAM) and adopt inputs necessary for the model to calculate the cost of serving census blocks in price cap carrier areas. The Commission also estimates the final budget for the Phase II offer to model-based support to price cap carriers in light of the conclusion of the second round of Phase I funding.

DATES: Effective **[INSERT DATE 30 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER].**

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SUPPLEMENTARY INFORMATION: This is a summary of the Bureau's Report and Order in WC Docket No. 10-90, 05-337; DA 14-534, adopted on April 22, 2014, and released on April 22, 2014. The full text of this document is available for public inspection during regular business hours in the FCC Reference Center, Room CY-A257, 445 12th Street, SW., Washington, DC 20554, or at the following Internet address: http://hraunfoss.fcc.gov/edocs_public/attachmatch/DA-14-534A1.pdf

I. INTRODUCTION

1. The Report and Order takes important steps to further implement the landmark reforms unanimously adopted by the Federal Communications Commission (Commission) in 2011 to modernize universal service to maintain voice service and expand broadband availability in areas served by price cap carriers, known as Phase II of the Connect America Fund. The Commission concluded that it would provide support through a combination of "a new forward-looking model of the cost of constructing

modern multi-purpose networks" and a competitive process. The Commission delegated to the Bureau the task of developing that forward-looking cost model.

2. In the Report and Order, the Bureau finalizes decisions regarding the engineering assumptions contained in the Connect America Cost Model (CAM) and adopts inputs necessary for the model to calculate the cost of serving census blocks in price cap carrier areas. The Bureau modified the model over the course of this proceeding to reflect the unique circumstances of serving non-contiguous areas of the United States, but questions remain in the record regarding whether model-based support would be sufficient to enable all of these carriers to meet their public interest obligations. Price cap carriers serving non-contiguous areas therefore will be offered model-based support, but also be provided the option of receiving frozen support. The Bureau identifies the likely funding benchmark that will determine which areas are eligible for the offer of model-based support, which will enable the Bureau to commence the Phase II challenge process. The Bureau also estimates the final budget for the Phase II offer of model-based support to price cap carriers in light of the conclusion of the second round of Phase I funding.

II. DISCUSSION

3. In the Report and Order the Bureau adopts the modifications to the Connect America Cost Model platform that we have made since the CAM Platform Order, 78 FR 26269, May 6, 2013, was adopted and the inputs reflected in CAM v4.1.1 that will be used to estimate the forward-looking cost of building voice and broadband-capable networks in areas served by price cap carriers, including price cap carriers that serve areas outside the contiguous United States.

4. Before addressing particular input values and platform updates, the Bureau first describes the CAM methodology documentation and other information, including illustrative model results, that have been made available to assist the public in understanding the CAM. The Bureau then adopts the model platform updates and turn to input values, focusing on those on which we sought and/or received comment in response to various public notices and virtual workshop questions. Next, the Bureau

discusses the treatment of carriers serving the non-contiguous areas of the United States. The Bureau then adopts the methodology for calculating average per-unit costs and explain how certain business locations and community anchor institutions are treated in the model.

5. Finally, the Bureau identifies the likely funding benchmark for the model, which will be used to develop the initial list of census blocks in areas served by price cap carriers that are presumptively eligible for model-based support in Connect America Phase II. The Bureau also estimates the final budget for the offer of model-based support in light of the conclusion of the second round of Phase I funding. Subject to the outcome of the Phase II challenge process, we estimate that approximately 4.25 million residential and business locations will be eligible to receive model-based Connect America Phase II support.

A. Model Documentation and Accessibility

6. Throughout the more than two year model development process, the Bureau has been committed to ensuring an open, transparent, and deliberative process. As discussed above, the Bureau solicited public comment on a variety of topics related to the development and adoption of the cost model through public notices, an in-person workshop, and the virtual workshop questions. At the outset of the process, the Bureau set forth the criteria by which it would evaluate models submitted in this proceeding and identified the capabilities models must have to support the policy choices and options specified by the Commission. Consistent with the Commission's criteria for public accessibility, the Bureau specified that the models and data must be available for public scrutiny and potential modification, and that access to models could not be restricted by use of a paywall (i.e., access to the model cannot be conditioned on paying a fee). At the same time, the Bureau made clear that "models and input values submitted in this proceeding may be subject to reasonable restrictions to protect commercially sensitive information and proprietary data."

1. Openness and Transparency

7. Considerable information about the CAM is available either on the Commission's website or the CAM website hosted by the Administrator, consistent with the Commission's obligation to protect commercially sensitive information and proprietary data. The models submitted by parties in this proceeding and the CAM developed by the Bureau are available subject to protective orders. The Bureau ensured that the protective order governing the CAM did not prohibit employees of telecommunications or competing companies from accessing the model. The Bureau has concluded that the procedures that govern access to CAM adopted in the Third Supplemental Protective Order "provide the public with appropriate access to the model while protecting competitively sensitive information from improper disclosure." Members of the public who execute the relevant acknowledgement of confidentiality, the licensing agreement, and/or non-disclosure agreement have access to CAM; detailed CAM outputs; proprietary CAM inputs, data and databases; the proprietary capital cost model, CQCapCostFor CACM; network topologies provided as inputs to CAM; and source code for CAM and the code that creates the network topologies (CQLL and CQMM). Any member of the public can obtain access to CAM and the additional information on the CAM website by executing the relevant documents attached to the Third Supplemental Protective Order. Parties who have questions about how the model works or need assistance in running the model can take advantage of the CAM support desk.

8. The Bureau has worked with USAC and its contractor, CostQuest, to make model documentation, results and other explanatory material available on the CAM website. Specifically, the CAM home page (cacm.usac.org) displays a "system updates page" link to "Release Notes," which provides summary level information on model changes by version number and release date, and a "Resources" button to provide users a consolidated location for documentation and additional resources. Current documentation listed under the "Resources" button includes the following:

- Background Information on Connect America Cost Model – Provides a summary of the Connect America Cost Model and its role within the Connect America Fund;

- CAM Methodology – Provides comprehensive details on the model's methodology and the methodology used to derive various input values (updated as each new version is released);
- Capex Tutorial – Links to a tutorial video explaining the capital expenditures workbook to help parties better understand the structure and inputs contained in the workbook;
- User Guide – Provides help to users with information on how to work with and analyze the Connect America Cost Model;
- FAQ– Provides Frequently Asked Questions sent to CAM Support desk (CACMsupport @costquest.com);
- Tile Query Field Definitions – Lists the field definitions for data fields within the tile query results.

Additional resources listed under the "Resources" button to assist users in analyzing model results include:

- Opex Overview – Provides material that walks through the development of the Opex inputs for the Connect America Cost Model;
- Capital Cost Model – Derives annual charge factors for depreciation, cost of money, and income taxes associated with capital investments, used as inputs in the model;
- TelcoMaster Table – Provides holding company name associated with serving wire centers and includes state, company name, study area code, status as rate-of-return or price cap, company size, and other data;
- Coverage Data – Identifies census blocks presumptively served by unsubsidized competitors.

9. The CAM home page also displays a "Posted Data Sets" button to provide users with access to model inputs and model outputs from various model runs, and a link for users to submit questions to the CAM Support desk related to access, administration and output generation. Additional documentation is available in a "System Evaluator" package that provides a test environment populated with a sample database, allowing users to view database structures, observe processing steps of CAM for a subset of the country, and see changes in the database. In addition to the CAM source code, the processing source code for CostQuest's proprietary applications that develop the network topology for the CAM – CQLL and CQMM – also is available upon request to the CAM support desk for users that have complied with the additional requirements of the Third Supplemental Protective Order.

10. Information relating to the model also is available on the Commission's website. On June 4, 2013, the Bureau announced the release and public availability of the model methodology documentation, and published on the Commission's website a number of illustrative reports showing results of various runs of CAM v3.1.2. These reports provided the opportunity for the public to see how changes in certain input values and other decisions would impact total support amounts per carrier per state and the number of locations eligible for support. On June 17, 2013, the Bureau published illustrative results of various runs of CAM v3.1.3 and announced the release of methodology documentation for v3.1.3. On June 25, 2013, the Bureau announced the release of updated methodology documentation for CAM v3.1.4 and illustrative model outputs from running this version using different combinations of possible model inputs and support assumptions, with an illustrative funding threshold of $52. On August 29, 2013, the Bureau announced the availability of updated methodology documentation for CAM v3.2 and illustrative model outputs from running this version using different combinations of possible model inputs and support assumptions, with illustrative funding thresholds of $49.15, $52, and $55.40. These reports showed potential support amounts and number of supported locations by carrier, by study area, and by state.

11. On December 4, 2013, the Bureau released default inputs for CAM v4.0. On December 18, 2013, the Bureau released the updated methodology documentation and posted illustrative results

from running this version with funding thresholds of $48 and $52. The reports summarize information on estimated support and locations for the funded census blocks for each funding threshold. Users are able to filter the results to view potential support amounts and the number of supported price cap carrier locations, by price cap carrier, by state, and by study area. In response to informal requests, these illustrative results for v4.0 also provided additional detail depicting the number of locations that would newly receive broadband and the number of locations in price cap areas that would fall above the extremely high-cost threshold for each funding threshold. The Bureau also released lists of census blocks that potentially would be funded, so that the public could determine where funding would be targeted under alternative thresholds. On February 6, 3014, the Bureau published maps that visually displayed the same information provided in these illustrative results, so that the public could see the actual geographic territories that would potentially be subject to the offer of model-based support.

12. On March 21, 2014, the Bureau announced the availability of CAM v4.1, and released a new set of illustrative results reflecting a funding benchmark of $52.50. In addition, the default inputs for CAM v4.1, updated model documentation, and a list of census blocks that potentially would be funded were posted on the Commission's website. On April 17, 2014, the Bureau announced the availability of CAM v4.1.1 and posted default inputs for CAM v4.1.1 and updated model documentation on the Commission's website. As noted above, the minor adjustments in this version did not have a material effect on funding levels previously released for CAM v4.1.

13. The Bureau thus is not persuaded by arguments that the cost model is "not sufficiently open and transparent." NASUCA's argument that the Bureau's model development process is inconsistent with Commission precedent regarding the development of the prior forward-looking model fails to take into account the different constraints that necessarily apply to the CAM. NASUCA ignores the fact that HCPM, which could be downloaded and run on a personal computer, was considerably less complex than CAM. When the Commission delegated to the Bureau "the authority to select the specific cost model and associated inputs" in the USF/ICC Transformation Order, 76 FR 73830, November 29, 2011, it recognized that "modeling techniques and capabilities have advanced significantly since 1998,

when [HCPM] was developed, and the new techniques could significantly improve the accuracy of modeled costs in a new model." Rather than updating HCPM, as some suggested, the Commission concluded "that it is preferable to use a more accurate, up to date model based on modern techniques." CAM provides more detailed and precise results at a much more disaggregated level than HCPM by relying on proprietary logic, code and data sources. The Bureau cannot "lift the proprietary designation from the results" that the model yields, as NASUCA requests, because the very detailed results available to users of the CAM could reveal proprietary business information of the contractor or reveal proprietary (commercial) source data. The Bureau has always intended to release model results at an appropriate level of aggregation, but the necessary first step was to make certain threshold decisions in order to focus the debate on those policy choices that would have a material impact on support levels. As discussed above, the Bureau has released several iterations of potential support amounts and number of locations by carrier, by state, and has published results by study area as well. The Bureau thus have addressed NASUCA's request that "[a]t a minimum, results at the study area level should be public."

14. The Bureau finds that the model results that have been posted on the Commission's website with each version of the model since early June 2013 have afforded the public ample opportunity "to understand the implications of the model." Each model run requires making assumptions about literally hundreds of individual inputs; releasing "all" model results as requested by NASUCA potentially would have amounted to an infinite amount of information that would not enhance the public's ability to comment on the policy choices facing the Bureau. It would not have been productive to publish illustrative results for earlier versions of the model when so many aspects of the model were still under development and refinement. Once the model development process was well underway, the Bureau began to release results for several successive versions that illustrated a range of potential outcomes so that the public could evaluate a finite number of alternatives, rather than an infinite number of alternatives. Moreover, the Bureau has now published several iterations of the information that NASUCA specifically identified as being very important to have – the number of locations that are above the extremely high-cost threshold.

15. The Bureau is not persuaded by arguments that the model development process has failed to meet the level of openness and transparency required by the Commission for the model. When the Commission declined to adopt the CQBAT model in the USF/ICC Transformation Order, it noted that, "all underlying data, formulae, computations, and software associated with the model must be available to all interested parties for review and comment." As discussed above, that standard has been met for the CAM: the 300 users who have signed the relevant attachments to the Third Supplemental Protective Order have had access to detailed CAM outputs; proprietary CAM inputs, data and databases; the processing source code for CostQuest's proprietary applications that develop the network topology for the CAM (CQLL and CQMM), which are inputs to CAM; and source code for the CAM itself. Given the extensive documentation and access to the model that we have made available to the public, the Bureau concludes that this sufficiently meets the Commission's directive that "all underlying data, formulae, computations, and software associated with the model must be available to all interested parties for review and comment."

16. For many of the same reasons why the Bureau finds this process consistent with the Commission's stated expectations, the Bureau also concludes that the Bureau's development of the model is consistent with the Administrative Procedure Act's (APA) notice and comment requirements. The Bureau is not persuaded by the argument that the Bureau has violated the APA by relying on a proprietary model with "hidden algorithms, assumptions, and inputs . . . that are not available to the public or other potentially affected entities." One commenter argues that notice and comment requires that "[i]n order to allow for useful criticism, it is especially important for the agency to identify and make available technical studies and data that it has employed in reaching the decisions to propose particular rules." As discussed above, considerable technical information and data about the CAM are available to interested parties to help them understand how the model works and to analyze the results. The Bureau rejects PRTC's nebulous claim that it needs "access to all the meetings, discussion, analyses, and workpapers that led to the development of the model's inputs" and algorithms to be able to validate the results of the model. PRTC does not explain specifically what "meetings, discussion, analyses, and workpapers" it

seeks that are not already available to commenters in this proceeding, given that commenters have had available to them sufficient information to evaluate the reasonableness of model results. And PRTC's claims that the operating expense, CQLL, and CQMM inputs and algorithms it identifies are "hidden" are unfounded. In fact, as the Bureau discusses more fully below, the Bureau provided detailed documentation about these algorithms and inputs. PRTC has failed to demonstrate that it is necessary to have access to additional information in order to meaningfully comment on and validate the operating expense values that the model calculates.

17. As the Bureau has released versions of the CAM, it has also released accompanying public notices explaining the changes it has made to the model, and revised and expanded the documentation and other information associated with the model. The Bureau also held physical and virtual workshops on the model, provided for multiple rounds of comments and for ex parte filings, all of which were available to commenters in the record. The Bureau thus has provided all interested stakeholders – including price cap carriers, potential competitors, consumer advocates, and the states – with full access to all the information that is necessary to understand how the model works and the results it produces. That is sufficient for all parties to evaluate the reasonableness of the model.

2. Validation/Verification

18. The information provided on the CAM website, available to commenters subject to reasonable limitations to protect commercially sensitive and proprietary information under the Bureau's protective order, provides interested parties with sufficient information to be able to evaluate the reasonableness of the input values and model results. Early in the model development process, several parties complained that there was not enough information available to validate the reasonableness of certain assumptions and input values. Over a multi-month period after the first version of the CAM was made available, the Bureau worked with the CAM contractor to provide additional information and documentation to assist the public in understanding the model. As discussed above, subsequent versions of the model, updated documentation, inputs, and model results were posted to the Commission's website and thus available to the public. In addition to the model methodology documentation, which describes

the methodology used to derive various input values, there is a tutorial video explaining the capex workbook and inputs, and an overview of the development of the opex inputs. Furthermore, detailed results posted to the model site, accessible to any authorized model user, provide data from various model runs; one set of reports includes location counts, a breakout of many components of cost, and investment (capex) data at the census block group level (i.e., with little aggregation, breaking the country into 219,761 geographic areas); and model results at the census block level (i.e., without any geographic aggregation) with location counts and cost rounded to the nearest $5.00.

19. Despite the availability of this detailed information, some parties reiterate complaints that there is not enough information available to validate and verify the reasonableness of certain assumptions, input values, and model results. As discussed below, the Bureau is not persuaded that the additional data, documentation, and reporting functions that some parties request would help users better assess whether modeled results are reasonable. Nor is the Bureau persuaded by the arguments of carriers serving non-contiguous areas of the United States that they were unable to evaluate model results.

