Before the
Federal Communications Commission
Washington, D.C.20554

In the Matter of	)	
	)	
Connect America Fund	)	WC Docket No. 10-90
	)	
High-Cost Universal Service Support	)	WC Docket No. 05-337

REPORT AND ORDER

Adopted: April 22, 2014 **Released: April 22, 2014**

By the Deputy Chief, Wireline Competition Bureau:

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I. INTRODUCTION

1. This Report and Order (Order) takes important steps to further implement the landmark reforms unanimously adopted by the 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.[1] 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.[2] The Commission delegated to the Wireline Competition Bureau (Bureau) the task of developing that forward-looking cost model.[3]

2. In this order, we finalize 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. We modified the model over the course of this

[1] *See Connect America Fund; A National Broadband Plan for Our Future; Establishing Just and Reasonable Rates for Local Exchange Carriers; High-Cost Universal Service Support; Developing a Unified Intercarrier Compensation Regime; Federal-State Joint Board on Universal Service; Lifeline and Link-Up; Universal Service Reform—Mobility Fund*; WC Docket Nos. 10-90, 07-135, 05-337, 03-109, CC Docket Nos. 01-92, 96-45, GN Docket No. 09-51, WT Docket No. 10-208, Report and Order and Further Notice of Proposed Rulemaking, 26 FCC 17663 (2011) (*USF/ICC Transformation Order and/or FNPRM*); *pets. for review pending sub nom. In re: FCC 11-161*, No. 11-9900 (10th Cir. argued Nov. 19, 2013). The Commission determined that rate-of-return operating companies that are affiliated with holding companies for which the majority of access lines are regulated under price caps would receive frozen support in Phase I and be eligible for the offer of model-based support in Phase II.

[2] *USF/ICC Transformation Order*, 26 FCC Rcd at 17725, para. 156.

[3] *See id*. at 17725, para. 157.

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.[4] We identify 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.[5] We also estimate 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. BACKGROUND

3. In the *USF/ICC Transformation Order*, the Commission adopted reforms to "extend broadband to millions of unserved locations over a five-year period, including households, businesses, and community anchor institutions, while sustaining existing voice and broadband services."[6] Recognizing that over eighty percent of the unserved locations in the nation at that time were in price cap areas, the Commission provided for up to $1.8 billion to be spent annually to make broadband-capable infrastructure available to as many unserved locations as possible within these areas, while sustaining voice and broadband-capable infrastructure in high-cost areas that would not be served absent support.[7]

4. The Commission concluded that a forward-looking cost model should be used to estimate the support necessary to serve areas where costs are above a specified benchmark,[8] but below a second "extremely high-cost" benchmark.[9] Each price cap carrier will be offered a model-derived support amount in exchange for a commitment to serve locations in its service territory in a state that, based on the model, fall within the high-cost range (i.e., above the specified cost benchmark but below the "extremely high-cost" benchmark) and are not served by a competing, unsubsidized provider.[10] In areas where the price cap carrier declines the state-level commitment, support will be determined through a competitive process.[11]

5. The Commission delegated to the Bureau the task of selecting a specific engineering cost model and associated inputs, consistent with the parameters set forth in the *USF/ICC Transformation Order*.[12] Specifically, "the model should be of wireline technology and at a census block or smaller

[4] *See id*. at 17737, para. 193.

[5] *See id*. at 17728-29, paras. 167-70; *infra* para. 84.

[6] *Id*. at 17725, para. 156.

[7] *See id*. at 17725, para. 158.

[8] We refer to this benchmark as the "funding benchmark" in this Order.

[9] *USF/ICC Transformation Order*, 26 FCC Rcd at 17725, para. 156. We refer to this second benchmark as the "extremely high cost threshold" in this Order.

[10] *Id*. In meeting its obligation to serve a particular number of locations in a state, an incumbent that has accepted the state-level commitment may choose to serve some census blocks with costs above the highest cost threshold instead of eligible census blocks (i.e., census blocks with lower costs), provided that it meets the public interest obligations in those census blocks, and provided that the total number of unserved locations and the total number of locations covered is greater than or equal to the number of locations in the eligible census blocks. *Id*. at 17729, para. 171 n.279. *See* 47 C.F.R. §§ 54.309-310.

[11] *USF/ICC Transformation Order*, 26 FCC Rcd at 17725, para. 156.

[12] *Id*. at 17735, para. 187.

level."[13] In addition, the Commission directed the Bureau "to ensure that the model design maximizes the number of locations that will receive robust, scalable broadband within the budgeted amounts."[14]

6. In the *USF/ICC Transformation Order*, the Commission directed the Bureau "to consider the unique circumstances of [Alaska, Hawaii, Puerto Rico, the U.S. Virgin Islands and Northern Marianas Islands] when adopting a cost model."[15] The Commission further directed the Bureau to determine whether the cost model provides sufficient support to these areas, and if, in the Bureau's determination, the model does not provide these areas with sufficient support, the Commission granted the Bureau the discretion to "maintain existing support levels . . . to any affected price cap carrier, without exceeding the overall budget of $1.8 billion per year for price cap areas."[16]

7. On December 15, 2011, the Bureau released a public notice inviting interested parties to submit proposed forward-looking cost models and setting forth the criteria the Bureau would use to evaluate the models submitted.[17] In particular, "[c]onsistent with the Commission's order, the adopted model should be capable of estimating the forward-looking economic costs of an efficient wireline provider at a granular level – census block or smaller – in all areas of the country, including [the non-contiguous areas of the United States]."[18] In response, in early February 2012, a group of price cap carriers known as the ABC Coalition submitted a model that estimates the cost of providing service to the entire nation.[19] In February 2012, Alaska Communications Systems Group, Inc. (ACS) submitted a model with certain Alaska-specific cost variables.[20]

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[13] *Id.*; *see also id.* at 17735-36, paras. 188-89.

[14] *Id*. at 17735, para. 187. Specifically, the Commission concluded that the model should direct funds to support 4 Mbps/1 Mbps broadband service to all supported locations, subject only to the waiver process for upstream speed, and should ensure that as many locations as possible receive a 6 Mbps/1.5 Mbps or faster service at the end of the five-year term, consistent with the Connect America Phase II budget. *Id*.

[15] *Id*. at 17737, para. 193.

[16] *Id*.

[17] *Request for Connect America Fund Cost Models*, WC Docket Nos. 10-90, 05-337, Public Notice, 26 FCC Rcd 16836 (Wireline Comp. Bur. 2011) (*Request for Models PN*).

[18] *Id*. at 16838, para. 6. "Models must also be capable of excluding areas served by unsubsidized competitors." In addition, among other things, "models should be able to incorporate changes to underlying data sources;" "reflect how an efficient provider would likely evaluate deployment decisions;" and "be capable of incorporating a comprehensive range of different costs." *Id*. at 16838-39, paras. 6, 8,10.

[19] Letter from Jonathan Banks, USTelecom, to Marlene H. Dortch, Secretary, FCC, WC Docket Nos. 10-90, 05-337 (filed Feb. 13, 2012) (USTelecom Feb. 13, 2012 Ex Parte Letter) (attaching, on behalf of the ABC Coalition, updated documentation of the CostQuest Associates Broadband Analysis Tool (CQBAT) model). This submission updated the ABC Coalition's prior proposal for a forward-looking model, which had been submitted prior to the release of the *USF/ICC Transformation Order*. Letter from Robert W. Quinn, Jr., AT&T, Steve Davis, CenturyLink, Michael T. Skrivan, FairPoint, Kathleen Q. Abernathy, Frontier, Kathleen Grillo, Verizon, and Michael D. Rhoda, Windstream, to Marlene H. Dortch, Secretary, FCC, WC Docket No. 10-90 et al. (filed July 29, 2011). The ABC Coalition model was submitted pursuant to a protective order adopted by the Bureau. *See Connect America Fund*; *High-Cost Universal Service Support*, WC Docket Nos. 10-90, 05-337, Second Supplemental Protective Order, 27 FCC Rcd 1503 (Wireline Comp. Bur. 2012) (*Second Supplemental Protective Order*).

[20] Letter from Karen Brinkmann, Counsel for ACS, to Marlene H. Dortch, Secretary, FCC, WC Docket Nos. 10-90, 05-337 (filed Feb. 13, 2012) (submitting Alaska Communications Broadband Network Cost Study Model). This model was submitted pursuant to a protective order adopted by the Bureau. *Connect America Fund; High-Cost Universal Service Support*, WC Docket Nos. 10-90 and 05-337, Second Protective Order, 27 FCC Rcd 1494, para. 1 n.2 (Wireline Comp. Bur. 2012) (*Second Protective Order*); *see also* Comments of ACS, WC Docket Nos. 10-90, 05-337 (filed Feb. 1, 2012).

8. On June 8, 2012, the Bureau released the *Model Design PN*, seeking comment generally on model design and data input issues and on the two models that had been submitted in the record at that time.[21] The *Model Design PN* identified certain threshold model design decisions and sought comment on specific proposals for the design of the model and data inputs to be used. Subsequently, the Bureau convened an in-person workshop in September 2012 to discuss the design and mechanics of the nationwide model submitted by the ABC Coalition, and the Alaska-specific model submitted by ACS.[22] In October 2012, the Bureau commenced a "virtual workshop" to provide additional opportunities for all affected stakeholders and interested parties to provide input.[23] Over the course of ten months, the virtual workshop sought input to more fully develop the record on twenty-eight topics related to economic and engineering assumptions and input values to be incorporated into the model.[24] The virtual workshop closed on July 24, 2013, and all comments from the virtual workshop are part of the official public record of this proceeding.[25]

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[21] *Wireline Competition Bureau Seeks Comment on Model Design and Data Inputs for Phase II of the Connect America Fund*, WC Docket Nos. 10-90, 05-337, Public Notice, 27 FCC Rcd 6147 (Wireline Comp. Bur. 2012) (*Model Design PN*).

[22] *Wireline Competition Bureau Announces Connect America Phase II Cost Model Workshop*, WC Docket Nos. 10-90, 05-337, Public Notice, 27 FCC Rcd 9882 (Wireline Comp. Bur. 2012); *Wireline Competition Bureau Announces Agenda for Connect America Phase II Cost Model Workshop*, WC Docket Nos. 10-90, 05-537, Public Notice, 27 FCC Rcd 10968 (Wireline Comp. Bur. 2012).

[23] *Wireline Competition Bureau Announces Connect America Phase II Cost Model Virtual Workshop*, WC Docket Nos. 10-90, 05-337, Public Notice, 27 FCC Rcd 11056 (Wireline Comp. Bur. 2012).

[24] *See Wireline Competition Bureau Announces Commencement of Connect America Phase II Cost Model Virtual Workshop*, WC Docket Nos. 10-90, 05-337, Public Notice, 27 FCC Rcd 11977 (Wireline Comp. Bur. 2012); *Wireline Competition Bureau Releases Additional Discussion Topics for Connect America Phase II Cost Model Virtual Workshop*, WC Docket Nos. 10-90, 05-337, Public Notice, 27 FCC Rcd 13212 (Wireline Comp. Bur. 2012) (*Oct. 19 Virtual Workshop PN*); *Wireline Competition Bureau Releases Further Discussion Topics for Connect America Cost Model Virtual Workshop*, WC Docket Nos. 10-90, 05-337, Public Notice, 27 FCC Rcd 15795 (Wireline Comp. Bur. 2012) (*Dec. 17 Virtual Workshop PN*); *Wireline Competition Bureau Seeks Additional Comment in Connect America Cost Model Virtual Workshop*, WC Docket Nos. 10-90, 05-337, Public Notice, 28 FCC Rcd 1007 (Wireline Comp. Bur. 2013); *Wireline Competition Bureau Seeks Updates and Corrections to Telcomaster Table for Connect America Cost Model*, WC Docket No. 10-90, Public Notice, 28 FCC Rcd 1151 (Wireline Comp. Bur. 2013) (*Telcomaster Table Updates Public Notice*); *Wireline Competition Bureau Releases Further Discussion Topics and Seeks Additional Comment in Connect America Cost Model Virtual Workshop*, WC Docket No. 10-90, Public Notice, 28 FCC Rcd 1447 (Wireline Comp. Bur. 2013); *Wireline Competition Bureau Adds New Discussion Topic to Connect America Cost Model Virtual Workshop*, WC Docket No. 10-90, Public Notice, 28 FCC Rcd 1961 (Wireline Comp. Bur. 2013); *Wireline Competition Bureau Adds New Discussion Topic to Connect America Cost Model Virtual Workshop*, WC Docket No. 10-90, Public Notice, 28 FCC Rcd 4674 (Wireline Comp. Bur. 2013); *Wireline Competition Bureau Announces Availability of Version 3.1.2 of the Connect America Fund Phase II Cost Model and Adds Additional Discussion Topics to Connect America Cost Model Virtual Workshop*, WC Docket No. 10-90, Public Notice, 28 FCC Rcd 7293 (Wireline Comp. Bur. 2013) (*CAM Version 3.1.2 Availability PN*); *Wireline Competition Bureau Adds Two New Topics to Connect America Cost Model Virtual Workshop*, WC Docket No. 10-90, Public Notice, 28 FCC Rcd 8888 (Wireline Comp. Bur. 2013); *Wireline Competition Bureau Announces Closing of the Bureau's Cost Model Virtual Workshop*, WC Docket No. 10-90, Public Notice, 28 FCC Rcd 10869 (Wireline Comp. Bur. 2013) (*Virtual Workshop Closure PN*).

[25] *See* Letter from Michael J. Jacobs, Legal Advisor to the Chief, Wireline Competition Bureau, to Marlene H. Dortch, Secretary, FCC (filed Feb. 6, 2013) (submitting into the record the attached "Connect America Cost Model Virtual Workshop Questions and Comments Posted as of February 1, 2013") (WCB Feb. 6, 2013 Virtual Workshop Submission Letter); Letter from Jamie Susskind, Legal Advisor to the Chief, Wireline Competition Bureau, to Marlene H. Dortch, Secretary, FCC (filed Mar. 28, 2013) (submitting into the record comments posted by parties in the CAM virtual workshop from February 2, 2013 through March 25, 2013) (WCB Mar. 28, 2013 Virtual Workshop Submission Letter); Letter from Michael J. Jacobs, Legal Advisor to the Chief, Wireline Competition Bureau, to Marlene H. Dortch, Secretary, FCC (filed Apr. 30, 2013) (submitting into the record comments posted by parties in

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9. On December 11, 2012, the Bureau announced the availability of version 1.0 of the Connect America Cost Model.[26] The Administrator of the Universal Service Fund, the Universal Service Administrative Company (USAC), procured the services of a contractor, CostQuest Associates, Inc. (CostQuest), to assist with the execution and support of the CAM, under policy direction from the Commission.[27] By procuring the services of the modeling contractor, USAC and the Bureau were in a better position to direct ongoing model development work in a way not feasible with a model entered into the record by an outside party.[28] CAM v1.0 was similar to the model submitted into the record by the ABC Coalition, but contained a number of key differences, including an estimate of the cost of providing voices services over a broadband-capable network, and additional capabilities the Bureau determined would be useful in the model development process.[29]

10. The CAM is considerably more complex than HCPM and relies on more extensive data sets.[30] For example, the CAM relies extensively on geo-spatial optimization routines that find efficient

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the CAM virtual workshop from March 26, 2013 through April 29, 2013 (WCB Apr. 30, 2013 Virtual Workshop Submission Letter); Letter from Michael J. Jacobs, Legal Advisor to the Chief, Wireline Competition Bureau, to Marlene H. Dortch, Secretary, FCC (filed June 25, 2013) (submitting into the record comments posted by parties in the CAM virtual workshop from April 30, 2013 through June 24, 2013) (WCB June 25, 2013 Virtual Workshop Submission Letter); Letter from Michael J. Jacobs, Legal Advisor to the Chief, Wireline Competition Bureau, to Marlene H. Dortch, Secretary, FCC (filed July 22, 2013) (submitting into the record comments posted by parties in the CAM virtual workshop from June 25, 2013 through July 19, 2013) (WCB July 22, 2013 Virtual Workshop Submission Letter); *Virtual Workshop Closure PN*.

[26] *Wireline Competition Bureau Announces Availability of Version One of the Connect America Fund Phase II Cost Model*, WC Docket Nos. 10-90, 05-337, Public Notice, 27 FCC Rcd 15356 (Wireline Comp. Bur. 2012) (*CAM v1 Availability PN*).

[27] *Id*. at 15357. In addition, CostQuest assisted in hosting CAM v1.0.

[28] Consistent with Office of Management and Budget (OMB) guidelines, the Bureau sought peer review of the CAM. *See* OMB Final Information Quality Bulletin for Peer Review, 70 Fed. Reg. 2664 (Jan. 14, 2005) (requiring that influential scientific information on which a federal agency relies in a rulemaking proceeding be subject to peer review to enhance the quality and credibility of the government's scientific information). On July 25, 2013, the Bureau submitted into the record the peer review charge letter, the peer review submissions that were provided to the Bureau, and the Bureau's responses to those peer review submissions. *See* Letter from Michael J. Jacobs, Legal Advisor to the Chief, Wireline Competition Bureau, to Marlene H. Dortch, Secretary, FCC (filed July 25 , 2013) (Peer Review Submission Letter). The Bureau considered the suggestions of the peer reviewers as it further refined the model. For example, the most important improvement Professors Reed and Sirbu called for was better documentation, and substantial improvements have been made since they reviewed the documentation. *See* Response to Professors Reed and Sirbu at 2-3, available at http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-322386A1.pdf.; *infra* paras. 35-39. Professor Hogendorn's suggestion that the 90 percent "take-rate" used in CAM v1.0 seemed too high appears to focus on whether this is an appropriate assumption regarding subscription levels. *See* Peer Review Submission Letter, Attach., Response to Hogendorn, at 5 (Hogendorn Peer Review Response). As discussed below, for purposes of setting the likely funding benchmark, the Bureau assumes a subscription rate of 70 percent. *See infra* para. 177. For purposes of calculating network costs, we now adopt input values that assume 80 percent of customer locations have a physical drop to the premise, referred to as the "customer drop rate" in this Order. *See infra* paras. 81-84. The model inputs, interface and associated documentation refer to the customer drop rate as the "take rate," which should not be confused with the consumer subscription rate.

[29] *See CAM v1 Availability PN*, 27 FCC Rcd at 15357.

[30] In the late 1990s when the Commission developed the Hybrid Cost Proxy Model (HCPM), which combined the best elements from two industry-proposed models and one model developed by Commission staff, there was considerable expertise within the Commission with then-leading-edge modeling techniques; engineering cost models were less complex and could be run on a personal computer. *See Federal-State Joint Board on Universal Service; Forward-Looking Mechanism for High Cost Support for Non-Rural LECs*, CC Docket Nos. 96-45, 97-160, Fifth Report and Order, 13 FCC Rcd 21323, 21325, 21331, paras. 3-4, 17 & n.42 (1998) *(HCPM Platform Order*). Modeling techniques are considerably more sophisticated today.

routing along existing roads (rather than along idealized grids as HCPM did).[31] USAC's contractor, CostQuest, brought considerable modeling expertise that the Bureau was able to utilize in the model development process. CAM v1.0 and all subsequent versions of the CAM have been made available to the public subject to the *Third Supplemental Protective Order* "to ensure that the proprietary features of the cost model are afforded adequate protection in any submissions made to the Commission and to ensure that the public has the opportunity for robust participation."[32]

11. Over the course of more than sixteen months, the Bureau has released eleven working versions of the CAM to allow Commission staff and interested parties to calculate costs based on a series of inputs and assumptions for Connect America Phase II implementation, with each successive version containing refinements and improvements over the prior version. Each version of the CAM has two components: a cost-to-serve module and a support module. The cost-to-serve module contains the technical and engineering assumptions about network topology that, together with input data, produce an estimate of the monthly cost of providing voice and broadband.[33] The cost-to-serve module considers both capital expenditures (in the capex sub-module) and operating expenses (in the opex sub-module). The support module takes the cost estimates of the cost-to-serve module and other information (such as the exclusion of certain areas because they are served by an unsubsidized competitor, and the upper and lower benchmarks that determine which areas are high cost) and calculates a support amount for each geography. Reports can be generated in a number of ways, including by company, by study area code, and by state.

12. On January 17, 2013, the Bureau announced the availability of version 2.0 of the CAM, which built upon version one in a number of key areas, specifically with regard to input data sets. For example, CAM v2.0 incorporated 2010 census boundaries, December 2011 National Broadband Map data,[34] the latest available version of GeoResults wire center boundaries, and updated consumer location and business location counts compared to version one.[35]

13. In January 2013, Puerto Rico Telephone Company, Inc. (PRTC) submitted a standalone, Puerto Rico-specific cost model.[36] The Bureau sought comment on whether and how it should incorporate PRTC's modifications into the working version of the model.[37]

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[31] *See* CostQuest Associates, Inc., Connect America Cost Model (CACM): Model Methodology, at 45-48 (Apr. 11, 2014) (Model Methodology), http://transition.fcc.gov/Daily_Releases/Daily_Business/2014/db0417/DOC-326628A1.pdf.

[32] *Connect America Fund*, WC Docket No. 10-90, Third Supplemental Protective Order, 27 FCC Rcd 15277, at para. 2 (Wireline Comp. Bur. 2012) (*Third Supplemental Protective Order*).

[33] The model calculates the cost of serving every census block in the country, including those that are served or partially served by rate-of-return carriers. A feature of the model allows the user to filter down to price cap carrier census blocks.

[34] National Broadband Map data also are referred to as Statewide Broadband Initiative (SBI) data.

[35] *Wireline Competition Bureau Announces Availability of Version Two of the Connect America Fund Phase II Cost Model*, WC Docket No. 10-90, Public Notice, 28 FCC Rcd 280 (Wireline Comp. Bur. 2013). After the release of CAM v1 and CAM v2, the Bureau sought comment in the virtual workshop on whether any modifications to functionalities, capabilities, or data sets should be addressed in or added to subsequent versions of the model. *See id*. at 281.

[36] *See* Letter from Thomas J. Navin, Counsel to PRTC, to Marlene H. Dortch, Secretary, FCC, WC Docket Nos. 10-90, 05-337 (submitting "Broadband Cost Model: Puerto Rico (BCMPR)," Attach. A (BCMPR model documentation), Attach. B (CQBAT analysis comparing insular and non-insular results) (filed Jan. 18, 2013); Letter from Thomas J. Navin, Counsel to PRTC, to Marlene H. Dortch, Secretary, FCC, WC Docket Nos. 10-90, 05-337 (filed Jan. 18, 2013) (submitting PRTC model). This model was submitted pursuant to the *Second Protective Order*.

14. In February 2013, the Bureau sought comment on the various options for providing Connect America Phase II support to price cap carriers serving non-contiguous areas and the associated service obligations that would accompany the receipt of such support.[38] Regarding support levels, we specifically sought to develop the record on whether the Bureau should: (1) modify the design of and/or specific inputs used in the CAM, including incorporating aspects of the Alaska-specific and Puerto Rico-specific model submissions; or (2) maintain existing support levels.[39]

15. On March 11, 2013, the Bureau released version 3.0, which contained further updates to customer locations and existing broadband coverage.[40] CAM v3.0 utilized GeoResults third quarter 2012 data for residential and business locations, with adjustments to residential location counts to conform to 2011 Census data. Geocoded locations for both residences and businesses were used to the extent available, with locations lacking geocodes placed randomly along roads. CAM v3.0 contained National Broadband Map data as of June 2012, enabling users to identify census blocks shown as unserved by wireline telecommunications, cable, and/or fixed wireless providers offering speed levels of 3 Mbps downstream and 768 kbps upstream.[41]

16. On April 22, 2013, consistent with Commission precedent, the Bureau adopted a model platform that enables the Bureau to estimate the average monthly total forward-looking cost of building, operating and maintaining an efficient, modern network.[42] The *CAM Platform Order* focused on the model platform components of the cost-to-serve module, i.e., the basic framework for the model consisting of key assumptions about the design of the network and network engineering, and also addressed certain framework issues related to inputs. The CAM platform estimates the costs of an Internet protocol (IP)-based fiber to the premise (FTTP) network of a wireline telecommunications provider, capable of providing both voice and broadband, as if all providers were able to claim the

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[37] *See Wireline Competition Bureau Seeks Comment on Connect America Phase II Support for Price Cap Areas Outside of the Contiguous United States*, WC Docket No. 10-90, Public Notice, 28 FCC Rcd 1030 (Wireline Comp. Bur. 2013) (*Phase II Non-Contiguous Areas PN).*

[38] *See id*.

[39] *Id*. at 1032, para. 7. In 2011, disbursements to price cap carriers serving non-contiguous areas totaled $74,760,972. The individual carriers received the following support amounts: ACS received $19,694,208; Hawaiian Telecom, Inc. (HTI) received $1,968,816; PRTC received $36,053,856; Virgin Islands Telephone Corporation d/b/a Innovative Telephone (Vitelco) received $16,360,728; and Micronesian Telecommunications Corporation received $683,364. *See* USAC Frozen High Cost Support Price Caps-Rate of Return Affiliates and CETCs, http://www.usac.org/_res/documents/hc/pdf/fcc/Frozen-High-Cost%20Support-021512.pdf .

[40] *Wireline Competition Bureau Announces Availability of Version Three of the Connect America Fund Phase II Cost Model*, WC Docket No. 10-90, Public Notice, 28 FCC Rcd 2316 (Wireline Comp. Bur. 2013) (*CAM Version 3 Availability PN*).

[41] This feature enabled the user to designate areas that receive a speed of 3 Mbps downstream and 768 kbps upstream as a served census block, and areas that receive a speed less than 3 Mbps downstream and 768 kbps upstream as an unserved census block. The Bureau previously had sought public comment on various issues regarding how to determine which areas are served by an unsubsidized competitor, including specific metrics for latency, usage and price, which are not captured in the data incorporated into the National Broadband Map. *See Wireline Competition Bureau Seeks Further Comment on Issues Regarding Service Obligations for Connect America Phase II and Determining Who is an Unsubsidized Competitor*, WC Docket No. 10-90, Public Notice, 28 FCC Rcd 1517 (Wireline Comp. Bur. 2013); *Wireline Competition Bureau Seeks Comment on Procedures Relating to Areas Eligible for Funding and Election to Make a Statewide Commitment in Phase II of the Connect America Fund*, WC Docket No. 10-90, Public Notice, 27 FCC Rcd 15970 (Wireline Comp. Bur. 2012); *see also Connect America Fund*, WC Docket No. 10-90, Report and Order, 28 FCC Rcd 15060 (Wireline Comp. Bur. 2013) *(Phase II Service Obligations Order*) (resolving issues addressed in Public Notices).

[42] *See Connect America Fund; High-Cost Universal Service Support*, WC Docket Nos. 10-90, 05-337, Report and Order, 28 FCC Rcd 5301 (Wireline Comp. Bur. 2013) (*CAM Platform Order*); *id*. at 5308, para. 15.

efficiency advantages of a modern green-field build.[43] The terminal value of the network is determined by the "book value" of the assets, calculated as the difference between investment and economic depreciation.[44] The Bureau concluded that the CAM will calculate the total cost of serving an entire service territory within a state, and allocate the shared costs between eligible and ineligible census blocks using a pro rata method based on the relative number of customers in each area.[45] The adopted model platform estimates the average ongoing costs of serving locations irrespective of whether they are currently provided broadband by the price cap carrier.[46] The model platform uses a combination of commercial data and census data to determine residential and business locations, uses geocoded locations wherever possible, and places locations that cannot be geocoded randomly along the roads within the census block.[47] The CAM platform utilizes a clustering approach that uses road-based routing to determine the maximum size of the clusters and a routing methodology that builds plant along roads and uses a minimum spanning tree algorithm.[48] The CAM platform appropriately sizes the relevant network facilities to ensure there is sufficient capacity to handle peak usage.[49] The Bureau concluded that the CAM should estimate the cost of providing voice service over an IP-enabled network and take into account the cost of hardware, software, services, and customer premises equipment to provide carrier-grade Voice over IP (VoIP) service.[50] The CAM platform assumes that Ethernet fiber connections tie central offices to the nearest tandem location; assumes connections to the nearest Internet access point; and uses efficient routing paths along roads for all connections.[51] The CAM platform assumes that each state is made up of three density zones – urban, suburban, and rural – and for each density zone, assumes a specific plant mix for each of three different parts of the network – distribution, feeder, and inter-office transport.[52] Finally, the Bureau decided that the CAM would use uniform input values for various capital costs, with adjustments for regional variations in labor and material costs.[53]

[43] *See id*. at 5308-16, paras. 16-33.

