Part 54 - Universal Service

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Subpart D – Universal Service Support for High Cost Areas

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§ 54.305 Reserved ~~Sale or transfer of exchanges.~~

~~(a) The provisions of this section are not applicable to the sale or transfer of exchanges between non-rural carriers after the complete phase-down of interim hold-harmless support, pursuant to § 54.311, for the non-rural carriers subject to the transaction.~~

~~(b) Except as provided in paragraph (c) of this section, a carrier that acquires telephone exchanges from an unaffiliated carrier shall receive universal service support for the acquired exchanges at the same per-line support levels for which those exchanges were eligible prior to the transfer of the exchanges. If the acquired exchanges are incorporated into an existing rural incumbent local exchange carrier study area, the rural incumbent local exchange carrier shall maintain the costs associated with the acquired exchanges separate from the costs associated with its pre-acquisition study area. The transferred exchanges may be eligible for safety valve support for loop related costs pursuant to paragraph (d) of this section.~~

~~(c) A carrier that has entered into a binding agreement to buy or acquire exchanges from an unaffiliated carrier prior to May 7, 1997 will receive universal service support for the newly acquired lines based upon the average cost of all of its lines, both those newly acquired and those it had prior to execution of the sales agreement.~~

~~(d) Transferred exchanges in study areas operated by rural telephone companies that are subject to the limitations on loop-related universal service support in paragraph (b) of this section may be eligible for a safety valve loop cost expense adjustment based on the difference between the rural incumbent local exchange carrier's index year expense adjustment and subsequent year loop cost expense adjustments for the acquired exchanges. Safety valve loop cost expense adjustments shall only be available to rural incumbent local exchange carriers that, in the absence of restrictions on high-cost loop support in § 54.305(b), would qualify for high-cost loop support for the acquired exchanges under § 36.631 of this chapter.~~

~~(1) For carriers that buy or acquire telephone exchanges on or after January 10, 2005 from an unaffiliated carrier, the index year expense adjustment for the acquiring carrier's first year of operation shall equal the selling carrier's loop-related expense adjustment for the transferred exchanges for the 12-month period prior to the transfer of the exchanges. At the acquiring carrier's option, the first~~

~~year of operation for the transferred exchanges, for purposes of calculating safety valve support, shall commence at the beginning of either the first calendar year or the next calendar quarter following the transfer of exchanges. For the first year of operation, a loop cost expense adjustment, using the costs of the acquired exchanges submitted in accordance with §§ 36.611 and 36.612 of this chapter, shall be calculated pursuant to § 36.631 of this chapter and then compared to the index year expense adjustment. Safety valve support for the first period of operation will then be calculated pursuant to paragraph (d)(3) of this section. The index year expense adjustment for years after the first year of operation shall be determined using cost data for the first year of operation of the transferred exchanges. Such cost data for the first year of operation shall be calculated in accordance with §§ 36.611, 36.612 and 36.631 of this chapter. For each year, ending on the same calendar quarter as the first year of operation, a loop cost expense adjustment, using the loop costs of the acquired exchanges, shall be submitted and calculated pursuant to §§ 36.611, 36.612, and 36.631 of this chapter and will be compared to the index yea year expense adjustment. Safety valve support for the second year of operation and thereafter will then be calculated pursuant to paragraph (d)(3) of this section.~~

~~(2) For carriers that bought or acquired exchanges from an unaffiliated carrier before January 10, 2005, and are not subject to the exception in paragraph (c) of this section, the index year expense adjustment for acquired exchange(s) shall be equal to the rural incumbent local exchange carrier's high cost loop expense adjustment for the acquired exchanges calculated for the carrier's first year of operation of the acquired exchange(s). At the carrier's option, the first year of operation of the transferred exchanges shall commence at the beginning of either the first calendar year or the next calendar quarter following the transfer of exchanges. The index year expense adjustment shall be determined using cost data for the acquired exchange(s) submitted in accordance with §§ 36.611 and 36.612 of this chapter and shall be calculated in accordance with § 36.631 of this chapter. The index year expense adjustment for rural telephone companies that have operated exchanges subject to this section for more than a full year on the effective date of this paragraph shall be based on loop cost data submitted in accordance with § 36.612 of this chapter for the year ending on the nearest calendar quarter following the effective date of this paragraph. For each subsequent year, ending on the same calendar quarter as the index year, a loop cost expense adjustment, using the costs of the acquired exchanges, will be calculated pursuant to § 36.631 of this chapter and will be compared to the index year expense adjustment. Safety valve support is calculated pursuant to paragraph (d)(3) of this section.~~

~~(3) Up to fifty (50) percent of any positive difference between the transferred exchanges loop cost expense adjustment and the index year expense adjustment will be designated as the transferred exchange's safety valve loop cost expense adjustment and will be available in addition to the per line loop related support transferred from the selling carrier to the acquiring carrier pursuant to §~~

~~54.305(b). In no event shall a study area's safety valve loop cost expense adjustment exceed the difference between the carrier's study area loop cost expense adjustment calculated pursuant to § 36.631 of this chapter and transferred support amounts available to the acquired exchange(s) under paragraph (b) of this section. Safety valve support shall not transfer with acquired exchanges.~~

~~(e) The sum of the safety valve loop cost expense adjustment for all eligible study areas operated by rural telephone companies shall not exceed five (5) percent of the total rural incumbent local exchange carrier portion of the annual nationwide loop cost expense adjustment calculated pursuant to § 36.603 of this chapter. The five (5) percent cap on the safety valve mechanism shall be based on the lesser of the rural incumbent local exchange carrier portion of the annual nationwide loop cost expense adjustment calculated pursuant to § 36.603 of this chapter or the sum of rural incumbent local exchange carrier expense adjustments calculated pursuant to § 36.631 of this chapter. The percentage multiplier used to derive study area safety valve loop cost expense adjustments for rural telephone companies shall be the lesser of fifty (50) percent or a percentage calculated to produce the maximum total safety valve loop cost expense adjustment for all eligible study areas pursuant to this paragraph. The safety valve loop cost expense adjustment of an individual rural incumbent local exchange carrier also may be further reduced as described in paragraph (d)(3) of this section.~~

~~(f) Once an acquisition is complete, the acquiring rural incumbent local exchange carrier shall provide written notice to the Administrator that it has acquired access lines that may be eligible for safety valve support. Rural telephone companies also shall provide written notice to the Administrator defining their index year for those years after the first year of operation for~~

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Subpart H – Administration

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§ 54.702 Administrator's functions and responsibilities.

(b) The Administrator, and the divisions therein, shall be responsible for administering the schools and libraries support mechanism, the rural health care support mechanism, the high cost support mechanism, and the low income support mechanism.

(b) The Administrator shall be responsible for billing contributors, collecting contributions to the universal service support mechanisms, and disbursing universal service support funds.

(c) The Administrator may not make policy, interpret unclear provisions of the statute or rules, or interpret the intent of Congress. Where the Act or the Commission's rules are

unclear, or do not address a particular situation, the Administrator shall seek guidance from the Commission.

* * *

(h) The Administrator shall report quarterly to the Commission on the disbursement of universal service support program funds. The Administrator shall keep separate accounts for the amounts of money collected and disbursed for eligible schools and libraries, rural health care providers, low-income consumers, and high-cost and insular areas. The Administrator's quarterly report for 3rd quarter, filed on or about May 2 annually, shall contain projected annual funding requirements for the Connect America Fund, including all high cost funding components, for Price Cap and Rate of Return carriers and the Mobility Fund.

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New Subpart M – Connect America Fund for Rural Rate of Return Carriers

§ 54.1100 Terms and Definitions

(a) For purposes of determining Connect America Fund (CAF) support for rural rate of return carriers, the following definitions shall apply:

(1) *Broadband Access Service Connection Point* – the network equipment located in a telephone company serving wire center where broadband traffic from one or more telephone company service wire centers is aggregated.