20. Throughout the model development process, the Bureau has improved the model and its documentation in response to comments and analyses from various parties. For instance, using the detailed results from a previous version of the model, ACA identified certain census block groups "where support was being provided in unexpected urban areas," such as the National Mall in Washington, DC. The Bureau investigated this issue and made further adjustments to the location data utilized by the CAM to ensure that only census blocks with residential locations were included in the model's cost calculations. The Bureau concludes that this improvement to the model addresses the concern raised by ACA in a comprehensive way and the Bureau adopts this modification. Indeed, ACA concedes that "[t]here are potentially legitimate reasons why these areas may be receiving support" and notes that the urban areas it identified "may include counties or portions of counties that are not densely populated, currently serviced, or easily accessible." Because the model estimates cost at a granular level, it is not unexpected that some otherwise low-cost urban areas will include a few high-cost locations. Accordingly, given the limited,

equivocal concerns raised in the record, the Bureau does not find it necessary to separately investigate each census block in an urban area that may be eligible for support.

21. The Bureau finds that ACA's further requests for additional documentation and reporting functions either would not enhance parties' ability to evaluate the reasonableness of the model results or are not necessary because the information already is available. For example, we are not persuaded that ACA's request for access to the geographic coordinates of modeled locations, including whether locations were randomly placed or spread along roads "would help users better assess whether modeled results appear reasonable at the census block level." ACA seems to presuppose that whether a location is geocoded or randomly placed matters in determining the reasonableness of that location's cost. There is no reason to believe this is the case. As the Bureau explained in the CAM Platform Order, because ninety-six percent of residential locations and ninety-four percent of business locations are geocoded, the Bureau expects that any effect on average cost in a census block because of random placement of some locations would be small. Thus there is no reason to believe that understanding whether a location is geocoded or randomly placed would lead to any insight about whether the cost is reasonable. Moreover, as the Bureau discusses above, there can be high-cost geo-coded locations within otherwise low-cost areas. Since the cost of a location is thus clearly influenced greatly by drivers other than the source (e.g., distance to network facilities), the Bureau does not see how the information that ACA requests would provide insight into the reasonableness of the cost of that location. Although the Bureau is not persuaded that ACA's request for "geographic visualizations" that include the location of demand units would be useful, as discussed above, after the Bureau released illustrative results for CAM v4.0, it published maps that visually displayed those results so the public could see the geographic territories that would potentially be subject to the offer of model-based support under two different funding benchmarks. These maps thus provide "geographic visualizations" of costs and support that "would enable stakeholders to more easily evaluate the modeled results."

22. Nor is the Bureau persuaded that ACA needs additional reporting and documentation to identify specific cost drivers. The detailed model results available permit users to identify asset

categories at the census block group level (for example, the available results break out capital costs by part of the network (e.g., middle mile costs, outside plant costs, customer premises costs – by network node in model parlance) and different types of opex (network operations, general and administrative and customer operations and marketing). Moreover, because support is based on total costs, it does not matter which asset category contributes more to costs in a particular area. In other words, whether cost is driven by (non-labor) plant cost or labor cost does not matter to the level of support. ACA also requests "access to all interim calculations" or, at a minimum, an example showing all interim calculations, input assumptions, and how these assumptions are aggregated to estimate levelized monthly cost. Such access already is available. CostQuest provides a sample database to parties who have requested the System Evaluator package and signed the non-disclosure agreement that allows users to analyze CAM processing steps by running each step and then investigating what data changed after each step. With regard to the specific question of how costs are levelized, that is to say how a monthly annuity is calculated for a given investment, the capital cost model that calculates the monthly capital recovery (depreciation) and post-tax return (cost of money and tax) is available on the CAM website, as is a detailed explanation of how opex values are calculated.

23. ACA requested a comparison of CAM determined support amounts with previous support amounts. ACA and anyone else can easily compare frozen Phase I support and Phase II support at the study area level by comparing 2013 support disbursements available on USAC's website with the various illustrative model results. Aggregating those amounts at the state or holding company level is a simple mathematical exercise. In any event, it is not clear how such a comparison would be relevant to our decisions to finalize the model, which calculates costs at the census block level. Current frozen support levels were the result of several different legacy mechanisms, some of which provided support based on carriers' embedded costs averaged over a study area (ICLS, HCLS and LSS), while others were determined based on a fixed amount per-voice line (IAS), or state level averaging of an earlier forward-looking cost model (HCMS). As a practical matter, there is no simple way to compare those costs to CAM outputs.

24. The Bureau has made available sufficiently detailed information on the CAM website, and the Bureau does not find NASUCA's complaints to the contrary persuasive. Contrary to NASUCA's claims, as discussed above, some model results are reported at the census block level, e.g., the number of locations and average cost in the block rounded to the nearest $5.00, and a list of blocks eligible for support as part of the package of illustrative results was released for CAM v4.0 and v4.1. At the census block group level, the total monthly cost is broken down separately for residential and business locations into the following components: network operations; general and administrative; customer operations and marketing; depreciation; taxes; and cost of money. In addition, the block group level results break out capital costs by network node – the precise network breakout that NASUCA says is of interest. NASUCA has not convinced us that the detailed information provided on the CAM website is inadequate, and the Bureau concludes that the information already available is sufficient to enable parties to provide meaningful analysis and comment on the model and its inputs.

25. Nor is the Bureau convinced that requiring price cap carriers to file accounting data, as NASUCA requests, is an appropriate way to validate cost inputs for a FTTP network. Only one price cap carrier has deployed FTTP at scale. Even for providers that have deployed FTTP, the Bureau is skeptical that accounting data would allow us to determine FTTP-specific costs. Fiber costs in an FTTP deployment would be indistinguishable from the fiber deployed in a Digital Subscriber Line (DSL) or voice-only network. State-wide reporting would mean that costs from areas without FTTP would be lumped together with costs for FTTP areas; and even if FTTP were deployed across an entire state, carriers largely have continued to maintain their copper networks in parallel.

26. The Bureau also is not persuaded by the arguments of the non-contiguous carriers that they were unable to evaluate the model inputs and results. For instance, at various points in the proceeding, ACS claimed that it did not have enough information to determine whether model results are reasonable. Similarly, PRTC argued that it did not have enough information to evaluate whether input values are reasonable. The record demonstrates, however, that ACS and PRTC understand CAM and its inputs well enough to advocate specific changes to the model with clear expectations as to the impact of

those changes. Although ACS, PRTC, and Vitelco initially argued that the Bureau should use their state/territory-specific models rather than CAM to estimate their Phase II support, after further discussion and meetings with the Bureau, the carriers serving non-contiguous areas demonstrated that they were able to analyze CAM inputs and outputs, and they subsequently provided inputs for the Bureau to incorporate into later versions of the model. In addition, ACS, PRTC, and Vitelco each ultimately proposed state/territory-specific modifications to CAM.

27. Similarly, the Bureau is unpersuaded by ACS' and PRTC's arguments that they did not have enough information to verify various input values and understand why the model results do not reflect their own costs. Both ACS and PRTC seem to assume that verifying input values involves comparing them to their own embedded (i.e., previously incurred) costs rather than evaluating whether the input values are reasonable estimates of the forward-looking costs of an efficient provider. For example, one would only expect model-calculated property taxes to be the same as actual property taxes if both reflect the same asset base on which the taxes are assessed. However, one should expect a forward-looking model to reflect a more efficient network compared to today's network – for example, due to moving to a more efficient technology and replacing thick bundles of copper with smaller, higher capacity fiber cables, or from higher asset utilization due to improved clustering and routing. Therefore arguments that the model is flawed, or that access is incomplete because the model does not produce results similar to embedded costs are mistaken.

28. The Bureau also is not persuaded by ACS and PRTC's argument that they needed access to other carriers' proprietary data in order to evaluate whether calculated opex costs were appropriate. The carriers have always had the opportunity to compare their own costs or labor rates with those used in the model which we believe is sufficient to evaluate the appropriateness of the inputs. In addition, the Bureau worked with CostQuest to provide a detailed explanation of the model's opex methodology, which is posted on the CAM website and includes a comparison between the model-calculated per-location opex values and per-line NECA data for carriers' reported operating expenses. In addition, model users can obtain reports of CAM expenses by wire center, study area or carrier footprint, and can

determine, for example, the location-adjusted unit cost for labor. In short, the Bureau believes that such data provide ample opportunity for commenters to evaluate the model's ability to appropriately capture the cost of operating in any given area including the non-contiguous areas of the United States.

29. The Bureau also has made available sufficient documentation and information about CQLL and CQMM to enable parties to evaluate the reasonableness of the outputs and do not find PRTC's call for the release of CQLL and CQMM warranted. As noted above, parties can access CQLL and CQMM source code using DRM-protected PDF files. In addition, the System Evaluator package allows users to view each of the processing steps used to calculate costs by the CAM. This includes access to the databases of information used as inputs to the cost calculations; these databases include the output of CQLL and CQMM that are used by the CAM for the coverage area contained within the System Evaluator package. And as noted above, parties that have signed the relevant Third Supplemental Protective Order attachments have had access to CAM's inputs and outputs throughout the model development process, and CAM illustrative results and methodology documentation have been made available for months on the Commission's website. Such access affords the requisite opportunity for parties to assess the reasonableness of CQLL and CQMM's output without compromising CostQuest's proprietary business information.

30. Parties have had numerous opportunities to comment, and the Bureau has received numerous suggestions through the virtual workshop, comments and the ex parte process regarding how to improve the model over more than eighteen months. Pursuant to the Bureau's policy direction, numerous changes have been made to the model in response to meaningful written comments that were filed and issues identified in the ex parte process. For example, in response to commenters' concerns that the National Broadband Map data do not show the availability of voice services for purposes of determining whether a census block is served by an unsubsidized competitor to determine areas eligible for support, the Bureau concluded the CAM's cable and fixed wireless coverage should be modified to reflect only carriers who reported voice service on FCC Form 477, pursuant to the Bureau's policy decision. As discussed above, the Bureau also concluded it was necessary to modify the national demand location data

utilized in CAM v4.0 to address an issue previously raised by ACA. Although the Bureau has not incorporated all changes to the CAM that were suggested by outside parties, it has made numerous improvements in response to issues raised in the record. The Bureau therefore concludes that the CAM includes functionalities and capabilities needed to accomplish the task delegated to by Bureau by the Commission. Moreover, given the extensive documentation available, as well as the ability to compare the model output values as a means to test the validity of the model input values, the Bureau concludes that the Bureau's approach with the CAM sufficiently meets the Commission's directive that the "model and all underlying data, formulae, computations, and software associated with the model must be available to all interested parties for review and comment. All underlying data should be verifiable, engineering assumptions reasonable, and outputs plausible."

3. Alleged Delegation by the Bureau

31. Finally, PRTC's assertion that the Bureau has sub-delegated its responsibility to develop the model to CostQuest is unfounded. PRTC claims that the Bureau has delegated its "decision-making authority" to CostQuest because CostQuest "has crafted the hidden algorithms, input sheets, and toggle formulae that power the [CAM]" and has allowed CostQuest to "'make crucial decisions' about the inputs and assumptions the model will employ." Contrary to PRTC's assertions, and unlike the case law cited by PRTC, the Bureau has given CostQuest no such decision-making role.

32. The Commission instructed the Bureau to "select" a model that is consistent with the Commission's parameters. As described in greater detail above, the Bureau at all times has independently made all necessary decisions regarding the model, based on the record before it. As evidenced by the Report and Order and the prior CAM Platform Order, the Bureau, with much input from outside parties, has made the policy decisions on everything from the network architecture to be used to how the input values should be developed. USAC directs CostQuest to implement these decisions pursuant to the policy direction of the Bureau—simply put, CostQuest has no decision-making authority to make changes to the CAM without the Bureau fully vetting and USAC approving a change. Moreover, PRTC has not persuasively explained why it lacked sufficient access to specific aspects of the model to enable

meaningful comment—and thus meaningful oversight and review by the Bureau—particularly given the extensive access and information available to commenters, as discussed above.

33. Contrary to PRTC's unsupported claim that the Bureau has engaged in the "abdication to CostQuest of the entire modeling process," throughout the process the Bureau has been in full control of model development. These changes are detailed by the CAM Release Notes and public notices that accompany each iteration of the CAM, and as described above, are often made in response to comments made by outside parties. For example, the Bureau concluded that the model should calculate the costs of a green-field FTTP wireline network (rather than a brown-field or DSL network), estimate the cost of an IP-enabled network capable of providing voice services (rather than a switched network or a network that offers no voice services), and exclude areas from support based on the Bureau's definition of unsubsidized competitor—and those changes were implemented pursuant to the Bureau's policy decisions. The Bureau also sought comment on CQLL and CQMM's methodology for developing a wireline topology, and made the policy decision that the methodology is reasonable; in fact a good deal of the virtual workshop was devoted to issues of how best to approach such analyses. In addition, the Bureau not only determined what input data sets to use, but also how to modify those sources in response to public input. The process of creating a model undertaking such an exercise from scratch and then seeking and considering comments from outside parties, would have added many more months to the Phase II implementation timeline. It was far more efficient to use the expertise of CostQuest to help with the technical aspects of implementing the Commission's directives, and for the Bureau to refer parties to CostQuest when they had technical questions.

B. Model Inputs and Platform Updates

34. In this section the Bureau adopts the model inputs and the minor modifications to the model platform that we have made since the CAM Platform Order was adopted on April 22, 2013. In that Order, the Bureau "primarily address[ed] the model platform, which is the basic framework for the model consisting of key assumptions about the design of the network and network engineering," and also "address[ed] certain framework issues relating to inputs." The Bureau anticipated that "[t]ogether, the

two orders should resolve all the technical and engineering assumptions necessary for the CAM to estimate the cost of providing service at the census block level and state level."

35. Model platform changes, including changes to certain network engineering assumptions with regard to non-contiguous areas of the United States, were discussed and explained in public notices announcing subsequent versions of CAM, in the model methodology documentation, and in more detail in the CAM Release Notes. The Bureau also adopts the updated data sets that are used in the current version of CAM. For example, when the model platform was adopted, the version of the model at the time (CAM v3.0) used National Broadband Map data as of June 2012 to identify census blocks shown in the National Broadband Map as unserved by wireline telecommunications, cable, and fixed wireless providers offering speed levels of 3 Mbps downstream and 768 kbps upstream. The current version of CAM updates the broadband coverage data in several ways. This version uses June 2013 National Broadband Map data, modifies the cable and fixed wireless broadband coverage to reflect only providers that have reported voice subscriptions on FCC Form 477 June 2013, and removes subsidized providers from the model's source data used to identify which census blocks presumptively will receive funding. As discussed below, CAM uses GeoResults 4Q 2012 data to identify wire center boundaries and central office locations. As discussed above, CQLL and CQMM develop the network topology for CAM, which are used as inputs to CAM. The Bureau also adopts the updates to these data. For example, in the CAM Platform Order, the Bureau adopted the customer location data used in the model, which CQLL uses to develop the network topology. As described above, we updated the demand location data by modifying the methodology for placing randomly placing county growth locations. The major data inputs to the CAM along with the underlying source for those data are listed in Appendix three of the Model Methodology documentation.

36. The Bureau also adopts the user-adjustable inputs for purposes of finalizing the model in order to calculate support amounts to be offered to price cap carriers. The inputs for CAM v4.1.1 are posted on the Commission's website and include values for capital expenses, operating expenses, annual charge factors, busy hour bandwidth, business and residential take rate, company size classifications,

adjustments made for company size purchasing power, plant mix, property tax, regional cost adjustments, the percentage of buried plant placed in conduit, and state sales tax. The Bureau discusses below those inputs that were the focus of the virtual workshop questions and public comment, specifically: (1) outside plant and interoffice transport capex input values, including wire center boundaries, plant mix, and sharing; (2) other capex input values, including customer premises equipment, customer drops, central office facilities, FTTP equipment, voice capability, busy hour demand, and annual charge factors; and (3) opex input values, including network operations expense factors, general and administrative expenses, customer operations marketing and service operating expenses, and bad debt expense.

1. Outside Plant and Interoffice Transport Capex Input Values

37. In this section, the Bureau addresses the model inputs related to capital expenditures capex for outside plant and interoffice transport plant. As the Commission recognized when it adopted the model platform and inputs for HCPM, outside plant – i.e., the facilities that connect the customer premises to the central office – constitutes the largest portion of total network investment. Outside plant investment in an FTTP network includes the fiber cables in the feeder and distribution plant and the cost of the fiber distribution hubs and fiber splitters that connect feeder and distribution plant; transport plant investment includes fiber cables as well as the required electronics. Cable costs include the material costs of the fiber-optic cable, as well as the costs of installing the cable, including the materials and labor associated with the structure. Outside plant and transport consist of a mix of different types of structure: aerial, underground, and buried cable. Aerial cable is strung between poles above ground. Underground cable is placed underground within conduit for added support and protection, with access points via manholes. Buried cable is placed underground but without any conduit. A significant portion of outside plant investment consists of the poles, trenches, conduits, and other structure that support or house the cables along with the capitalized labor associated with those structures. In some cases, other providers like electric utilities share structure with the LEC and, therefore, only a portion of the costs associated with that structure are borne by the LEC. As discussed below, CAM outside and interoffice plant capex

input values take into account variations in cost due to plant mix (aerial, buried, or underground) and structure sharing, as well as terrain, density and regional material and labor cost differences.

a. Wire Center Boundaries

38. As discussed in the CAM Platform Order, in designing the modeled network, the CAM platform uses a green-field, "scorched node" approach that estimates the average (levelized) cost over time of an efficient modern network, assuming only the existence of current LEC wire centers and their boundaries, and central office and tandem locations. In the Model Design PN, 77 FR 38804, June 29, 2012, the Bureau proposed using wire center boundaries obtained through a new data collection, or in the alternative, commercial data, if the data collection could not be completed in time for the model development process. The only party directly commenting on data sources for wire center boundaries, NASUCA, favored using the Bureau's study area boundary data collection.