[44] *See id*. at 5316-17, paras. 34-36. The CAM produces an annualized (sometimes also called a "levelized") cost, which assumes ongoing operations in perpetuity. The "book value" of the network at any point in time, including at the end of the support period, is equal to the present value of the difference between past investment and depreciation streams.

[45] *See id*. at 5317-19, paras. 37-42.

[46] *See id*. at 5320-21, paras. 43-46.

[47] *See id*. at 5322-23, paras. 50-55. For residential locations without an address or that cannot be geocoded, a random placement algorithm is used to place the locations along the roads of the census block. Roads that are restricted, e.g., interstate highways, are not used. With the use of geocoded locations, a rectification step is included, which spreads points out along a segment if they are unrealistically bunched/clustered on the road. *Id.* at 5323, para. 53 n.115. As described below, this methodology was modified slightly in CAM v4.0 to place non-geocoded locations along roads only in census blocks that have residential locations. *See infra* para. 47 and note 146.

[48] *See CAM Platform Order*, 28 FCC Rcd at 5324, paras. 56-57.

[49] *See id*. at 5324-25, para. 58; *infra* para. 93.

[50] *See CAM Platform Order*, 28 FCC Rcd at 5325-26, paras. 59-60.

[51] *See id*. at 5326, para. 61.

[52] *See id*. at 5326-27, paras. 63-66.

[53] *See id*. at 5327-28, paras. 67-68. For a complete description of how the CAM works, see the Model Methodology at http://www.fcc.gov/encyclopedia/price-cap-resources.

17. On April 29, 2013, the Bureau released version 3.1, which updated CAM v3.0 in a number of respects.[54] Specifically, to enable the public to see the impact of adjusting the assumed customer drop rate, version 3.1 adjusted the default rate from 90 percent to 80 percent for both residential and business locations, which resulted in lower cost estimates.[55] CAM v3.1 made minor adjustments to opex values for bad debt and customer operations/marketing. It also revised the default assumptions for plant mix based on data submitted by the ABC Coalition.[56] Furthermore, CAM v3.1 provided users the ability to compare the effect of defining fixed wireless coverage based solely on June 2012 National Broadband Map data or based on those data filtered to include only fixed wireless providers that reported voice service on FCC Form 477 (as of June 2012). CAM v3.1 updated the TelcoMaster table to incorporate certain input received as a result of the Bureau's Public Notice seeking corrections to holding company and related information for individual study areas.[57] Consistent with the *CAM Platform Order*,[58] CAM v3.1 made FTTP the default run for new solution sets, eliminating the option to run new solution sets based on fiber-to-the-DSLAM (FTTD) builds.[59]

18. On May 16, 2013, the Bureau issued san order setting the framework for the Phase II challenge process.[60] The challenge process gives parties the opportunity to contest the status of a particular census block as it is reflected in National Broadband Map or FCC Form 477 data.

19. On May 17, 2013, the Bureau announced the release of version 3.1.2 of CAM, which modified cable coverage to reflect census blocks as served by cable providers only where the cable company reported voice subscriptions on FCC Form 477,[61] consistent with the approach implemented in CAM v3.1 for fixed wireless coverage.[62] CAM v3.1.2 also made minor adjustments to the fixed wireless voice coverage.

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[54] *Wireline Competition Bureau Announces Availability of Version 3.1 of the Connect America Fund Phase II Cost Model*, WC Docket No. 10-90, Public Notice, 28 FCC Rcd 5707 (Wireline Comp. Bur. 2013) (*CAM Version 3.1 Availability PN*).

[55] The model inputs for the residential and business customer drop rate are referred to as a "take rate" in the model inputs, interface and associated documentation. *See* Model Methodology at 80-82, http://transition.fcc.gov/Daily_Releases/Daily_Business/2014/db0417/DOC-326628A1.pdf.

[56] Comments of the United States Telecom Association, AT&T, CenturyLink, Frontier Communications, Verizon, and Windstream Communications (ABC Coalition) in Response to the Bureau's Public Notices of December 11 & 17, 2012, WC Docket Nos. 10-90, 05-337, at App. A (filed Jan. 11, 2013). *See* also WCB Mar. 28, 2013 Virtual Workshop Submission Letter, Attach. at 11.

[57] *See Telcomaster Table Updates Public Notice*. The "Updates to TelcoMaster" document, located at the Resources tab, documented which proposed changes to the TelcoMaster table were incorporated into this version of the model and which were not.

[58] *See CAM Platform Order*, 28 FCC Rcd at 5314-16, para. 33.

[59] When making this change, the Bureau noted that FTTD solution sets run using prior versions of the model remained available for inspection.

[60] *Connect America Fund*, WC Docket No. 10-90, Order, 28 FCC Rcd 7211, 7212-20, paras. 4-22 (Wireline Comp. Bur. 2013) (*Connect America Phase II Challenge Process Order*). The Commission directed the Bureau, after the cost model is adopted, to "publish a list of all eligible census blocks" (specifically, those census blocks in price cap territories above the funding benchmark but below the extremely high-cost threshold) and provide an opportunity for parties to "challenge the determination of whether or not areas are unserved by an unsubsidized competitor." *USF/ICC Transformation Order*, 26 FCC Rcd at 17701, 17729, paras. 103, 170.

[61] Both the fixed wireless and the cable voice coverage were determined at the holding company level in version 3.1.2 using the best available data.

[62] *See CAM Version 3.1.2 Availability PN*, 28 FCC Rcd at 7293, n.2.

20. In May 2013, Vitelco filed a standalone, Virgin Islands-specific cost model, but argued that the Bureau should maintain support at existing levels.[63]

21. On June 7, 2013, the Bureau announced the availability of version 3.1.3.[64] CAM v3.1.3 updated the model's coverage table, which is used in the support module to calculate support amounts, by removing subsidized competitors from the model's source data used to calculate which census blocks presumptively will receive the offer of model-based support in Phase II.[65] In addition, CAM v.3.1.3 updated the "OCNCoSize" input table to adjust records where an operating company number (OCN) was categorized inconsistently with other members of the same holding company.

22. On June 25, 2013, the Bureau announced the availability of version 3.1.4.[66] CAM v3.1.4 updated the prior version in a numbers of respects. This version included a code change to enable users to calculate costs associated with assumptions of very heavy data usage; modified the OCNCoSize table to change the size categorization of Fremont Telephone from medium to small; modified the support model interface to present users with illustrative values for the "Target Benchmark," referred to in this order as the "funding benchmark," and "Alternative Technology Cap (AltTechCap)," referred to in this order as the "extremely high cost threshold," by solution set; and made several clean-up changes to the support model, model reports, input workbooks and posted data sets.

23. Since June 2013, the Bureau has been focused on implementing the Commission's directive to consider the unique circumstances of areas outside of the contiguous United States.[67] The Bureau worked to make further refinements to the model, and in response to the Bureau's request, several carriers serving non-contiguous areas submitted data in a form that could be incorporated into the CAM.[68]

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[63] *See* Letter from Russell M. Blau, Counsel for Vitelco, to Marlene H. Dortch, Secretary, FCC, WC Docket No. 10-90 (filed May 20, 2013) (submitting confidential Broadband Cost Model specific to the Virgin Islands (USVI BCM)). This model was submitted pursuant to the *Second Protective Order*. *See also* Letter from Russell M. Blau, Counsel for Vitelco, to Marlene H. Dortch, Secretary, FCC, WC Docket No. 10-90 (filed May 20, 2013) (attaching non-confidential summary of USVI BCM).

[64] *Wireline Competition Bureau Announces Availability of Version 3.1.3 of the Connect America Fund Phase II Cost Model*, WC Docket No. 10-90, Public Notice, 28 FCC Rcd 8339 (Wireline Comp. Bur. 2013) (*CAM Version 3.1.3 Availability PN*).

[65] The Commission required the Bureau to determine those areas that are served by an unsubsidized competitor. *See USF/ICC Transformation Order*, 26 FCC Rcd at 17729, para. 170. The Commission defined an unsubsidized competitor "as a facilities-based provider of residential terrestrial fixed voice and broadband service that does not receive high-cost support." *Id*. at 17701, para. 103.

[66] *Wireline Competition Bureau Announces Availability of Version 3.1.4 of the Connect America Fund Phase II Cost Model, Illustrative Results, and Updated Methodology Documentation*, WC Docket No. 10-90, Public Notice, 28 FCC Rcd 9049 (Wireline Comp. Bur. 2013) (*CAM Version 3.1.4 Availability PN*).

[67] *See* Letter from Dania Ayoubi, Attorney Advisor, WCB, to Marlene H. Dortch, Secretary, FCC, WC Docket No. 10-90 (filed June 10, 2014) (summarizing Bureau's telephone conference with representatives of carriers serving the non-contiguous areas).

[68] *See, e.g.*, Letter from Richard R. Cameron, ACS, to Marlene H. Dortch, Secretary, FCC, WC Docket Nos. 10-90, 05-337 (filed July 9, 2013) (attaching Letter from Leonard A. Steinberg, General Counsel and Corporate Secretary, and Richard R. Cameron, Assistant Vice President and Senior Counsel, ACS to Marlene H. Dortch, Secretary, FCC, WC Docket Nos. 10-90, 05-337) (ACS July 9, 2013 Ex Parte Letter); Letter from Russell M. Blau, Counsel for Vitelco, to Marlene H. Dortch, Secretary, FCC, WC Docket No. 10-90 (filed Sept. 19, 2013) (Vitelco Sept. 19, 2013 Ex Parte Letter) (proposing CAM input changes in response to Bureau's June 6, 2013 request to focus on the specific aspects of operating in non-contiguous areas that might require adjustment in the model); Letter from Thomas J. Navin, Counsel to PRTC, to Marlene H. Dortch, Secretary, FCC, WC Docket Nos. 10-90, 05-337 (filed Oct. 30, 2013) (attaching Letter from Thomas J. Navin to Marlene H. Dortch, Secretary, FCC, WC Docket Nos. 10-90, 05-337) (PRTC Oct. 30, 2013 Ex Parte Letter).

24. On August 29, 2013, the Bureau announced the availability of CAM v3.2, which included certain adjustments to the CAM to reflect the unique circumstances and operating conditions in the non-contiguous areas of the United States, and sought comment on these changes.[69] Specifically, CAM v3.2 added code changes and a new Undersea tab in the Capex workbook that includes inputs for undersea cable and landing stations. These inputs and changes are used to calculate the investment and cost for undersea and landing facilities that connect areas outside of the contiguous United States, including Alaska, Hawaii, Puerto Rico, the U.S. Virgin Islands and Northern Mariana Islands, to the contiguous United States. This version also included plant mix values for Alaska that were filed by ACS, and set the value of the regional cost adjustment for the Virgin Islands to 1.0 (i.e. no adjustment).[70] In addition, CAM v3.2 included minor modifications to some existing investment calculations to more accurately reflect network infrastructure, several updates to the documentation, and additional clean-up changes to the Capex workbook.[71]

25. On September 11, 12, and 25, 2013, the Bureau presented three webinars about Phase II to state regulators and posted the staff presentations associated with the webinars on the Commission's website.[72] On October 18, 2013, the Bureau announced that audio recordings for the three webinars are available on USAC's website.[73] The second webinar, "Connect America Cost Model Overview," provided an overview of the model, the resources available to better understand the model, and information on how to access the model.

26. On October 31, 2013, the Bureau adopted the *Phase II Service Obligations Order*, which specified the latency, usage allowance, and pricing requirements for deployments by price cap carriers that accept Connect America Phase II model-based support through the state-level commitment process.[74] The *Phase II Service Obligations Order* specified the Commission's requirements that the networks constructed using Connect America funding have latency sufficient to allow use of real-time applications, and that those networks have minimum usage allowances and pricing reasonable comparable to that of comparable services in urban areas.[75] Under the *Phase II Service Obligations Order*, price cap carriers are required to demonstrate that they are providing service with round-trip latency of 100 milliseconds or less within the price cap carrier's network.[76] The Order also specified that to the extent price cap carriers

[69] *Wireline Competition Bureau Announces Availability of Version 3.2 of the Connect America Fund Phase II Cost Model, and Illustrative Results; Seeks Comment on Several Modifications for Non-Contiguous Areas*, WC Docket No. 10-90, 28 FCC Rcd 12833 (Wireline Comp. Bur. 2013) (*CAM Version 3.2 Availability PN*).

[70] The regional cost adjustments are based on data from a national survey of construction costs by R.S. Means, which does not include data for the U.S. Virgin Islands. CAM v3.2 adjusted the regional cost adjustment table to reflect that Zip 3 = 008, which had been previously coded for Puerto Rico, is in the U.S. Virgin Islands.

[71] *CAM Version 3.2 Availability PN*, 28 FCC Rcd at 12834-35.

[72] *See Wireline Competition Bureau Announces Availability of Staff Presentations Regarding Connect America Phase II*, WC Docket No. 10-90, Public Notice, 28 FCC Rcd 13370 (Wireline Comp. Bur. 2013); *Wireline Competition Bureau Announces Availability of Additional Staff Presentation Regarding Connect America Fund Phase II*, WC Docket No. 10-90, Public Notice, 28 FCC Rcd 14015 (Wireline Comp. Bur. 2013), http://www.fcc.gov/encyclopedia/price-cap-resources. The staff presentation for the model overview webinar is available at http://transition.fcc.gov/Daily_Releases/Daily_Business/2013/db0917/DOC-323344A1.pdf.

[73] *Wireline Competition Bureau Announces Availability of Connect America Fund Phase II Webinar Recordings*, WC Docket No. 10-90, Public Notice, 28 FCC Rcd 14105 (Wireline Comp. Bur. 2013) (*Phase II Webinar Recordings PN*); http://www.usac.org/hc/about/outreach/online-learning.aspx. The Bureau also submitted these staff presentations into the record in WC Docket No. 10-90. *See Phase II Webinar Recordings PN*, 28 FCC Rcd at 14105 n.2.

[74] The Order also specified how those requirements applied to unsubsidized competitors.

[75] *USF/ICC Transformation Order*, 26 FCC Rcd at 17698-99, 17708-09, paras. 96-99, 113-14.

[76] *Phase II Service Obligations Order*, 28 FCC Rcd at 15070-71, para. 23.

have usage allowances for their broadband offerings in the Phase II funded areas, they must offer a service offering with a usage allowance of at least 100 gigabyte (GB) per month initially at a price reasonably comparable to similar wireline offerings in urban areas, with the minimum usage allowance adjusted over time to remain consistent with trends in usage for 80 percent of customers using cable or fiber-based fixed broadband service.[77] Lastly, to demonstrate reasonable comparable pricing, the Order provided price cap carriers with the flexibility to certify either that their rates conform to the reasonable comparability benchmark to be set by the urban rate survey or that their rates are the same or lower in rural areas as in urban areas.[78]

27. On December 2, 2013, the Bureau announced the availability of CAM v4.0 and sought comment on whether to adopt this version of the model and associated default inputs as the final version of the model for purposes of calculating costs in price cap areas.[79] CAM v4.0 included additional modifications to address the unique circumstances and operating conditions in the non-contiguous areas of the United States. In particular, CAM v4.0 calculated the cost of submarine cables used for middle mile connections between intra-state points in non-contiguous areas (i.e., connections between islands or where crossing water provides a more direct route within each non-contiguous state or territory). It also updated the plant mix values for the non-contiguous carriers, and assumed that buried plant is placed in conduit in non-contiguous areas to provide additional protection from harsh conditions. This version modified the prior methodology used for determining input values for terrain in non-contiguous areas, and it treated ACS as a small carrier for purposes of calculating its operating expenses. It also used state-specific values for certain capital expense inputs for Vitelco. CAM v4.0 incorporated several modifications to CostQuestLandLine (CQLL) and CostQuestMiddleMile (CQMM), the proprietary applications that create the network topology for the CAM.[80] In CQLL, the national demand location data and the terrain data were updated, and the clustering code was modified. CQMM was modified to route middle-mile connections along roads, consistent with the treatment of last mile plant in prior versions. CAM v4.0 included inputs for submarine cable and other costs specific to non-contiguous areas, and it also adjusted the default input for the cost of money to 8.5 percent. CAM v4.0 also incorporated updated broadband coverage data to reflect National Broadband Map data as of December 2012 and FCC Form 477 data as of December 2012.

28. On March 21, 2014, the Bureau announced the availability of CAM v4.1, which contained updated broadband coverage data, modified certain default input values, and made a number of technical changes.[81] Specifically, CAM v4.1 incorporated updated broadband coverage data to reflect National Broadband Map data as of June 2013 and FCC Form 477 data as of June 2013,[82] and updated the TelcoMaster table to incorporate corrections to holding companies and related information for individual

[77] *Id.* at 15065-68, paras. 16-18.

[78] *Id.* at 15063-65, paras. 7-13.

[79] *See Wireline Competition Bureau Announces Availability of Version 4.0 of the Connect America Fund Phase II Cost Model and Seeks Comment on Adopting Current Default Inputs in Final Version of Model*, WC Docket No. 10-90, Public Notice, 28 FCC Rcd 16339 (Wireline Comp. Bur. 2013) (*CAM v4.0 Availability PN*); *Wireline Competition Bureau Releases Default Inputs for Connect America Version 4.0*, WC Docket No. 10-90, Public Notice, 28 FCC Rcd 16440 (Wireline Comp. Bur. 2013) (*CAM v4.0 Default Inputs PN*).

[80] The CQLL develops a wireline network topology from the demand point back to the central office, while the CQMM develops the network middle mile topologies between each central office in a state. CQLL and CQMM-derived databases are loaded into the CAM, along with other data, to create a solution set.

[81] *See Wireline Competition Bureau Announces Availability of Version 4.1 of the Connect America Fund Phase II Cost Model,* WC Docket No. 10-90, Public Notice, DA 14-394 (Wireline Comp. Bur. rel. Mar. 21, 2014) (*CAM v4.1 Availability PN*).

[82] *See* Model Methodology at 33-35, http://transition.fcc.gov/Daily_Releases/Daily_Business/2014/db0417/DOC-326628A1.pdf.

study areas. In addition, CAM v4.1 made certain adjustments to the terrain mix data for the Virgin Islands and included a number of other modifications to the state-specific inputs for the Virgin Islands. CAM v4.1 also increased the average revenue per user (ARPU) assumption used by the model from $65 to $75, which had a small impact on two model inputs that are calculated as a percentage of ARPU—customer operations marketing expense and bad debt expense. Finally, CAM v4.1 assumed a 70 percent subscription rate for purposes of calculating an illustrative funding benchmark of $52.50.

29. On April 17, 2014, the Bureau announced the availability of CAM v4.1.1, which incorporated minor corrections to the broadband coverage used by the model and made a number of technical changes.[83] Specifically, CAM v4.1.1 corrected the broadband coverage for approximately 5400 census blocks that should not have been identified as served by a fixed wireless provider in CAM v4.1.[84] CAM v4.1.1 also updated the TelcoMaster table to incorporate corrections to certain holding company names, and modified certain headers and field descriptions on two CAM reports.[85] These minor adjustments did not have a material effect on the funding levels previously released by the Bureau for CAM v4.1.[86]

III. DISCUSSION

30. In this Order we adopt the modifications to the Connect America Cost Model platform that we have made since the *CAM Platform Order* 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.[87]

31. Before addressing particular input values and platform updates, we first describe the CAM methodology documentation and other information, including illustrative model results, that have been made available to assist the public in understanding the CAM. We then adopt 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.[88] Next, we discuss the treatment of carriers serving the non-contiguous areas of the United States. We then adopt the methodology for calculating average per-unit costs and explain how certain business locations and community anchor institutions are treated in the model.

[83] *See Wireline Competition Bureau Announces Availability of Version 4.1.1 of the Connect America Fund Phase II Cost Model,* WC Docket No. 10-90, Public Notice, DA 14-515 (Wireline Comp. Bur. rel. Apr. 17, 2014).

[84] *See* CAM v4.1.1 Release Notes (Apr. 17, 2014), via System Updates link, at https://cacm.usac.org. *See also infra* para. 35.

[85] The default inputs for CAM v4.1.1 incorporate an update to one table (OCNCoSize) from the input collection for CAM v4.1. The default inputs are publicly available at http://www.fcc.gov/encyclopedia/price-cap-resources under the "Connect America Cost Model v4.1.1 Default Inputs" link.

[86] Illustrative results for CAM v4.1 are available at http://www.fcc.gov/encyclopedia/connect-america-cost-model-illustrative-results.

[87] The decisions we make herein are for purposes of the offer of model-based support to price cap carriers. Parties have argued in the record that adjustments would need to be made if the model were to be used for any purpose in rate-of-return areas. *See, e.g.*, Comments of NTCA and WTA, WC Docket No. 10-90 (filed Jan. 7, 2014); Letter from Michael R. Romano, Senior Vice President – Policy, NTCA, to Marlene H. Dortch, Secretary, FCC, WC Docket No. 10-90 et al., at 2 (filed Sept. 12, 2013). Parties also have argued that adjustments may need to be made if the model is used to establish reserve prices in a competitive process. *See* Comments of General Communications, Inc. (GCI) on CACM Version 4.0, WC Docket No. 10-90, at 7 (filed Jan. 7, 2014). We do not address those arguments here.

[88] *See, e.g.*, *Model Design PN; CAM Version 3.2 Availability PN; CAM v4.0 Availability PN*.

32. Finally, we identify 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. We also estimate 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

33. 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.[89] 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.[90] 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).[91] 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."[92]

1. Openness and Transparency

34. 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.[93] The Bureau ensured that the protective order governing the CAM did not prohibit employees of telecommunications or competing companies from accessing the model.[94] 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."[95] 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,

[89] *See, e.g., supra* paras. 8, 13, 24, 27.

[90] *See generally Request for Models PN*, 26 FCC Rcd 16836.

[91] *See id*. at 16837, para. 4. In the *USF/ICC Transformation Order*, the Commission found that the model submitted at that time did not meet the Commission's criteria for public accessibility. *USF/ICC Transformation Order*, 26 FCC Rcd at 17735, para. 185.

[92] *Request for Models PN*, 26 FCC Rcd at 16837, para. 4; *see also* 47 C.F.R. § 0.459.

[93] *See Second Supplemental Protective Order*; *Second Protective Order*; *Third Supplemental Protective Order*. Use of the confidential material is restricted to use in this Commission proceeding; parties may discuss the confidential information with other parties subject to the relevant protective order and with Commission staff, and may include confidential information in Commission filings in this proceeding if such information is appropriately identified and protected from public disclosure.

[94] Access to the models and related confidential information filed pursuant to the *Second Protective Order* (the state/territory-specific models for Alaska, Puerto Rico, and Virgin Islands) is restricted to outside counsel and outside consultants of participants in this proceeding. *See Second Protective Order*, 27 FCC Rcd at 1494-95, paras. 1-2.

[95] *Third Supplemental Protective Order*, 27 FCC Rcd at 15277-78, para. 2.

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*.[96] Parties who have questions about how the model works or need assistance in running the model can take advantage of the CAM support desk.

35. 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,[97] 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;[98]
- *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.[99]

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;[100]
- *Coverage Data* – Identifies census blocks presumptively served by unsubsidized competitors.

[96] *Id*. at 15283-87, Apps. A – C. There were 300 users with access to the CAM, not including CostQuest, FCC, and USAC personnel, as of April 17, 2014.

[97] CAM Release Notes also are emailed to authorized CAM users.

[98] *See Wireline Competition Bureau Announces Availability of Connect America Fund Phase II Cost Model Tutorial Video*, WC Docket No. 10-90, Public Notice, 28 FCC Rcd 10009 (Wireline Comp. Bur. 2013).

[99] Some model output files available on the CAM Posted Data Sets page are identified as a "tile data set," which is developed by analyzing the distribution of cost, from highest to lowest percentile, for all records in that model run.

[100] The TelcoMaster Table used in CAM v.4.1.1 is located on the Posted Data Sets page.

36. 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*.[101]

37. Information relating to the model also is available on the Commission's website.[102] 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.[103] 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.[104] 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.[105] 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.[106] These reports showed potential support amounts and number of supported locations by carrier, by study area, and by state.[107]

38. On December 4, 2013, the Bureau released default inputs for CAM v4.0.[108] On December 18, 2013, the Bureau released the updated methodology documentation and posted illustrative

[101] *See Wireline Competition Bureau Announces Availability of Processing Source Code for the Connect America Cost Model's Network Topology Applications,* WC Docket No. 10-90, Public Notice, 28 FCC Rcd 12216 (Wireline Comp. Bur. 2013).

[102] In addition to the model methodology documentation, illustrative results, and default inputs posted on the Commission's website, also available is the staff presentation associated with a webinar, "Connect America Cost Model Overview." In addition, an audio recording of that webinar is available on USAC's website. *See supra* para. 25 and note 73.

[103] *See Wireline Competition Bureau Releases Illustrative Results From Connect America Cost Model Version 3.1.2 and Methodology Documentation*, WC Docket No. 10-90, Public Notice, 28 FCC Rcd 8186 (Wireline Comp. Bur. 2013). The model methodology for CAM v3.1.2 and subsequent versions are available on the Commission's website, as well as on the CAM homepage. The illustrative results are available at http://www.fcc.gov/encyclopedia/connect-america-cost-model-illustrative-results.

[104] *See Wireline Competition Bureau Releases Illustrative Results From Connect America Cost Model Version 3.1.3 and Methodology Documentation for Version 3.1.3*, WC Docket No. 10-90, Public Notice, 28 FCC Rcd 8884 (Wireline Comp. Bur. 2013) (*CAM v3.1.3 Illustrative Results PN*).

[105] *See CAM Version 3.1.4 Availability PN.*

[106] *See CAM Version 3.2 Availability PN.*

[107] *See* illustrative results for CAM v3.1.2, available at http://www.fcc.gov/encyclopedia/connect-america-cost-model-illustrative-results.

[108] *See CAM v4.0 Default Inputs PN.*

results from running this version with funding thresholds of $48 and $52.[109] 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.[110]

39. 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.[111] 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.[112] 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.[113]

40. We thus are not persuaded by arguments that the cost model is "not sufficiently open and transparent."[114] 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.[115] 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*, 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."[116] Rather than updating HCPM, as some suggested, the Commission concluded "that it is preferable to use a more

[109] *See Wireline Competition Bureau Releases New and Improved Illustrative Results for Connect America Cost Model Version 4.0 and Updated Methodology Documentation*, WC Docket No. 10-90, Public Notice, 28 FCC Rcd 16827 (Wireline Comp. Bur. 2013) (*CAM Version 4.0 Improved Illustrative Results PN*).

[110] *See Wireline Competition Bureau Releases Maps of Illustrative Results for Connect America Cost Model Version 4.0*, WC Docket No. 10-90, Public Notice, DA 14-153 (Wireline Comp. Bur. rel. Feb. 6, 2014).

[111] *See CAM v4.1 Availability PN*.

[112] *See* Letter from Michael J. Jacobs, Legal Advisor to the Chief, Wireline Competition Bureau, to Marlene H. Dortch, Secretary, FCC (filed Mar. 28, 2014) (submitting into the record illustrative model results and default inputs for CAM v4.1); Letter from Michael J. Jacobs, Legal Advisor to the Chief, Wireline Competition Bureau, to Marlene H. Dortch, Secretary, FCC (filed Apr. 4, 2014) (submitting into the record model documentation for CAM v4.1).

[113] *See supra* para. 29; *see also* Letter from Michael J. Jacobs, Legal Advisor to the Chief, Wireline Competition Bureau, to Marlene H. Dortch, Secretary, FCC (filed Apr. 21, 2014) (submitting into the record default inputs and model documentation for CAM v4.1.1).

[114] National Association of State Utility Consumer Advocates (NASUCA) May 9, 2013 Comments at 2; *see also, e.g.*, ACS Mar. 25, 2013 Comments; PRTC Sept. 12, 2013 Comments at 3.

[115] *See* NASUCA May 9, 2013 Comments at 2, 8-10. NASUCA points out that HCPM results, as well as the HCPM itself, were posted on the Commission's website.

[116] *USF/ICC Transformation Order*, 26 FCC Rcd at 17735, paras. 186-87 ("For example, new models can estimate the costs of efficient routing along roads in a way that the older model cannot").

accurate, up to date model based on modern techniques."[117] CAM provides more detailed and precise results at a much more disaggregated level than HCPM by relying on proprietary logic, code and data sources.[118] The Bureau cannot "lift the proprietary designation from the *results*" that the model yields, as NASUCA requests,[119] 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.[120] 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.[121] We thus have addressed NASUCA's request that "[a]t a minimum, results at the study area level should be public."[122]

41. We find 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."[123] Each model run requires making assumptions about literally hundreds of individual inputs; releasing "all" model results as requested by NASUCA potentially would

[117] *Id*. at 17735, para. 187. Prior to the adoption of the *USF/ICC /Transformation Order*, the State Members of the Federal-State Joint Board on Universal Service had advocated that the Commission "update" the existing model by adopting a road-constrained minimum spanning tree to route plant. The Commission stated that this would so fundamentally change HCPM that the process involved would be comparable to adopting a new model. *Id*. at 17735, para. 187 n.306. The model in the record at that time, CQBAT, already used the routing method the State Members suggested, and the CAM platform subsequently adopted by the Bureau also uses a minimum spanning tree algorithm to route plant along roads. *See CAM Platform Order*, 28 FCC Rcd at 5324, para. 57.