(2) *Broadband Line*- loop equipment and facilities that support transmission of voice and broadband data, or broadband data only, between the carrier's central office and end user customer premises, at a minimum downstream speed of 256 Kbps.

(3) *Broadband Take Rate* – a percentage representing the extent to which a telephone company's customers adopt broadband services. For purposes of computing CAF support, a telephone company's Broadband Take Rate is the ratio of study area Broadband Lines in service to total Broadband Lines and voice-only common lines in service.

(4) *Middle Mile* - broadband transmission facilities and services beyond the Broadband Access Service Connection Point as well as facilities and services necessary to connect to the Internet backbone.

(5) *Second Mile* - broadband transmission facilities between the telephone company end office and the Broadband Access Service Connection Point.

(6) *Rural Broadband Benchmark* - for purposes of computing CAF support for a rate of return carrier, the Rural Broadband Benchmark includes a fixed per-line amount that applies to all study areas and a variable study area-specific amount, as more fully defined below.

(7) *Rural Broadband Network Transmission Costs* – costs associated with providing

Broadband Lines, Second Mile and Middle Mile transmission services on a regulated, common carriage basis, as more fully defined below.

§ 54.1101 Connect America Fund Support for Rural Rate of Return Carriers

(a) Beginning July 1, 2012, rural rate of return carriers designated as eligible telecommunications carriers under subpart B of this Part shall be eligible to receive Connect America Fund (CAF) support as described in this subpart.

(b) CAF Support for a rural rate of return carrier is equal to the sum of the Rural Broadband Network Transmission Support component calculated pursuant to § 54.1102 below and adjustments to High Cost Loop Support and Interstate Common Line Support as calculated pursuant to § 54.1103 below.

§ 54.1102 Rural Broadband Network Transmission Support Component

(a) A rural rate of return telephone company's annual Rural Broadband Network Transmission Component support amount shall equal its Rural Broadband Network Transmission Costs minus the result of multiplying the Rural Broadband Benchmark by end of year study area working Broadband Lines times 12 months.

(b) Rural Broadband Network Transmission Costs for a rural rate of return telephone company shall equal the sum of its interstate-assigned common line costs as defined in Part 69 subpart F of this Chapter; its Additional Interstate Assignment determined pursuant to § 36.154(h) of this Chapter; its Middle Mile Broadband Costs; and its Second Mile Costs.

(1) For purposes of this computation Middle Mile Broadband Costs include the fully-distributed embedded costs of providing regulated transmission services between the Broadband Access Service Connection Point and the Internet backbone assigned to the Middle Mile Special Access subelement defined in § 69.114 (a)(ii) of this Chapter.

(2) For purposes of this computation Second Mile Costs include the fully-distributed embedded costs of providing regulated transmission services between the telephone company end office and the Broadband Access Service Connection Point assigned to the Second Mile Special Access subelement defined in § 69.114 (a)(ii) of this Chapter.

(c) The Rural Broadband Benchmark equals the sum of a fixed component applicable to all rural rate of return study areas as calculated in subsection (1) below and a variable, study area-specific component as calculated in subsection (2) below.

(1) Fixed Component

(i) For the period July 1, 2012 through December 31, 2012 the fixed component of the Rural Broadband Benchmark shall be $19.25.

(ii) For 2013 the fixed component of the Rural Broadband Benchmark shall be $20.00.

(iii) For 2014 the fixed component of the Rural Broadband Benchmark shall be $20.75.

(iv) For 2015 the fixed component of the Rural Broadband Benchmark shall be $21.50.

(v) For 2016 the fixed component of the Rural Broadband Benchmark shall be $22.25.

(vi) For 2017 the fixed component of the Rural Broadband Benchmark shall be $23.00.

(vii) For 2018 the fixed component of the Rural Broadband Benchmark shall be $23.75.

(viii) For 2019, the fixed component of the Rural Broadband Benchmark shall be $24.50.

(ix) For 2020, the fixed component of the Rural Broadband Benchmark shall be $25.25.

(x) For 2021, the fixed component of the Rural Broadband Benchmark shall be $26.00.

(xi) For 2022, the fixed component of the Rural Broadband Benchmark shall be $26.75.

(xii) For 2023 and thereafter, the fixed component of the Rural Broadband Benchmark shall be $27.50.

(2) Variable Component

(i) The variable component of the Rural Broadband Benchmark shall be $6.50 for study areas having a Broadband Take Rate of 25 percent or less.

(ii) For study areas having a Broadband Take Rate in excess of 25 but less than 50 percent, the variable component is equal to $6.50 plus the product of the Broadband Take Rate minus 25 percent, divided by 25 percent, and multiplied by $6.50 multiplied by the following annual transition factor:

(1) For the period July 1, 2012 through December 31, 2012, the transition factor for the variable component of the Rural Broadband Benchmark shall be 0.0415.

(2) For 2013, the annual transition factor for the variable component of the Rural Broadband Benchmark shall be 0.166.

(3) For 2014, the annual transition factor for the variable component of the Rural Broadband Benchmark shall be 0.25.

(4) For 2015, the annual transition factor for the variable component of the Rural Broadband Benchmark shall be 0.333.

(5) For 2016, the annual transition factor for the variable component of the Rural Broadband Benchmark shall be 0.416.

(6) For 2017, the annual transition factor for the variable component of the Rural Broadband Benchmark shall be 0.5.

(7) For 2018, the annual transition factor for the variable component of the Rural Broadband Benchmark shall be 0.583.

(8) For 2019, the annual transition factor for the variable component of the Rural Broadband Benchmark shall be 0.66.

(9) For 2020, the annual transition factor for the variable component of the Rural Broadband Benchmark shall be 0.75.

(10) For 2021 the annual transition factor for the variable component of the Rural Broadband Benchmark shall be 0.833.

(11) For 2022 the annual transition factor for the variable component of the Rural Broadband Benchmark shall be 0.916.

(12) For 2023 and thereafter, the annual transition factor for the variable component of the Rural Broadband Benchmark shall be 1.0.

(iii) For study areas having a Broadband Take Rate of 50 percent or higher, the variable component shall be calculated as specified in subsection 54.1102(c)(2)(ii) above, except that the portion of the Broadband Take Rate over 50 percent shall be reduced by one-half, such that the Broadband Take Rate for purposes of calculating the variable component shall not exceed 75 percent.

§ 54.1103 Adjustments to Other Universal Service Support Mechanisms

(a) *High Cost Loop Support:* To the extent that the sum of the existing High Cost Loop Support calculated in accordance with Part 36 Subpart F of this Chapter plus Safety Net Additive Support calculated in accordance with Part 36 Subpart F of this Chapter plus Safety Valve Support calculated in accordance with § 54.305 of this Chapter exceeds the additional interstate assignment of loop costs calculated pursuant to § 36.154(h) of this Chapter, the study area shall be eligible to receive the difference between the sum of these three mechanisms and the additional interstate assignment of loop costs in addition to the Connect America Fund Support for which it is eligible.

(1) For purposes of this section the additional interstate assignment of loop cost shall be determined by comparing the interstate Part 69 Common Line results for the study period to the Common Line results from a Part 36/69 cost study, excluding the Broadband Take Rate additive calculated pursuant to § 36.154(h) of this Chapter.

(b) *Transitional Interstate Common Line Support:* Effective July 1, 2012, Interstate Common Line Support available to a rate of return carrier qualifying for Connect America Fund support shall be modified by multiplying the carrier's Interstate Common Line Revenue Requirement and its end user subscriber line charge revenue by (1- its Broadband Take Rate).