39. The Bureau concludes that it will use a commercial data set, GeoResults 4Q 2012 wire center boundaries and central office locations, in CAM that will determine support amounts to be offered to price cap carriers. Although the Bureau recently collected study area boundary and exchange data from all incumbent LECs (or state commissions filing data for their carriers), it would unnecessarily delay finalizing of the model to incorporate that data into the model for the purpose of calculating the offer of support to price cap carriers. The GeoResults data are the data used in all model versions starting with CAM v2. Interested parties have had ample opportunity to review model cost estimates and resulting support amounts using this data set, and no party has expressed concerns that using commercial data materially impacts the accuracy of model results for the price cap carriers. Indeed, carriers often rely on commercial data for their own wire center boundaries. For example, in response to the Bureau's data request, AT&T submitted GeoResults data for some of its study areas, and Verizon submitted data from another commercial vendor. Using the Bureau's study area boundary data collection in the model for price cap carriers would require additional time to complete Phase II Connect America implementation, without any clear indication that it would materially improve the accuracy of model results for price cap carriers.

b. Plant Mix Input Values

40. Outside and inter-office transport plant investment varies significantly based on plant mix, i.e., the relative proportions of different types of plant– aerial, underground, or buried – in any given area. The Bureau originally sought comment on plant mix input values in the virtual workshop in October 2012, and requested additional input on December 17, 2012, in light of the release of the Connect America Cost Model. The ABC Coalition filed updated plant mix values on January 11, 2013, and the Bureau sought comment on these values in the virtual workshop. In the CAM Platform Order, the Bureau adopted a model that assumes that each state is made up of three density zones – urban, suburban, and rural, but did not adopt input values at that time. For each of the three density zone, the model assumes a specific percentage of underground, buried, and aerial plant for each of the three sections of the network (feeder plant, distribution plant and inter-office facilities). As a result, each state will have a matrix of 27 different plant mixes, one for each combination of density zone, plant type and component of the network. In addition, the model includes default nationwide plant mix values, which may be used in any state for which specific inputs may not be available.

41. The Bureau adopts the plant mix inputs used in CAM v4.1.1 for contiguous carriers, which are based on carrier-specific data submitted by the ABC Coalition. Verizon derived six groups of plant mix values, recognizing regional differences, from its forward-looking cost model for FTTP and engineering sources of existing structure. AT&T extracted aerial, buried and underground plant outside plant mileage data from a network database covering copper and fiber cables placed in the previous fifteen years for each of its twenty-two state LEC service territories. CenturyLink provided its company-specific actual plant mix by using an internal database of continuing plant records for its thirty-seven state incumbent LEC footprint. In states where there were two or more reporting carriers, such as California and Florida, the values were combined using simple averages for the density zones and network sections in those states. Where company-specific or state-specific data were not available, the model uses national average data, which is consistent with the approach taken for HCPM. The national averages are simple averages of the company-specific values.

42. Although ACA agrees that using carrier-specific data to develop plant mix data is reasonable, it argues that the input values submitted by the ABC Coalition show lower proportions of aerial plant in rural areas than ACA has seen reported by other broadband providers, and that "deploying buried plant can be significantly more expensive than the cost of deploying aerial plant." In response, the ABC Coalition argues that ACA does not identify the broadband providers with higher percentages of aerial plant and ignores the wide range of the proportion of aerial plant in the Coalition's state-specific tables. The national average percentage of aerial plant used in the model is 29.8 percent, but the percentages are as high as 78 percent or 73.3 percent in some northeastern states to as low as 8.5 percent or 9 percent in some midwestern and western states (Kansas, Colorado, and Wyoming). ACA has not filed any data to support its claims that there is more aerial plant in rural areas; and it is not clear that the plant mix values that ACA refers to are representative of the entirety of price cap ILECs' study areas. Thus the Bureau has no data in the record on which to base alternative plant mix values. Even if the Bureau were to increase the percentages of aerial plant in rural areas, it would not expect the costs to change that much because the costs of buried plant in rural areas are not much higher, or can be lower, than the costs of aerial plant, so it finds the existing data reasonable to use here.

c. Outside Plant Sharing

43. The CAM platform assumes that outside plant facilities are shared a certain percentage of the time between a carrier's own distribution and feeder and with other providers, such as electric utilities. In addition, CAM assumes that interoffice routes (i.e., middle mile) will be shared with distribution and/or feeder routes a certain percentage of the time, and that the interoffice network is a shared network carrying both voice and broadband for residential and certain business locations and special access and private line (including direct Internet access) traffic for other business locations, wireless towers, and community anchor institutions. The percentage of shared facilities may vary by density zone – rural, urban, or suburban, and by structure type – aerial, buried, or underground. Thus, similar to the plant mix input tables, each plant sharing table has a matrix of nine possible density zone/structure type

combinations. In the virtual workshop, the Bureau sought comment on determining the plant sharing factors.

44. The Bureau adopts the outside plant sharing percentages used in CAM v4.1.1. For structure sharing with other providers, the model assumes that 48 percent of the cost of aerial structure in all density zones is attributed to the LEC, and that 96 percent of buried and underground structure in rural areas, 80 percent of buried and underground structure in suburban areas, and 76 percent of buried and underground structure in urban areas is attributed to the LEC. This effectively assumes, for example, that an electric or other company lays cable along a given route only four percent of the time in rural areas at the same time the LEC has a buried trench open or underground conduit available, and only 20 percent of the time in suburban areas. The Bureau concludes these are reasonable assumptions, given that it is unlikely that electric or other utilities would have a need to bury new cable at the same time as the incumbent LEC. Likewise, the Bureau finds that it is reasonable to assume that sharing of aerial plant is more prevalent (which results in less cost assigned to the LEC) than sharing of buried trenches or underground conduit because other companies do not need to be deploying facilities at the same time in the same place to share the cost of poles.

45. For sharing between the LEC's own plant, the model assumes that distribution and feeder plant share aerial structure 78 percent of the time that their routes overlap, share buried structure 41 percent of the time that their routes overlap, and share underground structure 67 percent of the time that their routes overlap. The model uses these sharing factors to determine how much structure is required for each route. The effect of this sharing is to reduce the cost of feeder and distribution plant because they require less structure like poles, conduits and trenches.

46. The Bureau also adopts the sharing percentages related to interoffice transport used in CAM v4.1.1. Interoffice routes connect central offices, and often will run along the same routes as the feeder and distribution and use the same structure. Because the model estimates the full cost of structure within the wire center, the model only needs to estimate the additional cost of interoffice structure that is not shared with feeder and distribution structure. Thus, these interoffice sharing percentages reflect the

percentages of interoffice routes requiring dedicated structure. The model also assumes that the interoffice network is shared between two major groups of services: voice and broadband for residential and certain business locations (mass market services) and special access and private line (including direct Internet access) for other business locations, wireless towers, and community anchor institutions, and that 50 percent of the cost of interoffice fiber and structure is attributed to voice/broadband services. The allocation is based on the assumption that residential/business voice and broadband services and special access/private line services are transported over the same middle mile routes using the same fiber cables and structure. CAM assumes that one-half the cost of the fiber and associated structures in the middle mile are attributed to the voice and broadband services delivered to residential and small business customers, and the other half is attributed to the private line/special access services, as if each service type would otherwise require the construction of an independent network.

47. Although there are various approaches to allocating common costs by dividing all costs and fully distributing them on the basis of an "allocation key," the Bureau chose to allocate middle mile costs by broad services types. Specifically, the CAM splits these costs between enterprise services, such as special access and other dedicated services, and mass market services, such as "best efforts" Internet access and single or dual line voice services that typically are delivered to residences and small businesses. The Bureau could have considered alternative cost allocation methods, such as a division based on some measure of bandwidth used, the share of bits transferred, or the share of revenues. However, the Bureau does not have any data to support an alternative allocation method.

d. Other Outside Plant and Interoffice Transport Capex Inputs

48. In addition to variations in cost due to plant mix and structure sharing, the CAM capex input values take into account other factors that affect costs, such as size or type of material, terrain and soil conditions, density of the area, or region of the country. In the CAM Platform Order, the Bureau adopted regional cost adjustment factors to capture regional cost differences in labor and material costs by three-digit ZIP codes. In the Report and Order, the Bureau adopts the approach and outside plant capex

input values used in CAM v4.1.1 that, where appropriate, reflect cost differences related to these other factors.

49. For the capex input values that vary by density, the Bureau adopts the methodology used to identify an area as urban, suburban, or rural in CAM. Specifically, density is measured at the census block group level and based on the number of locations in the block group divided by the area. Census block groups with 5000 or more locations per square mile are identified as urban; those with 200 or more locations per square mile that are not urban are identified as suburban; and those with fewer than 200 locations per square mile are defined as rural. The Bureau notes that these categories only address which inputs are used to calculate costs – what the unit costs are, not the cost to connect each location. The network costs themselves are driven by the amount of plant, which is determined by the route distance back to the ILEC central office. Thus areas within a density zone can have very different costs; for example, those locations that have the lowest density (e.g., 1 location per square mile or less) are likely to have much higher costs than those closer to the 200 per square mile cutoff. We note that these density zones collapse the nine density zones used in HCPM into three: the three lowest density zones are classified as rural, the four middles density zones are classified as suburban, and the two highest density zones are classified as urban. The Bureau finds that this is a reasonable approach. For some of the input values used in HCPM, there was little or no difference in values used in the lowest three density zones. Some input values used in HCPM, such as feeder and distribution placement costs, increased with density, so averaging the three lowest density zones together would have increased costs in the most rural areas.

50. In addition to varying by density, some costs also vary by type of terrain and soil conditions. For example, terrain/soil conditions affect the labor costs for placing underground and buried structure. The CAM uses different input values for underground and buried excavation costs in four types of terrain (normal, soft rock, hard rock or water, i.e., high water table). Terrain factors were developed for each census block group using data from the Natural Resources Conservation Service (NRCS) STATSGO database for bedrock depth, rock hardness, water depth and surface texture. For input values

that vary by terrain, we adopt the methodology used to identify terrain type in CAM v4.1.1 for contiguous areas of the United States. The rock hardness used in the contiguous United States for a given census block group is whichever type of rock is listed most frequently for the list of STATSGO map units in the census block group, regardless of the geographic area of the individual map units.

2. Other Capex Input Values

51. In this section, we address additional capex inputs used by the CAM. Consistent with the Commission's direction in the USF/ICC Transformation Order and the Bureau's decision in the CAM Platform Order, the CAM estimates the capital cost of the equipment necessary to facilitate provision of voice and broadband service to end users over a FTTP network. This includes estimating the cost of the hardware used throughout the network, including the carrier's central office facilities and at the end user's premises. To provide a more accurate reflection of the total cost to the carrier of providing this equipment, the CAM includes an estimate of the percentage of homes or business locations that would be expected to have drops and optical network terminals (ONTs) over the course of the relevant time period (the customer drop rate). The CAM also accounts for the capital cost per subscriber of providing voice service on an FTTP network, as well as the demand on the network during high traffic periods. The CAM also includes the capability to model the cost of both undersea and submarine cable used for middle mile connections in non-contiguous areas. Finally, the CAM captures the cost of capital investment used over time by utilizing Annual Charge Factors (ACFs) to determine the capital related to the monthly cost of depreciation, cost of money, and income taxes. As discussed below, the Bureau adopts the values used by the CAM v4.1.1 for these capex inputs and finalize the methodology used for calculating ACFs.

a. Optical Network Terminals

52. In the USF/ICC Transformation Order, the Commission required all federal high-cost universal service support recipients to offer voice telephony service over broadband-capable networks, and also required all recipients to offer broadband service as a condition of receiving such support. Consequently, the inputs used by the CAM must reflect the cost of equipment that provides the ability to provide both voice and broadband service. Included in the inputs is the cost of the ONT that provides the

gateway functionality to provide the Internet protocol-to-time-division multiplexing (IP-to-TDM) conversion needed to utilize the end-user's TDM equipment. The Bureau sought comment in the virtual workshop on the appropriateness of using these inputs.

53. The Bureau concludes that the CAM's methodology for the cost of ONTs is a reasonable approach and is consistent with the Commission's direction in the USF/ICC Transformation Order. We note that certain parties have advocated that the cost of battery backup for the modem should be included in this input. For example, NASUCA highlights the fact that, in FTTP networks, the ONT is powered in the end-users' home, whereas copper telephone networks are powered from the central office. To ensure that the network is sustainable when there are electrical outages, NASUCA argues that the cost of batteries at the customer's premises must be included in this input. The Bureau agrees with NASUCA and note that the CAM methodology assumes that the material prices of the ONTs include the up-front cost of battery backup and alarm, thereby incorporating the cost for such backup into model costs.

b. Customer Drop Rate

54. To properly model the cost of the equipment necessary to construct a new FTTP network, the CAM makes an assumption about the customer drop rate, i.e., the percentage of homes or businesses that will actually be connected to the network by a drop and ONT, rather than just being passed by the network. Beginning with CAM v3.1, the customer drop rate was set at 80 percent for both residential and business locations. ACA argued that the customer drop rate used by the CAM should be set at 90 percent to reflect the Commission's National Broadband Plan forecast adoption curve. The ABC Coalition advocated for the use of an 80 percent customer drop rate for broadband service.

55. The purpose of the customer drop rate is to determine the number of locations that are actually connected to the network by a drop and ONT, as opposed to the number of locations that are simply passed by the network. The underlying assumption is that an efficient provider will not physically connect every location when it runs fiber down a rural road, but rather will do so only when the subscriber chooses to subscribe.

56. The Bureau concludes that 80 percent is a reasonable estimate for the percentage of locations connected with a drop and ONT. The Bureau decided to adopt an 80 percent customer drop rate primarily because we are concerned that assuming that 90 percent for all residential and business locations are physically connected to the network may overestimate the potential level of customer demand. For example, some people may choose to subscribe to satellite broadband or only to mobile services provided by another provider (not the recipient of Phase II support); indeed, due to other barriers to adoption of broadband services, some small fraction may not subscribe to any form of broadband. Moreover, even in the presence of latent demand, it likely would take some time for customers to adopt a newly available service. Therefore, while the 80 percent customer drop rate used by the CAM may slightly understate the costs associated with constructing the network, it also recognizes that not all potential customers in a given area will necessarily opt to receive broadband or voice service from a Phase II-supported carrier.

57. At the same time, it is reasonable to assume that the customer drop rate used by the CAM is higher than the current or even expected subscription rate. When a carrier building a new FTTP network runs cable down a street, some locations may be vacant or the occupants may not presently wish to purchase broadband or voice service; over time, however these locations will become connected as new residents move in and choose to subscribe. Such "churn" means that at any point in time the percent of locations that have drops and ONTs will likely exceed the actual subscription rate.

c. Central Office Facilities

58. As with the ONT inputs, the CAM inputs reflecting the cost for central office facilities for an all-IP network must account for the cost of providing both voice and broadband service, consistent with the Commission's direction. This includes the costs for routers, Ethernet switches, rack space, and optical line terminators (OLTs) for FTTP configurations, as well as costs for buildings, land, and power.

59. The Bureau adopts CAM v4.1.1's input values to estimate the cost of central office facilities. The Bureau acknowledges that some parties have advocated for the inclusion of specific costs within the central office inputs. For example, NASUCA argued for the inclusion of inputs that ensure the

sustainability of the network in the event of electric outages, such as back-up generators and large batteries in the central offices. The Bureau agrees and notes that the capitalized power investments for central office generators and batteries are included in the "Other Rate" on the "Labor Rates and Loadings" input worksheet for all equipment items assigned to the circuit or switching accounts. The model also includes the cost for backup power at the location to account for the fact that, in an FTTP network, power at the central office does not supply power to the outside plant.

60. Though ACS agreed that the cost of routers, Ethernet switches, and other materials appropriate for a voice and broadband capable network should be included as inputs, it also advocated for additional costs, such as "building space, power, support equipment, etc." We take this opportunity to clarify that costs for buildings, land, and power are included as inputs for central office facilities.

d. FTTP Network Equipment

61. In the CAM Platform Order, the Bureau determined that the CAM would estimate the costs of an FTTP network. Consequently, the CAM reflects the capital cost of constructing a FTTP network, accounting for hardware such as ONTs, fiber drop terminals, fiber splitters, and OLTs. The Bureau solicited comment on the reasonableness of these inputs in the virtual workshop and asked parties to specify whether any other types of hardware should be added or excluded when they adopt the final version of the model.