[118] HCPM also relied on some proprietary data. For example, to estimate the number of customer locations, HCPM used the proprietary PNR National Access Line Model, which used a variety of proprietary information sources, including: the Local Exchange Routing Guide; Business Location Research wire center boundaries; Dun & Bradstreet's business database; Metromail's residential database; and Claritas's demographic database. *See Federal-State Joint Board on Universal Service; Forward-Looking Mechanism for High Cost Support for Non-Rural LECs*, CC Docket Nos. 96-45, 97-160, Tenth Report and Order, 14 FCC Rcd 20156, 20181, para. 51 (1999) (*HCPM Inputs Order*), *aff'd, Qwest Corp. v. FCC*, 258 F.3d 1191 (10th Cir. 2001).

[119] NASUCA May 9, 2013 Comments at 2.

[120] Although the very granular model results available on the CAM website could contain proprietary data, the Commission has the right to publish data at an aggregated level that does not disclose proprietary information, and the Bureau has always intended to publish model outputs on the Commission's website prior to adopting the final version of the model.

[121] *See e.g, supra* paras. 37-38; *CAM Version 3.2 Availability PN*, 28 FCC Rcd at 12841.

[122] NASUCA May 9, 2013 Comments at 8. When the Bureau released illustrative results for CAM v3.1.3, it "encourage[d] the public to contact Bureau staff if they would like other types of reports to be published." *CAM v3.1.3 Illustrative Results PN*, 28 FCC Rcd at 8885. Subsequent to this invitation, the Nebraska Rural Independent Companies (NRIC), the American Cable Association (ACA), and NASUCA requested that the Bureau publish additional results. *See* Letter from Cheryl L. Parrino, Parrino Strategic Consulting Group (on behalf of NRIC), to Marlene H. Dortch, Secretary, FCC, WC Docket Nos. 10-90, 05-337 (filed July 30, 2013); Letter from Thomas Cohen, Counsel for ACA, to Marlene H. Dortch, Secretary, FCC, WC Docket No. 10-90 (filed Aug. 19, 2013) (ACA Aug. 19, 2013 Ex Parte Letter); Letter from Charles Acquard, NASUCA, to Marlene H. Dortch, Secretary, FCC, WC Docket No. 10-90, at 3 (filed Oct. 25, 2013) (NASUCA Oct. 25, 2013 Ex Parte Letter). NRIC requested that the illustrative results include the number of locations above the extremely high-cost threshold. In the illustrative results for CAM v4.0 and v4.1, we included the number of locations that would fall above the extremely high-cost threshold in price cap areas, as finalizing the model for the purpose of the offer of support to price cap carriers is our current focus. We discuss below the reasons we did not provide the additional results requested by ACA. *See infra* paras. 48-50.

[123] NASUCA Oct. 25, 2013 Ex Parte Letter.

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.[124] 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.[125]

42. We are 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.[126] 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."[127] 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.[128] Given the extensive documentation and access to the model that we have made available to the public, we conclude 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."[129]

[124] *Id*. at 2 (criticizing the Bureau for making only "selective" model outputs publicly available on June 25, 2013, and reiterating "its earlier request that the Bureau make all model outputs public"). In addition, NASUCA incorrectly asserts that the Bureau "has now released data that the FCC earlier claimed was proprietary" and that "[t]his mode of operations allows the FCC staff to arbitrarily determine what information is proprietary and what is not proprietary." *Id*. As noted above, the Commission has the right to publish data at an aggregated level that does not disclose proprietary information, and the Commission never claimed that these aggregated data were proprietary.

[125] *Id*. at 3. As discussed above, when the Bureau released illustrative results from runs of CAM v4.0 and CAM v4.1, the reports included the number of locations that would newly receive broadband for each illustrative funding benchmark, and the number of locations in price cap areas that would fall above the extremely high-cost threshold. *See supra* paras. 27-28.

[126] *See, e.g.*, PRTC Sept. 12, 2013 Comments at 3 (claiming that the "Bureau is not authorized to adopt a CAM absent full open access to the model, including its underlying data and assumptions"); Letter from Thomas J. Navin, Counsel to PRTC, to Marlene H. Dortch, Secretary, FCC, WC Docket Nos. 10-90, 05-337 (attaching "White Paper of Puerto Rico Telephone Co. Inc. on Legal and Policy Issues with Applying the CACM to Insular Areas"), Attach. at 4 (filed July 17, 2013) (claiming that "the Bureau would exceed its delegated authority by ignoring the Commission's explicit instruction to make the 'model and all underlying data, formulae, computations, and software associated with the model . . . available to all interested parties for review and comment") (PRTC July 17, 2013 Letter and PRTC White Paper).

[127] *USF/ICC Transformation Order*, 26 FCC Rcd at 17735, para. 185 (quoting *Federal-State Joint Board on Universal Service*, CC Docket No. 96-45, Report and Order, 12 FCC Rcd 8776, 8915, para. 250, criterion (1997) (*Universal Service First Report and Order*) (history omitted).

[128] *See supra* para. 34 and note 96. In contrast, parties had limited access to the CQBAT model when the Commission adopted the *USF/ICC Transformation Order*; for instance, parties had to travel to Cincinnati to inspect the source code.

[129] *USF/ICC Transformation Order*, 26 FCC Rcd at 17735, para.185 (quoting *Universal Service First Report and Order*, 12 FCC Rcd at 8913, 8915, para. 250).

43. For many of the same reasons why we find this process consistent with the Commission's stated expectations, we also conclude that the Bureau's development of the model is consistent with the Administrative Procedure Act's (APA) notice and comment requirements. We are 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."[130] 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."[131] 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.[132] We reject 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.[133] 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.[134] And PRTC's claims that the operating expense, CQLL, and CQMM inputs and algorithms it identifies are "hidden" are unfounded.[135] In fact, as we discuss more fully below, we provided detailed documentation about these algorithms and inputs.[136] 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.[137]

44. 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.[138] 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.[139] The Bureau thus has provided all interested stakeholders – including price cap carriers, potential competitors, consumer advocates, and the states –

[130] PRTC Sept. 12, 2013 Comments at 7; *see also* PRTC White Paper at 22-24.

[131] PRTC Sept. 12, 2013 Comments at 6 (quoting *Conn. Light & Power Co. v. Nuclear Regulatory Comm'n*, 673 F.2d 525, 530 (D.C. Cir. 2008)); *see also* PRTC White Paper at 22.

[132] *See supra* para. 34-39.

[133] PRTC White Paper at 22.

[134] Absent clarity on PRTC's part, we have no basis to conclude that any such materials not already in the record (if any) are critical to meaningful comment on the model. *See, e.g.*, *Chamber of Commerce v. SEC*, 443 F.3d 890, 900 (D.C. Cir. 2006) ("[T]he question is whether 'at least the most critical factual material that is used to support the agency's position on review ... [has] been made public in the proceeding and exposed to refutation.'") (quoting *Ass'n of Data Processing Serv. Orgs. v. Bd. of Governors of the Fed. Reserve Sys*., 745 F.2d 677, 684 (D.C. Cir. 1984)). *See also, e.g.*, *EchoStar Satellite LLC v. FCC*, 457 F.3d 31, 40 (D.C. Cir. 2006) (Commenters do not require access to what are merely "the agency staff's own cogitations upon the evidence in the record. Were parties entitled to comment upon every observation an agency staff member draws from the record as it accrues, rulemaking proceedings would be interminable."). To the contrary, as we explain below, all information regarding the model relied upon by the Bureau was made available to commenters in the proceeding, which enabled them to comment meaningfully on the model.

[135] PRTC White Paper at 23-24.

[136] *See infra* paras. 56, 113 note.336.

[137] PRTC White Paper at 23-24. *See infra* para. 55.

[138] *See, e.g., supra* para. 37-39.

[139] *See, e.g., supra* para. 8 note 25.

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

45. 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.[140] 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.[141] 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.[142] 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 219,761geographic areas);[143] 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.

46. 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.[144] As discussed below, we are not persuaded that the additional data, documentation, and reporting functions that some parties request would help users better assess whether

[140] As noted above, model methodology documentation, the default input values used in CAM v4.0, v4.1, and v4.1.1 and illustrative model results at a more aggregated level are available on the Commission's website. *See supra* paras. 38-39.

[141] *See, e.g.*, WCB Feb. 6, 2013 Virtual Workshop Submission Letter Attach. at 24 (Comments of Robin Tuttle, on behalf of ACS); WCB Mar. 28, 2013 Virtual Workshop Submission Letter Attach. at 18 (Comments of PRTC).

[142] For example, when some parties requested additional information regarding the differences between the CQBAT model filed by the ABC Coalition and versions of the CAM, the Bureau posted additional information in the virtual workshop and encouraged parties to review previous Public Notices for a high-level discussion of these differences, as well as the CAM systems update page, which provides more intricate details of the changes for versions of the CAM. *See* WCB Mar. 28, 2013 Virtual Workshop Submission Letter Attach. at 13 (Comments of Steve Rosenberg, Chief Data Officer, Wireline Competition Bureau, FCC); WCB Feb. 6, 2013 Virtual Workshop Submission Letter Attach. at 48 (Comments of Donald K. Stockdale, Jr. on behalf of ABC Coalition).

[143] The CAM v4.1 census block group detail download file includes data for 219,761 census block groups in 572,804 records. Those block groups are further disaggregated based on a number of variables: the study area and telecom service provider (including rate-of-return companies and areas); areas served by cable or fixed wireless providers; areas that have qualifying service from an incumbent telecommunications carrier. In contrast, HCPM breaks out data into approximately 11,000 wire centers.

[144] *See, e.g.*, Comments of ACA, WC Docket No. 10-90, at 5-6 (filed Jan. 7, 2014) (ACA Jan. 7, 2014 Comments) (reiterating request for additional reporting and documentation); ACA Aug. 19, 2013 Ex Parte Letter at 6 (arguing that "core issues related to calculation transparency and verification remain"); NASUCA Oct. 25, 2013 Ex Parte Letter at 12 (arguing that "[t]here is a need to expand the amount and type of model output that the model reports provide"); Comments of ACS, WC Docket No. 10-90 (filed Jan. 7, 2014) (ACS Jan. 7, 2014 Comments) (stating that it "does not believe that the public yet has sufficient visibility into the inputs and methodologies used in the model to verify the results or determine whether they are reasonable").

modeled results are reasonable. Nor are we persuaded by the arguments of carriers serving non-contiguous areas of the United States that they were unable to evaluate model results.

47. 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[145] 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.[146] We conclude that this improvement to the model addresses the concern raised by ACA in a comprehensive way and we adopt 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."[147] 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.[148] Accordingly, given the limited, equivocal concerns raised in the record, we do not find it necessary to separately investigate each census block in an urban area that may be eligible for support.[149]

[145] ACA Jan. 7, 2014 Comments at 6 (identifying the census block group that contains the National Mall and Memorial Parks, the White House and the U.S. Capitol); *see also* ACA Aug. 19, 2013 Ex Parte Letter at 1, 6. ACA demonstrated that the information already provided has enabled meaningful comment that the Bureau used to improve the model. ACA claimed that it could not identify which census blocks within the census block groups potentially would have received support because the detailed model results are available only at the census block group level. *See* ACA Aug. 19, 2013 Ex Parte Letter at 2 n.2. ACA could have used the census block results available on the CAM website, however, to identify at least some of the census blocks that were above the funding benchmark in the illustrative model run results.

[146] *See CAM v4.0 Availability PN*, 28 FCC Rcd at 16344. Although most locations used in the model are geocoded, the housing unit counts are adjusted to match Census 2010 census block housing unit counts and 2011 county estimates. *See CAM Platform Order*, 28 FCC Rcd at 5323, para. 53 n.115; Model Methodology at 12-15, http://transition.fcc.gov/Daily_Releases/Daily_Business/2014/db0417/DOC-326628A1.pdf. Because the 2011 data are at the county level, not the block level, locations reflecting county growth were randomly dispersed to census blocks based on the amount of roads in each census block in the country. As a result, residential locations may have been assigned to census blocks for which the 2010 Census data showed no residential locations, such as the National Mall. In the updated location data, census blocks with no residential locations in the geocode data or the 2010 Census data are removed as possible targets for random placement of county growth locations. This modification impacted about 0.1 percent of all residential demand locations. *See also See* CAM v4.0 Release Notes (Dec. 4, 2013), via system updates link, at https://cacm.usac.org .

[147] *See* ACA Aug. 19, 2013 Ex Parte Letter at 3 & n.4. *See also* Letter from Robert Mayer, USTelecom, to Marlene Dortch, Secretary, FCC, WC Docket 10-90 (filed Oct. 21, 2013).

[148] There are a number of reasons that can contribute to locations having high (or extremely high) costs in otherwise low-cost areas. First, where there are a small number of locations served by a single splitter (node 2), each of those locations has higher splitter costs (the fixed cost of the splitter itself is amortized over fewer end-user locations). In addition, there are fewer locations over which to amortize the cost of the feeder fiber that connects that splitter back to the central office. And if that splitter location is relatively isolated and that feeder fiber runs largely on a dedicated path (i.e., if a good portion of the path does not coincide with feeder or distribution fiber for other areas – reducing the cost of the fiber run by allowing for the sharing of structure cost), the feeder-fiber costs attributable to that splitter will be higher. In other words, the numerator (total cost) could be higher while the denominator (number of locations) could be lower. Finally, if the fiber path from the splitter to the end-user location is largely dedicated (i.e., if the distribution fiber path is not shared with other distribution or feeder fiber), then those end-user locations will have higher distribution-fiber costs associated with them as well. For example, these conditions apply to the isolated high-cost locations in Rock Creek Park in Washington, DC.

[149] *See* ACA Jan. 7, 2014 Comments at 6 (arguing that "a transparent process evaluating outliers should be completed").

48. We find 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."[150] 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, we expect that any effect on average cost in a census block because of random placement of some locations would be small.[151] 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 we discuss above, there can be high-cost geo-coded locations within otherwise low-cost areas.[152] Since the cost of a location is thus clearly influenced greatly by drivers other than the source (e.g., distance to network facilities), we do not see how the information that ACA requests would provide insight into the reasonableness of the cost of that location.[153] Although we are 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.[154] These maps thus provide "geographic visualizations" of costs and support that "would enable stakeholders to more easily evaluate the modeled results."[155]

49. Nor are we persuaded that ACA needs additional reporting and documentation to identify specific cost drivers.[156] The detailed model results available permit users to identify asset categories at

[150] ACA Aug. 19, 2013 Ex Parte Letter at 6-7 (requesting "access to the geographic coordinates of modeled locations and their central offices, as well as summary reporting on locations that were randomly assigned to a road location and/or spread along a road segment").

[151] *CAM Platform Order*, 28 FCC Rcd at 5323, para. 53 n.115. In fact, the impact of random placement for *all* locations was only to increase cost by a few percent in aggregate (and the model randomly places only a few percent of locations nationwide). Using geocoded customer locations likely results in more accurate results and lower costs than randomly placed data, because the actual geocoded locations are likely more clustered than randomly placed locations within each census block. For example, using geocoded data, CAM v3.2 requires almost 10 percent fewer pedestals (Node3 locations) and more than two percent fewer splitters (Node2 locations), compared to CAM v3.2 model runs made with demand data (locations) and network topology from CAM v2 in which all points were randomly placed. There are also reductions in the amount of feeder and distribution plant required to serve locations using geocoded data relative to randomly placed data. These results are true in rural areas which are more likely to be relevant for Phase II funding: CAM v3.2 shows an increase in the number of rural locations of just over seven percent, but requires just over six percent fewer pedestals and just under one percent fewer splitters.

[152] *See supra* para. 47 and note 148.

[153] In addition, providing geographic coordinates of locations would require the Bureau to release publicly proprietary commercial data – the geographic coordinates of those locations that came from a commercial data source. As a practical matter, after the location demand data are generated, information about whether any individual location was based on a geocoded address or randomly assigned is not retained, so the information ACA requests, in addition to being proprietary, is not readily available. As noted above, HCPM relied on proprietary data. *See supra* note 118.

[154] *See supra* para. 38.

[155] ACA Aug. 19, 2013 Ex Parte Letter at 7.

[156] *Id*. (requesting "reporting and documentation that helps users better understand how costs are allocated across asset categories, including calculated asset quantities for each supported area" and claiming that this "would

(continued…)

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.[157] 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.[158] 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.[159]

50. ACA requested a comparison of CAM determined support amounts with previous support amounts.[160] 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,[161] 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.

51. The Bureau has made available sufficiently detailed information on the CAM website, and we do not find NASUCA's complaints to the contrary persuasive.[162] 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.[163] At the census block group level, the total monthly cost is broken down separately for residential and business locations

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facilitate analysis to identify specific cost drivers (e.g., determine from reporting whether an area is receiving support due to high underground unitized plant costs vs. high regional labor costs)").

[157] *Id*. (requesting "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 node and asset-level investment requirements, and ultimately levelized monthly cost, to facilitate error checking).

[158] *See supra* para. 36.

[159] *See supra* para. 35.

[160] ACA Aug. 19, 2013 Ex Parte Letter at 7 (arguing that a "comparison of CAF Phase II funding with pre-CAF universal service support would help identify how CAF Phase II would redistribute support amounts, both geographically and among price cap local exchange carriers").

[161] *See USF/ICC Transformation Order*,26 FCC Rcd at 17712-15, paras. 128-33 (freezing legacy support)..

[162] NASUCA Oct. 25, 2013 Ex Parte Letter at 12 (complaining that "it is not possible to obtain reports at the census block level … to determine the cost by model node … [or] to obtain a complete inventory of the equipment and facilities purchased by each model scenario run").

[163] *See supra* paras. 38-39.

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.[164] NASUCA has not convinced us that the detailed information provided on the CAM website is inadequate, and we conclude that the information already available is sufficient to enable parties to provide meaningful analysis and comment on the model and its inputs.

52. Nor are we 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.[165] Only one price cap carrier has deployed FTTP at scale. Even for providers that have deployed FTTP, we are 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.

53. We also are 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.[166] Similarly, PRTC argued that it did not have enough information to evaluate whether input values are reasonable.[167] 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.[168] Although ACS, PRTC, and Vitelco initially argued that we should use their state/territory-specific models rather than CAM to estimate their Phase II support,[169] 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

[164] We note that the model does not retain monthly cost (depreciation, taxes and cost of money) by network node. We have not found any reason to retain such data in the calculation and, in fact, NASUCA fails to put forward any argument to do so. In addition, we question the value of allocating opex costs, many of which are not attributable to any particular part of the network.

[165] NASUCA Oct. 25, 2013 Ex Parte Letter at 8 (arguing that "accounting data are necessary to verify the inputs to the model").

[166] *See, e.g.*, WCB Feb. 6, 2013 Virtual Workshop Submission Letter Attach. at 24 (Comments of Robin Tuttle, on behalf of ACS) (arguing that it could not validate the model results because the regression methodology for developing the operating expense inputs was not publicly available). The Bureau subsequently provided detailed information about the methodology used by CAM to develop all of the opex factors.

[167] *See, e.g.*, WCB Mar. 28, 2013 Virtual Workshop Submission Letter Attach. at 19 (Comments of PRTC) (arguing that "it is virtually impossible to effectively evaluate the input values").

[168] *See, e.g.,* ACS Jan. 7, 2014 Comments at i (proposing "additional Alaska-specific capex inputs in a CAM v4.0-ready format for 18 material and 21 labor items, reflecting ACS's current inventory and installation contracts"); PRTC Oct. 30, 2013 Ex Parte Letter (providing adjustments to CAM v3.2 inputs resulting in "funding levels ranging from $23.57 million to $71.86 million – a range more in keeping with the current annual frozen support received by PRT of $36.8 million and with the results of PRT's own BCMPR").

[169] As noted above, ACS, PRTC, and Vitelco each filed highly confidential state/territory-specific cost models. *See supra* paras. 7, 13, 20]. These models were filed pursuant to the *Second Protective Order*, which restricts access to outside counsel and outside consultants of participants in this proceeding, and thus is less accessible for review and comment by interested parties than CAM. *See Second Protective Order*, 27 FCC Rcd at 1494-95, paras. 1-2. All three models were developed by the same outside consulting firm.

into later versions of the model.[170] In addition, ACS, PRTC, and Vitelco each ultimately proposed state/territory-specific modifications to CAM.[171]

54. Similarly, we are 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.[172] 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.[173] 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.

55. We also are 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.[174] 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.[175] 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.[176] In addition,

[170] *See, e.g.*, ACS July 9, 2013 Ex Parte Letter; Letter from Karen Brinkmann, Counsel to ACS, to Marlene H. Dortch, Secretary, FCC, WC Docket Nos. 10-90, 05-337 (filed July 25, 2013); Letter from Richard R. Cameron, ACS, to Marlene H. Dortch, Secretary, FCC, WC Docket Nos. 10-90, 05-337 (filed July 30, 2013) (ACS July 30, 2013 Ex Parte Letter) (attaching Letter from Leonard A. Steinberg and Richard R. Cameron, ACS, to Marlene H. Dortch, Secretary, FCC); Letter from Richard R. Cameron, ACS, to Marlene H. Dortch, Secretary, FCC, WC Docket Nos. 10-90, 05-337 (filed Aug. 5, 2013) (attaching letter from Richard R. Cameron, ACS, to Marlene H. Dortch, Secretary, FCC); Letter from Karen Brinkmann, Counsel to ACS, to Marlene H. Dortch, Secretary, FCC, WC Docket Nos. 10-90, 05-337 (filed Sept. 12, 2013) (attaching Comments of ACS, WC Docket No. 10-90 (filed Sept. 12, 2013) (ACS Sept. 12, 2013 Comments)); PRTC Oct. 30, 2013 Ex Parte Letter.

[171] *See* Letter from Karen Brinkmann, Counsel to ACS, to Marlene H. Dortch, Secretary, FCC, WC Docket Nos. 10-90, 05-337 (filed Jan. 7, 2014) (attaching ACS Jan. 7, 2014 Comments); Vitelco Sept. 19, 2013 Ex Parte Letter; Letter from Russell M. Blau, Counsel for Vitelco, to Marlene H. Dortch, Secretary, FCC, WC Docket Nos. 10-90, 05-337 (filed Dec. 16, 2013); Comments of PRTC, WC Docket No. 10-90, at 10-11 & nn.31-34 (filed Jan. 7, 2014 (filing a Puerto Rico-specific capex workbook that makes 56 changes to individual CAM v4.0 input values).

[172] For example, ACS argues that "without access to the data and analyses used to develop the [state-specific property tax] factors, ACS has no way of discovering an explanation as to why the model understates these expenses for ACS, or how [to] ensure the model better reflects ACS's costs." *See* WCB Mar. 28, 2013 Virtual Workshop Submission Letter Attach. at 17 (Comments of Robin Tuttle, on behalf of ACS); ACS Mar. 25, 2013 Comments at 3. Similarly, PRTC argues that "[w]ithout access to the data and analyses used to develop the [property tax] factors, PRTC has no way of discovering an explanation as to why the model understates these expenses for PRTC." *See* WCB Mar. 28, 2013 Virtual Workshop Submission Letter Attach. at 18 (Comments of PRTC).

[173] We note that ACS argues both that its embedded costs are indicative of the costs that should be used in the forward-looking model – that the costs it has incurred in its existing network should be used to evaluate model-output costs calculated by the CAM; and the opposite – that embedded costs cannot be used to evaluate the model outputs in aggregate. *See* ACS Jan. 7, 2014 Comments at 5-13, 22-26.

[174] *See e.g.*, WCB Mar. 28, 2013 Virtual Workshop Submission Letter Attach. at 17 (Comments of Robin Tuttle, on behalf of ACS); PRTC White Paper at 23

[175] *See supra* para. 53 and note 170.

[176] *See supra* para. 35.

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.[177] In short, we believe 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.

56. 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.[178] As noted above, parties can access CQLL and CQMM source code using DRM-protected PDF files.[179] In addition, the System Evaluator package allows users to view each of the processing steps used to calculate costs by the CAM.[180] 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.[181] 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.

57. 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.[182] 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,[183] we concluded the CAM's cable and fixed wireless coverage should be modified to reflect

[177] *See supra* para. 45.

[178] *See* PRTC Sept. 12, 2013 Comments at 3-4 (claiming that providing access to the application's source code does not "allow commenters fully to test changes in input values, understand the interactions between the various assumptions and inputs, and ultimately evaluate whether the outputs of CQLL and CQMM are reasonable").

[179] *See supra* para. 34.

[180] *CAM Version 3 Availability PN*, 28 FCC Rcd at 2317. In order to access the System Evaluator package, parties must execute all three attachments to the protective order: the acknowledgement of confidentiality, the licensing agreements, and the nondisclosure agreement. *See Third Supplemental Protective Order*, 27 FCC Rcd at 15283-92, Apps. A-C.

[181] *See supra* paras. 34-39.

[182] Although PRTC claimed in 2013 that the Bureau and CostQuest had been unresponsive to questions posed by parties, the example the carrier cited was questions that ACS previously had submitted to CostQuest related to the ABC Coalition's CQBAT model back in May 2012 — and not the versions of CAM that the Bureau has worked to refine and improve over the course of this proceeding. *See supra* para. 7 and note 19; PRTC White Paper at 24. A number of the remaining relevant technical questions have been addressed in the methodology documentation, the capex tutorial, and the virtual workshop materials that have been available to all interested stakeholders. PRTC's complaint in July 2013 that the Bureau did not respond to comments that asked why the CAM would distribute less support than what PRTC, Vitelco, and ACS currently receive, *id*. at 24 n.71, is unpersuasive in light of the Bureau's efforts over ten months working to make adjustments to the model to better reflect the costs of serving non-contiguous areas of the United States.

[183] *See, e.g.*, Comments of the National Telecommunications Cooperative Association, the National Exchange Carrier Association, Inc., and the Western Telecommunications Alliance, WC Docket No. 10-90, at 7 (filed Feb. 19, 2013); Reply Comments of Alaska Communications Systems, WC Docket No. 10-90, at 6-7 (filed March 4, 2013); (continued…)

only carriers who reported voice service on FCC Form 477, pursuant to the Bureau's policy decision.[184] As discussed above, we 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.[185] Although the Bureau has not incorporated all changes to the CAM that were suggested by outside parties,[186] we have made numerous improvements in response to issues raised in the record. We therefore conclude 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,[187] we conclude 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."[188]

3. Alleged Delegation by the Bureau

58. Finally, PRTC's assertion that the Bureau has sub-delegated its responsibility to develop the model to CostQuest is unfounded.[189] PRTC claims that the Bureau has delegated its "decision-making

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Reply Comments of the Independent Telephone and Telecommunications Alliance, WC Docket No. 10-90, at 5 (filed March 4, 2013).

[184] *CAM Version 3.1 Availability PN*, 28 FCC Rcd at 5707-08; *CAM Version 3.1.2 Availability PN,* 28 FCC Rcd at 7293.

[185] *See supra* para. 47.

[186] For example, in response to a virtual workshop question asking whether there were any functionalities or capabilities in CAM v1 that should be addressed in or added to subsequent versions, ACA provided a list of several. *See* WCB Feb. 6, 2013 Virtual Workshop Submission Letter Attach. at 37-38 (Comments of Thomas Cohen, Counsel to ACA). Some of these were not really necessary for the analysis that ACA was proposing that they or we could do. For example, ACA requested that the model provide a toggle to exclude Alaska from the calculations. However, the model can be run without including Alaska in the cost estimates, and support can be calculated excluding support for Alaska. ACA also requested that the model provide the ability to separate opex and capex expenditures in the reporting module by adding a toggle to include/exclude capex and a toggle to include/exclude opex, or showing these costs as separate reporting fields. The Bureau determined that both opex and capex costs should be included in any calculation of support based on costs. Regardless, at least some model reports already disaggregate capex from opex; and it is possible to choose input values that lead to zero opex or to choose input values that lead to zero monthly capex. Parties that have signed the attachments of the *Third Protective Supplemental Order* can access the census block group detail files available on the Posted DataSets page of the CAM website under "Model Outputs." *See* Connect America Cost Model, https://cacm.usac.org; *Third Supplemental Protective Order*, 27 FCC Rcd 15277.