(c) The provisions of this section shall be effective as of the effective date of Connect America Fund Support pursuant to section 54.1101, and shall remain effective for so long as section 54.1101 remains in effect.

§ 54.1104 Transitional Stability Plan

(a) Connect America Fund (CAF) support available to rate of return carriers shall be subject to Transitional Stability Plan (TSP) adjustments as provided herein. TSP adjustments shall assure that in each year of a transitional period no rate of return study area experiences reductions in total support provided under this Chapter of more than five percent (5%) as a result of rule revisions in Parts 36, 54 and 69 of this Chapter occurring on July 1, 2012, to the extent funding is available as described in (f) below.

(b) During the period July 1, 2012 through December 31, 2015, annual CAF support amounts payable to a rate of return study area pursuant to §§ 54.1101 and 54.1103 of this Chapter for each calendar year shall be compared to High Cost Loop (HCL) support (including any applicable safety net adjustments or safety valve support) in accordance with Part 36, Subpart F and § 54.305 of this Chapter, and Interstate Common Line Support (ICLS) in accordance with § 54.901 of this Chapter that would have been available to that same study area for that same calendar year if Part 36, 54 and 69 rules in effect prior to July 1, 2012 had remained in effect for the current year (Prior Rule Support). If CAF support amounts are lower than the Prior Rule Support amounts by more than five percent, CAF support payable to the study area for that year shall be adjusted to equal ninety-five percent of the Prior Rule Support amount.

(c) For the period January 1, 2016 through December 31, 2016, the TSP adjustment described in subparagraph (b) above shall be reduced by one-third.

(d) For the period January 1, 2017 through December 31, 2017, the TSP adjustment described in subparagraph (b) above shall be reduced by two-thirds.

(e) Effective January 1, 2018 such TSP adjustments shall no longer be available.

(f) Funding for the TSP adjustments described above in each calendar year shall be obtained by reducing, on a pro-rata basis, CAF support amounts available under §§ 54.1101 and 54.1103 of this chapter payable to rate of return study areas having an increase in their CAF support in that same calendar year above their Prior Support amount. Such pro-rata adjustments shall apply only to the portion of CAF support for each study area that exceeds its Prior Rule Support. If adequate funding is not available from such increased amounts of CAF support, TSP adjustment amounts otherwise payable to study areas under subparagraphs (b) through (d) above shall be reduced on a pro-rata basis.

§ 54.1105 Data Reporting and True-up Procedures

(a) Each rate of return carrier shall submit to the Administrator annually on March 31st projected data necessary to calculate the carrier's prospective CAF Support for each of its study areas in the upcoming funding year. The funding year shall be July 1 of the current year through June 30 of the next year. Each rate of return carrier will be permitted to submit a correction to the projected data filed on March 31 until June 30 for the upcoming funding year. On June 30 each rate of return carrier will be permitted to submit to the Administrator an update to the projected data for the funding year ending on that date.

(b) Each rate of return carrier shall submit to the Administrator on December 31st of each year the data necessary to calculate a carrier's CAF Support for the prior calendar year. Such data shall be used by the Administrator to make adjustments to monthly CAF Support amounts in the final two quarters of the following calendar year to the extent of any differences between the carrier's CAF

received based on projected data and the support for which the carrier is ultimately eligible based on its actual data during the relevant period.

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APPENDIX H

Modeling Limits on Reimbursable Operating and Capital Costs

1. Overview. This appendix describes a methodology for determining carrier-specific limits on High Cost Loop Support (HCLS) payments to rate-of-return cost carriers with very high capital expenses (capex) and operating expenses (opex) relative to their similarly situated peers.[1] The methodology operates within the current HCLS calculation algorithm, using information that is readily available to the Commission and to the public.[2] This appendix describes both the econometric process used to establish carrier-specific limits to HCLS payments and the implementation process.

2. This work significantly extends the analyses submitted by the Nebraska Rural Independent Companies, which use ordinary least squares regression analysis to develop a framework to predict capital and operating expenditures.[3] The Nebraska study examines data for a subset of rural rate-of-return carriers, and uses proprietary data not available to the Commission or to the public. In contrast, the proposed methodology described herein uses data currently available to the Commission and sets forth a detailed and implementable mechanism for examining all rural rate-of-return cost study areas and limiting HCLS payments in those study areas that have costs higher than the vast majority of their similarly-situated peers. We use quantile regression for parameter estimation rather than ordinary least squares for reasons set forth below. In addition, because directly implementing caps for capex and opex cannot be accomplished without fundamentally altering the way HCLS support payments are calculated today, the methodology we describe can be implemented quickly within the current HCLS framework.

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[1] The term "similarly-situated peers" means that, based on data from all the carriers in the analysis, if there were (hypothetically) 100 study areas with independent variable values that were nearly the same as those with the study area in question, 90 of them would be expected to have values equal to or less than the 90th percentile prediction. It does not mean the carriers with the most similar number of loops (or values of the other variables).

[2] The analysis is based on 2010 NECA data. *See* NECA Annual Universal Service Fund submission, at http://transition.fcc.gov/wcb/iatd/neca.html. Rate-of-return study areas affiliated with price cap carriers were excluded because support in those study areas will be frozen at 2011 levels in CAF-Phase I and transitioned to CAF-Phase II. *See supra* para. 133. Also excluded were the exchanges that were acquired by other carrier study areas. Pursuant to section 54.305 of the Commission's rules, the acquiring carrier receives support for the acquired exchanges at the same per-loop support as calculated at the time of transfer. *See* 47 C.F.R. § 54.305. Rural carriers who incorporate acquired exchanges into an existing study area are required to provide separately the cost data for the acquired exchanges and the pre-acquisition study area. *See* NECA 2010 USF Overview, at 5, App. F, http://transition.fcc.gov/wcb/iatd/neca.html. The Commission does not have readily available data allowing it to separate these exchanges out from the acquiring exchange, but should be able to do so when running the final analysis. Because of the stable nature of the regression analysis used, staff expects the inclusion of these additional exchanges to have only a small effect on the regression coefficients and therefore on the limits created by the analysis.

[3] *See* Letter from Thomas Moorman, Counsel to Nebraska Rural Independent Companies, to Marlene H. Dortch, Secretary, FCC, WC Docket Nos. 10-90, 05-337, GN Docket No. 09-51, Attach. (Nebraska Rural Independent Companies' Capital Expenditure Study: Predicting the Cost of Fiber to the Premise) (dated Jan. 7, 2011) (Nebraska Rural Independent Companies' Study). *See also* Letter from Paul M. Schudel, Counsel to Nebraska Rural Independent Companies, to Marlene H. Dortch, Secretary, FCC, WC Docket Nos. 10-90, 07-135, 05-337, 03-109, GN Docket No. 09-51, CC Docket Nos. 01-92, 01-92, 96-45, Attach. (Operating Expense Study Sponsored by the Nebraska Rural Independent Companies and Telegee Alliance of Certified Public Accounting Firms: Predicting the Operating Expenses of Rate-of-Return Telecommunications Companies) (dated May 10, 2011).