62. The Bureau concludes that CAM v4.1.1's FTTP equipment input values are reasonable based on the record before us. The ABC Coalition noted that there was a general lack of experience among its members of building FTTP networks in high cost and rural areas, but explained that, based on input from at least one Coalition member, "the current FTTP inputs are the best available values and should be used as the FTTP input values in the adopted version of CACM." Both ACS and PRTC also agreed that the CAM makes the appropriate assumptions regarding the types of hardware needed for FTTP networks.

e. Voice Capability

63. As noted above, the Commission requires all federal high-cost universal service support recipients to offer "voice telephony service" over broadband-capable networks, and also requires all recipients to offer broadband service as a condition of receiving such support. Accordingly, in the CAM Platform Order, the Bureau adopted "a model platform that estimates the cost of an IP-enabled network capable of providing voice service." The cost of providing voice service is "modeled on a per-subscriber basis and takes into account the cost of hardware, software, services, and customer premises equipment to provide carrier-grade Voice over Internet Protocol (VoIP) service." The CAM Platform Order, however, did not address the specific inputs used to calculate the per-subscriber costs.

64. The Bureau now adopts CAM v4.1.1's default inputs for voice service. Specifically, the CAM assumes capital costs of $52.50 per subscriber associated with providing voice service on an IP-enabled broadband network. Applying the annual charge factor to this per-subscriber capital charge increases the levelized monthly cost of service by approximately one dollar. The Bureau notes that this cost estimate is consistent with the rates charged by third-party providers of hosted voice services. USTelecom agrees that these monthly costs are "within the realm of reason."

f. Busy Hour Demand

65. In the CAM Platform Order the Bureau adopted a model platform that will size network facilities such that there is sufficient capacity at the time of peak usage. The model platform accomplishes this by ensuring that the size of each link in the network is sufficient to support peak usage busy hour offered load (BHOL), taking into account average subscriber usage at peak utilization.

66. The Bureau now adopts CAM v4.1.1's BHOL input value of 0.44 Mbps, which corresponds to 440 kbps per user. The Bureau sought comment on using a BHOL input value of 440 kbps in the virtual workshop. The use of this value was supported by the ABC Coalition and was not opposed by any party. The ABC Coalition explains that while a higher BHOL value "may be reasonable," it believes that the model's "results are not sensitive enough to changes in the busy hour

bandwidth input to warrant modifying it." The Bureau agrees. Modest changes in this BHOL value are unlikely to impact significantly cost estimates and ultimate support amounts.

67. As explained in the model's methodology, CAM v4.1.1 has been sized to provide, at a minimum, a capacity of 5.4 Mbps per user, corresponding to a BHOL of 5,400 kbps. Thus, the specific BHOL value that we choose would only impact costs (by requiring the network to add additional capacity) if the BHOL were to exceed 5,400 kbps. The Bureau does not believe this is likely, as discussed below.

68. The CAM models a FTTP network architecture that is based on a GPON design. In the GPON network, there are a limited number of aggregation points that constrain broadband speeds, including fiber splitters and optical line terminal (OLT). When both the splitters and the OLT are fully utilized, each subscriber will receive at a minimum 5.4 Mbps of capacity in the most capacity-constrained areas, and in rural areas where there are fewer subscribers per splitter and fewer splitters per OLT, each subscriber will have many times that capacity by default, with the exact amount determined by local conditions. Further toward the core network, aggregation points are Ethernet switches and routers, whose capacities (number of line cards) increase with the number of subscribers assumed to be on the network. Thus, the CAM captures the need for increased capacity in the Ethernet (backhaul) network according to the supported number of subscribers. As a result, the modeled network is designed to provide far more busy-hour capacity, at least 5.4 Mbps per end user, than the BHOL value of 0.44 Mbps the Bureau adopts here.

69. The Bureau adopts a BHOL that is significantly higher than that used for the National Broadband Plan. There, staff adopted a BHOL of 160 kbps for the Broadband Assessment Model "to represent usage in the future," finding that with this value, "this network will not only support the traffic of the typical user, but it will also support the traffic of the overwhelming majority of all user types, including the effect of demand growth over time." In developing the Broadband Assessment Model, the staff assumed all residential and small business locations would receive speeds at 4 Mbps/1 Mbps. Usage for the CAM differs in several key ways: monthly data usage has continued to grow since the

development of the Broadband Assessment Model, and the Connect America Phase II model will be calculating support for a period of time further into the future than the modeling for the National Broadband Plan. Moreover, the Commission expressly contemplated that recipients of Phase II support would be offering service with higher speeds by the end of the five-year term. Therefore, the Bureau finds that it is reasonable to adopt a higher BHOL for the CAM than was used in the Broadband Assessment Model. The 0.44 Mbps value is consistent with growth rates utilized by Commission staff when developing the Broadband Assessment Model.

70. Even with higher assumed broadband speeds than the current 4 Mbps downstream, based on current and forecast usage, the Bureau concludes the BHOL input value of 0.44 Mbps is reasonable. As noted above, the assumed BHOL – which reflects a mix of high- and low-bandwidth uses – incorporates growth over time as subscribers move to more bandwidth-intensive uses. Further, some data suggest that moving to a higher speed connection by itself does not raise the BHOL substantially. Moving to a higher speed connection might allow users to demand more busy hour capacity for bandwidth-intensive applications like streaming video. However, because BHOL includes the effect of low-bandwidth users and those who are not online at all, the effect of higher-bandwidth video streaming will be muted. In other words, as long as people spend some of their busy hour time with email and social media, or offline entirely, the overall increase in BHOL associated with higher broadband speeds is minimal. And, to the extent that demand falls outside of periods of peak demand (i.e., if people watch more, higher-quality video but outside of busy hour), there will be no effect on BHOL at all. For that reason, we do not expect an increase in broadband speed of, e.g., 2x to 5x (i.e., a downstream speed of 8-20 Mbps) would lead to a comparable increase in BHOL. Moreover, even if BHOL were to increase linearly with speed, to 880 to 2,200 kbps, there would not result in any increase in modeled network cost because, as noted above, model costs are not sensitive to BHOL values below 5400 kbps.

71. The BHOL the Bureau selects also is consistent with the Commission's expectation that recipients of Phase II support would offer services with usage allowances reasonably comparable to usage for comparable services in urban areas. The Bureau implemented that directive by specifying an initial

minimum usage allowance of 100 GB of data per month, with usage allowances over time consistent with trends in usage for 80 percent of consumers using cable or fiber-based fixed broadband services. The 0.44 Mbps input value that the Bureau adopts today should be sufficient to accommodate a 100 GB/month usage allowance and reasonable growth trends in usage over the five-year term.

g. Annual Charge Factors for Capex

72. The CAM captures the cost of capital investment used over time, reflecting both the cost of initial deployment, replacement capital expense and the cost of money necessary to have access to that amount of capital. To do so, the model applies levelized Annual Charge Factors (ACFs) to a number of capital investment assets categories, including circuits, software, switches, land, and buildings, to determine the capital-related monthly cost of depreciation, cost of money, and income taxes (i.e., to ensure the appropriate cost of money is provided after accounting for the impact of income taxes). The Bureau sought comment in the virtual workshop on the reasonableness of the ACFs and the methodology used to calculate the ACFs. Below the Bureau adopts the specific inputs for depreciation, income taxes, and cost of money to be utilized in calculating the ACFs.

(i) Depreciation

73. In the CAM Platform Order, the Bureau concluded that the CAM should determine terminal value "based on 'book value' calculated as the difference between investment and economic depreciation, which takes into account the economic life of the equipment and infrastructure." Utilizing such an approach reflects the likelihood of failure of a particular piece of capital equipment, rather than its straight-line accounting lifetime. The methodology the Bureau adopted for the CAM in the CAM Platform Order, therefore, is consistent with the methodology used in the past by the Commission and calculates book depreciations using Gompertz-Makeham survivor (mortality) curves and projected economic lives, adjusted so that the average lifetime of the asset falls within the range of expected accounting lifetimes authorized by the Commission. The Bureau noted that this approach was supported in the record.

74. ACA contends that the input assumptions should be updated to remove the negative future net salvage values, because the CAM uses the low end of project equipment lives. Instead, ACA recommends that the future net salvage rates used in the CAM be modified to adopt the high end of the salvage rate range for asset classes where the high end of the salvage rate range is zero or positive, and adopt a salvage rate of zero for asset classes where the high end of the salvage rate is negative. The Bureau disagrees. Adopting a salvage rate of zero for certain asset classes, rather than a negative salvage rate, implicitly assumes that there is no cost associated with removing those assets at the end of their usable lives. Ignoring the fact that carriers face actual costs to remove certain assets would be akin to ignoring the cost of placing the asset and would result in a flawed estimate of cost recovery.

75. ACA further recommends that the CAM use lower starting year prices for capital equipment, given that the prices used by the model will be more than two years old by the time Phase II support is distributed, and include a mechanism that reduces capital equipment prices over time to reflect deflation in equipment pricing. The Bureau declines to adopt both these proposals. As explained in the Bureau's response to the Hogendorn peer review, even after analyzing potential price fluctuations using extreme values, overall costs are unlikely to increase or decrease significantly. Further, to the extent that either the funding benchmark or the extremely high cost threshold is raised, the range over which prices are likely to move also is raised, lowering the extent to which the assumption of zero cost changes potentially overstates costs, and increasing the likelihood that they will understate costs. Therefore, using a fixed cost for capital equipment, in conjunction with the CAM's assumptions of a fixed cost for other inputs like labor, provides a consistent representation of the cost of this input over the five-year funding period and will have minimal, if any, effects on overall costs.

(ii) Income Taxes

76. Federal and state income tax rates are included in the ACF calculation so that when the ACFs are applied, the model provides a post-income-tax rate of return for each plant category. The Bureau concludes that adopting the marginal federal corporate income tax rate of 34 percent and a marginal state income tax rate averaged across all states of 5.3 percent is reasonable and supported by the

record. The ABC Coalition supported the use of these income tax rates, and no party objected to their use.

(iii) Cost of Money

77. Versions one through 3.1 of the CAM assumed a nine percent cost of money in setting the default ACF input values, calculated with a ratio of debt to equity of 25:75, 9.7 percent cost of equity, and 7 percent cost of debt. CAM v3.1.2 through v3.1.4 provided users the option of selecting ACFs that assume a nine percent cost of money, calculated with the same debt to equity ratio of 25:75, or an eight percent cost of money, calculated with a ratio of debt to equity of 45:55, 9.48 percent cost of equity, and 6.19 percent cost of debt. CAM v4.0 adjusted the default input for the cost of money to 8.5 percent.

78. The ABC Coalition, through its submission of the CQBAT model and virtual workshop comments, advocated for the use of a nine percent cost of money input when calculating ACFs. Conversely, ACA, in response to the Model Design PN, contended that an appropriate cost of money input for purposes of calculating ACFs should be between five percent and seven percent. Both parties agree that the rate adopted by the Bureau should be the same for all price cap carriers.

79. In a 2013 staff report, the Bureau explained that a reasonable analytical approach would establish a zone of reasonableness for the cost of capital between 7.39 percent and 8.72 percent for rate-of-return carriers, calculated with a debt to equity ratio based on the market value of carriers' capital structure. Based on that analysis and other factors, the Bureau recommended that the authorized rate of return should be selected in the upper half of this range, between 8.06 percent and 8.72 percent. This suggested range is lower than the Commission's previous 11.25 percent rate of return for all incumbent LECs, which was adopted in 1990 when incumbent LECs were operating as regulated monopolies.

80. The Bureau finds that the methodology used in the 2013 staff report in the rate represcription proceeding is a helpful tool for determining a reasonable return for price cap carriers accepting model-based support. Applying this methodology solely to data from the price cap carriers yields a zone of reasonableness for a cost of money for price cap carriers between 7.84 percent and 9.20

percent. The Bureau concludes that a reasonable approach is for the CAM to use a unitary cost of money at approximately the midpoint of that range, 8.5 percent. The Bureau believes that adopting an 8.5 percent cost of money, rather than a figure at the lower end of the zone of reasonableness, recognizes that this number will effectively be locked in for the next five years and accounts for the fact that the data used to calculate the zone of reasonableness reflects a time of historic lows. The Bureau takes this action solely for purposes of finalizing the input values for the cost model, and our action today in no way prejudges what action the Commission may ultimately take in the pending rate represcription proceeding.

81. The Bureau is not persuaded by PRTC's argument that the rate of return used in the CAM should remain 11.25 percent. PRTC argues that a lower rate of return does not account for the actual market conditions it faces, due in part to the fact that it is still heavily dependent upon traditional telecommunications revenue streams and therefore faces different risks than the larger price cap carriers that are market leaders in video and wireless services. Even if the Bureau were to accept PRTC's argument that it is less diversified than the other price cap ILECs, that argument by itself does not necessarily justify a higher rate for PRTC. The cost of capital, according to well-established portfolio theory, does not depend on the overall risk of a company, but rather on portion of the overall risk that cannot be diversified away. That portion, known as the non-diversifiable, or systematic, risk is the risk that an investor could not offset through the purchase of other assets. Investors are assumed to diversify by holding a portfolio of assets, and only to the extent that an investor is unable to diversify away the risk of any individual asset by so doing should there be an expectation of a return on an investment in an asset that is commensurate with that non-diversifiable risk, according to this theory. Companies for which the rate of return on an investment in its stock is expected to change by less than the market rate of return have less systematic risk and a lower cost of capital than the average company, while companies for which the rate of return on an investment in its stock is expected to change by more than the market rate of return have greater systematic risk and a higher cost of capital than the average company.

82. PRTC asserts that it has a higher cost of capital and therefore requires a higher rate of return than the other price cap ILECs because it is less diversified than the others. The Bureau cannot

accept this argument absent a showing that PRTC's systematic risk is greater than the systematic risk of the typical price cap ILEC. While a company's systematic risk will vary depending on the services that it offers, there is nothing in the record that would enable us to conclude that the systematic risk of a telecommunications company that derives a relatively large fraction or even all of its revenues from traditional phone services, and a small fraction or none from other services, is greater or lesser than that of a company that derives a relatively small fraction of revenues from traditional phone services and a relatively large fraction from other services. Thus, the record does not demonstrate whether PRTC has a higher or a lower cost of capital than the other price cap ILECs as a result of being less diversified than the other price cap ILECs.

3. Opex Input Values

83. In this section, the Bureau addresses the model inputs related to operating expenditures. The CAM estimates opex incurred by an efficient provider using a forward-looking network in the provisioning of voice and broadband by developing opex factors. These factors vary by company size and by a rural, urban, or suburban classification. The network opex factors and G&A factors are applied to capital investment estimates calculated by the CAM to determine monthly operating costs. In other words, the total investment is multiplied by a factor to determine network operating costs under the assumption that providers with larger networks have higher total operating expenses; G&A costs are calculated the same way. The customer operations marketing and service operating expenses and bad debt are expressed as dollar amounts of expense per location. The customer operations marketing and service operating expenses and the bad debt operating expense per customer are derived based on factors applied to an assumed ARPU for broadband and voice services. As discussed below, the Bureau adopts CAM v4.1.1's methodology for calculating opex, as well as its opex input values.

a. Network Operations Expense Factors

84. Network operations expense includes both plant specific expenses and plant non-specific expenses. Plant specific expenses include expenses related to the operation and maintenance of telecommunications plant. Plant non-specific expenses include network operations expenses such as

network administration, testing, and engineering. They also include general support and network support expenses such as provisioning, network operations, depreciation, and amortization expenses for land and buildings, office furniture and equipment, general purpose computers, and vehicles.

85. The Bureau adopts the CAM's approach of calculating network operations expense factors by determining the relationship between capital investment and ongoing cost to operate and maintain the plant. This approach is similar to the HCPM, which also calculated plant specific opex as a ratio to capex. The Bureau also adopts the plant specific and plant non-specific network operations inputs used in CAM v4.1.1 which were initially developed based on NECA data from 2008 to 2010, and supplemented with additional data sourced from ARMIS and third party sources. As described in the methodology documentation, model inputs were scaled so that the model-calculated opex figures reflect NECA data from 2008 to 2010 and ARMIS data for 2007 and 2010. Such calculations were based on model runs for a copper-based network to reflect the dominant technology deployed during the time the source data were drawn. These values were then adjusted to reflect the costs associated with a FTTP, rather than a copper-based deployment. These factors were all derived to adjust for size, density, and location.

86. The Bureau sought comment in the virtual workshop on the CAM's methodology for calculating network operations expense factors and the associated input values. ACS and PRTC objected to the company-size adjustments made to the opex factors for medium companies. They claimed that the use of a negative factor for medium companies (relative to large companies) means that the model calculates opex costs that are lower than large companies, suggesting that medium companies are more efficient than large companies. In fact, as shown in the September 12th webinar presentation that Bureau staff presented to state regulators, the opex per location for medium companies is generally larger, often much larger, than that of the large companies for the reasons set forth below.