ACA also requested functionalities that are inconsistent with other policy decisions subsequently adopted by the Bureau. For example, ACA requested that the model provide the ability to exclude capital expenditures for all locations that are "Telco served." In the *CAM Platform Order*, the Bureau concluded that "the model platform will estimate the costs of serving locations irrespective of whether they are currently provided broadband by the ILEC." *CAM Platform Order*, 28 FCC Rcd at 5320, para. 43. The Bureau found that "this approach is consistent with the Commission's goals and directives in the *USF/ICC Transformation Order*. While the Commission sought to 'extend[] broadband to millions of unserved locations,' it also recognized the importance of 'sustaining existing voice and broadband services.'" *Id.* This approach also is consistent with the Commission's approach when it adopted HCPM. *See id*. at 5321, para. 46 & n.100.

[187] As noted above, the CAM v4.0, v4.1, and v4.1.1 input tables are publicly available on the Commission's website.

[188] *USF/ICC Transformation Order*, 26 FCC Rcd at 17735, para. 185 (quoting *Universal Service First Report and Order*, 12 FCC Rcd at 8913, 8915, para. 250).

[189] PRTC July 17, 2013 Ex Parte Letter at 18; PRTC Sept. 12, 2013 Comments at 4-7. *But see* Letter from Jonathan Banks, Senior Vice President Law & Policy, WC Docket Nos. 10-90, 05-337, to Marlene H. Dortch, Secretary FCC, at 3 (filed Aug. 16, 2013) (USTelecom Aug. 16, 2013 Ex Parte Letter).

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."[190] Contrary to PRTC's assertions, and unlike the case law cited by PRTC, the Bureau has given CostQuest no such decision-making role.[191]

59. The Commission instructed the Bureau to "select" a model that is consistent with the Commission's parameters.[192] 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 this 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.[193] 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.[194] 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.[195]

60. Contrary to PRTC's unsupported claim that the Bureau has engaged in the "abdication to CostQuest of the entire modeling process,"[196] throughout the process the Bureau has been in full control of model development.[197] 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.[198] 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),[199] 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),[200] 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

[190] PRTC July 17, 2013 Ex Parte Letter at 19-20; PRTC Sept. 12, 2013 Comments at 5-6.

[191] In the case law PRTC cites, the Commission had given full discretion to the states to make a determination regarding competitive local exchange carriers (LECs). *See* PRTC July 17, 2013 Ex Parte Letter at 18-22 (citing *U.S. Telecom Ass'n v. F.C.C.*, 359 F.3d 554, 556 (D.C. Cir. 2004)); s*ee also* USTelecom Aug. 16, 2013 Ex Parte Letter at 3.

[192] *USF/ICC Transformation Order*, 26 FCC Rcd at 17725, 17735, paras. 157, 187.

[193] *See infra* paras. 61-163; *CAM Platform Order*.

[194] USAC holds the contract with CostQuest and in that role ensures that CostQuest meets all contractual obligations to implement changes to the model under policy direction from the Commission.

[195] *See* paras. 34-39.

[196] PRTC White Paper at 21.

[197] PRTC's allegation that the Bureau "lacks fundamental information about the model" because it advised insular carriers to make use of CostQuest's help desk to answer technical questions about the model, and then CostQuest subsequently directed questions about the model back to the Bureau for resolution, misses the mark. PRTC Sept. 12, 2013 Comments at 6-7 & n.20. This merely is one example that demonstrates that the Bureau has been the entity making the policy decisions regarding the model. The questions that CostQuest redirected to the Bureau involved policy questions that were not appropriate for CostQuest to address; USAC has contracted with CostQuest to provide technical support.

[198] *See e.g., supra* paras.27,35, 47..

[199] *CAM Platform Order*, 28 FCC Rcd at 5308-16, paras. 16-33; *CAM Version 3.1 Availability PN*, 28 FCC Rcd at 5708.

[200] *CAM Platform Order*, 28 FCC Rcd at 5325-26, paras. 59-60; *CAM v1 Availability PN*, 27 FCC Rcd at 15357.

decisions.[201] 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.[202] In addition, the Bureau not only determined what input data sets to use,[203] but also how to modify those sources in response to public input.[204] 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.[205] 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

61. In this section we adopt 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.[206] 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."[207] 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."[208]

62. 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.[209] We also adopt 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.[210] The current version of CAM updates the broadband coverage data in several ways. This version uses June 2013 National Broadband Map data,

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[201] *Connect America Phase II Challenge Process Order*, 28 FCC Rcd at 7216, para. 11; *CAM Version 3.1 Availability PN*, 28 FCC Rcd at 5707-08; *CAM Version 3.1.2 Availability PN,* 28 FCC Rcd at 7293; *CAM Version 3.1.3 Availability PN*, 28 FCC Rcd at 8339.

[202] *See* WCB Feb. 6, 2013 Virtual Workshop Submission Letter Attach. at 4-9, 12-14; *supra* para. 8.

[203] *See, e.g.*, *CAM Platform Order*, 28 FCC Rcd at 5322-23, paras. 50-55 (adopting customer location data); *infra* para. 62.

[204] *See, e.g.*, *supra* para. 47; *infra* para. 62.

[205] For example, although the Commission currently employs several Geographic Information Systems (GIS) specialists and route optimization is a common GIS practice, it would have taken a great deal of time and resources for those employees to write, debug and run route-optimization code for the entire country that would conform with FTTP engineering guidelines, diverting them from other mission-critical assignments.

[206] CAM v3.0 was the current version when the model platform was adopted.

[207] *CAM Platform Order*, 28 FCC Rcd at 5306, para. 10.

[208] *Id*.

[209] *See, e.g.*, *CAM Version 3.2 Availability PN*, 28 FCC Rcd 12833; *CAM Version 4.0 Availability PN*, 28 FCC Rcd 16339 ; Model Methodology, http://transition.fcc.gov/Daily_Releases/Daily_Business/2014/db0417/DOC-326628A1.pdf; CAM Release Notes, via system updates link, at https://cacm.usac.org. To the extent not specifically discussed below, we adopt those changes described in the public notices for the reasons discussed in those public notices.

[210] *See CAM Version 3 Availability PN*, 28 FCC Rcd 2316.

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.[211] As discussed below, CAM uses GeoResults 4Q 2012 data to identify wire center boundaries and central office locations.[212] As discussed above, CQLL and CQMM develop the network topology for CAM, which are used as inputs to CAM. We also adopt the updates to these data. For example, in the *CAM Platform Order*, we adopted the customer location data used in the model, which CQLL uses to develop the network topology.[213] As described above, we updated the demand location data by modifying the methodology for placing randomly placing county growth locations.[214] 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.[215]

63. We also adopt 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.[216] We discuss 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.[217]

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[211] *See* Model Methodology at 33-35, http://transition.fcc.gov/Daily_Releases/Daily_Business/2014/db0417/DOC-326628A1.pdf; CAM v.4.1.1 incorporated minor corrections to the broadband coverage data. *See also supra* para. 29; CAM 4.1.1 Release Notes (Apr. 17, 2014), via system updates link, at https://cacm.usac.org.

[212] *See infra* para. 65.

[213] *CAM Platform Order*, 28 FCC Rcd at 5322-23, paras. 50-55. The model uses GeoResults 3Q 2013 geocoded locations which are trued up with Census 2010 SF1 housing units and 2011 housing unit estimates.

[214] *See supra* para. 47.

[215] *See* Model Methodology at 60-62, http://transition.fcc.gov/Daily_Releases/Daily_Business/2014/db0417/DOC-326628A1.pdf. These inputs are not user-configurable and not available for end users to change or adjust.

[216] The capex input collection includes the following input workbooks: ACF8 50 V6, Bandwidth V1, BusTakeRate80Pct V5, Capex V21, CoSizeAdjustment V1, OCNCoSize V15, Opex V8, PlantMix V8, PlantMixBuriedConduit V1, Ptax V3, RegionalCostAdjustment V6, ResTakeRate80Pct V5, StateSalesTaxV2. These input workbooks are publicly available at http://www.fcc.gov/encyclopedia/price-cap-resources under the "Connect America Cost Model v4.1.1 Default Inputs" link.

[217] We do not specifically discuss other user-adjustable inputs such as state sales tax, the costs of fiber and placing fiber, and the model's size classification of carriers. *See* Capex V21 Input Workbook, Fiber Material, Labor Rates and Loadings, Material Labor, Structure Labor, Structure Material, and Engineering Rules Worksheets; OCNCoSize V15 Input Workbook; StateSalesTaxV2 Input Workbook. We sought comment generally on adopting the input values in CAM v4.0's input collection and made available all input tables at that time. The input tables in the version of the CAM that we adopt herein are largely the same as those in CAM v4.0, with very limited exceptions. Taking into account arguments relating to input values, assumptions, or the costs that various iterations of the CAM have calculated, we have made minor adjustments in v4.1 and v4.1.1, and discuss those concerns in this Order. We also previously sought comment on adopting the input values in CAM v3.1.2's input collection, and no parties raised objections to using these input values that have not otherwise been addressed in this Order. *See* WCB June 25, 2013 Virtual Workshop Submission Letter Attach. at 14-21. These changes can also be viewed by accessing the

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1. Outside Plant and Interoffice Transport Capex Input Values

64. In this section, we address 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.[218] 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.[219] 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.[220] 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

65. 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.[221] In the *Model Design PN*, 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.[222] The only party directly commenting on data sources for wire center boundaries, NASUCA, favored using the Bureau's study area boundary data collection.[223]

66. We conclude that we 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.[224] Although the Bureau recently collected study area boundary and exchange data from

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model pursuant to the *Third Supplemental Protective Order*, and visiting the systems updates page, at https://cacm.usac.org.

[218] *See HCPM Platform Order*, 13 FCC Rcd at 21335-36, para. 27; *HCPM Inputs Order*, 14 FCC Rcd at 20187, para. 64; *see also CAM Platform Order*, 28 FCC Rcd at 5321-22, para. 49.

[219] For buried plant in the non-contiguous areas of the United States, the model assumes "buried in conduit" systems. *See infra* para. 127-28.

[220] Included in such costs is the capitalized labor associated with installation of fiber-optic cables and the structure.

[221] *CAM Platform Order*, 28 FCC Rcd at 5310-11, paras. 21, 24 n.47.

[222] *See Model Design PN*, 27 FCC Rcd at 6171, para. 80. The Bureau also discussed allowing the model to use efficient routing without regard to existing wire center boundaries, but noted that such an approach would go beyond existing model precedent which used a scorched node approach. *See id*. at 6170-71, paras. 76, 79.

[223] *See* Comments of the Nationals Association of State Utility Consumer Advocates, WC Docket Nos. 10-90, 05-337, at 19-20 (filed July 9, 2012) (NASUCA *Model Design PN* Comments).

[224] The data used in the model incorporate updates and corrections to wire center ownership filed in response to the Bureau's Public Notice seeking such information. *See Telcomaster Table Updates Public Notice*, 28 FCC Rcd 1151.

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.[225] 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.[226] 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.[227]

b. Plant Mix Input Values

67. 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.[228] The ABC Coalition filed updated plant mix values on January 11, 2013, and the Bureau sought comment on these values in the virtual workshop.[229] In the *CAM Platform Order*, the Bureau adopted a model that assumes that each state is made up of three density zones – urban, suburban,

[225] *See Connect America Fund; High-Cost Universal Service Support*, WC Docket Nos. 10-90, 05-337, Report and Order, 27 FCC Rcd 13528 (Wireline Comp. Bur. 2012); *Connect America Fund; High-Cost Universal Service Support*, WC Docket Nos. 10-90, 05-337, Order on Reconsideration, 28 FCC Rcd 1489 (Wireline Comp. Bur. 2013). Incumbent LECs were required to submit and certify study area boundary data by May 23, 2013, and state commissions filing study area boundary data were required to file and certify the data no later than June 28, 2013. *See Wireline Competition Bureau Announces Procedures and Deadlines for Submissions of Study Area Boundaries*, WC Docket Nos. 10-90, 05-337, Public Notice, 28 FCC Rcd 2852 (Wireline Comp. Bur. 2013). On December 2, 2013, the Bureau announced the publication of an online map displaying the submitted wire center boundaries, and directed incumbent LECs to review the online map, resolve any overlaps and voids with neighboring incumbent LECs, and certify revised boundaries by January 13, 2014. *See Wireline Competition Bureau Publishes Online Map of Submitted Study Area Boundaries, Announces Procedures for Filing Revised Data*, WC Docket Nos. 10-90, 05-337, Public Notice, 28 FCC Rcd 16315 (Wireline Comp. Bur. 2013). On January 9, 2014, the Bureau granted a two month extension of the deadline until March 17, 2014. *See Connect America Fund; High-Cost Universal Service Support*, WC Docket Nos. 10-90, 05-337, Order, 29 FCC Rcd 171 (Wireline Comp. Bur. 2014).

[226] *See* Letter from Vonda T. Long-Dillard, AT&T, to Marlene H. Dortch, Secretary, FCC (filed July 25, 2013) (attaching Letter from Cathy Carpino, AT&T to Marlene H. Dortch, Secretary, FCC, requesting confidential treatment of GeoResults data); Letter from Maggie McCready, Verizon, to Marlene H. Dortch, Secretary, FCC, WC Docket Nos. 05-337, 10-90 (filed May 22, 2013) (requesting confidential treatment of TomTom North America, Inc. data).

[227] Our decision to use commercial data for purposes of finalizing the model to make an offer of support to price cap carriers does not prejudge what adjustments to the model we might make, such as incorporating study area boundary area information obtained through this data collection, at a future date for other regulatory purposes.

[228] *See Oct. 19 Virtual Workshop PN*; *Dec. 17 Virtual Workshop PN*; WCB Feb. 6, 2013 Virtual Workshop Submission Letter Attach. at 30-33.

[229] *See* Comments of the United States Telecom Association et al., WC Docket Nos. 10-90, 05-337, at App. A (filed Jan. 11, 2013); WCB Mar. 28, 2013 Virtual Workshop Submission Letter Attach. at 11 (Comments of Steve Rosenberg, Chief Data Officer, Wireline Competition Bureau, FCC).

and rural, but did not adopt input values at that time.[230] 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).[231] 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.

68. We adopt 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.[232] 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.[233] 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.[234] 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.[235] The national averages are simple averages of the company-specific values.

69. 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."[236] 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.[237] 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

[230] *CAM Platform Order*, 28 FCC Rcd at 5326-27, para. 64. In the virtual workshop, the Bureau sought comment on capturing variation by geography and additional issues relating to plant mix. WCB Feb. 6, 2013 Virtual Workshop Submission Letter Attach. at 10, 30-33.

[231] *See* Plant Mix V8 Input Workbook; PlantMixBuriedConduit V1 Input Workbook. *See also supra* note 216.

[232] *See* Letter from Alan Buzacott, Verizon, to Marlene H. Dortch, Secretary, FCC, WC Docket No. 10-90 (dated May 22, 2013). The six groups were: North Atlantic (Massachusetts, Rhode Island, New York, New Jersey and Pennsylvania), South Atlantic (Delaware, Virginia, and Maryland), Washington, DC, and three non-contiguous Verizon jurisdictions (California, Florida, and Texas). *Id*. at 2.

[233] *See* Letter from Henry Hultquist, AT&T, to Marlene H. Dortch, Secretary, FCC, WC Docket No. 10-90 (dated May 22, 2013).

[234] *See* Letter from Craig J. Brown, CenturyLink, to Marlene H. Dortch, Secretary, FCC, WC Docket No. 10-90 (dated May 22, 2013).

[235] Although the Commission adopted nationwide plant mix values in the *HCPM Inputs Order*, it noted that historical plant mix values might reflect terrain conditions that will not change over time, and that its analysis of Automated Reporting Management Information System (ARMIS) data revealed a great deal of variability in plant mix ratios among the states. We find that using company-specific and state-specific plant mix values where available is a better approach than using nationwide values as the Commission did in HCPM. *See HCPM Inputs Order*, 14 FCC Rcd at 20256, para. 231.

[236] WCB Mar. 28, 2013 Virtual Workshop Submission Letter Attach. at 11-12 (Comments of Thomas Cohen, Counsel for ACA).

[237] *See id*. at 12 (Comments of Robert Mayer, on behalf of the ABC Coalition).

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 we have no data in the record on which to base alternative plant mix values. Even if we were to increase the percentages of aerial plant in rural areas, we 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 we find the existing data reasonable to use here.[238]

c. Outside Plant Sharing

70. 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.[239] 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.[240] 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.[241]

71. We adopt the outside plant sharing percentages used in CAM v4.1.1.[242] 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. We conclude 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, we find 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.

72. 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.[243] 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.

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[238] *See* Connect America Cost Model Overview, at 20 (Sept. 12, 2013), http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-323344A1.pdf .

[239] *See* Model Methodology at 69-73 (CACM Plant Sharing Input Walkthrough), http://transition.fcc.gov/Daily_Releases/Daily_Business/2014/db0417/DOC-326628A1.pdf.

[240] *See id*.; *infra* paras. 158-63.

[241] *See* WCB Feb. 6, 2013 Virtual Workshop Submission Letter Attach. at 27-28.

[242] *See* Capex V21 Input Workbook, Plant Sharing Tables Worksheet. *See also supra* note 216.

[243] These sharing percentages do not differ by density.

73. We also adopt 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.[244] 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.[245] 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.[246]

74. Although there are various approaches to allocating common costs by dividing all costs and fully distributing them on the basis of an "allocation key," we 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. We 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, we do not have any data to support an alternative allocation method.

d. Other Outside Plant and Interoffice Transport Capex Inputs

75. 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

[244] Specifically, the model assumes the following percentages of interoffice routes require additional dedicated structure: aerial – 37 percent (rural), 22 percent (suburban), 14 percent (urban); buried – 71 percent (rural), 64 percent (suburban), 56 percent (urban); underground – 26 percent (rural), 19 percent (suburban), 11 percent (urban). *See* Model Methodology at 72, http://transition.fcc.gov/Daily_Releases/Daily_Business/2014/db0417/DOC-326628A1.pdf.

[245] These sharing percentages do not vary by plant type or density.

[246] This approach is consistent with the approach used in the modeling for the National Broadband Plan. The Broadband Access Model assumed three distinct services required a backhaul network (broadband, special access/private line, and TDM switching). Given that a standalone network built for each network separately would have a very similar cost, the model assumed an equal allocation of the backhaul cost to the three networks, and thus assigned 1/3 of the cost to the broadband network. The CAM assumes there are two types of services that require a backhaul network – broadband and special access/private line – because voice has moved from a separate TDM network to packets on the broadband network. With only two now, the cost is split equally between broadband and special access/private line. As noted in the *CAM Platform Order*, the Bureau's adoption of a model platform that assumes voice service is provided via an all-IP network does not imply that carriers in fact will provide VoIP. *See CAM Platform Order*, 28 FCC Rcd 5325, para. 60 n.127. Carriers may continue to offer TDM-based switched voice services.

three-digit ZIP codes.[247] In this order, we adopt 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.[248]

76. For the capex input values that vary by density, we adopt 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.[249] We note 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.[250] We find 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.[251] 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.[252]

77. 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).[253] 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.[254]

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[247] *Id*. at 5327-28, paras. 67-68. These regional adjustment factors are based on data obtained from a national survey of the costs of construction in various areas of the United States, by R.S. Means. *See* R.S. Means, *Building Construction Cost Data* (69th Annual Ed. 2010). The regional cost adjustments do not include data for the U.S. Virgin Islands. CAM v3.2 also adjusted the regional cost adjustment table to reflect that Zip 3 = 008, which had been previously coded for Puerto Rico, is in the U.S. Virgin Islands. *See CAM Version 3.2 Availability PN*.

[248] *See* RegionalCostAdjustment V6 Input Workbook. *See also supra* note 216.

[249] *See* Model Methodology at 26, http://transition.fcc.gov/Daily_Releases/Daily_Business/2014/db0417/DOC-326628A1.pdf.

[250] *See* CostQuest Associates, Inc., Connect America Cost Model (CACM): Frequently Asked Questions (FAQ), at 7-8 (Apr. 11, 2014), via Resources link, at https://cacm.usac.org.

[251] For example, the plant mix percentages for fiber feeder are the same in each of the lowest three density zones. *See HCPM Inputs Order*, 14 FCC Rcd at 20368, App. A (Fiber Feeder Plant Mix table).

[252] *See id*. at 20370, App. A. We also note that while some costs, such as placement costs, increase with density, overall cost in rural areas is typically much higher because the distances are so much greater.

[253] Underground excavation costs and buried excavation costs also vary by density. *See* Capex V21 Input Workbook, Structure Labor Worksheet. *See also supra* note 216.

[254] The STATSGO map units of a particular type had to cover at least twenty percent of the census block group to be represented in the calculations. *See* CAM Methodology at 25-26, http://transition.fcc.gov/Daily_Releases/Daily_Business/2014/db0417/DOC-326628A1.pdf.

2. Other Capex Input Values

78. 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, we adopt 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

79. 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.[255] 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.[256]

80. We conclude 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*.[257] 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.[258] 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.[259] We agree 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.[260]

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[255] *USF/ICC Transformation Order*, 26 FCC Rcd at 17692-95, paras. 77-83.

[256] *See* WCB June 25, 2013 Virtual Workshop Submission Letter Attach. at 14 (Finalizing Input Values for Connect America Cost Model Cost Estimate Module Topic).

[257] *See* Capex V21 Input Workbook, FTTp Material Worksheet. *See also supra* note 216.

[258] *See* NASUCA *Model Design PN* Comments at 24-25.

[259] *Id.* at 25.

[260] We do this purely for the limited, specific purpose of adopting model inputs based on the existing record, and do not find it appropriate, in the course of this proceeding, to take up broader legal or policy questions regarding the availability of network power, as NASUCA proposed. *See, e.g.*, *id*. at 25-26 (advocating that the Commission seek comment on issues regarding the sustainability of communications in the case of power outages).

b. Customer Drop Rate

81. 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.[261] Beginning with CAM v3.1, the customer drop rate was set at 80 percent for both residential and business locations.[262] 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.[263] The ABC Coalition advocated for the use of an 80 percent customer drop rate for broadband service.[264]

82. 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.[265] 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.

83. We conclude that 80 percent is a reasonable estimate for the percentage of locations connected with a drop and ONT.[266] We decide 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);[267] indeed, due to other barriers to adoption of broadband services, some small fraction may not subscribe to any form of broadband.[268] 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.

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[261] During the Virtual Workshop and in documentation for prior versions of the CAM, we referred to this percentage as the "take rate." We also used the term "take rate" to refer to the Bureau's estimate of the average percentage of locations that will subscribe to a carrier's service during the five-year funding period. Because these are separate concepts, in this Order we will refer to the cost of connecting locations with a drop and ONT as the "customer drop rate" and the Bureau's estimate of the percentage of locations that will subscribe to a carrier's service over the five-year funding period as the "subscription rate." *See infra* para. 171, note 491.

[262] *See CAM Version 3.1 Availability PN*. Prior to CAM v3.1, the model assumed a customer drop rate of 90 percent of all residential and business locations passed.

[263] Letter from Thomas Cohen and Josh Guyan, Counsel for ACA, to Marlene H. Dortch, Secretary, FCC, WC Docket No. 10-90, at 7-8 (filed June 12, 2013) (ACA June 12, 2013 Ex Parte Letter).

[264] Letter from Robert Mayer, USTelecom, to Marlene Dortch, Secretary, FCC, WC Docket 10-90, at 5 (filed Sept. 3, 2013) (ABC Coalition Sept. 3, 2013 Ex Parte).

[265] These costs are referred to as "node 4 costs."

[266] *See* BusTakeRate 80Pct V5 Input Workbook and ResTakeRate 80Pct V5 Input Workbook. *See also supra* note 216.

[267] For example, over 50 percent of new subscribers to ViaSat's broadband offering previously were unserved or served by dial-up or satellite, while just over 40 percent were either served or underserved. *See* Letter from John P. Janka, Counsel to ViaSat, Inc., to Marlene H. Dortch, Secretary, Federal Communications Commission, WC Docket 10-90 et al., at 8 (filed Sept. 19, 2012).

[268] The Commission has noted that barriers to broadband adoption include not only availability, but also cost, digital literacy, and relevance. *See Inquiry Concerning the Deployment of Advanced Telecommunications Capability to All Americans in a Reasonable and Timely Fashion, and Possible Steps to Accelerate Such Deployment Pursuant to Section 706 of the Telecommunications Act of 1996, Amended by the Broadband Data Improvement Act*, GN Docket No. 11-121, Eighth Broadband Progress Report, 27 FCC Rcd 10342, 10403-04, para. 140 (2012).

84. 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.[269] 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.[270]

c. Central Office Facilities

85. 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.

86. We adopt CAM v4.1.1's input values to estimate the cost of central office facilities.[271] We acknowledge 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.[272] We agree and note 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.[273] 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.[274]

87. 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."[275] We take this opportunity to clarify that costs for buildings, land, and power are included as inputs for central office facilities.[276]

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[269] *See* WCB Feb. 6, 2013 Virtual Workshop Submission Letter Attach. at 39-40 (Calculating Average Per-Unit Costs/Take Rate Topic); *see also* Hogendorn Peer Review Response at 6.

[270] *See* Hogendorn Peer Review Response at 6.

[271] *See* Capex V21 Input Workbook, CO and MiddleMile Material Worksheet. *See also supra* note 216. Both the ABC Coalition and ACS indicated support for the Commission's approach regarding inputs for central office facilities in their virtual workshop comments. *See* WCB Feb. 6, 2013 Virtual Workshop Submission Letter Attach. at 18-19 (Comments of Donald K. Stockdale, Jr., on behalf of the ABC Coalition, and Robin Tuttle, Counsel for ACS).

[272] NASUCA *Model Design PN* Comments at 25.

[273] *See* Capex V21 Input Workbook, Labor Rates and Loadings Worksheet, "Other Rate" column. *See also supra* note 216. The following Cost Components include a loading factor for the central office capitalized investment associated with power investments required for the electronic gear as part of the "Other Rate" value: BBRouter (Broadband Router); EAR (Ethernet Edge Router, referred to as the Ethernet Switch); and OLT (Optical Line Terminal).

[274] *See supra* para. 79.

[275] WCB Feb. 6, 2013 Virtual Workshop Submission Letter Attach. at 18-19 (Comments of Robin Tuttle, Counsel for ACS).

[276] The costs for buildings, land, and site improvement are based on the number of lines served by the central office. For example, a central office serving greater than 25,000 lines will have a higher cost input for buildings, land, and site improvement than a central office serving 25,000 or fewer lines. *See* Capex V21 Input Workbook, LandandBuilding Worksheet. *See also supra* note 216.

d. FTTP Network Equipment

88. In the *CAM Platform Order*, the Bureau determined that the CAM would estimate the costs of an FTTP network.[277] 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. We 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 we adopt the final version of the model.[278]

89. We conclude that CAM v4.1.1's FTTP equipment input values are reasonable based on the record before us.[279] 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." [280] Both ACS and PRTC also agreed that the CAM makes the appropriate assumptions regarding the types of hardware needed for FTTP networks.[281]

e. Voice Capability

90. 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.[282] 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."[283] 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."[284] The *CAM Platform Order*, however, did not address the specific inputs used to calculate the per-subscriber costs.[285]

91. We now adopt 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.[286] Applying the annual charge factor to this per-subscriber capital charge increases the levelized monthly cost of service by approximately one dollar.[287] We note that this cost estimate is

[277] *See CAM Platform Order*, 28 FCC Rcd at 5314-16, para. 33.

[278] WCB Mar. 28, 2013 Virtual Workshop Submission Letter Attach. at 19 (FTTP Capitals Cost Inputs Topic).

[279] *See* Capex V21 Input Workbook, FTTp Material Worksheet. *See also supra* note 216.

[280] *See* WCB Mar. 28, 2013 Virtual Workshop Submission Letter Attach. at 21 (Comments of Robert Mayer, on behalf of the ABC Coalition).

[281] *See id.* at 19-20 (Comments of Robin Tuttle, Counsel for ACS, and Comments of PRTC).

[282] *See supra* para. 79 (citing *USF/ICC Transformation Order*, 26 FCC Rcd at 17692-95, paras. 77-83).

[283] *CAM Platform Order*, 28 FCC Rcd at 5325-26, para. 60.

[284] *Id.* This model design approach does not imply a requirement that carriers provide voice service using VoIP.

[285] *Id.*

[286] *See* Capex V21 Input Workbook, cVOIP Worksheet. *See also supra* note 216.