3. Background. Today, carriers eligible for HCLS file with NECA annual detailed cost data, pursuant to Part 36, at the study area level reporting their costs in many different cost categories.[4] The cost categories are then fed into NECA's 26-step Cost Company Loop Cost Algorithm.[5] The early algorithm steps calculate intermediate values (based on the reported cost categories) and feed into the later algorithm steps which ultimately (in step 26) calculate the carrier's total unseparated cost per-loop for that study area. HCLS for each study area is then calculated by the Expense Adjustment Algorithm.[6] This algorithm determines HCLS payments based on a study area's cost per-loop compared to the nationwide average cost per-loop.[7]

4. Methodology for Imposing Limits. Our methodology creates caps for 11 of the algorithm steps in NECA's 26-step Cost Company Loop Cost Algorithm.[8] These algorithm steps are all functions of cost categories that are defined in NECA's Appendix B.[9] The methodology calculates the maximum amount for each of the 11 algorithm steps as the 90th percentile cost for a similarly situated company. A company whose actual costs for a particular step in the algorithm are above the 90th percentile, compared to similarly situated companies, would be limited to recovering amounts that correspond to the 90th percentile of cost, i.e. the amount of cost that ninety percent of similarly situated companies are at or below when they submit costs for that particular step in the algorithm

5. The methodology involves a quantile regression analysis using data from nearly all the rural rate-of-return cost carriers for each algorithm step.[10] The quantile regression parameter estimates are used to calculate a cap equal to the 90th percentile prediction for each carrier for that algorithm step. This is repeated for each of the rest of the examined algorithm steps. Once all the 90th percentile caps are calculated, the lesser of the company's capped algorithm step value and the original value is inserted into the appropriate algorithm step, which then flows into the later algorithm steps as before. We identify the 11 algorithm steps in the analysis below.

6. We considered using an ordinary least squares-based analysis to set the caps, but decided that quantile regression was preferable for two reasons. First, error terms in bivariate OLS

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[4] *See* Appendix A of NECA's Annual Universal Service Fund submission to the FCC at http://www.fcc.gov/Bureaus/Common_Carrier/Reports/FCC-State_Link/Monitor/usf10af.zip.

[5] *See* Appendix B of NECA's Annual Universal Service Fund submission to the FCC at http://www.fcc.gov/Bureaus/Common_Carrier/Reports/FCC-State_Link/Monitor/usf10af.zip.

[6] *See* Appendix B of NECA's Annual Universal Service Fund submission to the FCC at http://www.fcc.gov/Bureaus/Common_Carrier/Reports/FCC-State_Link/Monitor/usf10af.zip.

[7] The cost per loop used in the HCLS support calculation is annually set at a level to ensure that total HCLS disbursements stay within the HCLS cap that year rather than the actual average loop cost. *See* 47 C.F.R. §§ 36.603(a), 36.622.

[8] Although NECA labels each algorithm step with a line number, we use the word "step" in our description of the methodology to avoid possible confusion of lines with loops.

[9] *See* Appendix B of NECA's Annual Universal Service Fund submission to the FCC at http://www.fcc.gov/Bureaus/Common_Carrier/Reports/FCC-State_Link/Monitor/usf10af.zip.

[10] There were three study areas for which our source of study area boundaries (Tele Atlas Telecommunications Suite 2010.6) did not provide study area information and therefore we could not properly aggregate census data for those study areas so those study areas were omitted. Further, 25 study area had to be omitted because Tele Atlas Telecommunications Suite 2010.6 labeled two or more distinct study areas as if they were one company, so we could not distinguish the proper boundaries. Although NECA labels each algorithm step with a line number, we use the word "step" in our description of the methodology to avoid possible confusion of lines with loops.

models of each algorithm step on the *loops* variable exhibit heteroscedasticity.[11] While ordinary least squares-based analyses such as weighted least squares can certainly deal with heteroscedasticity, it complicates efforts to deal with other problems such as outliers and non-Gaussian error terms.[12]

7. Further, ordinary least squares can produce biased parameter estimates in the presence of outliers.[13] Ordinary least squares has methods available for dealing with outliers, such as excluding them from the analysis or using dummy variables to deal with them, but that requires exercise of judgment as to which observations are truly outliers. Also, given the data currently available to the Commission, distinguishing between study areas with high idiosyncratic costs (i.e., those that truly are the most expensive-to-serve areas) and others with excessively high cost (e.g., due to imprudent or unnecessarily large past investments) is challenging. Further complicating matters, some carriers may enjoy especially low costs compared to their peers for idiosyncratic reasons. While these observations would be outliers, they would be masked by the virtue that they are somewhat "too low" and therefore it would be difficult to properly identify and deal with those outliers. Thus, simply looking only for observations that are too high may be insufficient. When using ordinary least squares, failing to account for all outliers (including the difficult-to-find outliers that are "too low") could bias the regression coefficients which would then bias payments to carriers. Quantile regression solves this problem.

8. Use of Quantile Regression. Quantile regression, developed by Roger Koenker and Gilbert Basset in 1978, is a good solution to address these problems.[14] It is similar to ordinary least squares regression, but where ordinary least squares minimizes the sum of squared residuals from the regression line, the median quantile regression minimizes the sum of absolute residuals from the regression line; for quantiles other than the median, quantile regression minimizes the sum of asymmetrically-weighted absolute residuals.[15]

9. While ordinary least squares requires the error terms be homoscedastic, quantile regression makes fewer assumptions about the error term than ordinary least squares, and so there is no need to correct for heteroscedasticity.[16] Thus the quantile regression methodology is robust to error structures that are non-Gaussian or violate the assumption of the normal distribution of errors required for unbiased estimation using ordinary least squares.[17]

10. Quantile regression is also resistant to outliers, so the parameter estimates would be little changed by accounting for (or not) particular observations as outliers.[18] That is, if one were to modify the

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[11] For all the algorithm steps in this methodology, the Breusch-Pagan test rejected the null hypothesis of homoscedasticity. Ordinary least squares requires the variance of the error term to be homoscedastic (constant) and therefore unrelated to the independent variables. William H Greene, Econometric Analysis 6th Ed. 11 (2008) (Prentice Hall).

[12] Another commonly-used option for correcting for heteroscedasticity is using robust standard errors. That option may work well for statistical inference, but we are most interested in obtaining parameter estimates (so that we can make cost predictions) that are concordant with each other year after year, and robust standard errors does not address this shortcoming.

[13] G.S. Madalla, Introduction to Econometrics, 2nd Ed. 88 (1992) (Macmillan Publishing Co).

[14] Koenker, Roger and Gilbert Bassett. 1978. "Regression Quantiles." Econometrica. January, 46:1, pp. 33–50.

[15] Roger Koenker and Keven Hallock, Journal of Economic Perspectives, Volume 15, Number 4, Fall 2001,Pages 143–156.

[16] Lingxin Hao and Daniel Q. Naiman, Quantile Regression 20 (2007) (Sage Publications).

[17] Koenker, Roger and Gilbert Bassett. 1978. "Regression Quantiles." Econometrica. January, 46:1, pp. 33–50.

[18] Lingxin Hao and Daniel Q. Naiman, Quantile Regression 20 (2007) (Sage Publications).

analysis to account for any known outliers, then we would not expect the list of study areas affected by the caps or the levels of those caps to change very much. Given the complexities of identifying outliers mentioned above, this is an attractive property.

11. Another significant advantage of quantile regression is that it allows the independent variables to have different effects on the study areas in the different quantiles. Thus, for illustrative purposes, if the number of housing units in a rural area increased while holding everything else constant, the size of the study area's cost increase could differ based on which quantile it is in. Hypothetically, the marginal effect of a change could even be positive for a carrier in one quantile (such as the 90th percentile)[19] and negative for a carrier in another (such as the 10th percentile).[20] This is not allowed in ordinary least squares, which assumes that the marginal effect is the same on all carriers. Given that we are examining carriers with high costs relative to other carriers, this is an especially helpful property.

12. Setting the Quantile Threshold. This methodology uses the 90th percentile because carriers with costs exceeding 90 percent of their similarly-situated peers may raise questions about the prudence of such expenditures. In the FNPRM, the Commission seeks comment on whether to set the exact quantile to a lower or higher level such as the 85th percentile or the 95th percentile.[21]

13. All of the regressions were log-log: all dependent and most independent variables were logged using the natural log.[22] For those variables that were logged, we added one before taking the log so that observations with values equaling zero could be included in the analysis.