87. The medium company size adjustment is a negative factor in relation to larger companies, because medium companies as a whole have greater capex (per location) costs than larger companies. Since opex is calculated as a product of capex multiplied by the opex input, if capex is higher, then with

no adjustment opex will be higher as well even for the same opex input. In the cost study used to determine opex values, the capital intensity (capex per active loop) was significantly higher for companies in the medium group than in the large group ($1,429 for the large vs. $2,117 for the medium). While the opex per loop for plant specific and plant non-specific opex was higher for medium companies, it was not as great as the difference in capex per loop; therefore the adjustment for medium companies for those categories is negative (-26.96 percent). In CAM v4.1.1, the difference in capital intensity remains ($1,281.25 for large, compared to $1,800.43 for medium). The resulting average operating cost per demand location in CAM v4.1.1 for large is $5.26 and for medium is $5.66. The Bureau therefore believes that the adjustment downward in the opex factor for medium companies is appropriate.

b. General and Administrative Expenses

88. General and Administrative (G&A) expenses are expenses of the day-to-day operations of a carrier. These expenses include such expenses as accounting and financial services, insurance, utilities, legal expenses, procuring materials and supplies, and performing personnel administrative activities.

(i) Development of General and Administrative Factors

89. The Bureau adopts the CAM's approach of employing a weight against investment to calculate G&A opex. As with network operations expense, the factors were calculated by company size and scaled to reflect providers' reported costs. The Bureau also adopts CAM v4.1.1's input values for G&A expenses.

90. The Bureau sought comment on the CAM's methodology for calculating G&A factors and the associated input values, and no party objected to the methodology. The ABC Coalition supports the values that CAM v4.1.1 uses for G&A, while ACA argues that the G&A input values overstate costs for large companies. ACA appears to assume that the CAM opex factors are not scaled based on size, as it claims that larger companies with higher revenues are able to take advantage of operating leverage and pay less for G&A expenses and overstating costs would incentivize carriers to operate inefficiently. In

fact, the CAM does take into account the disparity in costs by scaling the G&A factors based on size; and, as noted, since G&A ultimately depends on the investment for each carrier, carriers with lower investment per location will have lower G&A per location as well. The G&A factors were developed separately for each size class of carrier, resulting in lower G&A factors for larger carriers. CAM v4.1.1 calculates the average monthly G&A costs per location for large companies as $4.43, for medium companies as $6.05, and for small companies as $10.28.

(ii) State Property Tax Adjustment Factors

91. The CAM also adjusts the G&A factors to account for the fact that property taxes, which are usually accounted for as a subset of G&A operating expense, vary by state. The Bureau adopts the CAM's use of state property tax factors and the input values it uses for these factors to reflect the impact of property tax on opex, given the difference of state rates versus the national average. To develop the factors, the average property tax per state was determined, and then applied to the net plant in service to determine the implied property tax expense by state. These figures were then compared to an overall national weighted average property tax rate to develop state-specific factors.

92. The Bureau sought comment on the CAM's use of state property tax factors and their associated values in the virtual workshop. Parties agree that the use of state property tax factors is reasonable given the wide variety in state property tax rates. However, ACS and PRTC also claim that property tax should be separately calculated "in a manner that is consistent with how it is levied." They provide as an example the method of estimating property taxes by applying an "Other Operating Tax Factor" to investment, calculated based on a ratio of the balances of their other operating taxes account and their total plant in service account. But ACS and PRTC failed to explain how their methodology is applicable to a forward-looking cost model, and why that method would provide more appropriate results.

93. The ABC Coalition supported the use of the values the CAM utilizes for the state-specific factors. ACS and PRTC claimed that they are unable to assess the validity of the values the CAM uses for state-specific factors due to a lack of documentation of the analyses, data, and methodologies used to develop G&A and the property tax factors. The carriers also argued that although they were unable to

separately assess the costs that CAM estimates for property tax, the total G&A expense amount estimated (at that time, in CAM v2.0) understates their current costs for Alaska and Puerto Rico. As discussed above, the Bureau has provided reasonable access to the underlying data, assumptions, and logic of the model as required by the Commission, while still preserving the confidentiality of some of the underlying data provided by carriers. Although the Bureau has since posted documentation that describes in detail the methodology that the CAM uses to develop property tax factors, ACS and PRTC did not provide any further information about how their companies' property tax costs compare. The Bureau thus finds no basis to adopt their proposal.

c. Customer Operations Marketing and Service Operating Expenses

94. Customer operations marketing and service operating expenses include such expenses as produce management and sales, advertising, operator services, and costs incurred in establishing and servicing customer accounts. The Bureau adopts the CAM's approach of calculating customer operations and marketing on a per-subscriber basis. The Bureau further adopts $6.81 per location passed as the appropriate amount.

95. The Bureau sought comment on the CAM's methodology for determining customer operations marketing and service operating expenses and the associated input values in the virtual workshop. No party objected to the methodology, and the ABC Coalition supported the use of the expense input values that were used for the CAM at the time, noting that the ratio developed using ARMIS data of expenses to revenue continues to be consistent with their experience. While the Bureau made minor adjustments to these input values in CAM v4.1, the difference is not material to overall cost calculations.

d. Bad Debt Expense

96. Bad debt expense represents the amount of revenue that carriers are unable to collect from their customers. The Bureau adopts CAM v4.1.1's $1.05 per location passed cost for bad debt. The

Bureau sought comment on the CAM's methodology for calculating bad debt expense as 2 percent of assumed average revenue per user, and no party objected to this methodology.

C. Treatment of Non-Contiguous Carriers

97. In the USF/ICC Transformation Order, the Commission recognized that price cap carriers serving specific non-contiguous areas of the United States — Alaska, Hawaii, Puerto Rico, the U.S. Virgin Islands and Northern Marianas Islands — face different operating conditions and challenges from those faced by carriers in the contiguous 48 states. As a result, the Commission directed the Bureau to consider the unique circumstances of these areas when adopting a cost model and whether the model provides sufficient support for carriers serving these areas. If, after considering these issues, the Bureau determined that "the model ultimately adopted does not provide sufficient support to any of these areas, the Bureau could maintain existing support levels" to any affected price cap carrier, so long as support for price cap areas stayed within the overall budget of $1.8 billion per year.

1. Cost Adjustments for Non-Contiguous Areas

98. At the outset, the Bureau recognizes that earlier in the model development process, ACS, PRTC, and Vitelco contended that any national broadband cost model developed by the Bureau would be unable to adequately account for the unique challenges of deploying and offering broadband services in non-contiguous areas. As a result, each of the carriers submitted its own cost model and encouraged the Bureau to utilize its respective model when allocating support to Alaska, Puerto Rico, and the Virgin Islands. The Bureau declines to do so. Rather than modeling the cost for a FTTP network, as previously decided by the Bureau, the cost models submitted by PRTC ("BCMPR") and Vitelco ("USVI BCM") estimate the cost of a forward-looking DSL network and a hybrid fiber coaxial network, respectively. Moreover, the ACS model simply estimates the cost of middle mile microwave, satellite, and undersea cable transport facilities in Alaska, rather than modeling the cost of an entire network. Further, none of the models filed by these non-contiguous carriers calculate costs at the census-block level or smaller or contain the functionality to exclude unsubsidized competitors. Therefore, none of the submitted models

meet the criteria laid out by the Bureau to estimate the costs of constructing a forward-looking FTTP network capable of providing both voice and broadband service.

99. Instead, the Bureau has modified the CAM to reflect the unique operating conditions and challenges faced by price cap carriers in Alaska, Hawaii, Puerto Rico, the U.S. Virgin Islands, and the Northern Marianas Islands. Throughout the model development process, these carriers have filed information regarding the unique costs of providing both voice and broadband service in their respective service areas. In accordance with the Commission's direction, the Bureau has carefully studied this information, while making those modifications we deemed appropriate to take into account their unique geographic circumstances. The Bureau also has examined the embedded costs of these carriers in order to provide us with a historical view of the costs associated with serving these areas. The Bureau believes that the totality of our work over a nine-month period has provided us with a better understanding of the issues facing non-contiguous carriers in their service areas. Below, we discuss this analysis in greater detail and adopt a number of inputs specific to non-contiguous areas.

a. Plant Mix

100. Several non-contiguous carriers suggested that the model should incorporate "forward-looking" plant mix values for their areas that are significantly different than their current plant mix values. For example, ACS stated that, because it deploys fiber exclusively within a conduit, it classifies any deployment in a conduit as underground in its records. Similarly, Vitelco argued that underground plant is necessary to protect fiber against extreme temperatures and humidity, high salt concentration in the air, and frequent tropical storms and hurricanes in the Virgin Islands. While the Bureau agrees that it is appropriate to use forward-looking plant mix values, it questions whether an efficient provider would in fact fully deploy underground plant in situations where it is cost effective to bury such plant. Therefore, in CAM v4.0, the Bureau modified the approach to plant mix inputs for non-contiguous areas to reflect a hybrid of the current plant mix values of non-contiguous carriers and the forward-looking plant-mix values they submitted. This hybrid approach assumes that the amount of underground plant in non-contiguous areas will not exceed a carrier's current amount of underground plant, and if the carrier-

submitted forward-looking values for underground plant are higher than current values, the excess is shifted into buried plant. Additionally, in response to comments submitted by several non-contiguous carriers, CAM v4.0 was modified to allow for the addition of conduit to fiber in buried plant. The same approach is used in CAM v4.1.1.

101. Today, the Bureau adopts CAM v4.1.1's hybrid approach to plant mix for all non-contiguous areas, as well as its use of "buried in conduit" plant. The Bureau concludes that the hybrid approach to plant mix recognizes that, in non-contiguous areas it may be appropriate to move some plant from aerial to buried, and to encase buried fiber in conduit for additional protection. This approach is more appropriate than assuming more fiber is moved into underground plant with underground vaults and man-hole or hand-hole access with costs that are typically three to five times more costly than buried plant.

b. Undersea and Submarine Cable

102. In CAM v3.2, the Bureau added the capability to model the investment and cost for "undersea cable" and landing station facilities needed to transport traffic to and from landing stations in non-contiguous areas to landing stations in the contiguous United States. CAM v3.2 modeled undersea cables: from Alaska to Oregon and Washington; from the Northern Marianas to Guam and from Guam to Oregon; from Hawaii to California; from the U.S. Virgin Islands to Puerto Rico and from Puerto Rico to Florida; and from Puerto Rico to Florida. The Bureau augmented this capability in CAM v4.0 by modeling intrastate middle mile routes requiring an underwater connection between islands in Hawaii, Puerto Rico, the U.S. Virgin Islands, and the Northern Mariana Islands, and to connect Anchorage to Juneau and the Kenai Peninsula. The model was modified to include "submarine cable" costs and the cost for two beach manholes on each intrastate middle mile submarine route.

103. The Bureau concludes that adopting the inputs for both undersea and submarine cable costs recognizes that carriers serving non-contiguous areas incur significant middle mile costs not faced by contiguous carriers. However, the Bureau notes that these inputs do not include all of the costs advocated for by non-contiguous carriers. For example, the CAM does not assume full landing stations,

with routing facilities and room for co-location, at submarine cable landing sites; instead, since the middle-mile routes run between central offices that already have such facilities, the Bureau concludes that an efficient provider would use less costly beach manholes, eliminating the need for duplicative facilities to provide multiplexing, routing, or co-location.

104. Beginning with CAM v3.2, the model estimated the cost attributable to the voice-and-broadband network the Bureau is modeling for transport to and from the contiguous United States by applying a percentage-use factor based on highest total capacity and highest lit capacity of existing fiber cable systems. Because the Alaska route and the Northern Marianas to Guam portion of the Northern Marianas route are not shared with any international traffic, CAM v3.2 included the same share of cost for this portion of the middle-mile network as the rest (i.e., 50 percent) for the costs of connecting Alaska to Oregon and Washington, the Northern Marianas to Guam, and the U.S. Virgin Islands to Puerto Rico.

105. HTI argues that the CAM should be based only on lit capacity of fiber that an efficient provider would be expected to utilize in the future. Additionally, HTI contends that the allocation process is inconsistent with the forward-looking methodology used by the CAM because the 50 percent sharing factor understates projected Hawaii usage. In particular, HTI states that it is a minor provider of interstate, interLATA special access, and private line services, and it does not possess the market power to capture a 50 percent market share for those services.

106. The Bureau disagrees that the CAM-calculated cost should be based only on the current lit-fiber capacity, rather than total capacity. HTI's argument that the Bureau should only take lit fiber into account is based on the idea that the owner of the fiber will only light the amount of capacity that it has to date. In fact, if demand grows, the owner of the fiber will light more capacity to meet that demand (at relatively low cost) rather than building an entire new international cable (at relatively high cost). Thus, the Bureau concludes a methodology that takes into account both lit and total capacity is appropriate. The Bureau also disagrees with HTI that the methodology is inconsistent with a forward-looking model. The Bureau notes that the demand it uses is a forecast of demand, thus aligning the cost it calculates with the demand it expects in the future. As a result, the Bureau adopts CAM v4.1.1's allocation methodology.

107. ACS argued that the CAM underestimates the percentage of total forward-looking capital costs for undersea cable that are allocated to supported voice and broadband services. The calculation used by the CAM allocates 50 percent of total Alaska traffic traveling over ACS's undersea cable to voice and broadband services and 50 percent to other services such as special access and wireless backhaul. The 50 percent allocated to voice and broadband services is then applied to the percentage of locations in Alaska actually served by ACS — approximately 67 percent — to determine the proportion of total undersea cable voice and broadband traffic carried by ACS — approximately 34 percent. This number is divided by the total amount of Alaska traffic assumed to be carried over ACS's undersea cable (100 percent) to determine the percentage of undersea cable costs that are allocated to the delivery of supported voice and broadband services by ACS. Instead, ACS asserted that, because of the presence of a subsidized competitor in its service areas, the model should assume that approximately 67 percent of the overall traffic between Alaska and the mainland travels over the cable owned by ACS, rather than 100 percent of the traffic. Using CAM v4.1.1's methodology, this modification would result in 50 percent of the undersea cable costs being allocated to eligible voice and broadband service deployed by ACS, rather than 34 percent.

108. The Bureau is not persuaded by this argument. Adopting ACS's proposal essentially would mean that the Bureau assumes the construction of an entirely new undersea cable to connect to the mainland areas in Alaska served by rate-of-return carriers, which makes little sense economically. Further, allocating the total traffic between Alaska and the mainland in this fashion suggests that ACS is unable to compete with the subsidized carrier in its service areas, as the Bureau would expect an efficient provider to be able to do. As a result, the Bureau adopts CAM v4.1.1's allocation methodology.

c. Terrain Methodology

109. As discussed above, the methodology the Bureau adopts for determining the rock hardness for a given census block group in the contiguous United States is whichever type of rock is listed most frequently for the list of STATSGO map units in the census block group, regardless of the

geographic area of the individual map units. Several carriers serving the non-contiguous areas — ACS, PRTC, and HTI — requested that the model treat 100 percent of their terrain as "hard rock," the most expensive terrain in which to place plant. The Bureau has concerns that this approach would significantly over-estimate the actual amount of hard rock in these areas. In CAM v4.0, the Bureau developed a modified approach for determining the appropriate rock hardness for census block groups in non-contiguous areas; this methodology was not changed in CAM v4.1 or v4.1.1 for non-contiguous carriers other than Vitelco. This new methodology considers the entire census block group in a given non-contiguous area to be hard rock if at least fifty percent of the area is identified as hard rock.

110. The Bureau generally adopts CAM v4.1.1's methodology for calculating rock hardness in non-contiguous areas except the Virgin Islands. The Bureau finds that this approach addresses issues with the differences in terrain data for census block groups in non-contiguous areas compared with those in contiguous areas, particularly the fact that the size of some of the block groups in non-contiguous areas and the associated STATSGO map units are much larger than in the contiguous United States. For example, in Alaska it would be possible to have a substantial fraction of an area described as hard rock in the STATSGO database, but because of multiple map units would be contained within the census block group, the block group may not have hard rock as the most commonly occurring value. Therefore, the Bureau believes an area-based measure is appropriate to determine the proper rock hardness outside the contiguous United States.

111. However, the STATSGO map data used by the model to calculate rock hardness in non-contiguous areas does not include terrain data for the Virgin Islands. Vitelco stated that the CAM should be modified to capture the actual terrain characteristics of the Virgin Islands. Because of the need to undertake significant additional work to examine the soil composition data available for the Virgin Islands in order to determine the relationship between the terrain mix and the cost of deploying a communications network in the Virgin Islands, CAM v4.1 incorporated a new methodology for approximating terrain mix data in the Virgin Islands, and the same approach was used in CAM v4.1.1. This methodology assumes that the mix of terrain types in the Virgin Islands is similar to the mix of

terrain types in Puerto Rico. The model utilizes the terrain mix from Puerto Rico to determine a weighted average structure labor cost by density zone for buried and underground plant. For example, Puerto Rico has 27 percent normal soil, 40 percent soft rock or medium, and 33 percent hard rock. Those weights are applied, in this example, to the default inputs for rural buried plant—$3.11 for normal, $3.77 for soft rock and $5.19 for hard rock. The results are then combined to find the terrain-adjusted cost of $4.06 for rural buried plant in the Virgin Islands.