[287] We emphasize that this is the incremental cost of adding VoIP service to an otherwise existing network that is capable of providing both voice and broadband. Most importantly, in contexts other than model design, a significant portion – perhaps nearly all – of the network costs that we have assigned to broadband service could be allocated to voice service.

consistent with the rates charged by third-party providers of hosted voice services.[288] USTelecom agrees that these monthly costs are "within the realm of reason."[289]

f. Busy Hour Demand

92. In the *CAM Platform Order* we 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.[290]

93. We now adopt CAM v4.1.1's BHOL input value of 0.44 Mbps, which corresponds to 440 kbps per user.[291] We sought comment on using a BHOL input value of 440 kbps in the virtual workshop.[292] The use of this value was supported by the ABC Coalition and was not opposed by any party.[293] 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."[294] We agree. Modest changes in this BHOL value are unlikely to impact significantly cost estimates and ultimate support amounts.[295]

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[288] *See, e.g.*, http://www.r-rtele.com/turn_key_hosted_solutions/wholesale_solutions/rates.html. Assuming 500-1,000 minutes per subscriber results in monthly per-user costs of up to $0.78, not including technical support.

[289] WCB March 28, 2013 Virtual Workshop Submission Letter Attach. at 2 (Comments of Robert Mayer, United States Telecom Association).

[290] *CAM Platform Order*, 28 FCC Rcd at 5324-25, para. 58. For further discussion regarding "busy hour offered load," *see* FCC Omnibus Broadband Initiative, The Broadband Availability Gap: OBI Technical Paper No. 1, at 109-14 (April 2010), http://download.broadband.gov/plan/the-broadband-availability-gap-obi-technical-paper-no-1.pdf (OBI, Broadband Availability Gap). BHOL is an average across the usage of all subscribers; at any given time during periods of peak demand, subscribers may not be online at all, they may be participating in low-bandwidth activities like social media or email, or they may be participating in high-bandwidth activities like watching a high-definition video. Thus, by definition, it is substantially lower than the peak speed available because it accounts for those who are offline or using only low-bandwidth services.

[291] This value represents the volume of data transmitted and received per second during the peak usage hour. *See* Bandwidth V1 Input Workbook. *See also supra* note 216. The BHOL input value sizes the network to accommodate residential and small business demand. *See infra* paras 158-63. For simplicity's sake, the Bureau assumes one Mbps = 1,000 kbps.

[292] *See* WCB Mar. 28, 2013 Virtual Workshop Submission Letter Attach. at 3.

[293] *See id.* (Comments of Robert Mayer, on behalf of USTelecom). ACS initially claimed that the use of a constant BHOL suggests that non-contiguous areas are not accounted for in the model. WCB Feb. 6, 2013 Virtual Workshop Submission Letter Attach at 20 (Comments of Robin Tuttle, Counsel for ACS). ACS also initially claimed that it was unable to validate the model's BHOL without being provided with the BHOL input value, the model's sensitivity to changes in the BHOL input value, and the oversubscription rate. *Id.* As we discussed above, the Bureau provided and sought comment on the model's BHOL input value of 0.44 Mbps. *See supra* note 292. As we explain below, we also updated the model's methodology documentation to provide more clarity about the model's oversubscription rate and its lack of sensitivity to changes in the BHOL value. *See infra* para. 94; CAM Methodology at 74-78, http://transition.fcc.gov/Daily_Releases/Daily_Business/2014/db0417/DOC-326628A1.pdf (explaining the model's capacity). ACS did not comment further about the reasonableness of the BHOL input value after this information was provided.

[294] WCB Mar. 28, 2013 Virtual Workshop Submission Letter Attach. at 3 (Comments of Robert Mayer, on behalf of USTelecom).

[295] Contrary to NASUCA's assertion, the Bureau has explained how the 0.44 Mbps BHOL value is related to current customer usage. *See* NASUCA Oct. 25, 2013 Ex Parte at 11-12. The CAM's publicly-available model methodology documentation has, since June 2013, included an extensive discussion of how the model's current capacity allows for constant streaming of 5.4 Mbps by every user all the time. *See* CAM Methodology at 74-78, http://transition.fcc.gov/Daily_Releases/Daily_Business/2014/db0417/DOC-326628A1.pdf. This capacity would

(continued…)

94. As explained in the model's methodology,[296] 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.[297] 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. We do not believe this is likely, as discussed below.

95. 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,[298] 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.[299] 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 we adopt here.

96. We adopt 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."[300] In developing the Broadband Assessment Model, the staff assumed all residential and small business locations would receive speeds at 4 Mbps/1 Mbps.[301] Usage for the CAM

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equal well over 1.5 terabytes per month, far exceeding the monthly mean and median data usage figures cited by NASUCA. *See* NASUCA Oct. 25, 2013 Ex Parte Letter at 11 (citing a 39 percent growth in monthly mean data usage from 32.1 GBs in 2012 to 44.7 GBs in 2013, and a 56.5 percent growth in monthly median data usage from 10.3 GBs in 2012 to 18.2 GBs in 2013).

[296] CAM Methodology at 74-78, http://transition.fcc.gov/Daily_Releases/Daily_Business/2014/db0417/DOC-326628A1.pdf.

[297] *Id.* We note that the CAM sizes the network based on downstream traffic. Given that a Gigabit Passive Optical Network's (GPON) upstream capacity tends to be one half of downstream, we find that sizing the network based on downstream traffic is appropriate. *Id.*

[298] The OLT aggregates the multiple splitter fibers and shifts them onto a 10 Gbps connection to Ethernet switches and routers. The capacity of 5.4 Mbps is calculated by dividing the 10 Gbps connection by the 1,856 subscribers served by the OLT. *See id*. For simplicity's sake, the Bureau assumes one Gbps = 1,000 Mbps.

[299] As noted in model methodology documentation, the CAM assumes up to 32 end-user locations are served by a single 2.5 Gbps (downstream) link. *See id.* If one assumes the provider offers, and the customers all purchase, one Gbps service, the total oversubscription ratio could be as high as 12.8 (32 Gbps of end-user demand with 2.5 Gbps of backhaul). Of course it is unlikely for all end-users to subscribe and particularly unlikely for all end-users to subscribe to one Gbps service. If 25 end-users (78 percent of locations served by a splitter) subscribe to 100 Mbps, the oversubscription ratio would be 1:1. And particularly in rural areas, there may be far fewer than 32 end-user locations served by a splitter. Closer to the network core, up to 58 of those 2.5 Gbps splitter fibers are connected to a single OLT, which, as mentioned above, has 10 Gbps of backhaul (i.e., a total of 145 Gbps is backhauled by 10 Gbps), for an oversubscription ratio as high as 14.5:1. *See supra* note 298. As noted above, for constant usage of up to about 5.4 Mbps per location, there would be no oversubscription. *See id.* and accompanying text.

[300] OBI, Broadband Availability Gap at 111. Here, we adopt a BHOL for the CAM that is 175 percent larger than the BHOL that was used in the National Broadband Plan model, the Broadband Assessment Model. Given the growth rate for capacity discussed in the National Broadband Plan, this represents more than four years' additional growth in capacity per user.

[301] OBI, Broadband Availability Gap at 43.

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.[302] 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.[303] Therefore, we find 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.[304]

97. Even with higher assumed broadband speeds than the current 4 Mbps downstream, based on current and forecast usage, we conclude 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.[305] Further, some data suggest that moving to a higher speed connection by itself does not raise the BHOL substantially.[306] 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.[307] 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.[308]

98. The BHOL we select 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

[302] *Phase II Service Obligations Order*, 28 FCC Rcd at 15067-68, paras. 17-18.

[303] *USF/ICC Transformation Order*, 26 FCC Rcd at 17705, para. 108 ("[W]e establish a benchmark of 6 Mbps downstream and 1.5 Mbps upstream for broadband deployments in later years of [Connect America] Phase II"); *see also id.* at 17735, para. 187 (the model "should ensure that the most locations possible receive a 6 Mbps/1.5 Mbps or faster service at the end of the five year term, consistent with the [Connect America] Phase II budget").

[304] Commission staff noted that average monthly usage is doubling roughly every three years. OBI, Broadband Availability Gap at 111. *See also* FCC Omnibus Broadband Initiative, Broadband Performance: OBI Technical Paper No. 4, at 6-7 (Aug. 2010), http://download.broadband.gov/plan/fcc-omnibus-broadband-initiative-(obi)-technical-paper-broadband-performance.pdf. Applying that growth rate to the 160 kbps value through the end of 2019 produced a BHOL of just over 400 kbps. This value is also consistent with Commission staff analysis of the value for average usage. OBI, Broadband Availability Gap at 113, Exh. 4-BS.

[305] *See supra* para 95.

[306] We note that according to the data used in developing the National Broadband Plan, the impact of higher speed on usage was quite limited; doubling speed (moving from the 3-5 Mbps tier to the 5-10 Mbps tier) only increased mean usage by approximately 14 percent. OBI, Broadband Availability Gap at 112, Exh. 4-BQ. The impact of broadband speed on mean usage was smaller, in fact, than the impact of the top 1 percent of users to mean usage (for the 3-5 Mbps tier). *Id.* at 112, Exh. 4-BR.

[307] According to Nielsen data, computer users spend 20.1 percent of their time online on social media and blogs, which tend to be lower-bandwidth activities, and spend 5.2 percent of their time watching videos and movies, which tend to be higher-bandwidth activities. Nielsen, State of the Media U.S. Consumer Usage Report (2013), http://www.nielsen.com/us/en/reports/2013/state-of-the-media--u-s--consumer-usage-report.html.

[308] *See supra* paras. 94-95.

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.[309] The 0.44 Mbps input value that we adopt today should be sufficient to accommodate a 100 GB/month usage allowance and reasonable growth trends in usage over the five-year term.[310]

g. Annual Charge Factors for Capex

99. 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.[311] Below we adopt the specific inputs for depreciation, income taxes, and cost of money to be utilized in calculating the ACFs.[312]

(i) Depreciation

100. In the *CAM Platform Order*, we 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."[313] 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 we 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,

[309] *Phase II Service Obligations Order*, 28 FCC Rcd at 15066-67, 15068, paras. 16, 18.

[310] There is no straightforward conversion between monthly usage and peak demand. One user, for example, could download 100 GB in a month, but do so entirely at off-peak times and have no peak demand; another user could download only 15 minutes of video each week (just over 2 GB/month), but do so entirely during peak-usage periods and have a peak demand of 5 Mbps. In the context of developing the National Broadband Plan, Commission staff estimated that 12.5-15 percent of usage occurs during busy hour. OBI, Broadband Availability Gap at 111. Taking this figure, and assuming three busy hours each weekday, 100 GB/month of usage would produce a BHOL of 430 kbps to 517 kbps. Of course, usage patterns may change; for example, data for the approximately 7,000 volunteer participants in the Measuring Broadband America project suggest that as much as 18-20 percent of usage may occur at busy hour for that group. Federal Communications Commission, Data from the 2013 Measuring Broadband America, February Report, http://www.fcc.gov/measuring-broadband-america/2013/February (last visited Apr. 22, 2014). As noted above, however, even if the BHOL were to exceed the 440 kbps we adopt for CAM v4.1.1, BHOL figures below 5,400 kbps would not lead to any incremental costs for CAM v4.1.1. *See supra* paras. 94-95 and accompanying text.

[311] WCB Mar. 28, 2013 Virtual Workshop Submission Letter Attach. at 4 (Comments of Steve Rosenberg, Chief Data Officer, Wireline Competition Bureau, FCC).

[312] The values loaded into the CAM are produced by CostQuest's CapCost Model, which is available for download by users that have signed the protective order. To determine these values, the specific inputs for depreciation, income taxes, and cost of money are inputted into the CapCost model, which produces ACFs as an output. The ACFs are loaded into the CAM ACF Input workbook, which then converts the ACFs within the "Model Inputs" worksheet to a monthly charge factor. The CAM logic utilizes these monthly charge factors to convert investments into a monthly recurring capital cost.

[313] *See CAM Platform Order*, 28 FCC Rcd at 5316, para. 34.

adjusted so that the average lifetime of the asset falls within the range of expected accounting lifetimes authorized by the Commission.[314] The Bureau noted that this approach was supported in the record.[315]

101. 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.[316] 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.[317] We disagree. 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.

102. 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.[318] We decline 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.[319] 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.[320] 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.

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[314] *See HCPM Inputs Order*, 14 FCC Rcd at 20342-47, paras. 422-431.

[315] NASUCA *Model Design PN* Comments at 10-13; WCB Mar. 28, 2013 Virtual Workshop Submission Letter Attach. at 7 (Comments of Robert Mayer, on behalf of the ABC Coalition) (noting that the use of the Gompertz-Makeham curves is reasonable and "standard practice" for annualizing the cost of capital investments). ACS argued that the asset lives previously adopted by the Commission are too long and instead advocates that the asset lives be tied to the five-year support window, since carriers will be compelled to recover their investment in that time frame. *See* WCB Feb. 6, 2013 Virtual Workshop Submission Letter Attach. at 26 (Comments of Robin Tuttle, Counsel for ACS). As we noted in the *CAM Platform Order*, a FTTP network would continue to have significant commercial value after five years; as such, tying the asset lives to the five-year support window "would permit carriers to recover the entire cost of the network over five years, and assume the network had no future commercial value." *See CAM Platform Order*, 28 FCC Rcd at 5317, para. 36.

[316] WCB June 25, 2013 Virtual Workshop Submission Letter Attach. at 12-13 (Comments of Thomas Cohen, Counsel for ACA) ("For example, in the case of the 'Pole' asset category, if a pole costs $100 and has an economic life of 25 years, the -75 percent future net salvage value means that the model provides $175 in capital recovery to the price-cap LECs for the $100 capital expense. As such, $175 would be depreciated over 25 years, rather than the $100 value of the asset.").

[317] *Id.*; Letter from Thomas Cohen, Counsel for ACA, to Marlene H. Dortch, Secretary, FCC, at 4-5 (filed May 21, 2013).

[318] WCB June 25, 2013 Virtual Workshop Submission Letter Attach. at 14-15 (Comments of Thomas Cohen, Counsel for ACA).

[319] The Bureau estimates that overall costs would likely fall no more than 2.1 percent or rise by 1.6 percent. While the midpoint of this range is negative (-0.25 percent), given forecast errors, any number in this range is essentially indistinguishable from zero. *See* Hogendorn Peer Review Response at 3-4.

[320] *Id.* at 4.

(ii) Income Taxes

103. 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. We conclude 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.[321] The ABC Coalition supported the use of these income tax rates, and no party objected to their use.[322]

(iii) Cost of Money

104. 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.

105. 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.[323] 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.[324] Both parties agree that the rate adopted by the Bureau should be the same for all price cap carriers.

106. 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.[325] 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.[326]

107. We find 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. We conclude that a reasonable approach is for the CAM to use a unitary cost of money at approximately the

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[321] As noted above, the values loaded into the CAM are produced by CostQuest's CapCost Model, which is available for download by users that have signed the protective order. *See supra* note 312. To determine these values, the specific inputs for federal and state income taxes are inputted into the CapCost model, which produces ACFs as an output. *See* ACF8 50 V6 Input Workbook. *See also supra* note 216.

[322] WCB Mar. 28, 2013 Virtual Workshop Submission Letter Attach. at 18 (Comments of Robert Mayer, on behalf of the ABC Coalition).

[323] *See* USTelecom Feb. 13, 2012 Ex Parte Letter Attach. at 18.

[324] *See* Reply Comments of ACA, WC Docket Nos. 10-90, 05-337, at 21-23, App. II (filed July 23, 2012).

[325] *See Prescribing the Authorized Rate of Return: Analysis of Methods for Establishing Just and Reasonable Rates for Local Exchange Carriers*, WC Docket No. 10-90, Staff Report, 28 FCC Rcd 7123 (Wireline Comp. Bur. 2013). The staff report used data from a wide spectrum of carriers, including Regional Bell Holding Companies, Mid-Size Companies, and Publicly-Traded RLECs. A Public Notice seeking comment was released in conjunction with the staff report. *See Wireline Competition Bureau Seeks Comment on Rate of Return Represcription Staff Report*, WC Docket No. 10-90 et al., Public Notice, 28 FCC Rcd 7120 (Wireline Comp. Bur. 2013).

[326] *See Represcribing the Authorized Rate of Return for Interstate Services of Local Exchange Carriers*, CC Docket No. 89-624, Order, 5 FCC Rcd 7507 (1990).

midpoint of that range, 8.5 percent. We believe 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.

108. We are not persuaded by PRTC's argument that the rate of return used in the CAM should remain 11.25 percent.[327] 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.[328] Even if we 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.[329] 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.[330] 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.

109. 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. We 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

110. In this section, we address 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

[327] WCB April 30, 2013 Virtual Workshop Submission Letter Attach. at 3-5 (Comments of Robin Tuttle, on behalf of PRTC). We note that ACS originally advocated for a higher rate of return, but recently stated that it supports adoption of the 8.5 percent cost of money in CAM v4.0. *See* ACS Jan. 7, 2014 Comments at 22.

[328] WCB April 30, 2013 Virtual Workshop Submission Letter Attach. at 3-5 (Comments of Robin Tuttle, on behalf of PRTC).

[329] *See, e.g.*, Leonardo R. Giacchino and Jonathan Lesser, *Principles of Utility Corporate Finance*, 2011 at pp. 217-44 (discussing the capital asset pricing model, the Fama-French three-factor model, and the Arbitrage Pricing Model).

[330] *Id.*

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, we adopt CAM v4.1.1's methodology for calculating opex, as well as its opex input values.

a. Network Operations Expense Factors

111. 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.

112. We adopt 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.[331] This approach is similar to the HCPM, which also calculated plant specific opex as a ratio to capex.[332] We also adopt 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.[333] As described in the methodology documentation,[334] 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.[335] Such calculations were based on model runs

[331] Plant specific opex is scaled with investment in each plant type, while plant non-specific opex scales with total investment. *See* Opex Overview at slide 18, via Resources link, at https://cacm.usac.org.

[332] *HCPM Inputs Order*, 14 FCC Rcd at 20301-02, 20310, paras. 341, 365. The HCPM relied on current-to-book ratios and ARMIS data from 1997 and 1998 to calculate the opex-to-capex ratio.

[333] *See* Opex V8 Input Workbook, Telco Opex Worksheet. *See also supra* note 216; Model Methodology at 29-30, http://transition.fcc.gov/Daily_Releases/Daily_Business/2014/db0417/DOC-326628A1.pdf.

[334] Model Methodology at 29-30, http://transition.fcc.gov/Daily_Releases/Daily_Business/2014/db0417/DOC-326628A1.pdf.

[335] NECA data is available at: Universal Service Fund Data: NECA Study Results, http://transition .fcc.gov/wcb/iatd/neca.html; ARMIS data is available at: Complete Set of ARMIS Materials, http://transition.fcc.gov/wcb/armis/descriptions.html (FCC Report 43-01). Once model output was available, this scaling was revisited to ensure that forward-looking opex values did not exceed NECA-based booked opex. CAM Methodology at 27, http://transition.fcc.gov/Daily_Releases/Daily_Business/2014/db0417/DOC-326628A1.pdf. We disagree with ACS's claim that this validation step is inconsistent with Commission precedent. Letter from Karen Brinkmann, Counsel to ACS, to Marlene H. Dortch, Secretary, FCC, WC Docket Nos. 10-90, 05-337, at 3 (filed Feb. 24, 2014) (ACS Feb. 24, 2014 Ex Parte) (claiming that the model "constrain[s] forward-looking operating costs, . . . to be no higher than embedded costs, regardless of the result that would be achieved by applying the OpEx-to-Investment ratio to forward-looking investment" and that "[t]he Commission has rejected the use of the absolute level of embedded operating costs to determine appropriate forward-looking values"). As we explain below, our use of embedded costs as a tool to evaluate the reasonableness of proposed adjustments to the model is consistent with Commission precedent. *See infra* paras. 145-47. We also note that ACS's assumption that embedded costs were used as a hard cap to reduce the forward-looking costs of the model for all carriers if they exceeded embedded costs is mistaken. ACS Feb. 24, 2014 Ex Parte at 3. The calculation for the CAM's forward-looking opex ratio factors was based on groups of carriers and their aggregate NECA-reported cost data. CAM Methodology at 27, http://transition.fcc.gov/Daily_Releases/Daily_Business/2014/db0417/DOC-326628A1.pdf. The opex for each individual carrier, however, is calculated by applying the relevant opex ratio factor to each carrier's model-calculated investment. Thus, it is possible for the CAM to calculate higher opex costs than a

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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.

113. The Bureau sought comment in the virtual workshop on the CAM's methodology for calculating network operations expense factors and the associated input values.[336] ACS and PRTC objected to the company-size adjustments made to the opex factors for medium companies.[337] 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.[338] 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.[339]

114. 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.[340] 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

(Continued from previous page)
particular carrier's embedded costs, particularly for those carriers that have a relatively low opex to investment ratio compared to others in their group.

[336] *See* WCB Feb. 6, 2013 Virtual Workshop Submission Letter Attach. at 23; WCB Apr. 30, 2013 Virtual Workshop Submission Letter Attach. at 8-12. Several carriers expressed some concerns about the transparency of the CAM's network operations expense factors. ACS suggested that there was not enough information provided that describes the regression analysis used by the CAM to develop the network operations factors, and thus it was unable to validate the results. WCB Feb. 6, 2013 Virtual Workshop Submission Letter Attach. at 24 (Comments of Robin Tuttle, Counsel for ACS). We have since provided detailed information about the methodology used by the CAM to develop all of the opex factors. *See* CAM Methodology at 26-32, http://transition.fcc.gov/Daily_Releases/Daily_Business/2014/db0417/DOC-326628A1.pdf. Similarly, PRTC claimed that CostQuest has not explained how it made certain adjustments to opex factors. PRTC White Paper at 23. But PRTC ignored the fact that CostQuest made available on the CAM website, to parties that have signed the relevant attachments of the *Third Supplemental Protective Order*, a detailed Opex Overview that explains how these adjustments were made. *See supra* para. 55. ACS also expressed concern about the model using national averages to validate the opex factors, claiming that national averages would not ensure accurate results for carriers serving non-contiguous areas. WCB Feb. 6, 2013 Virtual Workshop Submission Letter Attach. at 24 (Comments of Robin Tuttle, Counsel for ACS). As we discuss below, we made a number of adjustments to the model to reflect the unique circumstances of serving non-contiguous areas, including adjusting ACS's size classification from medium to small for purposes of calculating opex to ensure that the model properly accounts for ACS's total opex costs. *See infra* paras. 125-49. We also note that we have determined that by comparing the embedded costs for carriers in non-contiguous areas such as Alaska, Puerto Rico, and Hawaii, the current version of the model is capturing costs reasonably well in these areas despite the fact that we have declined to adopt carrier-specific inputs. *See infra* paras. 140-47. To the extent carriers serving non-contiguous areas believe that the support calculated by the model is insufficient, they have the option of choosing frozen support. *See infra* paras. 150-54. Finally, PRTC claimed that CostQuest had not explained whether the ABC Coalition data that was used to help develop the factors would be made available to third parties. PRTC White Paper at 23. As we explain above, we have provided sufficient documentation for carriers to assess the reasonableness of the factors. *See supra* paras. 54-55.

[337] WCB June 25, 2013 Virtual Workshop Submission Letter Attach. at 18-21 (Comments of Robin Tuttle, on behalf of ACS); Comments of Alaska Communications Systems Group, Inc., WC Docket 10-90, at 2-7 (filed June 18, 2013) (ACS June 18, 2013 Comments); PRTC White Paper at 12-13.

[338] WCB June 25, 2013 Virtual Workshop Submission Letter Attach. at 20 (Comments of Robin Tuttle, on behalf of ACS); ACS June 18, 2013 Comments at 6; PRTC White Paper at 12-13.

[339] Connect America Cost Model Overview, at 23 (Sept. 12, 2013), http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-323344A1.pdf .

[340] *Id.*

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.[341] We therefore believe that the adjustment downward in the opex factor for medium companies is appropriate.

b. General and Administrative Expenses

115. 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

116. We adopt the CAM's approach of employing a weight against investment to calculate G&A opex.[342] As with network operations expense, the factors were calculated by company size and scaled to reflect providers' reported costs.[343] We also adopt CAM v4.1.1's input values for G&A expenses.[344]

117. 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.[345] The ABC Coalition supports the values that CAM v4.1.1 uses for G&A,[346] while ACA argues that the G&A input values overstate costs for large companies.[347] 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.[348] 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.[349] 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.

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[341] The average per location operating cost associated with large and medium companies is the investment-driven plant specific and plant non-specific network operations costs.

[342] Model Methodology at 30.

[343] *See supra* para. 112.

[344] *See* Opex V8 Input Workbook, Telco Opex Worksheet. *See also supra* note 216.

[345] *See* WCB Feb. 6, 2013 Virtual Workshop Submission Letter Attach. at 23; WCB Apr. 30, 2013 Virtual Workshop Submission Letter Attach. at 8-12.

[346] WCB Apr. 30, 2013 Virtual Workshop Submission Letter Attach. at 13 (Comments of Robert Mayer, on behalf of USTelecom).

[347] Letter from Thomas Cohen, Counsel for ACA, to Marlene Dortch, Secretary, FCC, WC Docket Nos. 10-90, 05-337, at 2 (filed Feb. 6, 2013).

[348] *Id.*

[349] *See* WCB Apr. 30, 2013 Virtual Workshop Submission Letter Attach. at 13 (Comments of Robert Mayer, on behalf of USTelecom) ("[T]he G&A cost inputs used in [the CAM] are appropriate for the large carriers and appropriately reflect efficiencies of larger scale operations").

(ii) State Property Tax Adjustment Factors

118. 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. We adopt 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.[350] 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.[351] These figures were then compared to an overall national weighted average property tax rate to develop state-specific factors.

119. The Bureau sought comment on the CAM's use of state property tax factors and their associated values in the virtual workshop.[352] Parties agree that the use of state property tax factors is reasonable given the wide variety in state property tax rates. [353] However, ACS and PRTC also claim that property tax should be separately calculated "in a manner that is consistent with how it is levied."[354] 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.[355] 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.[356]

120. The ABC Coalition supported the use of the values the CAM utilizes for the state-specific factors.[357] 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.[358] 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

[350] CAM Methodology at 31, http://transition.fcc.gov/Daily_Releases/Daily_Business/2014/db0417/DOC-326628A1.pdf. The state factor input values are available at the Ptax V3 Input Workbook. *See also supra* note 216.

[351] *See* Opex V8 Input Workbook, Telco Opex Worksheet. *See also supra* note 216. Net in plant was determined using NECA data. The average tax rates were developed using information obtained from tax research sources such as Thomson Reuters' Checkpoint/RIA and Wolters Kluwer's Commerce Clearing House.

[352] *See* WCB Mar. 28, 2013 Virtual Workshop Submission Letter Attach. at 16.

[353] *Id*. at 17 (Comments of Robin Tuttle, on behalf of ACS), 18 (Comments of Robin Tuttle, on behalf of PRTC). *See also id.* at 18 (Comments of Robert Mayer, on behalf of the ABC Coalition).

[354] *Id.* at 17 (Comments of Robin Tuttle, on behalf of ACS), 18 (Comments of Robin Tuttle, on behalf of PRTC).

[355] *Id.*

[356] Calculating property tax based on the value of assets owned by a carrier would require determining for each carrier the property tax rate it pays in each state and the age of the assets it owns in each state. Such a calculation would be based on historical costs, not on forward-looking costs as required by the Commission. *See USF/ICC Transformation Order*, 26 FCC Rcd at 17727, para. 166. Moreover, such information is not readily available and would be burdensome to collect from each carrier. In fact, as the Commission recognized when adopting the HCPM, "it would be administratively unworkable to use company-specific values in the federal nationwide model." *HCPM Inputs Order*, 14 FCC Rcd at 20172, para. 31. *See also CAM Platform Order*, 28 FCC Rcd at 5327, para. 67. As we noted in the *CAM Platform Order*, the Commission "recognized that a forward-looking model could appropriately recognize variations in cost," and thus similar to the labor cost adjustments we adopted in the *CAM Platform Order*, we find that the property tax factors appropriately reflect the variation in cost between states while avoiding the burden of having to collect proprietary data from carriers. *Id*. at 5327-28, paras. 67-68.

[357] WCB Mar. 28, 2013 Virtual Workshop Submission Letter Attach. at 18 (Comments of Robert Mayer on behalf of the ABC Coalition).

[358] *Id.* at 16-17 (Comments of Robin Tuttle, on behalf of ACS), 17-18 (Comments of Robin Tuttle, on behalf of PRTC).