14. While many of the measures of density are collinear, this is not problematic for this methodology because our goal is prediction, not statistical inference. Multicollinearity does not harm predictions.[23]

15. Dependent Variables. Consistent with the idea of limiting reimbursements for capex, we create caps for algorithm steps 1, 2, 17 and 18.[24] Algorithm steps 1 and 2 represent the two categories of gross plant.[25] Algorithm steps 17 and 18 represent the depreciation and amortization associated with the plant represented in algorithm steps 1 and 2.[26]

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[19] This would be a carrier with very high costs given the number of loops that it serves and other factors.

[20] This would be a carrier with very low costs given the number of loops that it serves and other factors.

[21] Technically, the choice is not limited to percentiles and any quantile can be used, such as the .925 quantile. *See supra* para. 1080.

[22] Weighted density and percent water were not logged. We considered a methodology whereby all the algorithm step dependent variables were unitized by dividing by the number of loops, but we found that approach inferior to the current approach of leaving the algorithm steps non-unitized for two reasons. First, the algorithm steps we are capping are not unitized. Also, the regressions using the unitized algorithm steps lost much of their significance, and we therefore had less confidence in the caps they generated.

[23] Multicollinearity is another reason to be careful when deciding to omit particular variables from the model. T-tests in the presence of multicollinearity can be biased down and can lead one to drop a variable that belongs in the model.

[24] For definitions of these algorithm steps, see Appendix B of NECA's Annual Universal Service Fund submission to the FCC at http://www.fcc.gov/Bureaus/Common_Carrier/Reports/FCC-State_Link/Monitor/usf10af.zip

[25] In particular, step 1 is cable and wire facilities plus the portion of cable and wire facilities leases assigned to Category 1, and step 2 is central office equipment plus the portion of central office equipment leases assigned to Category 4.13.

[26] Specifically, step 17 is depreciation and amortization expense assigned to cable and wireless facility Category 1, and Step 18 is depreciation and amortization expense assigned to central office equipment Category 4.13.

16. Consistent with the idea of limiting reimbursements for opex, we create caps for algorithm steps 7, 8, 13, 14, 15, 16, and 21. Algorithm steps 7 and 8 represent materials and supplies.[27] Algorithm steps 13 and 14 represent maintenance.[28] Algorithm steps 15 and 16 represent network support and general support expenses.[29] Algorithm step 21 represents benefits other than corporate operations expenses.[30] By creating caps for these 11 algorithm steps, we limit the reimbursements for capex and opex expenditures that exceed those of the vast majority of similarly-situated carriers.

17. We exclude algorithm step 19 (corporate operations expense) from our regression analysis because limitations for that cost category have been separately adopted in the Order,[31] and we also exclude algorithm step 20 because it represents taxes. Additionally, we exclude algorithm step 22 (rents) because the regression fit is so poor. Because the regressions are run independently, the exclusion of algorithm step 22 from the methodology does not affect the other regressions.

18. As mentioned above, some of the early algorithm steps calculate factors (based on the reported cost categories) that flow into later algorithm steps. While we do not directly modify algorithm steps 3, 4, 5, 6, 9, 10, 19, 20, and 22, we allow changes in algorithm steps 1 and 2 to flow through to these algorithm steps. For example, algorithm steps 1 and 2 flow into algorithm step 20, which accounts for operating taxes to be assigned to loop costs.[32] Thus, a reduction to algorithm step 1 and/or 2 could lead to a reduction in algorithm step 20, which would be in accordance with the approach of limiting HCLS payments to study areas with very high capital expenses.

19. As we do with the independent variables, the values of the algorithm steps in our analysis were logged to linearize the model. In two instances, a study area had a negative algorithm step value, which prevented us from taking the natural log for those two values. These two observations were omitted. The data from these two study areas were still included in all the other regressions. Where the algorithm step value was negative, the study area's original algorithm step value was retained.

20. Independent Variables. The independent variables in this study are those that we believe correlate with each carrier's costs, are currently available to the Commission, and exist for all study areas in the regression analysis.[33] The independent variables in our methodology are proxies for scale, density, and terrain. Other than the number of loops the study area serves, all the independent variables are from

[27] Specifically, step 7 is materials and supplies assigned to cable and wireless facility Category 1, and Step 8 is materials and supplies assigned to central office equipment Category 4.13.

[28] In particular, algorithm step 13 represents cable and wire facilities maintenance assigned to Category 1, and algorithm step 14 represents Central Office equipment maintenance expense assigned to Category 4.13.

[29] Specifically, algorithm step 15 is associated with network support expenses plus general support expenses assigned to cable and wire facility category 1 and central office equipment associated with Category 4.13.

[30] Algorithm step 21 is benefits other than corporate operations expense assigned to cable and wire facility Category 1 and central office equipment Category 4.13.

[31] *See* Section VII.D.4.

[32] Algorithm steps 1 and 2 (combined with 5 and 6) result in an allocation ratio that determines the amount of an expense, such as taxes, that will be assigned to loop costs for purposes of calculating HCLS.

[33] We note that using the Soil Survey Geographic Database (SSURGO) soils data from the Natural Resource Conservation Service (NRCS) that the Nebraska study used to generate soil, frost and wetland variables do not cover the entire United States. The SSURGO data do not cover about 24 percent of the United States land mass (including Puerto Rico, Guam, American Samoa, US Virgin Islands and Northern Mariana Islands). Much, but not all of the missing land area is in Alaska. Thus, there are some study areas where there is no SSURGO data (such as Adak Tel Utility) and other study areas where the SSURGO data not cover the entire study area such as Matanuska Tel Assoc. We therefore could not use these data in the regression model.

the 2010 United States census.[34] As we do with the algorithm step variables, we took the natural logs of all the independent variables to linearize the model.[35]

21. Census block data were rolled up to study area boundaries using Tele Atlas data.[36] There were 28 study areas without census block information that were excluded from this analysis.[37] There are two significant advantages to using block-level census data. First, census blocks are most granular areas at which the Census Bureau publishes data, so using census blocks allows for the most accurate mapping of demographic data such as housing units to study areas. Second, census blocks are designated as being part of (in decreasing urbanness order) an urbanized area, urbanized cluster or nonurban.[38] In this fashion, we allow the nonurban (rural) independent variables to have different effects from the urban variables. For instance, the additional cost of serving an additional urban housing unit (holding all else constant) is likely to be different than the cost of serving an additional rural housing unit. Therefore, for each of the census-based independent variable in our analysis, we roll the data up based on whether they are in an urbanized area, urbanized cluster or rural area within the study area.

22. Not all the variables are significant in each regression, and there are some variables (such as the log of land area in urbanized clusters) that are not significant in any of the regressions. We chose to use all the variables in all the regressions so long as the parent variable (such as land area) had at least one child variable (such as land area in a non-urbanized area) that was significant for at least one of the regressions in the analysis. While this meant that some regressions had many insignificant variables, this was not a problem because the goal of the regression was not to determine statistically significant correlations, but instead to generate 90th percentile predictions, which are unaffected by the addition of insignificant variables.

23. We use two measures of scale, *loops* and *housing units*. The more loops the carrier is serving, the higher its expenses will be. We use the number of loops in NECA's October 2011 filing.[39]

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[34] The census data can be downloaded here: http://www2.census.gov/census_2010/01-Redistricting_File--PL_94-171/ and the documentation is available here: http://www.census.gov/prod/cen2010/doc/pl94-171.pdf. Census has not yet released the urban/rural breakouts for 2010, so we used the 2000 urban/rural breakouts.