112. The Bureau adopts the terrain approximation methodology used in CAM v4.1.1 for the Virgin Islands. The Bureau acknowledges that Vitelco suggested that it look to a soil survey from the National Resources Conservation Service and the new STATSGO2 database to assist us in determining the actual terrain characteristics of the Virgin Islands. The Bureau notes that, while these are adequate sources for determining the geologic composition of the territory, they provide no additional detail regarding how expensive excavation and other constructions costs would be in these types of soil, and Vitelco has provided no additional explanation as to how it should or could use this information to determine those costs. As a result, considering the geographic proximity and similar geologic composition of the Virgin Islands and Puerto Rico, the Bureau concludes that the weighted average approach we adopt today is reasonable approximation for the Virgin Islands.

d. State-Specific Inputs

113. Vitelco advocated for a number of specific adjustments to the model throughout the development process to better reflect the cost of providing service in the Virgin Islands. In particular, Vitelco filed data on materials and labor unit costs, claiming that the data reflected the actual costs it faced from contractors for the provisioning and installation of outside plant facilities. CAM v4.0 incorporated an updated capex workbook specific to the Virgin Islands, reflecting a number of cost increases to certain capital expenses associated with the build out of a FTTP network in the territory, but did not include any labor adjustments. CAM v4.1 modified a number of these state-specific inputs for the Virgin Islands, including adjusting the number of poles assumed by the model to reflect the spacing

associated with 35 foot poles and using the default input values associated with the structure sharing table, FTTpFill input, and duct labor input, and the same approach was used in CAM v4.1.1.

114. The Bureau adopts the state-specific capex workbook utilized by CAM v4.1.1. The Bureau concludes that, though some of the cost adjustments it makes for the Virgin Islands appear large — for instance, the increased cost of poles — these costs are reasonable given that the small size of the islands creates a lack of scale and a dearth of local sources for materials. The Bureau remains unconvinced that the labor costs should be adjusted upward. Increasing labor costs as proposed by Vitelco would give the Virgin Islands the highest labor rates of anywhere in the country by a significant margin, particularly when compared to incomes. While the Bureau recognizes the challenges of obtaining skilled labor for network expansion, it is not persuaded that an efficient provider would have labor costs as high as that proposed by Vitelco. As a result, the Bureau declines to adopt Vitelco's proposed labor adjustments.

115. Several other non-contiguous carriers voiced concerns that the model versions to date have underestimated the cost of deploying voice and broadband in their service areas. These carriers also submitted input values for material and labor costs that they claim reflect the cost of providing service in their respective areas. Though the Bureau adopts a state specific capex workbook for the Virgin Islands, it is not convinced that further adjustments to the material or labor costs used by the model for any of the non-contiguous carriers is appropriate.

116. The objective of a forward-looking cost model is not to model how much it costs a specific provider to serve its area, but how much it would cost an efficient provider to do so. The difficulty, of course, is determining what it would cost for an efficient provider to operate. As a general matter, the Bureau believes that it is useful to compare model costs to embedded costs, based on the assumption that a modern network would cost no more than the historical network. Given the embedded costs for carriers in non-contiguous areas such as Alaska, Puerto Rico, and Hawaii, it appears that the current version of the model is capturing costs reasonably well in these areas, despite the fact that the Bureau is not using the inputs submitted by carriers serving these areas. For example, the loop costs

calculated by CAM v4.0 are within one percent of the loop costs reported to NECA by ACS. Conversely, if the Bureau were to use the state-specific inputs submitted by ACS in our model, the cost of the loop network in Alaska would be 76 percent higher than ACS's embedded costs. Similarly, using the state-specific inputs submitted by PRTC results in the cost of the network exceeding both PRTC's embedded costs and the costs from PRTC's own forward-looking cost model for a DSL network.

117. Some carriers have filed receipts reflecting their actual costs for materials and labor, which they argue lends support to fact that the model should include their state-specific input values. However, the Bureau is unconvinced that these receipts are generally representative of the costs of building an entirely new FTTP network from the ground up. The comparisons to embedded costs are illuminating here. If the unit costs provided did represent the cost of an entirely new network in these areas, then the Bureau would expect embedded costs to be substantially higher. Because the Bureau has no reason to doubt the veracity of these filings, it believes that the receipts it has received relate to the cost to the carrier of replacing individual pieces of a network, rather than the wholesale cost of constructing an entirely new network. For example, on a per unit basis, it is cheaper to purchase and install all the poles for a network at one time, rather than to purchase and install one replacement pole when needed. Similarly, the Bureau expects on a per-unit basis that it will be far more costly to splice only one or two fibers at a time when compared with the cost of building an entirely new FTTP network.

118. ACS in particular has attacked our use of embedded costs as a comparison for forward-looking costs. The question the Bureau seeks to answer is whether the proposals made by ACS and other non-contiguous carriers lead to reasonable outcomes. In particular, ACS argues that "historic loop costs are informative only of the largely depreciated costs of a portion of a network based on an outmoded technology." The Bureau agrees that embedded costs are based on an outmoded technology; however, there are many reasons to believe that the cost of a modern network should not be higher than the costs of the older network. First, while labor costs have increased over time, as ACS argues, there are offsetting gains in labor productivity and in the cost-capability of network equipment. Second, a forward-looking cost model, by its nature, assumes the use of clustering and routing that will lead to more efficient

utilization of network equipment and fewer network assets overall – i.e., lower costs. Finally, as ACS notes, the Bureau adopted GPON FTTP as the network technology of choice, in large measure because that technology has much lower operating expenses. In total, this provides ample reason to expect forward-looking costs to be lower than embedded costs.

119. The Bureau also recognizes that embedded costs will fall as a network depreciates. Comparing levelized forward-looking costs to only one or two years of embedded cost could indeed provide a skewed perspective, particularly for a carrier that has depreciated plant more quickly than it has made investments. However, over a long-enough period of time, the average of embedded costs reflects the cost to serve that area over that period of time, albeit perhaps with an older technology. The Bureau compared modeled forward-looking costs to the average of ACS's embedded costs over almost 20 years. Given that long timeframe, including some time periods where there was greater investment and greater embedded costs, the Bureau concludes that the average of embedded costs is a good measure of the ongoing cost to provide service in these areas with the embedded network, which is a useful guide as to the maximum cost to provide service in a forward-looking model. Further, the current inputs used by the model actually produce a forward-looking loop cost for ACS above its embedded cost, so the Bureau is not using embedded cost as a hard cap, as ACS seems to believe.

120. In its latest filing, ACS argued that the Commission previously rejected the use of embedded costs to calculate forward-looking costs. Specifically, ACS notes that while "the estimation of forward-looking expenses may start with embedded costs, limiting forward-looking costs based on embedded costs would violate Commission policy that federal support should be determined based on forward-looking costs." Indeed, the Commission previously stated that it did not believe "that the cost of maintaining…embedded plant is the best predictor of the forward-looking cost of maintaining the network investment predicted by the model." However, in doing so, the Commission explained that it would not use this data because it could not determine "how much of the differences among companies are attributable to inefficiency and how much can be explained by regional differences or other factors." The Commission's rejection of embedded costs, therefore, was predicated on the concern that incumbent

LEC embedded costs would be too high and might reflect inefficient operations more than they reflect the cost associated with any given area. Thus, our use of embedded costs as a tool to evaluate the reasonableness of proposed adjustments to the model is in fact completely consistent with Commission precedent. ACS's arguments that costs could be much higher than embedded costs, however, are not.

e. Company Size

121. The approach the Bureau adopts above to calculate network operations expense factors considers the relationship between capital investment and ongoing cost to operate and maintain the plant. ACS objected to the company-size adjustments made to the opex factors for medium companies, stating that the use of a negative factor for medium companies (relative to large companies) results in the model calculating opex costs that are lower than large companies, which suggests that medium companies are more efficient than large companies. In addition, ACS argued that, given its continued line loss, remote and largely rural service area, and heavy reliance on high-cost support, it should instead be considered a "small" carrier for purposes of calculating its opex. In CAM v4.0, the Bureau shifted ACS from the "medium" carrier category to the "small" carrier category. This same approach was used in CAM v4.1 and v4.1.1.

122. Today the Bureau adopts CAM v4.1.1's approach to company size for ACS. After analyzing the model's results, the Bureau finds that this approach more accurately reflects ACS's forward-looking opex costs. For example, classifying ACS as a medium company captures only 60 percent of ACS's total opex costs as reported to NECA; conversely, reclassifying ACS as a small company captures 76 percent of ACS's total opex costs. As a result, the Bureau believes classifying ACS as a "small" carrier rather than a "medium" carrier allows the model to properly calculate the company's opex.

2. Election of Frozen Support for Non-Contiguous Areas

123. As described above, the Bureau adopts a number of inputs specific to non-contiguous areas for use in the CAM. The Bureau believes these inputs generally reflect the unique costs and

circumstances of serving non-contiguous areas and, as such, do not believe any additional specific changes proposed by non-contiguous carriers are appropriate based on the evidence in the record.

124. Consistent with the Commission's directive, the Bureau has also evaluated the sufficiency of the support calculated by the model. The model development process has been ongoing for almost two years, with the Bureau having responded to dozens of filings, ex parte presentations, and comments in a Virtual Workshop in order to refine and calibrate the model. With respect to non-contiguous areas in particular, the Bureau has worked intensively over the last nine months to make adjustments to the model to take into account the unique costs and circumstances of serving non-contiguous. At the same time, questions have been raised recently specifically about whether the model accurately accounts for wireline terrestrial middle mile costs in Alaska. The Bureau does not expect to be able to resolve such questions quickly. Questions also continue to be raised by several carriers regarding whether model-calculated support would be sufficient in the areas they serve.

125. The Bureau is mindful that continuing work on the model delays the day when the offer of support is made to the price cap carriers and delays the time when consumers across the nation will newly have access to broadband services. As noted above, the Commission delegated to the Bureau the authority to maintain existing support levels for any non-contiguous carrier for which the model did not provide sufficient support. The Bureau therefore makes available to all non-contiguous carriers the option of choosing either to continue to receive frozen support amounts for the term of Phase II, or to elect or decline the model-determined support amount.

126. The Bureau recognizes that for several of the non-contiguous carriers, the amount of model-determined support is greater than frozen support. For purposes of ensuring that the Bureau does not exceed the overall budget for the offer of support when we determine the final list of eligible blocks after the challenge process, it will require each non-contiguous carrier to notify us within 15 days of resolution of the associated service obligations whether it will choose to elect to continue to receive frozen support for the term of Phase II.

127. The Bureau previously sought to develop the record on what the service obligations should be for these carriers, should they be provided frozen support. In light of our decision today to provide this option, further consideration of this question is now timely. To provide non-contiguous carriers with the requisite information to make an informed decision about whether to elect to receive frozen support or model-based support, the Bureau anticipates that the service obligations for carriers receiving frozen support would be determined prior to their having to make a decision whether to receive frozen support.

D. Identifying Supported Locations

128. In this section, the Bureau adopts the methodology for taking the results of the cost-to-serve module to determine support levels. The Bureau begins by discussing the methodology for calculating the average forward looking per-location cost of building voice and broadband-capable networks. The Bureau then explains the treatment of certain business locations and community anchor institutions.

1. Calculating Average Per-Unit Costs

129. The model calculates costs on a per-location-passed basis. It calculates the average cost-per-location for a given census block by dividing the total cost of serving customer locations (the fixed cost of passing all locations in a given area plus the variable cost associated with serving active subscribers) by the number of residential locations and small business locations in that census block, as discussed in more detail in the following section. The CAM gives users the option of unitizing costs by all residential/small business locations in an area or by active residential/small business subscribers, which takes into account an assumed subscription rate. The Bureau sought comment in the virtual workshop on unitizing costs by all locations. The Bureau concludes that unitizing costs by all locations is consistent with the Commission's general expectation that the supported providers would offer services with the desired characteristics to all supported locations. In addition, this approach means that the per-unit costs calculated by the model do not depend on the assumed subscription rate.

130. The Bureau concludes that this is a preferable approach than unitizing costs across active subscribers, as suggested by PRTC and ACS. The crux of PRTC and ACS's argument appears to be that the model should factor in the revenue that each carrier is expected to receive from customers when calculating support amounts. They argue that unitizing costs by active subscribers would ensure that carriers' support is calculated based only on the revenues carriers are actually receiving from customers. But they assume that the Bureau would adopt the same funding benchmark—based only on the assumed revenue per subscriber—regardless of whether costs are unitized by location or by subscriber. If instead the Bureau adopts a funding benchmark that takes into account both assumed revenues per subscriber and an assumed subscription rate, then the support per location will be the same regardless of whether costs are unitized by locations (using the methodology discussed below to calculate the funding benchmark) or by subscribers (using a market price per subscriber funding benchmark). As the Bureau discusses below, it adopts a funding benchmark that estimates the likely revenues available through reasonable end user rates, taking into account the assumed subscription rate. Thus, the Bureau has addressed PRTC and ACS's concern by adopting a benchmark that calculates support levels by accounting for the number of locations from which carriers will recover revenue, even though it calculates costs on a per-location-passed basis.

2. Treatment of Non-"Mass Market" Locations

131. In the USF/ICC Transformation Order, the Commission established a performance goal of ensuring "the universal availability of modern networks capable of delivering broadband and voice service to homes, businesses, and community anchor institutions." The Commission stated that it expected that eligible telecommunications carriers "would provide higher bandwidth offerings to community anchor institutions in high-cost areas at rates that are reasonably comparable to comparable offerings to community anchor institutions in urban areas," and would engage with community anchor institutions while planning their Connect America-supported networks.

132. To account for demand for such high speed connections, the CAM sizes its network by assuming dedicated fiber connections for "enterprise locations," including certain business locations,

community anchor institutions, and wireless towers, that are typically served by special access and private line or similar non-TDM-based services like Ethernet. Given the Commission's statement that it did not intend "that the model will skew more funds to communities that have community anchor institutions," the Bureau finds that it is reasonable to exclude the costs of extending fiber to community anchor locations from cost-to-serve calculations. Locations served by such enterprise services, which includes direct Internet access, are also excluded from the unitization of the total middle mile cost of a census block to avoid location counts that are a mixture of residences and small businesses intermingled with enterprise locations.

133. If the Bureau were to include the costs specifically associated with serving anchor institutions in the model, any census block containing one or more anchor institutions would become more costly to serve than a census block otherwise identical but containing just residential locations. The net result would be that some census blocks that otherwise would be below the funding benchmark would become eligible for support, while at the same time other census blocks that otherwise would have been eligible for funding might become ineligible for the offer of model-based support because the average cost would now fall above the extremely high-cost threshold. This is precisely the skewed effect that the Commission sought to avoid.

134. But the model does account for the fact that price cap carriers will be using their networks to provide high speed service to enterprise locations when it makes its cost calculations for residential and small business locations. To determine the costs of shared last-mile network assets, the CAM determines how many fiber strands are used by the various demand locations and allocates the cost of fiber and structure between special access and private line locations, and other locations (i.e., residential locations and those business locations assumed to be purchasing mass-market services), with support calculated based only on costs related to the latter group of locations. As described above, the model similarly captures the sharing of middle mile network by estimating that 50 percent of the costs of an interoffice route are attributable to enterprise services and are excluded from cost calculations.

135. The Bureau sought comment on the CAM's approach for sizing the network to account for enterprise locations and its exclusion of the costs of dedicated fiber to such locations from cost to serve calculations. The ABC Coalition supported the CAM's treatment of enterprise locations, and no parties submitted alternative proposals for how the CAM should account for such locations.

136. The Bureau concludes that this approach is the most reasonable way to implement the Commission's directive that the Phase II budget maximize the number of residences, businesses and anchor institutions that have access to robust, scalable broadband, while not skewing support towards communities with a greater number of anchor institutions. The Bureau finds that by sizing the network to assume a dedicated fiber to enterprise locations, the model reasonably captures the efficiencies of a network designed to serve all locations in an area and appropriately accounts for the fact that these locations typically require more bandwidth than a residential connection. At the same time, excluding the dedicated fiber costs of serving community anchor institutions from cost to serve calculations is an appropriate method to avoid potential distortions in which particular census blocks are funded over others.

E. Support Thresholds

137. In this section, the Bureau tentatively sets the funding benchmark for Connect America Phase II support at $52.50 per location and estimate that the extremely high-cost threshold will be $207.81 per location. We first establish the methodology for determining the funding benchmark. The Bureau then adopts two inputs – subscribership rate and ARPU – used in the methodology to calculate the benchmark. Finally, the Bureau calculates the budget available for Connect America Phase II and estimate the extremely high-cost threshold using that budget.