(at that time, in CAM v2.0) understates their current costs for Alaska and Puerto Rico.[359] As discussed above, the Bureau has provided reasonable access to the underlying data, assumptions, and logic of the model as required by the Commission,[360] while still preserving the confidentiality of some of the underlying data provided by carriers.[361] 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.[362] We thus find no basis to adopt their proposal.

c. Customer Operations Marketing and Service Operating Expenses

121. 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. We adopt the CAM's approach of calculating customer operations and marketing on a per-subscriber basis. We further adopt $6.81 per location passed as the appropriate amount.[363]

122. 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.[364] No party objected to the methodology,[365] 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

[359] *Id.*

[360] *See supra* paras. 34-39.

[361] We note that some of the data that were relied upon to calculate the state property tax factors were proprietary.

[362] *See* CAM Methodology at 32, http://transition.fcc.gov/Daily_Releases/Daily_Business/2014/db0417/DOC-326628A1.pdf. As discussed above, parties who have signed the attachments to the *Third Supplemental Protective Order* also have access to a detailed Opex Overview that further explains how the state property tax factors were developed. *See supra* paras. 54-55.

[363] The input value of $6.81 was calculated using publicly available ARMIS data and ABC Coalition company data to derive a ratio that then was multiplied by an assumed ARPU. CAM Methodology at 28, http://transition.fcc.gov/Daily_Releases/Daily_Business/2014/db0417/DOC-326628A1.pdf. The ratio of customer operations and marketing expenses to revenue, using ARMIS data from 2007 and 2010 for large and mid-sized incumbent LECs, was determined to be 12.97 percent of all ARMIS-reported revenue. The data were pulled from FCC Report 43-01, ARMIS Annual Summary Report. *See supra* note 335. While the ARMIS data are older than the ABC Coalition data, we considered their use reasonable to take account of an available independent data source, rather than solely relying on one provided by interested parties. ARMIS data are not available for all carriers and have been discontinued over time for others. For example, starting with the 2008 reporting year, Verizon, AT&T, and Qwest were no longer required to file FCC Report 43-01. *See Petition of Qwest Corporation for Forbearance from Enforcement of the Commission's ARMIS and 492A Reporting Requirements Pursuant to 47 U.S.C. § 160, et al.*, WC Docket No. 07-204 et al., Memorandum Opinion and Order, 23 FCC Rcd 18483 (2008). The ratio of ABC Coalition data to revenue was determined to be 12.8 percent of total operating revenue. These percentages were then each applied to an assumed ARPU of $75 for both voice and broadband services, the results were averaged together, and multiplied by an assumed 70 percent subscription rate. *See infra* paras. 172-76 (adopting an ARPU of $75).

[364] *See* WCB Feb. 6, 2013 Virtual Workshop Submission Letter Attach. at 23; WCB Apr. 30, 2013 Virtual Workshop Submission Letter Attach. at 8-12.

[365] PRTC expressed concern that the factors were developed using ABC Coalition company data that were not made available to third parties. PRTC White Paper at 23-24. As we explain above, although the company-specific data that was used to develop the factors are proprietary, we find that we have provided enough documentation regarding the development of the factors for carriers to assess their reasonableness. *See supra* para. 55. Below we address the ABC Coalition's comments with respect to ARPU. *See infra* paras. 172-76

ARMIS data of expenses to revenue continues to be consistent with their experience.[366] While we made minor adjustments to these input values in CAM v4.1, the difference is not material to overall cost calculations.[367]

d. Bad Debt Expense

123. Bad debt expense represents the amount of revenue that carriers are unable to collect from their customers. We adopt CAM v4.1.1's $1.05 per location passed cost for bad debt.[368] We 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.[369]

C. Treatment of Non-Contiguous Carriers

124. 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.[370] As a result, the Commission directed the Bureau to consider the unique circumstances of these areas when adopting a cost model and whether the

[366] WCB Apr. 30, 2013 Virtual Workshop Submission Letter Attach. at 13 (Comments of Robert Mayer, on behalf of USTelecom).

[367] We note that prior versions of the CAM assumed a $65 ARPU to calculate customer operations marketing and service operating expenses; we explain below our reasoning for increasing the ARPU in CAM v4.1. *See infra* paras. 172-76. Once these expenses were calculated, they were multiplied by the number of locations with a customer drop (assuming a customer drop rate of 80 percent) to get the total cost for customer operations marketing and service operating expenses. With the use in CAM v4.1 of a funding benchmark that assumes a 70 percent subscription rate, calculating the customer operations marketing and service operating expenses on a per-drop basis would have required multiplying the customer operations marketing and service operating expenses per subscriber by the ratio of subscribers to drops. *See infra* paras. 177-79. Instead, we translate the customer operations marketing and service operating expenses to a per-location-passed basis, using the 70 percent subscription rate as an input to the model. The model then multiplies this value by *all* locations to get the total cost for customer operations marketing and service operating expenses. *CAM v4.1 Availability PN*, DA 14-394, at n.8. This modification did not have a significant impact on the total for these expenses. Prior versions of the CAM calculated $1,038,508,654 in total customer operations marketing and service operating expenses. CAM v4.1 calculated $1,048,671,995 in total customer operations marketing and service operating expenses.

[368] The input value of $1.05 was calculated by applying an industry-standard two percent of revenue derived bad debt factor to an assumed ARPU for both voice and broadband services of $75, and then multiplying by an assumed 70 percent subscription rate. *See* CAM Methodology at 31, http://transition.fcc.gov/Daily_Releases/Daily_Business/2014/db0417/DOC-326628A1.pdf. We note that prior versions of the CAM assumed a $65 ARPU to calculate bad debt expense; we explain below our reasoning for increasing the ARPU in CAM v4.1. *See infra* paras. 172-76. Once bad debt was calculated, the value was multiplied by the number of locations with a customer drop (assuming a customer drop rate of 80 percent) to get total bad debt. With the use in CAM v4.1 of a funding benchmark that assumes a 70 percent subscription rate, calculating the bad debt on a per-drop basis would have required multiplying the bad debt per subscriber by the ratio of subscribers to drops. *See infra* paras. 177-79. Instead, we translate the bad debt to a per-location-passed basis, using the 70 percent subscription rate as an input to the model. The model then multiplies this value by *all* locations to get the total cost for bad debt expense. *CAM v4.1 Availability PN*, DA 14-394, at n.8. This modification did not have a significant impact on the total for these expenses. It increased total bad debt expense by $1,539,900. Prior versions of the CAM calculated $160,149,615 in total bad debt expense. CAM v4.1.1 calculated $161,689,515 in total bad debt expense.

[369] *See* WCB Feb. 6, 2013 Virtual Workshop Submission Letter Attach. at 23; WCB Apr. 30, 2013 Virtual Workshop Submission Letter Attach. at 8-13. Below we address the ABC Coalition's comments with respect to ARPU. *See infra* paras. 172-76.

[370] *USF/ICC Transformation Order*, 26 FCC Rcd at 17737-38, para. 193.

model provides sufficient support for carriers serving these areas.[371] 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.[372]

1. Cost Adjustments for Non-Contiguous Areas

125. At the outset, we recognize 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.[373] We decline to do so. Rather than modeling the cost for a FTTP network, as previously decided by the Bureau,[374] 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.[375] 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.[376] 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.

126. Instead, we have 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, we have carefully studied this information, while making those modifications we deemed appropriate to take into account their unique geographic circumstances. We also have examined the embedded costs of these carriers in order to provide us with a historical view of the costs associated with serving these areas. We believe 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

127. 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.[377] For example, ACS stated that, because it deploys fiber exclusively within a conduit, it classifies

[371] *Id.*

[372] *Id.*

[373] *See* Letter from Thomas J. Navin, Counsel for PRTC, to Marlene H. Dortch, Secretary, FCC, WC Docket Nos. 10-90, 05-337 (filed Jan. 18, 2013) (PRTC Model Letter); Letter from Russell Blau, Counsel for Vitelco, to Marlene H. Dortch, Secretary, FCC, WC Docket No. 10-90 (filed May 20, 2013) (Vitelco Model Letter); Letter from Karen Brinkmann, Counsel for ACS, to Marlene H. Dortch, Secretary, FCC, WC Docket Nos. 10-90, 05-337 (filed Feb. 13, 2012) (ACS Model Letter).

[374] *See CAM Platform Order*, 28 FCC Rcd at 5314-16, para. 33.

[375] *See* PRTC Model Letter Attach. A at 6; Vitelco Model Letter Attach. at 8.

[376] *See* ACS Model Letter Attach. at 2.

[377] *See* Letter from Russell M. Blau, Counsel to Vitelco, to Marlene H. Dortch, Secretary, Federal Communications Commission, WC Docket No. 10-90, Exh. A at 1-2 (filed Sept. 17, 2013) (Vitelco Sept. 17, 2013 Ex Parte); PRTC Sept. 12, 2013 Comments at 17; Letter from Gregory J. Vogt, Counsel for Hawaiian Telecom Inc., to Marlene H.

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any deployment in a conduit as underground in its records.[378] 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.[379] While we agree that it is appropriate to use forward-looking plant mix values, we question whether an efficient provider would in fact fully deploy underground plant in situations where it is cost effective to bury such plant.[380] Therefore, in CAM v4.0, we 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.[381] 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.[382] 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.[383] The same approach is used in CAM v4.1.1.

128. Today, we adopt 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. We conclude 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.[384]

b. Undersea and Submarine Cable

129. 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.[385] CAM v3.2 modeled undersea cables: from Alaska to Oregon and Washington; from the Northern Marianas to Guam and from Guam to

(Continued from previous page)
Dortch, Secretary, Federal Communications Commission, WC Docket No. 10-90, at 10 (filed Sept. 11, 2013) (HTI Sept. 11, 2013 Ex Parte); ACS July 30, 2013 Ex Parte Letter at 6-9. CAM v3.2 included plant mix values submitted by ACS. *See CAM Version 3.2 Availability PN*, 28 FCC Rcd at 12839-40.

[378] *See* ACS July 30, 2013 Ex Parte Letter at 7.

[379] *See* Vitelco Sept. 17, 2013 Ex Parte Exh. A at 2.

[380] We also are not convinced that the conditions faced by non-contiguous carriers would be so different in the future than they are today as to require such a significant increase in underground plant.

[381] In the *CAM v4.0 Availability PN*, we invited any party contending that the approach to plant mix taken in CAM v4.0 does not adequately reflect a forward-looking network to supply data that demonstrates what percentage of plant in the state must specifically be placed underground, as opposed to buried, due to local ordinances or for technical reasons. *CAM v4.0 Availability PN*, 28 FCC Rcd at 16342. No party submitted such data.

[382] 100 – (Current underground plant + Forward-looking aerial plant) = Hybrid buried plant.

[383] *See id*.; *see also* PRTC Oct. 30, 2013 Ex Parte Letter Attach. at A-7; ACS July 30, 2013 Ex Parte Letter at 7. Traditionally, underground plant is placed within conduit for added support and protection, with access points via manholes, while buried plant is placed directly into the ground, without any conduit.

[384] *See* Connect America Cost Model Overview at 20 (Sept. 12, 2013), http://transition.fcc.gov/Daily_Releases/Daily_Business/2013/db0917/DOC-323344A1.pdf.

[385] *See CAM Version 3.2 Availability PN*, 28 FCC Rcd at 12835. *See also* Comments of Professor David Gabel and Mr. Steven Burns, WC Docket No. 10-90, at 1 (filed Sept. 12, 2013) (Gabel and Burns Comments) ("[W]e believe it is reasonable for the FCC to assume 2 landing stations per route. We do not believe it is necessary to assume multiple landing stations at each end of a route because operators often seek to serve a single physical location where traffic is aggregated and/or because of environmental concerns such as the need to lay the cable in a shore approach that is physically suitable or one that is permitted by environmental laws or regulations.").

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.[386] 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.[387] The model was modified to include "submarine cable" costs and the cost for two beach manholes on each intrastate middle mile submarine route.[388]

130. We conclude 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, we note that these inputs do not include all of the costs advocated for by non-contiguous carriers.[389] 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, we conclude that an efficient provider would use less costly beach manholes, eliminating the need for duplicative facilities to provide multiplexing, routing, or co-location.[390]

131. Beginning with CAM v3.2, the model estimated the cost attributable to the voice-and-broadband network we are 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.[391] 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

[386] *See CAM Version 3.2 Availability PN*, 28 FCC Rcd at 12835.

[387] *See CAM v4.0 Availability PN*, 28 FCC Rcd at 16340.

[388] *Id.* The submarine cable is part of the middle-mile network in each area; it connects central offices just like wholly land-based middle-mile cable does. As a point of reference, a beach manhole allows a carrier to connect undersea cable to a land-based cable and includes a vault at the beach landing point to accommodate this splice point, as well as the facilities to ensure that the submarine cable comes ashore without being subject to surf and tides (typically by boring underneath the sea floor out to a point where the surf and tides are no longer likely to be problematic). *See id.*

[389] *See HCPM Inputs Order*, 14 FCC Rcd at 20313-15, paras. 368-69 (discussing the differences between reproduction costs and replacement costs).

[390] In addition to full landing stations at submarine cable landing sites, ACS advocated for additional undersea cable spurs, additional landing stations at each undersea cable landing site, higher cost factors to reflect the costs of operating an undersea cable, and increased submarine cable deployment. *See* ACS Sept. 12, 2013 Comments at 7-11; Letter from Karen Brinkmann, Counsel for ACS, and Leonard A. Steinberg, ACS, to Marlene H. Dortch, Secretary, FCC, WC Docket Nos. 10-90, 05-337, at 15-16 (filed Mar. 28, 2014) (ACS Mar. 28, 2014 Ex Parte Letter). Regardless of whether we were to adopt these proposals or not, we acknowledge questions have been raised in the record of whether the model adequately reflects forward-looking costs in Alaska. For that reason, we provide ACS the option of electing frozen support. *See infra* paras. 150-54.

[391] *See CAM Version 3.2 Availability PN*, 28 FCC Rcd at 12836-38. The model assumes that the presence and capacity of international undersea cables are driven primarily by international traffic demand, not by the traffic of the LEC in areas with landing stations. As a result, if the demand from the modeled network would outstrip capacity on these existing international undersea systems, without concurrent increases in demand for bandwidth that passes through the location, then construction of a new system would be economically justifiable. If, however, the capacity required would amount to only a fraction of available capacity, the model assumes that a carrier would lease capacity on an existing cable. Further, it is assumed that the cost of transport back to the contiguous United States would be the fraction of the cost associated with the fraction of the cable being consumed by peak demand of the modeled network. This assumes that the price for a LEC to buy capacity on an existing cable would be comparable to the cost of providing that access plus a rate of return comparable to the one assumed in the CAM. Given that each non-contiguous area with an international cable route is served by multiple cable systems, we conclude this is a reasonable assumption.

to Oregon and Washington, the Northern Marianas to Guam, and the U.S. Virgin Islands to Puerto Rico.[392]

132. 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.[393] 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.[394] 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.[395]

133. We disagree that the CAM-calculated cost should be based only on the current lit-fiber capacity, rather than total capacity. HTI's argument that we 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.[396] 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).[397] Thus, we conclude a methodology that takes into account both lit and total capacity is appropriate.[398] We also disagree with HTI that the methodology is inconsistent with a forward-looking model. We note that the demand we use is a forecast of demand, thus aligning the cost we calculate with the demand we expect in the future. As a result, we adopt CAM v4.1.1's allocation methodology.

134. 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.[399] 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.[400]

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[392] The model assumes that the other 50 percent of costs are allocated to special access and private line services, and supported by revenues from those services.

[393] Comments of HTI, WC Docket 10-90, at 4-6 (filed Jan 7, 2014).

[394] *Id.* at 7.

[395] *Id.*

[396] *Id.*

[397] *See* Gabel and Burns Comments at 2 ("We believe it is reasonable for the FCC to assume that network operators will lease capacity on other cable systems not only when their own facilities become congested, but also…to provide redundancy").

[398] *See CAM Version 3.2 Availability PN*, 28 FCC Rcd at 12836-38.

[399] ACS Sept. 12, 2013 Comments at 12-17; ACS Jan. 7, 2014 Comments at 13-15.

[400] ACS Jan. 7, 2014 Comments at 15. ACS argues that the other 33 percent of the overall traffic from the mainland to Alaska would travel over the undersea cable owned by its subsidized competitor, GCI. Because of this adjustment, the 34 percent of undersea voice and cable traffic carried by ACS would be divided by 67 percent, rather (continued…)

135. We are not persuaded by this argument. Adopting ACS's proposal essentially would mean that we assume 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 we would expect an efficient provider to be able to do. As a result, we adopt CAM v4.1.1's allocation methodology.

c. Terrain Methodology

136. As discussed above, the methodology we adopt 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.[401] 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.[402] We have concerns that this approach would significantly over-estimate the actual amount of hard rock in these areas.[403] In CAM v4.0, we developed a modified approach for determining the appropriate rock hardness for census block groups in non-contiguous areas;[404] 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.[405]

137. We generally adopt CAM v4.1.1's methodology for calculating rock hardness in non-contiguous areas except the Virgin Islands. We find 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, we believe an area-based measure is appropriate to determine the proper rock hardness outside the contiguous United States.[406]

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than 100 percent, to determine the percentage of undersea cable costs allocated to the delivery of supported voice and broadband services by ACS (approximately 50 percent).

[401] *See supra* paras. 75-77.

[402] *See, e.g.*, PRTC Oct. 30, 2013 Ex Parte Letter Attach. at A-9 to A-11; HTI Sept. 11, 2013 Ex Parte at 7-8; ACS July 9, 2013 Ex Parte Letter at 5-6.

[403] This approach also would over-estimate cost because hard rock is the most expensive terrain in which to place plant. *See, e.g.*, Connect America Cost Model Overview at 20 (Sept. 12, 2013), http://transition.fcc.gov/Daily_Releases/Daily_Business/2013/db0917/DOC-323344A1.pdf. Shifting aerial or buried plant to underground, while at the same time shifting terrain to hard rock, increases the costs substantially more than changing terrain or plant mix alone. None of the providers serving non-contiguous areas submitted any evidence that their areas were actually 100 percent hard rock. To the contrary, the terrain values used in CAM v4.0, v4.1, and v4.1.1 reflect actual hard rock coverage far more closely than an assumption of 100 percent would. According to STATSGO data, 56 percent of Hawaii, 23 percent of Alaska, and 33 percent of Puerto Rico consist of hard rock. CAM attributes similar percentages of hard rock to these areas.

[404] *See CAM v4.0 Availability PN*, 28 FCC Rcd at 16343.

[405] *Id*. Terrain factors for the entire country were developed for each census block group using data from the NRCS STATSGO data, where available. STATSGO data do not include terrain data for the Virgin Islands or the Northern Mariana Islands.

[406] Given that the database we use for this adjustment does not contain data for the Virgin Islands, we make a separate modification regarding terrain for the territory below.

138. 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.[407] 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.[408] This methodology assumes that the mix of terrain types in the Virgin Islands is similar to the mix of terrain types in Puerto Rico.[409] 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.[410]

139. We adopt the terrain approximation methodology used in CAM v4.1.1 for the Virgin Islands. We acknowledge that Vitelco suggested that we 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. We note 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 we 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, we conclude that the weighted average approach we adopt today is reasonable approximation for the Virgin Islands.[411]

d. State-Specific Inputs

140. 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.[412] CAM v4.0 incorporated an updated capex workbook specific to the Virgin Islands, reflecting a number of cost

[407] *See* Comments of Vitelco, WC Docket No. 10-90, at 2-5 (filed Jan. 6, 2014) (Vitelco Jan. 6, 2014 Comments).

[408] For example, terrain data for the Virgin Islands in STATSGO2 or SSURGO provides information about the terrain on the islands, but not on the attributes of rock hardness at the map unit level, which categorizes excavation difficulty. Significant work would be required to determine how much excavation costs would vary as the values in these databases change. Completing such a process likely would result in an extended delay in finalizing the model, which likely would delay the offer of model-based support before the end of 2014.

[409] *See* Vitelco Jan. 6, 2014 Comments at Exh. A, 18 ("St. Thomas and St. John, which make up the northern United States Virgin Islands, and the British Virgin Islands and Puerto Rico are subaerial topographical highs on the Puerto Rico Bank").

[410] In other words: combining 27 percent of $3.11 ($.84), 40 percent of $3.77 ($1.51), and 33 percent of $5.19 ($1.71) provides a total of $4.06 for rural buried plant in the Virgin Islands. This value is populated for rural buried plant in normal, soft and hard rock terrains in the Virgin Islands to avoid confusion as to when that value applies.

[411] Because we lack this key necessary data input, we made the simplifying assumption to use data from Puerto Rico in order to complete our work on the model. However, in the absence of actual data, we are not fully confident that the model adequately approximates costs in Virgin Islands. As discussed below, if Vitelco concludes that the model does not adequately approximate costs in Virgin Islands, it can elect to continue receiving frozen support. *See infra* paras. 150-54.

[412] *See* Vitelco Sept. 19, 2013 Ex Parte Letter at 1-2.

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.[413]

141. We adopt the state-specific capex workbook utilized by CAM v4.1.1. We conclude that, though some of the cost adjustments we make 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. We remain 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 we recognize the challenges of obtaining skilled labor for network expansion, we are not persuaded that an efficient provider would have labor costs as high as that proposed by Vitelco. As a result, we decline to adopt Vitelco's proposed labor adjustments.

142. 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.[414] Though we adopt a state specific capex workbook for the Virgin Islands, we are not convinced that further adjustments to the material or labor costs used by the model for any of the non-contiguous carriers is appropriate.

143. 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, we believe 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 we are 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.[415] Conversely, if we 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.[416]

[413] These adjustments were made to rectify the erroneous inclusion of certain inputs in CAM v4.0.

[414] *See* ACS Jan. 7, 2014 Comments at Attachs. A-1, A-2; Comments of PRTC, WC Docket No. 10-90, at Attach. A (filed Jan. 7, 2014) (PRTC Jan. 7, 2014 Comments). These values are confidential and are filed under protective order.

[415] To provide a more equal comparison between the costs reported to NECA, which reflect only loop costs, and the costs estimated by the CAM, which include loop, middle mile, and undersea costs, we used CAM v4.0 to develop a ratio of loop investment to total investment. We then applied this ratio to the total monthly costs to determine the total monthly loop cost, and annualized this total monthly loop cost in order to compare it to the 13-year average of annual NECA loop costs.

[416] As a general matter, the extent to which using PRTC's state-specific inputs would result in higher costs depends on whether customer operations and marketing costs are included in the CAM results for the comparison.

144. 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.[417] However, we are 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 we would expect embedded costs to be substantially higher. Because we have no reason to doubt the veracity of these filings, we believe that the receipts we have 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, we expect 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.

145. ACS in particular has attacked our use of embedded costs as a comparison for forward-looking costs. The question we seek 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."[418] We agree 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.[419] 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.[420] Finally, as ACS notes, we adopted GPON FTTP as the network technology of choice, in large measure because that technology has much lower operating expenses.[421] In total, this provides ample reason to expect forward-looking costs to be lower than embedded costs.

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[417] *See, e.g.*, ACS Jan. 7, 2014 Comments at Attach. A-2; Letter from Russell M. Blau, Counsel for Vitelco, to Marlene H. Dortch, Secretary, FCC, WC Docket No. 10-90 (filed Dec. 18, 2013); Letter from Russell M. Blau, Counsel for Vitelco, to Marlene H. Dortch, Secretary, FCC, WC Docket No. 10-90 (filed Dec. 16, 2013).

[418] ACS Feb. 24, 2014 Ex Parte at 5.

[419] Thus, as we noted in the reply to Professor Hogendorn's peer review, we believe that the cost of a network over time is basically flat. *See* Hogendorn Peer Review Response at 3-4 (stating that "overall costs are likely to fall no more than 2.1 percent, and could even rise by 1.6 percent. While the midpoint of this range, -0.25 percent, is negative, suggesting a small expected cost overstatement, given forecast errors, any number in this range is essentially indistinguishable from zero.").

[420] *See* CAM Methodology at 46-48, http://transition.fcc.gov/Daily_Releases/Daily_Business/2014/db0417/DOC-326628A1.pdf.

[421] These operating cost savings come without requiring substantial additional initial investment relative to more outdated technologies, because the cost of construction varies little by technology choice. These savings are due to the removal of active electronics from the outside plant. *See* CAM Methodology at 18, http://transition.fcc.gov/Daily_Releases/Daily_Business/2014/db0417/DOC-326628A1.pdf; *see also* Letter from Donna Epps, Verizon, to Marlene H. Dortch, FCC, GN Docket No. 09-51, at 2-3 (filed Feb. 12, 2010):

> Fiber networks are faster, more efficient, and more reliable than the legacy copper network. For example, fiber lines require no mid-span equipment or electronics (e.g., repeaters, terminals, remotes, etc.), which means that they are cheaper to maintain and have fewer potential points of failure than copper lines. Fiber lines are also more durable and require fewer repairs. For example, as Verizon has previously explained, the rate of maintenance dispatches in 2007 was *eighty percent* lower for FiOS lines than for copper lines. When fiber is deployed, consumers gain faster speeds and more reliable service, and carriers gain a more efficient, greener network that is much easier to operate and maintain.

(continued…)

146. We also recognize 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, we conclude that the average of embedded costs is a good measure of the ongoing cost to provide service in these areas with the embedded network,[422] which is a useful guide as to the maximum cost to provide service in a forward-looking model.[423] Further, the current inputs used by the model actually produce a forward-looking loop cost for ACS above its embedded cost, so we are not using embedded cost as a hard cap, as ACS seems to believe.[424]

147. 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."[425] 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."[426] 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."[427] 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

148. The approach we adopt above to calculate network operations expense factors considers the relationship between capital investment and ongoing cost to operate and maintain the plant.[428] 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

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It is unclear what expensive-to-operate active electronics ACS believes will drive up opex. *See* ACS Feb. 24 Ex Parte at 6-7; ACS Jan. 7, 2014 Comments at 23 n.62, 26. However, we note that ACS previously agreed with the Bureau's assumptions about the type of hardware needed for an FTTP network. *See* WCB Mar. 28, 2013 Virtual Workshop Submission Letter Attach. at 20 (Comments of Robin Tuttle, Counsel for ACS).

[422] *See HCPM Inputs Order*, 14 FCC Rcd at 20305, para. 348.

[423] Carriers may have to make investments to build out their networks in many places, and these investments could be higher than embedded costs and higher than the levelized costs the model calculates. However, comparing the short-term cash-cost to either embedded cost or to levelized cost is not appropriate. *See CAM Platform Order*, 28 FCC Rcd at 5309-12, paras. 19-25.

[424] *See* ACS Feb. 24, 2014 Ex Parte at 6. We note that ACS also disagrees with the process used by the model to scale and validate opex. *Id.* We address that argument above. *See supra* para. 112, note 335.

[425] ACS Feb. 24, 2014 Ex Parte at 3.

[426] *HCPM Inputs Order*, 14 FCC Rcd at 20305, para. 348.

[427] *Id*. at 20308, para. 355.

[428] *See supra* paras. 111-14.

calculating opex costs that are lower than large companies, which suggests that medium companies are more efficient than large companies.[429] 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.[430] 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.

149. Today we adopt CAM v4.1.1's approach to company size for ACS.[431] After analyzing the model's results, we find 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.[432] As a result, we believe 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

150. As described above, we adopt a number of inputs specific to non-contiguous areas for use in the CAM. We believe 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.

151. Consistent with the Commission's directive, we have 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.[433] With respect to non-contiguous areas in particular, we have worked intensively over the last nine months to make adjustments to the model to take

[429] WCB June 25, 2013 Virtual Workshop Submission Letter Attach. at 18-21 (Comments of Robin Tuttle, on behalf of ACS); Comments of ACS WC Docket 10-90 at 2-7 (filed June 18, 2013) (ACS June 18, 2013 Comments). The medium company size adjustment is a negative factor in relation to larger companies because, overall, medium companies 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 non-plant-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).

[430] *See, e.g.*, ACS July 9, 2013 Ex Parte Letter; Letter from Karen Brinkmann, Counsel to ACS, to Marlene H. Dortch, Secretary, FCC, WC Docket No. 10-90, Attach. at 9 (filed July 1, 2013); WCB June 25, 2013 Virtual Workshop Submission Letter Attach. at 20 (Comments of Robin Tuttle, on behalf of ACS).

[431] USTelecom agrees that ACS should be classified as a small company. *See* Letter from Jonathan Banks, USTelecom, to Marlene H. Dortch, Secretary, FCC, WC Docket Nos. 10-90, 05-337, at 3 (filed July 26, 2013).

[432] Given our decision to reclassify ACS as a small carrier, we conclude that its suggestion that the size adjustment for medium companies should be set to zero is moot. WCB June 25, 2013 Virtual Workshop Submission Letter Attach. at 20 (Comments of Robin Tuttle, on behalf of ACS); ACS June 18, 2013 Comments at 7.