[35] Because some of the census variables were sometimes zero (for instance, certain land areas were sometimes zero), we added 1 to each of the census variables (except percent water) before taking the natural log. We accounted for this when creating the 90th percentile prediction for each algorithm step.

[36] Census blocks were assigned to study areas based on the location of the block's centroid. Thus, all blocks were assigned to exactly one study area. Tele Atlas Telecommunications Suite 2010.6 was used to determine the study area boundaries for each of the study areas in this analysis. Study area boundaries could not be determined for the territories because Tele Atlas Telecommunications Suite 2010.6 did not provide data for them.

[37] There were three study areas for which we could not find 2010 census data, so those observations were omitted. Further, 25 study area had to be omitted because our source of study area boundaries (Tele Atlas Telecommunications Suite 2010.6) labeled two or more distinct study areas as is they were one company, so we could not distinguish the proper boundaries.

[38] For a discussion of how the Census Bureau determines urbanized areas, urbanized clusters, and rural areas, see http://www.census.gov/geo/www/ua/2010urbanruralclass.html.

[39] The most recent year of data was used. See NECA's Overview of Universal Service Fund, which can be found at http://transition.fcc.gov/wcb/iatd/neca.html.

The NECA data do not disaggregate loop data by urbanized clusters, urbanized areas or non-urban areas, so we include an additional scale variable with the urbanness breakout: housing units.[40]

24. We include two measures of density in our analysis, the *weighted housing unit density* and the *number of census blocks* in the study area. Because it is easier to wire businesses and homes when they are close to each other than when they are far apart, we expect that costs will decrease with density.[41] There are several ways one can measure density, however.

25. The simple method, which merely divides the study area's number of housing units by total area (or just land area) does not take into account the possibility that large swaths of land in a study area may have absolutely no homes or businesses.[42] So we calculate the weighted average density for each study area using census block data.

26. For each census block in each study area, we calculated the block's density by dividing the number of housing units in the block by the area of the block.[43] We then set the weight for each block equal to the number of housing units in the block divided by the total number of housing units in the study area. Thus, blocks without any homes had no weight. Again, census data do not include the number of businesses in the block, so we could not include them in the density calculation.

27. We include *land* and *percent water* in each study area as a rough indicator of terrain-driven costs. We expect that holding everything else constant, the more land area that a carrier has in its territory, the more expensive it is to serve. Similarly, the more water area in the study area, the more expensive it should be to serve, because roads are typically routed around such water, so the natural pathways for the carrier's cabling are longer than they otherwise would be.

28. Results. The regression analysis was run for the four most recent years of data that NECA reported to the Commission: 2007 – 2010. The results for each year of data were very consistent with each other. The regression results from 2010 are included below.

29. Two versions of the quantile regression analysis are presented: Table 1 includes the *weighted density* variable, and Table 2 excludes it. Perhaps surprisingly, weighted density was significant in only one of the regressions in Table 1. One may think weighted density is insignificant in this model because of the inclusion of the other density measures (the three blocks variables), but weighted density is still insignificant when the *blocks* variables are omitted. (Further, the pseudo R^2 drops when we omit the *blocks* variables, so we keep the *blocks* variables in the analysis and drop the *weighted density* variable.) We therefore use the model that excludes weighted density.

30. As expected, the *loops* variable was the most influential independent variable in predicting the values for the algorithm steps. The remaining variables are significant in many of the regressions (both when including and excluding the *weighted density* variable), and so they remain in the regressions.

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[40] We understand that carriers serve business as well as homes, but we do not have business information with the same urbanness breakout as housing units. We are comfortable with the assumption that businesses and homes are similarly distributed throughout study areas for rate-of-return carriers.

[41] For example, see Nebraska Companies' Capital Expenditure Study at 18.

[42] We estimated with model with the simple calculation of density, and it performed worse than the weighted density variable.

[43] Although the Census Bureau publishes census block area in square meters, the area was converted to square miles for this analysis.

31. As mentioned above, the study area's capped algorithm step values (or the original algorithm step values where they are lower than the capped algorithm step values) are inserted into the algorithm. These step values then flow into later algorithm steps that ultimately determine the Study Area Cost Per Loop value.

32. Implementation. This proposed methodology would be updated annually to establish limits on the Study Area Cost Per Loop values, which are used to determine eligibility for HCLS payments.

Table 1. 90th Percentile Quantile Regression Coefficients – Data as of 2010 without weighted density

	AS1	AS2	AS7	AS8	AS13	AS14	AS15	AS16	AS17	AS18	AS21	AS22
Loops	0.885***	0.964***	1.167***	1.291***	0.542***	0.725***	0.919***	0.876***	0.892***	0.834***	0.785***	0.769***
	(15.99)	(14.49)	(6.65)	(9.05)	(6.40)	(9.99)	(6.50)	(8.86)	(8.56)	(8.32)	(13.26)	(3.67)
Housing_Units_nu	-0.32***	-0.43***	-0.519*	-0.66***	0.0594	-0.272**	-0.185	-0.337**	-0.319*	-0.216	-0.125	-0.149
	(-4.57)	(-5.69)	(-2.36)	(-3.70)	(0.61)	(-2.96)	(-1.05)	(-2.62)	(-2.43)	(-1.94)	(-1.51)	(-0.55)
Housing_Units_uc	0.166**	0.194**	0.222	0.250	0.0353	0.0261	0.0476	0.223	0.161	0.174	0.241*	0.151
	(2.79)	(2.63)	(0.85)	(0.86)	(0.30)	(0.26)	(0.30)	(1.42)	(1.30)	(1.61)	(1.96)	(0.58)
Housing_Units_ua	-0.0356	0.0895	0.143	-0.0056	0.103	-0.0519	-0.00828	-0.189	-0.0520	0.191	-0.230*	-0.454
	(-0.52)	(0.66)	(0.35)	(-0.01)	(0.52)	(-0.40)	(-0.05)	(-0.80)	(-0.36)	(1.02)	(-2.38)	(-1.11)
Land_Area_nu	0.163***	0.138***	0.218**	0.215*	0.0835	0.143**	0.220**	0.0544	0.117*	0.171**	0.186***	0.222
	(6.11)	(3.57)	(2.60)	(2.42)	(1.74)	(2.86)	(2.91)	(0.68)	(2.30)	(3.05)	(4.33)	(1.69)
Land_Area_uc	0.00647	0.0223	-0.0051	-0.0614	-0.216	-0.0178	0.0292	0.145	-0.0146	-0.109	-0.104	-0.297
	(0.10)	(0.21)	(-0.02)	(-0.22)	(-1.41)	(-0.12)	(0.15)	(0.72)	(-0.13)	(-0.86)	(-0.71)	(-0.98)
Land_Area_ua	-0.101	0.137	0.596	0.265	-0.0041	-0.289*	0.0983	0.219	0.169	0.482	-0.384**	-0.467
	(-1.49)	(0.72)	(1.19)	(0.48)	(-0.02)	(-2.33)	(0.24)	(0.68)	(1.36)	(1.86)	(-2.59)	(-0.95)
Percent_Water	0.866***	-0.0712	-0.434	-1.103	0.299	-0.244	0.808	1.731*	0.577	-0.821	-0.246	-0.0843
	(3.31)	(-0.19)	(-0.36)	(-0.91)	(0.38)	(-0.54)	(0.86)	(2.53)	(1.03)	(-1.37)	(-0.31)	(-0.05)
Census_Blocs_nu	0.134*	0.200*	0.228	0.297	0.0559	0.113	-0.129	0.135	0.176	0.0630	0.0840	-0.259
	(2.44)	(2.37)	(1.27)	(1.53)	(0.58)	(1.05)	(-0.77)	(0.87)	(1.69)	(0.53)	(0.91)	(-1.01)
Census_Blocs_nu	-0.252**	-0.318**	-0.341	-0.388	0.0386	-0.0340	-0.0735	-0.325	-0.251	-0.246	-0.297	-0.0890
	(-2.72)	(-2.89)	(-0.84)	(-0.90)	(0.22)	(-0.22)	(-0.30)	(-1.38)	(-1.29)	(-1.46)	(-1.58)	(-0.22)
Census_Blocs_nu	0.160	-0.123	-0.492	-0.0194	-0.0713	0.303	0.000850	0.228	0.0383	-0.454	0.563***	1.037
	(1.48)	(-0.50)	(-0.66)	(-0.02)	(-0.19)	(1.64)	(0.00)	(0.48)	(0.18)	(-1.35)	(3.42)	(1.34)
Constant	10.38***	8.933***	4.261***	2.419***	7.263***	7.263***	6.055***	6.929***	7.269***	6.547***	5.822***	7.220***
	(50.38)	(36.72)	(6.26)	(3.56)	(19.34)	(21.60)	(10.77)	(12.50)	(19.23)	(17.90)	(17.85)	(8.58)
N	720	720	720	720	720	719	719	720	720	720	720	720
pseudo R^2	0.5863	0.4802	0.2949	0.2745	0.4395	0.3110	0.3648	0.3893	0.5121	0.3790	0.4516	0.0782