1. Budget

138. First, the Bureau determines that the budget used to set the extremely high-cost threshold will be approximately $1.782 billion. In the USF/ICC Transformation Order, the Commission established an annual funding target of $4.5 billion for high-cost universal service support. Within the $4.5 billion

budget, the Commission set aside up to $1.8 billion annually for a five-year period to support areas served by price cap carriers. This amount includes the support that price cap carriers receive through the CAF-ICC. The Bureau forecasted that over a five-year period, from 2015 to 2019, price cap carriers will draw an average of roughly $50 million per year of support from the CAF-ICC recovery mechanism, and it sought comment in the virtual workshop on whether $50 million would be a reasonable amount of support to set aside. The only party commenting on this topic agreed that it is reasonable to set aside $50 million to recognize the average draw from the CAF-ICC recovery mechanism. In addition, the budget will include approximately $32 million per year from funds remaining from Connect America Phase I after completion of round two. The Bureau therefore concludes that approximately $1.782 billion in support will be available in price cap areas for Phase II. The Bureau reserves the right to update this budget, however, when it releases the results of the final model run after the challenge process, based on the most current information at that time regarding projected CAF-ICC support.

2. Methodology

139. Next, the Bureau adopts the methodology discussed in the Virtual Workshop for establishing a funding benchmark. The Bureau will first establish the funding benchmark based on where costs are likely to be higher than reasonable end user revenues and then determine the extremely high-cost threshold based on the available budget, consistent with the Commission's direction that the Bureau takes into account determine where costs are likely to be higher than can be supported through reasonable end user revenues alone. The alternative methodology – to first identify the extremely high-cost threshold, and then use the available budget to identify the funding benchmark – would not guarantee that the funding benchmark would end up at a level where costs are likely covered by available end user revenues. In addition, the language used by the Commission in providing guidance regarding the extremely high-cost threshold – that it "anticipated that fewer than one percent of American households" would be in census blocks exceeding the threshold – reflects a predictive judgment about the effect of the policy it adopted, not a strict mandate that the extremely high cost threshold be set at the 99th cost percentile. For those reasons, the Bureau finds that first establishing the funding benchmark and using that, in

combination with the established budget for Connect America Phase II, is fully consistent with the Commission's instructions contained in the USF/ICC Transformation Order and produces a more reasonable outcome than the alternative.

140. As noted, the USF/ICC Transformation Order stated that the funding benchmark should "identify those census blocks where the cost of service is likely to be higher than can be supported through reasonable end user rates alone…." Any estimate of future revenues is necessarily a forecast, dependent on a range of reasonable assumptions. Below, the Bureau adopts a blended ARPU that reflects the revenues that a carrier can reasonably expect to receive from each subscriber for providing voice, broadband, and a combination of those services. Because not all locations will have active subscribers, we will adjust the ARPU by multiplying it by the expected subscription rate adopted below. The Bureau finds that multiplying the ARPU by the expected subscription rate will yield an estimate of the revenues that a carrier can reasonably expect to receive from the locations in each census block. ACA supported this methodology when it was presented in the Virtual Workshop. The Bureau also finds that a funding benchmark derived solely from cost, such as proposed by the ABC Coalition, does not satisfactorily address the requirement, inherent in the Commission's delegation of authority to the Bureau, that the funding benchmark reflect the revenues reasonably recovered from end users.

3. Average Revenue Per User

141. The Bureau adopts an ARPU of $75 which the CAM uses to calculate certain opex costs —customer operations marketing and service operating expenses and bad debt expense — and also to set the preliminary funding benchmark that will determine which areas will be subject to the challenge process to finalize the list of census blocks eligible for model-based support.

142. Forecasting the potential ARPU for recipients of model-based support necessarily requires making a number of predictive judgments. For example, a carrier's ARPU will average over customers who subscribe to both voice and broadband services and others who subscribe to just one of those services; in addition, the ARPU will average over prices that vary over time according to the carrier's current promotions and discounts off its basic rates; and which broadband speed package a

customer chooses. Depending on which assumptions are made, there is a range of ARPU values that would be reasonable to select.

143. Based on the record before us, the Bureau concludes that an ARPU of $75 is a reasonable assumption. The ABC Coalition presents an analysis based on Telogical System's "High Speed Internet Services Products, Pricing & Promotions Report National View" July 2013 survey that suggests that a reasonable range of monthly broadband rates for service that provides a minimum of 4 Mbps down would be $29 to $46 per month for cable, DSL and fiber Internet access providers in the 30 major U.S. markets, depending on how many customers are paying promotional rates versus month-to month rates. The ABC Coalition also assumes a rate of $30 for voice services, for a range of rates of $58.54 to $76.03 for voice and broadband services together. The National Broadband Plan model estimated an ARPU of fixed voice service at approximately $33.50 and an ARPU of fixed broadband at $36 to 44 —which when added together ranges from $69.50 to $77.50. ACA suggests that ARPU should be calculated by determining the lowest non-promotional, non-contract pricing for broadband and voice services (with unlimited local and long-distance minutes) from any area where 4 Mbps/1 Mbps broadband or greater is available, and weighting this by each price cap carriers' share of total Connect America-eligible locations. It recommends that the Bureau adopts an ARPU of $71.

144. The ABC Coalition did not submit any data to substantiate its claim that "a substantial percentage of customers" subscribe to stand-alone broadband and "a large percentage of customers" subscribe to voice-only services. On balance, the Bureau concludes that it would be reasonable to select a value in the higher end of the ranges of rates provided by the ABC Coalition and the range of ARPUs estimated by the National Broadband Plan model. The Bureau recognizes that a growing number of households rely only on wireless services for their voice services. On the other hand, to the extent customers continue to subscribe to landline voice service, the ARPU for such service may well be higher than the $30 suggested by the ABC Coalition. The results of our urban rate survey show that the average rate for an unlimited all-distance voice service offered by incumbent LECs in census tracts classified by Census as urban is $48.91, significantly higher than the $30 proposed by the ABC Coalition. While the

Bureau recognizes that not all customers may subscribe to such all-distance plans, many do. Moreover, consumers increasingly over time will migrate to higher speed broadband connections to meet their growing demand for video services, and many businesses will pay rates that exceed residential rates to receive higher-speed services or for service-level agreements that provide guaranteed rather than best-efforts performance associated with residential service. By selecting an ARPU that is on the higher side of the range of ARPU rates in the record before us today, the Bureau accounts for the fact that the Commission expects recipients of support to deliver higher speeds, and a significant number of customers are likely to purchase more expensive packages for higher tiers of broadband services that exceed 4 Mbps/1 Mbps.

145. The Bureau is not persuaded by NRIC's argument that it should select an ARPU of $97. NRIC makes this argument by pointing to benchmarks that the Bureau sought comment on in the context of setting interim reasonable comparability benchmarks, prior to completion of the urban rate survey. NRIC fails to recognize that there is a difference between the maximum allowable rate, which ensures that services in rural areas are offered at rates that are reasonably comparable to urban offerings, and the average revenue that Connect America Phase II-supported providers are more likely to earn. Rather than simply assuming that all carriers will charge the maximum allowable rate, the Bureau will rely on data submitted through the record as well as our own analyses and predictive judgment to make a reasonable assumption as to the revenue that we expect carriers will gain from their customers.

4. Expected Subscription Rate

146. The Bureau adopts an expected subscription rate of 70 percent for the purpose of estimating the amount of revenues a carrier may reasonably recover from end-users and, by extension, the funding benchmark. This is the percentage of locations that could reasonably be expected to subscribe to voice, broadband, or a bundle including at least one of those services. The blended subscription rate appropriately matches the blended ARPU adopted above.

147. As a threshold matter, the Bureau concludes that the subscription rate used to estimate revenues should be different than the customer drop rate, or take rate, used to estimate the cost of

customer premises equipment in the cost model. In the Virtual Workshop, the Bureau asked whether it was appropriate to use a single "take rate" for both purposes. Commenters, including ACA and US Telecom, broadly supported the use of single take rate for all purposes. The Bureau finds, however, that the different uses require rates tailored to their purpose. For the purpose of a customer drop rate, as described above, a location may have customer premises equipment without having a revenue-producing subscriber. For the purpose of estimating the amount of revenues that can reasonably be recovered from "end user revenues," on the other hand, the Bureau finds it is appropriate to use a subscription rate that reflects the percentage of locations with paying customers, rather than the percentage of locations with installed drops.

148. The expected subscription rate must necessarily be lower than the 80 percent customer drop rate adopted above because location with a subscriber must have a drop, but a location with a drop need not necessarily have a subscriber. ACA argues that the take rate should be set at 90 percent to reflect the Commission's National Broadband Plan forecast adoption curve. On the other hand, United States Telecom advocates for the use of a 60 percent take for voice service and an 80 percent take rate for broadband service. One peer review of the model cites academic studies argued that subscription rates of 90 percent would be too high, given that two academic studies suggest broadband subscription rates (i.e., not including voice-only subscribers) of 65 or 67 percent in the United States generally, and one those studies estimated rural subscription rates as low as 50 percent. The Pew Research Center's Internet and American Life Project estimates the current home broadband subscription rate to be 62 percent. In light of these varying estimates, and taking into account both broadband and voice subscriptions, either standalone or bundled with other services, in our predictive judgment we find that an expected subscription rate of 70 percent is appropriate for estimating revenue available from end users.

5. Setting the Funding Benchmark and Extremely High-Cost Threshold

149. Applying an assumed ARPU of $75 and the 70 percent expected subscription rate, the preliminary funding benchmark that we identify for purpose of developing the preliminary list of eligible census blocks is $52.50 per location. This benchmark is consistent with the benchmark proposed by the

ABC Coalition. This funding threshold is lower than the funding thresholds proposed by ACA and Nebraska Rural Independent Carriers, which assumed different ARPU and subscription rates than those we adopt in this order. Given the ARPU and subscription rate we adopt for the reasons discussed above, we are not persuaded based on the record before us that a higher funding benchmark is justified.

150. As described above, the Bureau concludes that approximately $1.782 billion is available for the Phase II budget pursuant to the CAM. Applying that amount and the $52.50 funding benchmark just discussed results in an extremely high-cost threshold of $207.81 per location, assuming carriers serving the non-contiguous areas of the United States accept model-based support. Accordingly, census blocks with average costs, as estimated by the CAM, equal to or in excess of $207.81 will not be eligible for the offer of model-based support in Phase II. The Bureau estimates that 0.37 percent of all locations in price cap areas are presumed to be extremely high cost. Given the $52.50 benchmark and $207.81 extremely high-cost threshold, the Bureau currently forecasts approximately 4.25 million locations will be in areas eligible for the offer of Connect America Phase II model-based support. These figures may change, however, dependent on the outcome of the challenge process and the elections of carriers serving the non-contiguous areas of the United States.

151. In identifying the preliminary funding benchmark and extremely high-cost threshold, the Bureau recognizes that minor adjustments may be appropriate to take into account the results of the challenge process before issuing the final list of eligible census blocks. The Bureau therefore reserves the right to make minor adjustments prior to releasing the final list of census blocks eligible for the offer of model-based support.

F. Initial List of Eligible Census Blocks

152. The Bureau concludes that using round eight National Broadband Map data (data as of June 2013) implements the Commission's directive to the Bureau to identify areas served by unsubsidized competitors as close as possible to the time of adoption of the cost model. The Bureau will finalize the list of eligible census blocks through the challenge process in the months ahead, and will not update the

model for purposes of the offer of support to price cap carriers in the event newer National Broadband Map data become available before completion of that challenge process.

153. As the Bureau explained in the Connect America Phase II Challenge Process Order, 78 FR 32991, June 3, 2013, the Bureau will publish a preliminary list of cost-qualified census blocks that are presumptively unserved by an unsubsidized competitor. The Bureau will then commence the Phase II challenge process, whereby interested parties may contend that census blocks should be added or removed from the list based on whether those blocks are unserved or served by an unsubsidized competitor. After the challenges and responses are reviewed, the Bureau will add or remove census blocks from the list of presumptively cost-qualified census block as appropriate to keep total support amounts within the overall Phase II budget. The CAM support module will be rerun using the finalized list of eligible census blocks. Support will be calculated in a manner that utilizes the appropriate amount of the Phase II budget. If the Phase II budget would be exceeded by a net increase in census blocks deemed to be "unserved," the extremely high-cost threshold may be lowered to keep Phase II within its budget.

III. PROCEDURAL MATTERS

A. Paperwork Reduction Act

154. This document does not contain new or modified information collection requirements subject to the Paperwork Reduction Act of 1995 (PRA), Public Law 104-13. In addition, therefore, it does not contain any new or modified information collection burden for small business concerns with fewer than 25 employees, pursuant to the Small Business Paperwork Relief Act of 2002, Public Law 107-198.

B. Final Regulatory Flexibility Analysis

155. As required by the Regulatory Flexibility Act, as amended (RFA), an Initial Regulatory Flexibility Analysis (IRFA) was incorporated in the Model Design Public Notice in WC Docket Nos. 10-90, 05-337, and the Phase II Non-Contiguous Areas Public Notice, 78 FR 12006, February 21, 2013, in

WC Docket No. 10-90. The Bureau sought written public comment on the proposals in the Model Design Public Notice and the Phase II Non-Contiguous Areas Public Notice, including comment on the IRFAs. This Final Regulatory Flexibility Analysis (FRFA) conforms to the RFA.

1. Need for, and Objectives of, the Report and Order

156. The Report and Order finalizes decisions regarding the engineering assumptions contained in the Connect America Cost Model (CAM) and adopts input values for the model, for example, the cost of network components such as fiber and electronics, plant mix, various capital cost parameters, and network operating expenses. Together with the CAM Platform Order, the two orders resolve all of the technical and engineering assumptions necessary for the CAM to estimate the cost of providing service at the census block and state level. In addition, the Report and Order adopts the methodology for determining the lower "funding benchmark" and the upper "extremely high-cost threshold," and also identifies preliminary values: a funding benchmark of $52.50 and an extremely high-cost threshold of $207.81. Areas between these thresholds will be presumptively eligible for funding, subject to the challenge process to ensure that areas are not served by unsubsidized competitor. The budget used to set the extremely high-cost threshold will be approximately $1.782 billion.

2. Summary of Significant Issues Raised by Public Comments in Response to the Supplemental IRFA

157. There were no comments filed that specifically addressed the rules and policies proposed in the IRFA for the Model Design Public Notice. Alaska Communications Systems (ACS) commented on the IRFA for the Phase II Non-Contiguous Areas Public Notice. In this IRFA, the Bureau noted that the Connect America Phase II issues for which it sought comment were "not anticipated to have a significant economic impact on small entities insofar as the results impact high-cost support amounts for price cap carriers." The Bureau explained that "most (and perhaps all) of the affected carriers are not small entities," and that the "choice of alternatives discussed is not anticipated to systematically increase or decrease support for any particular group of entities and therefore any significant economic impact cannot necessarily be minimized through alternatives."

158. In its comments, Alaska Communications Systems (ACS) claims that as a company with "roughly 800 aggregate employees across its [incumbent local exchange carriers] and their affiliates" and as a business that is not "dominant in its field of operation," it qualifies as a small entity within the meaning of the Regulatory Flexibility Act. It also asserts that the CAM "systematically reduces support for three of the non-[contiguous] price cap carriers, while substantially increasing support for the other price cap companies as a whole, including most of them individually."

3. Description and Estimate of the Number of Small Entities To Which Rules Will Apply

159. The RFA directs agencies to provide a description of, and where feasible, an estimate of the number of small entities that may be affected by the proposed rules, if adopted. The RFA generally defines the term "small entity" as having the same meaning as the terms "small business," "small organization," and "small governmental jurisdiction." In addition, the term "small business" has the same meaning as the term "small-business concern" under the Small Business Act. A "small-business concern" is one which: (1) is independently owned and operated; (2) is not dominant in its field of operation; and (3) satisfies any additional criteria established by the SBA.

160. **Small Businesses**. Nationwide, there are a total of approximately 27.5 million small businesses, according to the SBA.

161. **Wired Telecommunications Carriers**. The SBA has developed a small business size standard for Wired Telecommunications Carriers, which consists of all such companies having 1,500 or fewer employees. According to Census Bureau data for 2007, there were 3,188 firms in this category, total, that operated for the entire year. Of this total, 3144 firms had employment of 999 or fewer employees, and 44 firms had employment of 1000 employees or more. Thus, under this size standard, the majority of firms can be considered small.

162. **Local Exchange Carriers (LECs)**. Neither the Commission nor the SBA has developed a size standard for small businesses specifically applicable to local exchange services. The closest

applicable size standard under SBA rules is for Wired Telecommunications Carriers. Under that size standard, such a business is small if it has 1,500 or fewer employees. According to Commission data, 1,307 carriers reported that they were incumbent local exchange service providers. Of these 1,307 carriers, an estimated 1,006 have 1,500 or fewer employees and 301 have more than 1,500 employees. Consequently, the Commission estimates that most providers of local exchange service are small entities that may be affected by the rules and policies proposed in the FNPRM.