[433] *See, e.g.*, WCB Feb. 6, 2013 Virtual Workshop Submission Letter (submitting into the record the attached "Connect America Cost Model Virtual Workshop Questions and Comments Posted as of February 1, 2013"); WCB Mar. 28, 2013 Virtual Workshop Submission Letter (submitting into the record comments posted by parties in the CAM virtual workshop from February 2, 2013 through March 25, 2013); WCB Apr. 30, 2013 Virtual Workshop Submission Letter (submitting into the record comments posted by parties in the CAM virtual workshop from March 26, 2013 through April 29, 2013); WCB June 25, 2013 Virtual Workshop Submission Letter (submitting into the record comments posted by parties in the CAM virtual workshop from April 30, 2013 through June 24, 2013); WCB July 22, 2013 Virtual Workshop Submission Letter (submitting into the record comments posted by parties in the CAM virtual workshop from June 25, 2013 through July 19, 2013); *Virtual Workshop Closure PN*.

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.[434] 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.[435]

152. 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.[436] We therefore make 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.

153. We recognize that for several of the non-contiguous carriers, the amount of model-determined support is greater than frozen support. For purposes of ensuring that we do not exceed the overall budget for the offer of support when we determine the final list of eligible blocks after the challenge process, we 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.[437]

154. The Bureau previously sought to develop the record on what the service obligations should be for these carriers, should they be provided frozen support.[438] 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, we anticipate 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

155. In this section, we adopt the methodology for taking the results of the cost-to-serve module to determine support levels. We begin by discussing the methodology for calculating the average forward looking per-location cost of building voice and broadband-capable networks. We then explain the treatment of certain business locations and community anchor institutions.

1. Calculating Average Per-Unit Costs

156. 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,[439] as

[434] *See* Comments of GCI, WC Docket No. 10-90, at 3-7 (filed Jan. 7, 2014).

[435] *See, e.g.*, ACS Mar. 28, 2014 Ex Parte Letter at 15-16; Letter from Russell M. Blau, Counsel for Vitelco, to Marlene H. Dortch, Secretary, FCC, WC Docket No. 10-90, at 2 (filed Mar. 11, 2014); PRTC Jan. 7, 2014 Comments at 2-6.

[436] *See USF/ICC Transformation Order*, 26 FCC Rcd at 17737-38, para. 193.

[437] If a carrier notifies us at that time it will not elect frozen support for the term of Phase II, it will then have the same 120 days as other price cap carriers to determine whether to accept or decline model-based support.

[438] *See Phase II Non-Contiguous Areas PN.*

[439] In some circumstances, the cost per location will be calculated on a sub-census-block basis. For example, if only part of a block is served by a given carrier, each carrier's total costs and cost per location will be calculated independently. Similarly, if a block is served by multiple wire centers, the cost associated with each wire center will (continued…)

discussed in more detail in the following section.[440] 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.[441] We conclude 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.[442] In addition, this approach means that the per-unit costs calculated by the model do not depend on the assumed subscription rate.[443]

157. We conclude 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.[444] 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.[445] 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.[446] If instead we adopt 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).[447] As we discuss

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be calculated separately. Finally, if a block is served by more than one splitter (node2), the cost will be calculated separately. This ensures that a block that includes both low-cost and extremely high-cost locations will not be eligible for support if the cost averaged over the entire block falls into the funding band. *See* Model Methodology at 16, n.16, http://transition.fcc.gov/Daily_Releases/Daily_Business/2014/db0417/DOC-326628A1.pdf.

[440] *See infra* paras. 158-63. *See also supra* paras. 81-84. NASUCA expressed some concern that the model was not accurately calculating per-unit costs. But we note that the model is making the exact calculation that NASUCA suggested is the correct calculation, "total cost reduced by a decrease in drops and terminals, divided by the total locations." NASUCA Oct. 25, 2013 Ex Parte Letter at 4-5.

[441] *See* WCB Feb. 6, 2013 Virtual Workshop Submission Letter Attach. at 39-40.

[442] *USF/ICC Transformation Order*, 26 FCC Rcd at 17735, para. 187. *See supra* paras. 158-63.

[443] *See supra* paras. 177-79.

[444] WCB Feb. 6, 2013 Virtual Workshop Submission Letter Attach. at 41-42 (Comments of Robin Tuttle, on behalf of ACS), 42-43 (Comments of Robin Tuttle, on behalf of PRTC). *See also supra* paras. 170-71. Support will be calculated by subtracting the lower benchmark from the unit cost.

[445] WCB Feb. 6, 2013 Virtual Workshop Submission Letter Attach. at 41-42 (Comments of Robin Tuttle, on behalf of ACS), 42-43 (Comments of Robin Tuttle, on behalf of PRTC).

[446] *Id.*

[447] ACS and PRTC provide an example that assumes10 locations, a 90 percent subscription rate, a cost per location of $109, a cost per subscriber of $121, and a funding benchmark based on a market price per subscriber of $80. In a situation where costs are unitized by locations, ACS and PRTC provide the following calculation: $109 (cost per location) - $80 (funding benchmark) = $29 (support per location); $29 (support per location) x 10 (number of locations) = $290 (total support). To illustrate that more support would be provided in a situation where costs are unitized by subscribers, ACS and PRTC provide the following calculation: $121.11 (cost per subscriber) - $80 (funding benchmark) =$41.11 (support per unit); $41.11 (support per unit) x 9 (number of locations with a 90 percent subscription rate) = $370 (total support). *See* WCB Feb. 6, 2013 Virtual Workshop Submission Letter Attach. at 41-42 (Comments of Robin Tuttle, on behalf of ACS), 42-43 (Comments of Robin Tuttle, on behalf of PRTC). If, instead, the cost-per-location-passed illustration employed a funding benchmark developed based on the Bureau's adopted methodology (ARPU x Subscription Rate), the calculation would be as follows: $80 (revenue per subscriber) x 90 percent (assumed subscription rate for this example only) = $72 funding benchmark; $109 (cost per location) - $72 (funding benchmark) = $37 (support per location); $37 (support per location) x 10 (number of locations) = $370 (total support). Note the $370 support for unitizing costs by location using the Bureau's

(continued…)

below, we adopt a funding benchmark that estimates the likely revenues available through reasonable end user rates, taking into account the assumed subscription rate.[448] 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.[449]

2. Treatment of Non-"Mass Market" Locations

158. 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."[450] 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,"[451] and would engage with community anchor institutions while planning their Connect America-supported networks.[452]

159. 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,[453] community anchor institutions,[454] and wireless towers,[455] that are typically served by special access and private line or similar non-TDM-based services like Ethernet.[456] Given the Commission's statement that

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methodology for calculating the funding benchmark is the same as the $370 support for unitizing costs per subscriber using ACS and PRTC's assumed method for calculating the funding benchmark.

[448] *See supra* paras. 170-71; WCB Feb. 6, 2013 Virtual Workshop Submission Letter Attach. at 40 (Comments of Donald K. Stockdale, Jr. on behalf of the ABC Coalition) (stating that "if the Bureau changes to a per-location cost basis, it must then modify its thresholds").

[449] *See supra* paras. 170-71.

[450] *USF/ICC Transformation Order*, 26 FCC Rcd at 17681, para. 51.

[451] *Id.* at 17700, para. 102 n.164.

[452] *Id.* at 17700, para. 102. Eligible telecommunications carriers are required to "identify and report on the community anchor institutions that newly gain access to fixed broadband service as a result of [Connect America] support." *Id.* at 17700-01, para. 102.

[453] The model identifies the locations of business locations based on GeoResults (Q3/2012). *CAM Platform Order*, 28 FCC Rcd at 5322, para. 52. The model provisions dedicated fiber connections to technology oriented business locations that have 10 or more employees, and to all other business locations that have 50 or more employees. Business locations with fewer employees are provisioned the same voice and broadband services as residential locations. Businesses are classified as "technology oriented" or "all other business" based on their North American Industry Classification (NAICS) Code. *See* CAM Methodology at 20-21, http://transition.fcc.gov/Daily_Releases/Daily_Business/2014/db0417/DOC-326628A1.pdf.

[454] The *USF/ICC Transformation Order* defines community anchor institution to include such entities as schools, libraries, hospitals and other medical providers, public safety entities, institutions of higher education, and community support organizations that facilitate greater use of broadband by vulnerable populations, including low-income, the unemployed, and the aged. *See USF/ICC Transformation Order*, 26 FCC Rcd at 17681, para. 51 n.37; 47 U.S.C. § 1305(b)(3)(A). The model identifies the locations of community anchor institutions based on June 2012 National Broadband Map data. *CAM Platform Order*, 28 FCC Rcd at 5323, para. 52 n.114; CAM Methodology at Section 9.

[455] The model identifies the location of wireless towers based on a CostQuest proprietary tower database. *CAM Platform Order*, 28 FCC Rcd at 5323, para. 52 n.114; CAM Methodology at 60-62, http://transition.fcc.gov/Daily_Releases/Daily_Business/2014/db0417/DOC-326628A1.pdf

[456] *See* CAM Methodology at 20-22, http://transition.fcc.gov/Daily_Releases/Daily_Business/2014/db0417/DOC-326628A1.pdf. The model does not include any cost for the associated electronics necessary to light the enterprise service.

it did not intend "that the model will skew more funds to communities that have community anchor institutions,"[457] we find 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.[458]

160. If we 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.[459] 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.[460] This is precisely the skewed effect that the Commission sought to avoid.

161. 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.[461] As described above,[462] 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.

162. 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.[463] The ABC Coalition supported the CAM's treatment of enterprise locations,[464] and no parties submitted alternative proposals for how the CAM should account for such locations.

163. We conclude 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

[457] *USF/ICC Transformation Order*, 26 FCC Rcd at 17728, para. 167 n.269.

[458] When the total middle mile cost of serving the census block is divided by all locations passed, the locations passed only include residential as well as those business locations assumed to receive the same type of voice and broadband services as residential customers. *See supra* paras. 156.

[459] Bureau staff analyzed the costs associated with providing FTTP Metro Ethernet-like service to schools and libraries using CAM v4.0 and employing an illustrative funding benchmark of $50. Staff determined that, on average, it would cost $441 per month to serve each school and library. *See* Letter from Michael J. Jacobs, Legal Advisor to the Chief, Wireline Competition Bureau, FCC, to Marlene H. Dortch, Secretary, FCC, WC Docket No. 10-90 (filed Mar. 19, 2014) (submitting the analysis to the record) (Mar. 19, 2014 Letter to the Record).

[460] We note that the average cost to serve each school or library ($441 per month per location) is more than twice the preliminary extremely high-cost threshold that we specify in this Order. The precise amount of the increase will depend on the cost and number of schools and libraries, and the number of mass-market locations, in the block. *See supra* note 454; Mar. 19, 2014 Letter to the Record.

[461] CAM Methodology at 21-22, http://transition.fcc.gov/Daily_Releases/Daily_Business/2014/db0417/DOC-326628A1.pdf.

[462] *See supra* para. 73.

[463] WCB July 22, 2013 Virtual Workshop Submission Letter Attach. at 8-12.

[464] *Id.* at 9, 11-12 (Comments of Robert Mayer, on behalf of the ABC Coalition).

anchor institutions that have access to robust, scalable broadband, while not skewing support towards communities with a greater number of anchor institutions. We find 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.[465] 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

164. In this section, we tentatively set 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. We then adopt two inputs – subscribership rate and ARPU – used in the methodology to calculate the benchmark. Finally, we calculate the budget available for Connect America Phase II and estimate the extremely high-cost threshold using that budget.

1. Background

165. In the *USF/ICC Transformation Order*, the Commission concluded that the model would be used to determine what areas would be eligible to receive support, based on the costs as calculated by the model. Specifically, the Commission adopted a methodology "that will target support to areas that exceed a specified cost benchmark, but not provide support for areas that exceed an 'extremely high cost' threshold."[466] Support offered for each census block will be the amount the modeled cost exceeds the lower cost benchmark, provided that the census block's cost does not exceed the upper "extremely high-cost" threshold.[467] Given the fixed budget of up to $1.8 billion for Connect America Phase II – including the Connect America Fund intercarrier compensation (CAF-ICC) recovery mechanism – it is necessary that these benchmarks be established at levels coordinated to provide no more than the available amount of support.[468]

166. With regard to the funding threshold, the Commission stated that it would use the model "to identify those census blocks where the cost of service is likely to be higher than can be supported through reasonable end-user rates alone."[469] With regard to the extremely high-cost threshold, the Commission concluded that "a small number of extremely high-cost census blocks . . . should receive funding specifically set aside for remote and extremely high-cost areas . . . rather than receiving CAF Phase II support."[470] The Commission delegated to the Bureau "the responsibility for setting the

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[465] *See, e.g.*, *USF/ICC Transformation Order*, 26 FCC Rcd at 17700, para. 102 n.164.

[466] *Id*. at 17728, para. 168.

[467] *Id*. at 17729, para. 171.

[468] The *USF/ICC Transformation Order* set the annual budget for Connect America Phase II at up to $1.8 billion, including CAF-ICC support. *Id.* at 17725-26, paras. 158-59. The CAF-ICC recovery mechanism is an explicit support mechanism that replaces implicit support previously received by carriers from carrier-to-carrier revenues.

[469] *Id*. at 17728, para. 167.

[470] *Id*. The Commission found that excluding these extremely high-cost areas was consistent with its "recognition that the very small percentage of households that are most expensive to serve via terrestrial technology represent a disproportionate share of the cost of serving currently unserved areas." *Id.* at 17728, para. 168. The Commission anticipated that no more than 1 percent of all American households would be in such remote and extremely high-cost areas. The Commission exempted those areas from the broadband service requirements associated with Connect America Phase II, and set aside at least $100 million to serve those areas through alternative technologies, subject to modestly relaxed broadband requirements. *Id.* at 17837-38, paras. 533-34.

extremely high-cost threshold in conjunction with the adoption of the final cost model."[471] The Commission further instructed that the extremely high-cost threshold "should be set to maintain total support in price cap areas within our up to $1.8 billion annual budget."[472]

167. In the *Model Design PN*, the Bureau sought comment on how to set the funding benchmark and extremely high-cost threshold.[473] It specifically sought comment on 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.[474] Both ACA and NASUCA urged the Bureau to use the former approach, and set the funding threshold first.[475] The ABC Coalition supported the latter approach.[476]

168. Subsequently, in the Virtual Workshop, the Bureau sought comment on establishing the funding benchmark by estimating the average revenue per user 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.[477] The Bureau specifically sought comment on the reasonableness of using this methodology and, based on the then current version of the model (CAM v3.1.2), asked whether to establish a support threshold in the range of $40 to $50 per location.[478] The Bureau further noted that using a support threshold in this range would result in an extremely high-cost threshold of approximately $145 to $155 per location.[479] Later, the Bureau sought comment on version 4 of the Connect America Model, and released illustrative results with a $48 and $52 funding thresholds.[480]

2. Budget

169. 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.[481] 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.[482] 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

[471] *Id.* at 17729, para. 169.

[472] *Id.*

[473] *Model Design PN*, 27 FCC Rcd at 6167-69, paras. 64-71.

[474] *Id.*

[475] ACA *Model Design PN* Comments, WC Docket Nos. 10-90, 05-337 (filed July 9, 2012); Letter from Charles A. Acquard, NASUCA, to Marlene Dortch, Secretary, FCC, WC Docket Nos. 10-90, 05-337 (filed July 27, 2012).

[476] ABC Coalition *Model Design PN* Reply Comments at 28-30 (filed July 23, 2012); ABC Coalition Sept. 3, 2013 Ex Parte at 1; Letter from Robert Mayer, USTelecom, to Marlene Dortch, Secretary, FCC, filed Nov. 13, 2013 (ABC Coalition Nov. 13, 2013 Ex Parte).

[477] *CAM Version 3.1.2 Availability PN*, 28 FCC Rcd at 7294.

[478] *Id.*

[479] *Id.*

[480] *See CAM Version 4.0 Improved Illustrative Results PN*.

[481] *USF/ICC Transformation Order*, 26 FCC Rcd at 17672, para. 18.

[482] *Id*. at 17674, para. 25.

reasonable amount of support to set aside.[483] 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.[484] In addition, the budget will include approximately $32 million per year from funds remaining from Connect America Phase I after completion of round two.[485] We therefore conclude that approximately $1.782 billion in support will be available in price cap areas for Phase II. We reserve the right to update this budget, however, when we release 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.

3. Methodology

170. Next, the Bureau adopts the methodology discussed in the Virtual Workshop for establishing a funding benchmark.[486] 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 we take into account determine where costs are likely to be higher than can be supported through reasonable end user revenues alone.[487] 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.[488] 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.

171. 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…."[489] Any estimate of future revenues is necessarily a forecast,

[483] In the Virtual Workshop, the Bureau sought comment on its forecast that $50 million per year should be set aside for the price cap CAF-ICC recovery mechanism. *See CAM Version 3.1.2 Availability PN*, 28 FCC Rcd at 7294; WCB June 25, 2013 Virtual Workshop Submission Letter Attach. at 22. Before the CAM support module is rerun using the finalized list of eligible census blocks, the amount set aside for the CAF-ICC recovery mechanism may be adjusted in light of annual tariff filings and more current estimates.

[484] *See* WCB June 25, 2013 Virtual Workshop Submission Letter Attach. at 22 (Comments of Robert Mayer, on behalf of the ABC Coalition) (agreeing with this forecast and also reaching the conclusion that $1.75 billion should be available pursuant to Connect America Phase II).

[485] *See Connect America Fund*, Report and Order, WC Docket No. 10-90, 28 FCC Rcd 7766, 7769-70, para. 9 (2013) (setting Connect America Phase I Round 2 budget and determining that any unclaimed funds would be added to budget of Connect America Phase II); *Over $32 Million of Connect America Funding Authorized to Connect Unserved Homes and Businesses in Alaska, Hawaii, and Puerto Rico*, WC Docket No. 10-90, Public Notice, 28 FCC Rcd 14896 (Wireline Comp. Bur. 2013); *Over $255 Million of Connect America Funding Authorized to Connect Unserved Homes and Businesses in 41 States*, WC Docket No. 10-90, Public Notice, 28 FCC Rcd 16450 (Wireline Comp. Bur. 2013); *Connect America Fund*, WC Docket No. 10-90, Order, 29 FCC Rcd 181, 237-38, paras. 298-99 (Wireline Comp. Bur. 2014); *Additional $16.7 Million in Connect America Phase I Support Authorized*, WC Docket No. 10-90, Public Notice, DA 14-353 (Wireline Comp. Bur. rel. Mar. 14, 2014).

[486] *See CAM Version 3.1.2 Availability PN*, 28 FCC Rcd at 7294.

[487] *USF/ICC Transformation Order*, 26 FCC Rcd at 17728, para. 167.

[488] *Id.* at 17729, para. 169.

[489] *Id.* at 17728, para. 167.

dependent on a range of reasonable assumptions. Below, we adopt 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.[490] Because not all locations will have active subscribers, we will adjust the ARPU by multiplying it by the expected subscription rate adopted below.[491] 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.[492] 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.[493]

4. Average Revenue Per User

172. We adopt 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.[494]

173. 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.

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[490] *See infra* paras. 172-176. As noted below, the blended ARPU includes revenues associated with broadband and voice services. It does not include revenue associated with video services. We do not include video revenues because they would be relevant only to the extent that they exceed the incremental cost of video provision and therefore contribution toward shared costs. Being late entrants, incumbent LEC providers of video services have a relatively small share of all video subscribers. *See Annual Assessment of the Status of Competition in the Market for the Delivery of Video Programming*, MB Docket No. 12-203, Fifteenth Report, 28 FCC Rcd 10496, 10507-08, paras. 28-30 (2013); Leichtman Research Group, Major Multi-Channel Video Providers Lost About 105,000 Subscribers in 2013, http://leichtmanresearch.com/press/031414release.html (March 14, 2014) (telephone company share of video market share approximately 11 percent at end of 2013). Because of their low video market share, incumbent LECs typically face higher per subscriber programming, consumer premise equipment and customer acquisition costs than other video service providers. As a result, the net contribution from video is likely to be very low or perhaps even negative. Consequently, excluding revenues associated with video services from the ARPU is not likely to materially distort where we set the funding benchmark for Connect America support.

[491] *See infra* paras. 177-179. In the Virtual Workshop, the Bureau referred to this concept as the "take rate" rather than the "expected subscription rate." *See CAM Version 3.21 Availability PN*, 28 FCC Rcd at 7294. In this Order, we use the term "expected subscription rate" to distinguish this rate from "take rate" or "customer drop rate" as used in the cost model. *See supra* paras. 81-84.

[492] WCB June 25, 2013 Virtual Workshop Submission Letter Attach. at 24-29; *see also* Letter from Thomas Cohen, Counsel for ACA, to Marlene H. Dortch, Secretary, FCC, WC Docket No. 10-90 et al., at 6-7 (filed Jan. 8, 2014) (ACA Jan. 8, 2014 Letter).

[493] ABC Coalition *Model Design PN* Comments, WC Docket No. 10-90, at 28-30 (filed July 9, 2012); ABC Coalition Sept. 3, 2013 Ex Parte at 1. While we do not adopt the ABC Coalition's proposal to set the funding benchmark and extremely high-cost threshold based on cost, we note that the preliminary $52.50 benchmark identified above corresponds with the 93.5 percentile of costs, while the extremely high-cost threshold of $207.81corresponds with the 99.4 percentile of costs.

[494] *See supra* paras. 121-23, 170-71.

174. Based on the record before us, we conclude 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,[495] depending on how many customers are paying promotional rates versus month-to month rates.[496] The ABC Coalition also assumes a rate of $30 for voice services,[497] for a range of rates of $58.54 to $76.03 for voice and broadband services together.[498] 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.[499] 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.[500] It recommends that we adopt an ARPU of $71.[501]

[495] For its analysis, the ABC Coalition chose the lowest speed Internet service offered by each provider that was at a minimum speed of 4 Mbps down. They did not take into account an upload speed. ABC Coalition Sept. 3, 2013 Ex Parte at 5.

[496] *Id.* at 5 and Attach. (attaching Telogical Systems High Speed Internet Services Products, Pricing & Promotions Report National View (July 2013)) . Data from the Census Bureau's Current Population Survey, Computer and Internet Use Supplement lend further support that this is a reasonable range of monthly rates for broadband services. The data suggest that the average monthly price paid for standalone Internet service in non-metropolitan areas (as defined by the Current Population Survey) is approximately $42 and the median monthly price is $40. Bureau of the Census and Bureau of Labor Statistics, Current Population Survey (CPS), July 2011: Computer and Internet Use Supplement Data File, http://thedataweb.rm.census.gov/ftp/cps_ftp.html (last visited Feb. 7, 2014). Given that these prices are self-reported by survey respondents, there are a number of caveats. First, the data does not specify at what speeds the Internet service is provided. Second, some respondents may have included taxes and regulatory fees in their price response, and some respondents may have included equipment rental prices (e.g., router and modem rentals). The reported prices are also for a range of differing services, with price differences reflecting differences in bandwidths, data caps, customer helplines and service, antivirus and other protective software and services, email addresses, cloud storage, webpage hosting, etc. The reported prices may also not be the same as currently advertised prices to the extent that the reported prices include promotional discounts or add-on services, or are based upon a service plan no longer offered by the respondent's provider. Despite these caveats, the CPS data could provide a reasonable estimate of average monthly price for standalone Internet services, because the survey is of high quality and sufficiently large, and, as a result, biasing factors in the responses may tend to cancel out.

[497] The ABC Coalition indicates that the $30 rate includes the "local rate, federal Subscriber Line Charge (SLC), Access Recovery Charge (ARC), and the local Extended Area Service (EAS) charge." ABC Coalition Sept. 3, 2013 Ex Parte at 5. It also notes that $30 "corresponds to the Residential Rate Ceiling found in [the *USF/ICC Transformation Order*]," and that $30 "is approximately half way between a representative monthly charge of $25.62 and a $35.52 voice rate benchmark." Letter from Robert Mayer, USTelecom, to Marlene Dortch, Federal Communications Commission, WC Docket No. 10-90, at 2 n. 9 (filed Nov. 20, 2013) (ABC Coalition Nov. 20, 2013 Ex Parte) (citing *USF/ICC Transformation Order*, 26 FCC Rcd at 17959, para. 852).

[498] ABC Coalition Sept. 3, 2013 Ex Parte at 5. The ABC Coalition suggests that an average customer subscription rate of 80 percent for Internet services and 60 percent for voice services should be applied to this range of rates. *Id*. Below, we adopt an expected customer subscription rate of 70 percent to calculate the initial funding benchmark. *See infra* paras. 177-79.

[499] OBI, Broadband Availability Gap at 50, Exh. 3-V.

[500] WCB June 25, 2013 Virtual Workshop Submission Letter Attach. at 26-27 (Comments of Thomas Cohen, on behalf of ACA); ACA June 12, 2013 Ex Parte Letter at 8-9. ACA claims that this estimate is conservative because it does not include the additional charges that customers incur for voice minutes that exceed limited calling plans. *Id.*

[501] ACA claims that the Commission "should take into account that only a minority of subscribers in [Connect America] Phase II-eligible locations will receive promotional rates for broadband" given that such rates are typically (continued…)

175. 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.[502] On balance, we conclude 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. We recognize that a growing number of households rely only on wireless services for their voice services.[503] 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,[504] significantly higher than the $30 proposed by the ABC Coalition. While we recognize 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,[505] 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.[506] By selecting an ARPU that is on the higher side of the range of

(Continued from previous page)
temporary for subscribers, and subscribers have no choice but to pay a higher rate once the promotion ends or cancel their subscription altogether due to a lack of competition in the areas. ACA Jan. 8, 2014 Letter at 2-4.

[502] ABC Coalition Sept. 3, 2013 Ex Parte at 4. The ABC Coalition points out that data concerning the ARPU for stand-alone voice or broadband service or the combination of these services is "highly proprietary" and that collecting this data would "add lengthy and unnecessary increases to the timeline" for Phase II due to the "restrictive and controversial non-disclosure agreements" that would be involved. ABC Coalition Nov. 13, 2013 Ex Parte at 3. Given these concerns, we find that it is reasonable to determine an approximate estimate of ARPU based on the data that we do have available.

[503] *See Implementation of Section 6002(b) of the Omnibus Budget Reconciliation Act of 1993 Annual Report and Analysis of Competitive Market Conditions With Respect to Mobile Wireless, Including Commercial Mobile Services*, WT Docket No. 11-186, Sixteenth Report, 28 FCC Rcd 3700, 3724, para. 2 (2013) (finding that "[t]he number of adults who rely exclusively on mobile wireless for voice service has increased significantly in recent years," and that "[m]obile wireless Internet access service could provide an alternative to wireline service for consumers who are willing to trade speed for mobility, as well as consumers who are relatively indifferent with regard to the attributes, performance, and pricing of mobile and fixed platforms").

[504] Wireline Competition Bureau, Universal Service Implementation Progress Report, WC Docket No. 10-90, at 13 (Wireline Comp Bur. rel. March 24, 2014); *Wireline Competition Bureau Announces Results of Urban Rate Survey for Voice Services; Seeks Comment on Petition for Extension of Time to Comply with New Rate Floor*, WC Docket No. 10-90, Public Notice, DA 14-384 (Wireline Comp. Bur. rel. Mar. 20, 2014).

[505] As we explain above, the ARPU we adopt does not take into account video revenues. *See supra* note 490.

[506] Approximately 12 percent of locations that have initially been determined to be eligible for the offer of model-based support are businesses. NRIC suggests that ARPU should be calculated using a regression analysis that would account for the revenue that carriers receive from businesses based on population density. Letter from Thomas J. Moorman, Counsel to NRIC, to Marlene H. Dortch, Secretary, FCC, WC Docket Nos. 10-90, 05-337 (filed Mar. 5, 2014). Such an approach would require a reliable source of business revenue per location. We are not aware of any such data source; and NRIC does not provide one. Even with a data source, slightly different regression approaches (different specifications) can lead to different outcomes; thus, the time it would take to develop an appropriate regression would likely result in an extended delay in finalizing the model. Finally, a regression approach would involve a great deal of complexity in the cost model itself. The model would need to account for different ARPU amounts for businesses (including presumably different ARPU figures for businesses of different sizes), which in turn would suggest different funding thresholds for different areas depending on the mix of businesses. Despite all that difficulty, it is far from clear that such an approach would lead to a meaningfully different answer than the average approach we take (i.e., as long as the average revenue per user value we adopt reflects the presence of business locations). Thus, we find that it is reasonable to adopt an ARPU that is on the higher end of a reasonable range of residential rates to account for the fact that businesses are likely to be paying higher rates than many residential customers.