t statistics in parentheses

$^{*}p < 0.05$, $^{**}p < 0.01$, $^{***}p < 0.001$

Notes: All variables except Percent Water are in logs. AS = Algorithm Step; nu = non-urbanized area; uc = urbanized cluster; ua = urbanized area.

Table 2. 90th Percentile Quantile Regression Coefficients – Data as of 2010 – with weighted density

	AS1	AS2	AS7	AS8	AS13	AS14	AS15	AS16	AS17	AS18	AS21	AS22
Loops	0.891***	0.964***	1.008***	1.073***	0.529***	0.716***	0.756***	0.895***	0.762***	0.844***	0.785***	0.621*
	(17.29)	(11.74)	(8.03)	(5.79)	(5.65)	(8.89)	(5.67)	(7.44)	(9.37)	(6.92)	(11.08)	(2.07)
Weighted_Density	-0.0393	-0.0231	-0.0146	0.0160	-0.0735	-0.0554	0.157*	-0.0518	-0.0103	-0.0102	0.0504	0.211
	(-1.27)	(-0.54)	(-0.16)	(0.13)	(-1.24)	(-1.13)	(2.29)	(-0.49)	(-0.22)	(-0.18)	(1.01)	(1.33)
Housing_Units_nu	-0.35***	-0.42***	-0.392*	-0.416	0.0653	-0.287**	-0.0079	-0.374*	-0.155	-0.198	-0.101	0.0367
	(-5.11)	(-4.39)	(-2.31)	(-1.69)	(0.61)	(-2.84)	(-0.05)	(-2.14)	(-1.50)	(-1.40)	(-1.09)	(0.09)
Housing_Units_uc	0.139*	0.172*	0.227	0.248	0.0441	0.0248	-0.0198	0.176	0.121	0.117	0.220	0.235
	(2.26)	(2.12)	(0.91)	(0.73)	(0.41)	(0.25)	(-0.15)	(0.96)	(1.19)	(1.05)	(1.73)	(0.74)
Housing_Units_ua	-0.0321	0.0804	0.305	0.0561	0.121	-0.0907	-0.0332	-0.233	0.136	0.144	-0.205*	-0.417
	(-0.45)	(0.54)	(1.06)	(0.11)	(0.61)	(-0.72)	(-0.24)	(-0.84)	(1.35)	(0.85)	(-2.03)	(-0.92)
Land_Area_nu	0.138***	0.135**	0.161*	0.234*	0.0543	0.135**	0.204**	0.0114	0.125**	0.181**	0.197***	0.321
	(4.75)	(3.07)	(2.03)	(2.23)	(1.05)	(2.73)	(3.18)	(0.12)	(3.08)	(3.00)	(4.47)	(1.96)
Land_Area_uc	0.0226	0.0142	-0.0659	0.0955	-0.214	-0.0018	0.0815	0.153	-0.0904	-0.114	-0.128	-0.269
	(0.33)	(0.12)	(-0.23)	(0.29)	(-1.45)	(-0.01)	(0.53)	(0.65)	(-1.06)	(-0.87)	(-0.91)	(-0.77)
Land_Area_ua	-0.107	0.108	0.524	-0.0237	0.140	-0.242	0.0972	0.190	-0.110	0.263	-0.413**	-0.476
	(-1.59)	(0.51)	(1.12)	(-0.04)	(0.56)	(-1.95)	(0.38)	(0.50)	(-0.84)	(0.97)	(-3.12)	(-0.79)
Percent_Water	0.905**	-0.0899	-0.825	-1.349	0.167	-0.260	0.654	1.685*	0.375	-0.762	-0.166	0.131
	(3.00)	(-0.21)	(-0.73)	(-0.94)	(0.20)	(-0.59)	(0.84)	(2.08)	(0.76)	(-1.19)	(-0.21)	(0.07)
Census_Blocs_nu	0.178**	0.192*	0.301	0.232	0.0850	0.126	-0.107	0.192	0.140	0.0200	0.0809	-0.352
	(2.95)	(1.99)	(1.71)	(0.98)	(0.82)	(1.17)	(-0.75)	(1.02)	(1.63)	(0.16)	(0.85)	(-1.06)
Census_Blocs_uc	-0.215*	-0.279*	-0.319	-0.406	0.0452	-0.0284	0.00157	-0.247	-0.162	-0.164	-0.271	-0.241
	(-2.23)	(-2.29)	(-0.83)	(-0.80)	(0.28)	(-0.19)	(0.01)	(-0.90)	(-1.01)	(-0.94)	(-1.39)	(-0.50)
Census_Blocs_ua	0.163	-0.0922	-0.701	-0.0939	-0.173	0.344	0.0371	0.314	-0.0927	-0.276	0.539**	0.930
	(1.45)	(-0.34)	(-1.24)	(-0.10)	(-0.47)	(1.91)	(0.19)	(0.57)	(-0.58)	(-0.84)	(3.22)	(1.03)
Constant	10.58***	9.068***	4.426***	2.460*	7.735***	7.748***	4.921***	7.261***	7.234***	6.602***	5.275***	5.705***
	(37.30)	(23.73)	(5.48)	(2.26)	(14.24)	(17.77)	(7.72)	(7.26)	(17.65)	(12.92)	(14.24)	(4.18)
N	717	717	717	717	717	716	716	717	717	717	717	717
pseudo R^2	0.5931	0.4839	0.3042	0.2747	0.4440	0.3142	0.3718	0.3920	0.5194	0.3818	0.4570	0.0791

t statistics in parentheses

$^{*}p < 0.05$, $^{**}p < 0.01$, $^{***}p < 0.001$

Notes: All variables except Percent Water and Weighted Density are in logs. AS = Algorithm Step; nu = non-urbanized area; uc = urbanized cluster; ua = urbanized area

APPENDIX I

Estimated Consumer Benefits of Intercarrier Compensation Reform

1. This appendix explains Commission staff's estimate that consumers will likely gain benefits worth over $1.5 billion annually as a result of the ICC reform adopted in the Order.[1] These benefits will come in the form of lower prices, increased service levels at existing prices, and/or more innovative services. This appendix also explains staff's estimate that new Access Recovery Charges (ARCs) that incumbent LECs electing to participate in the recovery mechanism may assess will impose a total, peak-year burden on consumers of less than $500 million per year. This includes approximately $1 monthly per line in business ARCs, reflecting 5 years of annual increases of approximately 20 cents monthly per line, most or all of which we expect will ultimately get passed through to customers of these businesses, and approximately $0.65 monthly per line in residential and single-line ARCs, based on 5 years of annual increases of approximately 12.5 cents monthly per line.[2] Given these estimates, staff expects that the consumer benefit to cost ratio of ICC reform will be greater than 3:1. Although these estimates illustrate the likely consumer benefits of reform, given their inherent uncertainty, they were not relied on in reaching the decisions in the Order.[3]