163. **Incumbent Local Exchange Carriers (incumbent LECs)**. Neither the Commission nor the SBA has developed a size standard for small businesses specifically applicable to incumbent local exchange services. The closest applicable size standard under SBA rules is for Wired Telecommunications Carriers. Under that size standard, such a business is small if it has 1,500 or fewer employees. According to Commission data, 1,307 carriers reported that they were incumbent local exchange service providers. Of these 1,307 carriers, an estimated 1,006 have 1,500 or fewer employees and 301 have more than 1,500 employees. Consequently, the Commission estimates that most providers of incumbent local exchange service are small businesses that may be affected by rules adopted pursuant to the FNPRM.

164. We have included small incumbent LECs in this present RFA analysis. As noted above, a "small business" under the RFA is one that, inter alia, meets the pertinent small business size standard (e.g., a telephone communications business having 1,500 or fewer employees), and "is not dominant in its field of operation." The SBA's Office of Advocacy contends that, for RFA purposes, small incumbent LECs are not dominant in their field of operation because any such dominance is not "national" in scope. We have therefore included small incumbent LECs in this RFA analysis, although we emphasize that this RFA action has no effect on Commission analyses and determinations in other, non-RFA contexts.

165. **Competitive Local Exchange Carriers (competitive LECs), Competitive Access Providers (CAPs), Shared-Tenant Service Providers, and Other Local Service Providers**. Neither the Commission nor the SBA has developed a small business size standard specifically for these service providers. The appropriate size standard under SBA rules is for the category Wired Telecommunications

Carriers. Under that size standard, such a business is small if it has 1,500 or fewer employees. According to Commission data, 1,442 carriers reported that they were engaged in the provision of either competitive local exchange services or competitive access provider services. Of these 1,442 carriers, an estimated 1,256 have 1,500 or fewer employees and 186 have more than 1,500 employees. In addition, 17 carriers have reported that they are Shared-Tenant Service Providers, and all 17 are estimated to have 1,500 or fewer employees. In addition, 72 carriers have reported that they are Other Local Service Providers. Of the 72, seventy have 1,500 or fewer employees and two have more than 1,500 employees. Consequently, the Commission estimates that most providers of competitive local exchange service, competitive access providers, Shared-Tenant Service Providers, and Other Local Service Providers are small entities that may be affected by rules adopted pursuant to the FNPRM.

166. **Wireless Telecommunications Carriers (except Satellite)**. Since 2007, the SBA has recognized wireless firms within this new, broad, economic census category. Prior to that time, such firms were within the now-superseded categories of Paging and Cellular and Other Wireless Telecommunications. Under the present and prior categories, the SBA has deemed a wireless business to be small if it has 1,500 or fewer employees. For this category, census data for 2007 show that there were 1,383 firms that operated for the entire year. Of this total, 1,368 firms had employment of 999 or fewer employees and 15 had employment of 1000 employees or more. Similarly, according to Commission data, 413 carriers reported that they were engaged in the provision of wireless telephony, including cellular service, Personal Communications Service (PCS), and Specialized Mobile Radio (SMR) Telephony services. Of these, an estimated 261 have 1,500 or fewer employees and 152 have more than 1,500 employees. Consequently, the Commission estimates that approximately half or more of these firms can be considered small. Thus, using available data, we estimate that the majority of wireless firms can be considered small.

167. **Local Multipoint Distribution Service**. Local Multipoint Distribution Service ("LMDS") is a fixed broadband point-to-multipoint microwave service that provides for two-way video telecommunications. The auction of the 986 LMDS licenses began and closed in 1998. The Commission

established a small business size standard for LMDS licenses as an entity that has average gross revenues of less than $40 million in the three previous calendar years. An additional small business size standard for "very small business" was added as an entity that, together with its affiliates, has average gross revenues of not more than $15 million for the preceding three calendar years. The SBA has approved these small business size standards in the context of LMDS auctions. There were 93 winning bidders that qualified as small entities in the LMDS auctions. A total of 93 small and very small business bidders won approximately 277 A Block licenses and 387 B Block licenses. In 1999, the Commission re-auctioned 161 licenses; there were 32 small and very small businesses winning that won 119 licenses.

168. **Satellite Telecommunications**. Since 2007, the SBA has recognized satellite firms within this revised category, with a small business size standard of $15 million. The most current Census Bureau data are from the economic census of 2007, and we will use those figures to gauge the prevalence of small businesses in this category. Those size standards are for the two census categories of "Satellite Telecommunications" and "Other Telecommunications." Under the "Satellite Telecommunications" category, a business is considered small if it had $15 million or less in average annual receipts. Under the "Other Telecommunications" category, a business is considered small if it had $25 million or less in average annual receipts.

169. The first category of Satellite Telecommunications "comprises establishments primarily engaged in providing point-to-point telecommunications services to other establishments in the telecommunications and broadcasting industries by forwarding and receiving communications signals via a system of satellites or reselling satellite telecommunications." For this category, Census Bureau data for 2007 show that there were a total of 512 firms that operated for the entire year. Of this total, 464 firms had annual receipts of under $10 million, and 18 firms had receipts of $10 million to $24,999,999. Consequently, we estimate that the majority of Satellite Telecommunications firms are small entities that might be affected by rules adopted pursuant to the FNPRM.

170. The second category of Other Telecommunications "primarily engaged in providing specialized telecommunications services, such as satellite tracking, communications telemetry, and radar

station operation. This industry also includes establishments primarily engaged in providing satellite terminal stations and associated facilities connected with one or more terrestrial systems and capable of transmitting telecommunications to, and receiving telecommunications from, satellite systems. Establishments providing Internet services or voice over Internet protocol (VoIP) services via client-supplied telecommunications connections are also included in this industry." For this category, Census Bureau data for 2007 show that there were a total of 2,383 firms that operated for the entire year. Of this total, 2,346 firms had annual receipts of under $25 million. Consequently, we estimate that the majority of Other Telecommunications firms are small entities that might be affected by our action.

171. **Cable and Other Program Distribution.** Since 2007, these services have been defined within the broad economic census category of Wired Telecommunications Carriers; that category is defined as follows: "This industry comprises establishments primarily engaged in operating and/or providing access to transmission facilities and infrastructure that they own and/or lease for the transmission of voice, data, text, sound, and video using wired telecommunications networks. Transmission facilities may be based on a single technology or a combination of technologies." The SBA has developed a small business size standard for this category, which is: all such firms having 1,500 or fewer employees. According to Census Bureau data for 2007, there were a total of 955 firms in this previous category that operated for the entire year. Of this total, 939 firms had employment of 999 or fewer employees, and 16 firms had employment of 1000 employees or more. Thus, under this size standard, the majority of firms can be considered small and may be affected by rules adopted pursuant to the FNPRM.

172. **Cable Companies and Systems**. The Commission has developed its own small business size standards, for the purpose of cable rate regulation. Under the Commission's rules, a "small cable company" is one serving 400,000 or fewer subscribers, nationwide. Industry data indicate that, of 1,076 cable operators nationwide, all but eleven are small under this size standard. In addition, under the Commission's rules, a "small system" is a cable system serving 15,000 or fewer subscribers. Industry data indicate that, of 7,208 systems nationwide, 6,139 systems have under 10,000 subscribers, and an

additional 379 systems have 10,000-19,999 subscribers. Thus, under this second size standard, most cable systems are small and may be affected by rules adopted pursuant to the FNPRM.

173. **Cable System Operators**. The Act also contains a size standard for small cable system operators, which is "a cable operator that, directly or through an affiliate, serves in the aggregate fewer than 1 percent of all subscribers in the United States and is not affiliated with any entity or entities whose gross annual revenues in the aggregate exceed $250,000,000." The Commission has determined that an operator serving fewer than 677,000 subscribers shall be deemed a small operator, if its annual revenues, when combined with the total annual revenues of all its affiliates, do not exceed $250 million in the aggregate. Industry data indicate that, of 1,076 cable operators nationwide, all but ten are small under this size standard. We note that the Commission neither requests nor collects information on whether cable system operators are affiliated with entities whose gross annual revenues exceed $250 million, and therefore we are unable to estimate more accurately the number of cable system operators that would qualify as small under this size standard.

174. **Open Video Services**. The open video system ("OVS") framework was established in 1996, and is one of four statutorily recognized options for the provision of video programming services by local exchange carriers. The OVS framework provides opportunities for the distribution of video programming other than through cable systems. Because OVS operators provide subscription services, OVS falls within the SBA small business size standard covering cable services, which is "Wired Telecommunications Carriers." The SBA has developed a small business size standard for this category, which is: all such firms having 1,500 or fewer employees. According to Census Bureau data for 2007, there were a total of 955 firms in this previous category that operated for the entire year. Of this total, 939 firms had employment of 999 or fewer employees, and 16 firms had employment of 1000 employees or more. Thus, under this second size standard, most cable systems are small and may be affected by rules adopted pursuant to the Notice. In addition, we note that the Commission has certified some OVS operators, with some now providing service. Broadband service providers ("BSPs") are currently the only significant holders of OVS certifications or local OVS franchises. The Commission does not have

financial or employment information regarding the entities authorized to provide OVS, some of which may not yet be operational. Thus, again, at least some of the OVS operators may qualify as small entities.

175. **Internet Service Providers.** Since 2007, these services have been defined within the broad economic census category of Wired Telecommunications Carriers; that category is defined as follows: "This industry comprises establishments primarily engaged in operating and/or providing access to transmission facilities and infrastructure that they own and/or lease for the transmission of voice, data, text, sound, and video using wired telecommunications networks. Transmission facilities may be based on a single technology or a combination of technologies." The SBA has developed a small business size standard for this category, which is: all such firms having 1,500 or fewer employees. According to Census Bureau data for 2007, there were 3,188 firms in this category, total, that operated for the entire year. Of this total, 3144 firms had employment of 999 or fewer employees, and 44 firms had employment of 1000 employees or more. Thus, under this size standard, the majority of firms can be considered small. In addition, according to Census Bureau data for 2007, there were a total of 396 firms in the category Internet Service Providers (broadband) that operated for the entire year. Of this total, 394 firms had employment of 999 or fewer employees, and two firms had employment of 1000 employees or more. Consequently, we estimate that the majority of these firms are small entities that may be affected by rules adopted pursuant to the FNPRM.

4. Description of Projected Reporting, Record Keeping, and Other Compliance Requirements

176. In the Report and Order, the Bureau adopts inputs associated with a forward-looking economic cost model to be used to determine support amounts to be offered to price cap carriers and their affiliates pursuant to Phase II of the Connect America Fund. Comment was previously sought on possible data inputs that would require reporting by small entities, including wire center boundaries, residential location data, and data from local exchange carriers regarding their mix of aerial, underground, and buried plant, the age of existing plant, and the gauge of existing twisted-pair copper plant. The Bureau largely adopts the use of commercial data sources, or relies on data that was previously submitted by carriers to

develop the inputs. No small entity was required to submit data. The Report and Order does not impose further data collections and recordkeeping requirements.

5. Steps Taken to Minimize Significant Economic Impact on Small Entities and Significant Alternatives Considered

177. The RFA requires an agency to describe any significant alternatives that it has considered in reaching its proposed approach, which may include the following four alternatives (among others): "(1) the establishment of differing compliance or reporting requirements or timetables that take into account the resources available to small entities; (2) the clarification, consolidation, or simplification of compliance or reporting requirements under the rule for small entities; (3) the use of performance, rather than design, standards; and (4) an exemption from coverage of the rule, or any part thereof, for small entities."

178. The Report and Order adopts a number of input values for the Connect America Cost Model. The model's use of these input values to calculate support are not anticipated to have a significant economic impact on small entities insofar as the results produce high-cost support amounts for price cap carriers and their affiliates that accept the support in exchange for making a state-level commitment pursuant to Connect America Phase II. This is primarily because as discussed above, virtually all of the affected carriers are not small entities. Moreover, the alternatives for most input values that were considered were not anticipated to systematically increase or decrease support for any particular group of entities, and therefore any significant economic impact could not necessarily be minimized through alternatives.

179. The Bureau does note, however, that it adopted a number of inputs for carriers, several of which may be small entities, that serve non-contiguous areas in order to reflect the unique costs of serving these areas. The Bureau also has provided the opportunity for these carriers to elect to receive frozen support for the term of Connect America Phase II or elect to decline model-based support if they find that the support calculated by the CAM is not sufficient for serving non-contiguous areas.

180. Moreover, the choice of a methodology and preliminary values for the funding benchmark and extremely high-cost threshold may have a significant economic impact on small entities. Using a preliminary funding benchmark of $52.50 and a budget of $1.782 billion results in a preliminary extremely high-cost threshold of $207.81 per location. Areas that exceed this extremely high-cost threshold may be supported by the Remote Areas Fund, and thus could receive support through an alternative support mechanism that could include small entities.

181. The Bureau considered a number of alternatives for setting the funding benchmark and extremely high-cost threshold, including whether the Bureau should first determine the funding benchmark and then use the budget to determine the extremely high-cost threshold, or if it should first determine the extremely high-cost threshold and then use the budget to determine the funding benchmark. Consistent with the Commission's direction that the Bureau take into account where costs are likely to be higher than can be supported through reasonable end user revenues alone, the Bureau chose to set the funding benchmark first, by estimating the average revenue per user (ARPU) that could be reasonably expected from voice and broadband services and adjusting the ARPU to take into account that not all locations passed will necessarily subscribe to one or both services over the full term of Phase II support. The Bureau also sought comment on a number of alternatives for the ARPU and subscription rate for setting the funding benchmark. Using an assumed ARPU of $75 and a70 percent subscription rate, the Bureau identified a preliminary funding benchmark of $52.50. The Bureau found that an assumed ARPU of $75 reflects the revenues that a carrier can reasonably expect to receive from each subscriber for providing voice, broadband, and a combination of those services, and that a 70 percent subscription rate reflects that not all locations will have active subscribers.

182. By identifying a preliminary funding benchmark at $52.50 and an estimated budget of $1.782 billion, the preliminary extremely high-cost threshold becomes $207.81 per location. Although establishing this extremely high-cost threshold is likely to have a significant impact on smaller entities that may seek support from the Remote Areas Fund, the full impact will not be known until the Commission issues an order adopting the rules for the Remote Areas Fund, including rules designating

the areas that will be eligible for Remote Areas Fund support, and determining which entities are eligible to receive support for serving Remote Areas Fund-eligible areas. The Bureau anticipates that the Commission will consider alternatives when adopting rules for the Remote Areas Fund, including those that would minimize the significant economic impact on small entities.

183. The Model Design Public Notice IRFA also suggested that our adoption of a preliminary funding benchmark and extremely high-cost threshold may affect the service obligations of rate-of-return carriers. We have since clarified that the funding benchmark and extremely high-cost threshold we adopt for purposes of the offer of support to price cap carriers does not bind the Commission on any decision regarding the use of the model in other contexts. The Bureau anticipates that the Commission will consider alternatives when deciding whether to use the CAM in other contexts, including those that would minimize the significant economic impact on small entities.

6. Report to Congress

184. The Commission will send a copy of the Report and Order, including this FRFA, in a report to be sent to Congress pursuant to the Congressional Review Act. In addition, the Commission will send a copy of the Report and Order, including this FRFA, to the Chief Counsel for Advocacy of the SBA. A copy of the Report and Order and the FRFA (or summaries thereof) will also be published in the Federal Register.

C. Data Quality Act

185. The Commission certifies that it has complied with the Office of Management and Budget Final Information Quality Bulletin for Peer Review, 70 FR 2664, January 14, 2005, and the Data Quality Act, Pub. L. 106-554 (2001), codified at 44 U.S.C. 3516 note, with regard to its reliance on influential scientific information in the Report and Order in WC Docket Nos. 10-90 and 05-337.

IV. ORDERING CLAUSES

186. Accordingly, IT IS ORDERED, pursuant to the authority contained in sections 1, 2, 4(i), 5, 214, 254, 303(r), and 403 of the Communications Act of 1934, as amended, and section 706 of the

Telecommunications Act of 1996, 47 U.S.C. 151, 152, 154(i), 155, 214, 254, 303(r), 403, and 1302, §§ 0.91, 0.201(d), 1.1, and 1.427 of the Commission's rules, 47 CFR 0.91, 0.201(d), 1.1, 1.427, and the delegations of authority in paragraphs 157, 169, 170, 184, 186, 187, and 192 of the USF/ICC Transformation Order, FCC 11-161, that the Report and Order IS ADOPTED, effective **[INSERT DATE 30 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER]**.

187. IT IS FURTHER ORDERED that the Commission SHALL SEND a copy of the Report and Order to Congress and the Government Accountability Office pursuant to the Congressional Review Act, see 5 U.S.C. 801(a)(1)(A).

188. IT IS FURTHER ORDERED that the Commission's Consumer and Governmental Affairs Bureau, Reference Information Center, SHALL SEND a copy of the Report and Order, including the Final Regulatory Flexibility Analysis, to the Chief Counsel for Advocacy of the Small Business Administration.

FEDERAL COMUNICATIONS COMMISSION.

Carol E. Mattey,
Deputy Chief, Wireline Competition Bureau.

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