ARPU rates in the record before us today,[507] we account 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.[508]

176. We are not persuaded by NRIC's argument that we 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.[509] 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, we 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.

5. Expected Subscription Rate

177. We adopt 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.

178. As a threshold matter, we conclude 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.[510] In the Virtual Workshop, the Bureau asked whether it was appropriate to use a single "take rate" for both purposes.[511] Commenters, including ACA and US Telecom, broadly supported the use of single take rate for all purposes.[512] We find, 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.[513] For the purpose of estimating the amount of revenues that can reasonably be recovered from "end user revenues," on the other hand, we find it is appropriate to use a subscription rate that

[507] The Bureau is continuing to analyze the data collected in the urban rate survey to determine the average rate for broadband services with varying characteristics.

[508] The Commission has "establish[ed] a benchmark of 6 Mbps downstream and 1.5 Mbps upstream for broadband deployments in later years of [Connect America] Phase II." *USF/ICC Transformation Order*, 26 FCC Rcd at 17705, para. 108; *see also id*. at 17735, para. 187 (the model "should ensure that the most locations possible receive a 6 Mbps/1.5 Mbps or faster service at the end of the five year term, consistent with the [Connect America] Phase II budget"). Work is underway to analyze the data collected in the urban rate survey regarding broadband pricing.

[509] Letter from Cheryl L. Parrino, Consultant to NRIC, to Marlene H. Dortch, Secretary, FCC, WC Docket No. 10-90, Attach. at 3 (filed Sept. 6, 2013) (NRIC Sept. 6, 2013 Ex Parte); *Wireline Competition Bureau Seeks Further Comment on Issues Regarding the Design of the Remote Areas Fund*, WC Docket No. 10-90, Public Notice, 28 FCC Rcd 265, 271, para. 23 (Wireline Comp. Bur. 2013).

[510] *See supra* paras. 81-84.

[511] *CAM Version 3.1.2 Availability PN*, 28 FCC Rcd 7283.

[512] WCB June 25, 2013 Virtual Workshop Submission Letter Attach. at 2-4 (Comments of Thomas Cohen, Counsel for ACA); ABC Coalition Sept. 3, 2013 Ex Parte at 2.

[513] *See supra* paras. 81-84. For example, after initial installation of a drop and ONT, a customer may move and cancel service. If the next resident at the location does not subscribe, the location would still have the drop, even though it is not producing revenue. *See* WCB Feb. 6, 2013 Virtual Workshop Submission Letter Attach. at 39-40 (Calculating Average Per-Unit Costs/Take Rate Topic); *see also* Hogendorn Peer Review Response at 6.

reflects the percentage of locations with paying customers, rather than the percentage of locations with installed drops.

179. 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.[514] 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.[515] 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.[516] The Pew Research Center's Internet and American Life Project estimates the current home broadband subscription rate to be 62 percent.[517] 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.

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

180. 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.[518] This funding threshold is lower than the funding thresholds proposed by ACA and Nebraska Rural Independent Carriers,[519] 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.

181. As described above, we conclude that approximately $1.782 billion is available for the Phase II budget pursuant to the CAM.[520] 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.[521] 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, we currently forecast 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,

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[514] ACA June 12, 2013 Ex Parte Letter at 7-8.

[515] *See* ABC Coalition Nov. 20, 2013 Ex Parte at 4 (advocating 60 percent voice-broandband bundled take rate and 20 percent broadband-only take rate).

[516] Peer Review Submission Letter Attach. at 4-5 (Prof. Hogendorn Letter)

[517] *See* Pew Research Internet Project, Home Broadband 2013, http://pewinternet.org/Reports/2013/Broadband/Findings.aspx (Aug. 26, 2013).

[518] *See* ABC Coalition Nov. 20, 2013 Ex Parte (suggesting funding benchmark should be in the range of $40.83 and $54.83).

[519] *See* NRIC Sept. 6, 2013 Ex Parte Attach. (proposing support threshold of $77.60); ACA June 12, 2013 Ex Parte Letter at 10 (recommending a funding benchmark of $64); WCB June 25, 2013 Virtual Workshop Submission Letter Attach. at 24-29; *see also* ACA Jan. 8, 2014 Letter at 7.

[520] *See supra* para. 169.

[521] As noted above, cost per location is sometimes calculated at a sub-block level. *See supra* note 439.

however, dependent on the outcome of the challenge process and the elections of carriers serving the non-contiguous areas of the United States.

182. In identifying the preliminary funding benchmark and extremely high-cost threshold, we recognize 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. We therefore reserve 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

183. We conclude 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. We 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.

184. As we explained in the *Connect America Phase II Challenge Process Order*,[522] 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.[523]

IV. PROCEDURAL MATTERS

A. Paperwork Reduction Act

185. 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.[524]

B. Final Regulatory Flexibility Act Certification

186. The Regulatory Flexibility Act (RFA)[525] requires that an agency prepare a regulatory flexibility analysis for notice and comment rulemakings, unless the agency certifies that "the rule will not, if promulgated, have a significant economic impact on a substantial number of small entities."[526] Accordingly, we have prepared a Final Regulatory Flexibility Analysis concerning the possible impact of

[522] *Connect America Phase II Challenge Process Order*, 28 FCC Rcd at 7212-20, paras. 4-22.

[523] The determination of whether a census block is served or unserved by an unsubsidized competitor will only affect the support calculations (i.e., support may be excluded for a particular census block); it will have no effect on the cost calculations.

[524] *See* 44 U.S.C. § 3506(c)(4).

[525] *See* 5 U.S.C. §601–612. The RFA has been amended by the Small Business Regulatory Enforcement Fairness Act of 1996 (SBREFA), Pub. L. No. 104-121, Title II, 110 Stat. 857 (1996).

[526] 5 U.S.C. § 605(b).

the rule changes contained in the *Report and Order* on small entities. The Final Regulatory Flexibility Analysis is set forth in the Appendix.

C. Congressional Review Act

187. The Commission will send a copy of this Report and Order to Congress and the Government Accountability Office pursuant to the Congressional Review Act.[527]

D. Data Quality Act

188. The Commission certifies that it has complied with the Office of Management and Budget Final Information Quality Bulletin for Peer Review, 70 Fed. Reg. 2664 (2005), and the Data Quality Act, Pub. L. No. 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.[528]

E. Ordering Clauses

189. 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, sections 0.91, 0.201(d), 1.1, and 1.427 of the Commission's rules, 47 C.F.R. §§ 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 this Report and Order IS ADOPTED, effective thirty (30) days after publication of the text or summary thereof in the Federal Register.

190. IT IS FURTHER ORDERED that the Commission SHALL SEND a copy of this 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).

[527] *See* 5 U.S.C. § 801(a)(1)(A).

[528] *See* Peer Review Submission Letter.

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

FEDERAL COMMUNICATIONS COMMISSION

Carol E. Mattey
Deputy Chief
Wireline Competition Bureau

APPENDIX

Final Regulatory Flexibility Analysis

1. As required by the Regulatory Flexibility Act, as amended (RFA),[1] an Initial Regulatory Flexibility Analysis (IRFA) was incorporated in the *Model Design Public Notice* in WC Docket Nos. 10-90, 05-337,[2] and the *Phase II Non-Contiguous Areas Public Notice* in WC Docket No. 10-90.[3] 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.

F. Need for, and Objectives of, the Order

2. This Report and Order (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.[4] Together with the *CAM Platform Order*,[5] 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, this 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.[6] 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.[7] The budget used to set the extremely high-cost threshold will be approximately $1.782 billion.[8]

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

[1] *See* 5 U.S.C. § 603. The RFA, *see* 5 U.S.C. § 601 *et seq*., has been amended by the Contract With America Advancement Act of 1996, Pub. L. No. 104-121, 110 Stat. 847 (1996) (CWAAA). Title II of the CWAAA is the Small Business Regulatory Enforcement Fairness Act of 1996 (SBREFA).

[2] *Wireline Competition Bureau Seeks Comment on Model Design and Data Inputs for Phase II of the Connect America Fund*, WC Docket Nos. 10-90, 05-337, Public Notice, 27 FCC Rcd 6147, 6177, 6179-87, para. 110, app. (Wireline Comp. Bur. 2012) (*Model Design Public Notice*).

[3] *Wireline Competition Bureau Seeks Comment on Connect America Phase II Support for Price Cap Areas Outside of the Contiguous United States*, WC Docket No. 10-90, Public Notice, 28 FCC Rcd 1030, (Wireline Comp. Bur. 2013) (*Phase II Non-Contiguous Areas Public Notice*).

[4] *See supra* Sections III.A-C.

[5] *Connect America Fund, High-Cost Universal Service Support*, WC Docket Nos. 10-90, 05-337, Report and Order, 28 FCC Rcd 5301 (2013) (*CAM Platform Order*).

[6] *See supra* Section III.E.

[7] *See Connect America Fund; A National Broadband Plan for Our Future; Establishing Just and Reasonable Rates for Local Exchange Carriers; High-Cost Universal Service Support; Developing a Unified Intercarrier Compensation Regime; Federal-State Joint Board on Universal Service; Lifeline and Link-Up; Universal Service Reform—Mobility Fund*; WC Docket Nos. 10-90, 07-135, 05-337, 03-109, CC Docket Nos. 01-92, 96-45, GN Docket No. 09-51, WT Docket No. 10-208, Report and Order and Further Notice of Proposed Rulemaking, 26 FCC 17663, 17728-29, paras. 167-70. (2011) (*USF/ICC Transformation Order and/or FNPRM*); *pets. for review pending sub nom. In re: FCC 11-161*, No. 11-9900 (10th Cir. argued Nov. 19, 2013).

[8] *See supra* Section III.E.2.

3. 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."[9] 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."[10]

4. 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.[11] 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."[12] Description and Estimate of the Number of Small Entities To Which Rules Will Apply

5. 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.[13] The RFA generally defines the term "small entity" as having the same meaning as the terms "small business," "small organization," and "small governmental jurisdiction."[14] In addition, the term "small business" has the same meaning as the term "small-business concern" under the Small Business Act.[15] 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.[16]

6. **Small Businesses**. Nationwide, there are a total of approximately 27.5 million small businesses, according to the SBA.[17]

7. **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.[18] According to Census Bureau data for 2007, there were 3,188 firms in this category,

[9] *Phase II Non-Contiguous Areas Public Notice*, 28 FCC Rcd at 1045-46, para. 23.

[10] *Id.* at 1046, para. 23.

[11] Comments of Alaska Communications Systems, WC Docket No. 10-90 at 28-29 (filed March 11, 2013).

[12] *Id.* at 29.

[13] *See* 5 U.S.C. § 603(b)(3).

[14] *See* 5 U.S.C. § 601(6).

[15] *See* 5 U.S.C. § 601(3) (incorporating by reference the definition of "small-business concern" in the Small Business Act, 15 U.S.C. § 632). Pursuant to 5 U.S.C. § 601(3), the statutory definition of a small business applies "unless an agency, after consultation with the Office of Advocacy of the Small Business Administration and after opportunity for public comment, establishes one or more definitions of such term which are appropriate to the activities of the agency and publishes such definition(s) in the Federal Register."

[16] *See* 15 U.S.C. § 632.

[17] *See* SBA, Office of Advocacy, "Frequently Asked Questions," http://www.sba.gov/advo/stats/sbfaq.pdf (accessed Dec. 2010).

[18] 13 C.F.R. § 121.201, NAICS code 517110.

total, that operated for the entire year.[19] Of this total, 3144 firms had employment of 999 or fewer employees, and 44 firms had employment of 1000 employees or more.[20] Thus, under this size standard, the majority of firms can be considered small.

8. **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.[21] According to Commission data, 1,307 carriers reported that they were incumbent local exchange service providers.[22] Of these 1,307 carriers, an estimated 1,006 have 1,500 or fewer employees and 301 have more than 1,500 employees.[23] 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.

9. **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.[24] According to Commission data, 1,307 carriers reported that they were incumbent local exchange service providers.[25] Of these 1,307 carriers, an estimated 1,006 have 1,500 or fewer employees and 301 have more than 1,500 employees.[26] 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.

10. 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."[27] 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.[28] 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.

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[19] U.S. Census Bureau, 2007 Economic Census, Subject Series: Information, Table 5, "Establishment and Firm Size: Employment Size of Firms for the United States: 2007 NAICS Code 517110" (issued Nov. 2010).

[20] *See id*.

[21] 13 C.F.R. § 121.201, NAICS code 517110.

[22] *See Trends in Telephone Service*, Federal Communications Commission, Wireline Competition Bureau, Industry Analysis and Technology Division at Table 5.3 (Sept. 2010) (*Trends in Telephone Service*).

[23] *See id*.

[24] *See* 13 C.F.R. § 121.201, NAICS code 517110.

[25] *See Trends in Telephone Service* at Table 5.3.

[26] *See id*.

[27] 5 U.S.C. § 601(3).

[28] *See* Letter from Jere W. Glover, Chief Counsel for Advocacy, SBA, to William E. Kennard, Chairman, FCC (May 27, 1999). The Small Business Act contains a definition of "small business concern," which the RFA incorporates into its own definition of "small business." *See* 15 U.S.C. § 632(a); *see also* 5 U.S.C. § 601(3). SBA regulations interpret "small business concern" to include the concept of dominance on a national basis. *See* 13 C.F.R. § 121.102(b).

11. **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.[29] 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.[30] Of these 1,442 carriers, an estimated 1,256 have 1,500 or fewer employees and 186 have more than 1,500 employees.[31] 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.[32] In addition, 72 carriers have reported that they are Other Local Service Providers.[33] Of the 72, seventy have 1,500 or fewer employees and two have more than 1,500 employees.[34] 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.

12. **Wireless Telecommunications Carriers (except Satellite)**. Since 2007, the SBA has recognized wireless firms within this new, broad, economic census category.[35] Prior to that time, such firms were within the now-superseded categories of Paging and Cellular and Other Wireless Telecommunications.[36] Under the present and prior categories, the SBA has deemed a wireless business to be small if it has 1,500 or fewer employees.[37] For this category, census data for 2007 show that there were 1,383 firms that operated for the entire year.[38] Of this total, 1,368 firms had employment of 999 or fewer employees and 15 had employment of 1000 employees or more.[39] 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.[40] Of these, an estimated 261 have 1,500 or fewer employees and 152 have more than 1,500 employees.[41] Consequently, the Commission estimates that approximately half or more

[29] *See* 13 C.F.R. § 121.201, NAICS code 517110.

[30] *See Trends in Telephone Service* at Table 5.3.

[31] *See id.*

[32] *See id*.

[33] *See id*.

[34] *See id*.

[35] *See* 13 C.F.R. § 121.201, NAICS code 517210.

[36] U.S. Census Bureau, 2002 NAICS Definitions, "517211 Paging"; http://www.census.gov/epcd/naics02/def/NDEF517.HTM.; U.S. Census Bureau, 2002 NAICS Definitions, "517212 Cellular and Other Wireless Telecommunications"; http://www.census.gov/epcd/naics02/def/NDEF517.HTM.

[37] 13 C.F.R. § 121.201, NAICS code 517210. The now-superseded, pre-2007 C.F.R. citations were 13 C.F.R. § 121.201, NAICS codes 517211 and 517212 (referring to the 2002 NAICS).

[38] U.S. Census Bureau, Subject Series: Information, Table 5, "Establishment and Firm Size: Employment Size of Firms for the United States: 2007 NAICS Code 517210" (issued Nov. 2010).

[39] *Id*. Available census data do not provide a more precise estimate of the number of firms that have employment of 1,500 or fewer employees; the largest category provided is for firms with "100 employees or more."

[40] *See Trends in Telephone Service* at Table 5.3.

[41] *See id*.

of these firms can be considered small. Thus, using available data, we estimate that the majority of wireless firms can be considered small.

13. **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.[42] 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.[43] 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.[44] The SBA has approved these small business size standards in the context of LMDS auctions.[45] 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.

14. **Satellite Telecommunications**. Since 2007, the SBA has recognized satellite firms within this revised category, with a small business size standard of $15 million.[46] 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.[47] Under the "Other Telecommunications" category, a business is considered small if it had $25 million or less in average annual receipts.[48]

15. 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."[49] For this category, Census Bureau data for 2007 show that there were a total of 512 firms that operated for the entire year.[50] Of this total, 464 firms had annual receipts of under $10 million, and 18 firms had receipts of $10 million to $24,999,999.[51] Consequently, we estimate that the majority of Satellite Telecommunications firms are small entities that might be affected by rules adopted pursuant to the FNPRM.

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[42] *See Rulemaking to Amend Parts 1, 2, 21, 25, of the Commission's Rules to Redesignate the 27.5-29.5 GHz Frequency Band, Reallocate the 29.5-30.5 Frequency Band, to Establish Rules and Policies for Local Multipoint Distribution Service and for Fixed Satellite Services*, CC Docket No. 92-297, Second Report and Order, Order on Reconsideration, and Fifth Notice of Proposed Rule Making, 12 FCC Rcd 12545, 12689-90, para. 348 (1997) ("*LMDS Second Report and Order*").

[43] *See LMDS Second Report and Order*, 12 FCC Rcd at 12689-90, para. 348.

[44] *See id.*

[45] *See Alvarez to Phythyon Letter 1998*.

[46] *See* 13 C.F.R. § 121.201, NAICS code 517410.

[47] *Id*.

[48] *See* 13 C.F.R. § 121.201, NAICS code 517919.

[49] U.S. Census Bureau, 2007 NAICS Definitions, "517410 Satellite Telecommunications".

[50] *See* 13 C.F.R. § 121.201, NAICS code 517410.

[51] *See id*. An additional 38 firms had annual receipts of $25 million or more.

16. 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."[52] For this category, Census Bureau data for 2007 show that there were a total of 2,383 firms that operated for the entire year.[53] Of this total, 2,346 firms had annual receipts of under $25 million.[54] Consequently, we estimate that the majority of Other Telecommunications firms are small entities that might be affected by our action.

17. **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."[55] The SBA has developed a small business size standard for this category, which is: all such firms having 1,500 or fewer employees.[56] According to Census Bureau data for 2007, there were a total of 955 firms in this previous category that operated for the entire year.[57] Of this total, 939 firms had employment of 999 or fewer employees, and 16 firms had employment of 1000 employees or more.[58] Thus, under this size standard, the majority of firms can be considered small and may be affected by rules adopted pursuant to the FNPRM.

18. **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.[59] Industry data indicate that, of 1,076 cable operators nationwide, all but eleven are small under this size standard.[60] In addition, under the

[52] U.S. Census Bureau, 2007 NAICS Definitions, "517919 Other Telecommunications", http://www.census.gov/naics/2007/def/ND517919.HTM.

[53] *See* 13 C.F.R. § 121.201, NAICS code 517919.

[54] U.S. Census Bureau, 2007 Economic Census, Subject Series: Information, Table 5, "Establishment and Firm Size: Employment Size of Firms for the United States: 2007 NAICS Code 517919" (issued Nov. 2010).

[55] U.S. Census Bureau, 2007 NAICS Definitions, "517110 Wired Telecommunications Carriers" (partial definition), http://www.census.gov/naics/2007/def/ND517110.HTM#N517110.

[56] *See* 13 C.F.R § 121.201, NAICS code 517110.

[57] U.S. Census Bureau, 2007 Economic Census, Subject Series: Information, Table 5, Employment Size of Firms for the United States: 2007, NAICS code 5171102 (issued Nov. 2010).

[58] *See id*.

[59] *See* 47 C.F.R. § 76.901(e). The Commission determined that this size standard equates approximately to a size standard of $100 million or less in annual revenues. *See Implementation of Sections of the 1992 Cable Television Consumer Protection and Competition Act: Rate Regulation*, MM Docket Nos. 92-266, 93-215, Sixth Report and Order and Eleventh Order on Reconsideration, 10 FCC Rcd 7393, 7408 para. 28 (1995).

[60] These data are derived from R.R. BOWKER, BROADCASTING & CABLE YEARBOOK 2006, "Top 25 Cable/Satellite Operators," pages A-8 & C-2 (data current as of June 30, 2005); WARREN COMMUNICATIONS NEWS, TELEVISION & CABLE FACTBOOK 2006, "Ownership of Cable Systems in the United States," pages D-1805 to D-1857.

Commission's rules, a "small system" is a cable system serving 15,000 or fewer subscribers.[61] 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.[62] Thus, under this second size standard, most cable systems are small and may be affected by rules adopted pursuant to the FNPRM.

19. **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."[63] 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.[64] Industry data indicate that, of 1,076 cable operators nationwide, all but ten are small under this size standard.[65] 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,[66] and therefore we are unable to estimate more accurately the number of cable system operators that would qualify as small under this size standard.

20. **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.[67] The OVS framework provides opportunities for the distribution of video programming other than through cable systems. Because OVS operators provide subscription services,[68] OVS falls within the SBA small business size standard covering cable services, which is "Wired Telecommunications Carriers."[69] 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.[70] Of this total, 939 firms had employment of 999 or fewer employees, and 16 firms had employment of 1000

[61] *See* 47 C.F.R. § 76.901(c).

[62] WARREN COMMUNICATIONS NEWS, TELEVISION & CABLE FACTBOOK 2006, "U.S. Cable Systems by Subscriber Size," page F-2 (data current as of Oct. 2005). The data do not include 718 systems for which classifying data were not available.

[63] 47 U.S.C. § 543(m)(2); *see also* 47 C.F.R. § 76.901(f) & nn.1–3.

[64] 47 C.F.R. § 76.901(f); *see FCC Announces New Subscriber Count for the Definition of Small Cable Operator*, Public Notice, 16 FCC Rcd 2225 (Cable Services Bureau 2001).

[65] These data are derived from R.R. BOWKER, BROADCASTING & CABLE YEARBOOK 2006, "Top 25 Cable/Satellite Operators," pages A-8 & C-2 (data current as of June 30, 2005); WARREN COMMUNICATIONS NEWS, TELEVISION & CABLE FACTBOOK 2006, "Ownership of Cable Systems in the United States," pages D-1805 to D-1857.

[66] The Commission does receive such information on a case-by-case basis if a cable operator appeals a local franchise authority's finding that the operator does not qualify as a small cable operator pursuant to section 76.901(f) of the Commission's rules.

[67] 47 U.S.C. § 571(a)(3)-(4). *See Annual Assessment of the Status of Competition in the Market for the Delivery of Video Programming*, MB Docket No. 06-189, Thirteenth Annual Report, 24 FCC Rcd 542, 606 para. 135 (2009) ("*Thirteenth Annual Cable Competition Report*").

[68] *See* 47 U.S.C. § 573.

[69] U.S. Census Bureau, 2007 NAICS Definitions, "517110 Wired Telecommunications Carriers"; http://www.census.gov/naics/2007/def/ND517110.HTM#N517110.

[70] U.S. Census Bureau, 2007 Economic Census, Subject Series: Information, Table 5, Employment Size of Firms for the United States: 2007, NAICS code 5171102 (issued Nov. 2010).

employees or more.[71] 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.[72] Broadband service providers ("BSPs") are currently the only significant holders of OVS certifications or local OVS franchises.[73] 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.

21. **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."[74] The SBA has developed a small business size standard for this category, which is: all such firms having 1,500 or fewer employees.[75] According to Census Bureau data for 2007, there were 3,188 firms in this category, total, that operated for the entire year.[76] Of this total, 3144 firms had employment of 999 or fewer employees, and 44 firms had employment of 1000 employees or more.[77] 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.[78] Of this total, 394 firms had employment of 999 or fewer employees, and two firms had employment of 1000 employees or more.[79] Consequently, we estimate that the majority of these firms are small entities that may be affected by rules adopted pursuant to the FNPRM.

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

22. In this 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,

[71] *See id*.

[72] A list of OVS certifications may be found at http://www.fcc.gov/mb/ovs/csovscer.html.

[73] *See Thirteenth Annual Cable Competition Report*, 24 FCC Rcd at 606-07 para. 135. BSPs are newer firms that are building state-of-the-art, facilities-based networks to provide video, voice, and data services over a single network.

[74] U.S. Census Bureau, 2007 NAICS Definitions, "517110 Wired Telecommunications Carriers" (partial definition), http://www.census.gov/naics/2007/def/ND517110.HTM#N517110.

[75] 13 C.F.R. § 121.201, NAICS code 517110.

[76] U.S. Census Bureau, 2007 Economic Census, Subject Series: Information, Table 5, "Establishment and Firm Size: Employment Size of Firms for the United States: 2007 NAICS Code 517110" (issued Nov. 2010).

[77] *See id*.

[78] U.S. Census Bureau, 2007 Economic Census, Subject Series: Information, Table 5, Employment Size of Firms for the United States: 2007, NAICS code 5171103 (issued Nov. 2010).

[79] *See id*.

the age of existing plant, and the gauge of existing twisted-pair copper plant.[80] The Bureau largely adopts the use of commercial data sources,[81] or relies on data that was previously submitted by carriers to develop the inputs.[82] No small entity was required to submit data. This Order does not impose further data collections and recordkeeping requirements.

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

23. 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."[83]

24. This 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.

25. We do note, however, that we 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.[84] We also have 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.[85]

26. 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.[86] 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.[87]

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[80] *See Model Design Public Notice*, 27 FCC Rcd 6147.

[81] *See, e.g.*, *supra* Section III.B.1.a (adopting the use of the commercial data set GeoResults to set wire center boundaries)

[82] *See, e.g.*, *supra* Section III.B.1.b (describing the use of carrier-specific ABC Coalition plant mix data to develop plant mix inputs).

[83] 5 U.S.C. §§ 603(c)(1)-(4).

[84] *See supra* Section III.C.1.

[85] *See supra* Section III.C.2.

[86] *See supra* Section III.E.

[87] *See Connect America Fund, et al.*, WC Docket Nos. 10-90, et al., Report and Order and Further Notice of Proposed Rulemaking, 26 FCC Rcd 17663, 17837-39, 18092-108, paras. 533-536 1223-95 (2013) (USF/ICC

(continued…)

27. 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.[88] 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.[89] The Bureau also sought comment on a number of alternatives for the ARPU and subscription rate for setting the funding benchmark.[90] Using an assumed ARPU of $75 and a70 percent subscription rate, the Bureau identified a preliminary funding benchmark of $52.50.[91] 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.[92]

28. 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.[93] 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.[94] 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.[95]

29. 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

(Continued from previous page)
Transformation Order and FNPRM); *Wireline Competition Bureau Seeks Further Comment on Issues Regarding the Design of the Remote Areas Fund*, WC Docket No. 10-90, Public Notice, 28 FCC Rcd 265 (Wireline Comp. Bur. 2013) (Remote Areas Fund Public Notice).

[88] *Model Design Public Notice*, 27 FCC Rcd at 6167, para. 69.

[89] *See supra* Section III.E.3.

[90] Letter from Michael J. Jacobs, Legal Advisor to the Chief, Wireline Competition Bureau, to Marlene Dortch, Secretary, FCC, WC Docket No. 10-90, Attach. at 23-30 (filed June 25, 2013).

[91] *See supra* Section III.E.

[92] *Id.*

[93] *Id.*

[94] *See USF/ICC Transformation Order and FNPRM*, 26 FCC Rcd 17663, 17837-39, 18092-108, paras. 533-536 1223-95. The Bureau sought further comment on Remote Areas Fund implementation issues in a recent Public Notice, including using the cost model to identify eligible areas. *See Remote Areas Fund Public Notice*, 28 FCC Rcd 265.

[95] The *USF/ICC Transformation Order and FNPRM* included an IRFA that encouraged small entities "to bring to the Commission's attention any specific concerns they may have with the proposals outlined in the FNPRM," which included proposals related to the Remote Areas Fund. *USF/ICC Transformation Order and FNPRM*, 26 FCC Rcd at app. P, 18393-94, para. 91. *See also Remote Areas Fund Public Notice*, 28 FCC Rcd at 278, para. 57.

carriers.[96] 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.[97] 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.

J. Report to Congress

30. The Commission will send a copy of the Order, including this FRFA, in a report to be sent to Congress pursuant to the Congressional Review Act.[98] In addition, the Commission will send a copy of the Order, including this FRFA, to the Chief Counsel for Advocacy of the SBA. A copy of the Order and the FRFA (or summaries thereof) will also be published in the Federal Register.[99]

[96] *Model Design Public Notice*, 27 FCC Rcd at 6187, at App. para. 24.

[97] *See, e.g., Wireline Competition Bureau Releases New and Improved Illustrative Results for Connect America Cost Model Version 4.0 and Updated Methodology Documentation*, WC Docket No. 10-90, Public Notice, 28 FCC Rcd 16827, 16829 n.8 (Wireline Comp. Bur. 2013).

[98] *See* 5 U.S.C. § 801(a)(1)(A).

[99] *See* 5 U.S.C. § 604(b).