2. This analysis takes a conservative approach; that is, the analysis makes assumptions likely to understate expected consumer benefits and to overstate the potential costs of the ARC. In particular, this analysis estimates only those consumer gains and losses that will arise as a *direct* result of reforms adopted in the Order: carriers' direct responses to reductions in ICC rates and to the ability to assess ARCs, which will affect how carriers price and deliver calling services. There will also be *indirect* consequences of reform, which staff expects will also be on the whole positive for consumers, such as reductions in billing disputes; more efficient decisions in production, including an accelerated transition to all-IP networks; and innovation more generally.[4] The reforms will also enable consumers to efficiently expand their use of telephone services, compared to what they would have done absent reform, as prices are brought closer to marginal cost.[5] While staff did not attempt to estimate any of these indirect benefits, past experience suggests they will be substantial.[6]

Consumer Savings: Intercarrier Compensation Charge Reductions

3. Staff estimates that the consumer benefits from the ICC rate reductions adopted in the Order[7] will scale to between $1.5 and $2.6 billion annually.[8] This analysis begins by estimating the

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[1] This Appendix focuses exclusively on the ICC reforms in the Order. It does not address the effects of the Order's universal service reforms.

[2] *See infra* note 295 and accompanying text, *see also supra* para. 852. The average expected business ARCs were calculated using the same method described in the Order for average expected consumer ARCs.

[3] The Order does, however, conclude that the benefits of ICC reform outweigh the costs overall. *See supra* Section XII.A.

[4] *See id.*

[5] *See id.*

[6] *See supra* para. 751.

[7] The Order reduces rates for intrastate and interstate terminating end-office switching, reciprocal compensation (*i.e.*, non-access) rates, and certain terminating switched access transport rates (in the case where the tandem and (continued...)

termination charges that interexchange carriers, Commercial Mobile Radio Service (CMRS) providers, and other carriers currently pay to local exchange carriers (LECs) and that will be eliminated as carriers transition to bill and keep arrangements under the Order. For simplicity, staff did not consider ICC savings from reductions of dedicated transport from intrastate to interstate rates; from moving all intraMTA CMRS-to-LEC traffic to bill-and-keep, including rate elements not otherwise reduced in the Order; or from capping all interstate and most intrastate rates not reduced to bill and keep, each of which would increase staff's estimates of consumer savings. The analysis then estimates the fraction of ICC savings that will be passed on to consumers in the form of lower prices or better value for existing prices.

4. To estimate savings from ICC reductions, staff started with incumbent LECs' 2010 ICC revenues, filed in response to the *USF/ICC Transformation NPRM*.[9] These data showed $2.9 billion of revenues for the ICC rate elements that will be transitioned to a bill-and-keep methodology under the Order.[10]

5. For competitive LECs, staff had to estimate revenues indirectly. Although the *NPRM* requested data from all providers, including competitive LECs, competitive LECs did not file this type of data. To fill this gap, staff estimated competitive LEC ICC revenues based on incumbent LEC revenues, applying a conservative assumption that competitive LECs receive approximately 25 percent less ICC revenue per line than incumbents. This downward adjustment reflects the fact that there has been some dispute regarding payment for termination of VoIP calls, and competitive LECs affiliated with cable companies may be party to a disproportionate share of disputes relating to payment for VoIP traffic compared to incumbent carriers.[11] Based on these calculations, staff estimates that competitive LECs collected a total of approximately $1.1 billion in 2010 ICC revenues for the ICC rate elements that will be transitioned to bill-and-keep under the Order.[12]

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end-office switches are owned by the same carrier) to a bill-and-keep methodology. These reductions are all included in the staff's analysis. The *Order* also caps all interstate rates, all intrastate rates for price cap carriers, and reduces intrastate dedicated transport rates to interstate levels, but for simplicity the analysis ignores these additional changes in estimating consumer benefits.

[8] All estimates are expressed in 2010 dollars.

[9] *See supra* para. 852, note 1646.

[10] *See supra* note 7.

[11] Staff conservatively assumed that, due to these unresolved disputes, cable-company-affiliated competitive LECs receive only half the termination revenues that would accrue to an incumbent LEC. Cable companies account for 50 percent of competitive LEC voice services, and staff assumed that other competitive LECs receive per line ICC payments equivalent to those of incumbent LECs. Staff therefore estimates that competitive LECs as a whole receive 25 percent less on a per line basis in ICC revenues compared to incumbent LECs. *See* National Cable and Telecommunications Association, http://www.ncta.com/Stats/CablePhoneSubscribers.aspx (at the end of 2010, cable companies provided voice service to 23.9 million voice subscribers); Federal Communications Commission, Local Telephone Competition Status, Industry Analysis and Technology Division Wireline Competition Bureau March 2011, Table 1, page 12, http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-305297A1.pdf) (2010 total of all competitive LEC voice services). Consistent with the prospective approach the *Order* adopts with respect to VoIP payment obligations, the 25 percent per line revenue discount does not reflect any judgment concerning carriers' obligation to pay for VoIP traffic prior to the *Order*'s effective date—it is merely the staff's conservative estimate of 2010 actual collected revenues.

[12] Nationwide, incumbent LECs have approximately two thirds of all fixed (as opposed to mobile) voice customers and competitive LECs have approximately one third. *See* National Exchange Carrier Association's Annual Submission of Access Minutes of Use Data to the FCC, submitted to the FCC on March 21, 2011,
(continued...)

6. Adding incumbent LEC revenues of approximately $2.9 billion to competitive LEC revenues of approximately $1.1 billion, staff estimates that, accounting for rounding errors, a total of approximately $4.1 billion in 2010 ICC revenues will be transitioned to a bill-and-keep methodology over the course of reform. Because these revenues are payments from other carriers, including CMRS and interexchange carriers, the paying carriers will realize savings as ICC rates are phased out.[13] And because these savings are in traffic-sensitive costs, the paying carriers will have a strong incentive to reduce prices or otherwise enhance their offerings so as to encourage greater network use and retain or attract customers.

7. Staff therefore next considered what share of these savings will be passed on to consumers in the form of lower prices, increased service levels at existing prices, and/or more innovative services. To build a simplified, conservative model of consumer pass-through, staff assumed all end users

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http://www.fcc.gov/Bureaus/Common_Carrier/Reports/FCC-State_Link/Monitor/netwu10.zip. If the equivalent competitive LEC termination revenues were scaled by these line counts, then they would be approximately half of the incumbent LEC's revenues, or approximately $1.5 billion for 2010. Reducing this amount by 25 percent, allowing for rounding errors, results in approximately $1.1 billion.

[13] Some ICC payments are internal company transfers, such as when an AT&T LEC or CMRS customer places a long-distance call to an AT&T LEC customer. As explained below, we estimate that these account for less than 20 percent of ICC payments. It might be thought that integrated firms will not view reductions in such payments as savings, and therefore these payments should be excluded when calculating consumer gains. This argument rests on the incorrect assumption that profit-maximizing carriers set retail prices to their customers based solely on their resource marginal cost of call termination for calls going to other on-network customers, rather than based on regulated ICC rates. But as recognized in the economics literature cited below, this assumption ignores an important point: an integrated carrier (i.e., one that also owns a LEC) will recognize that decreases in its retail price typically will divert business to it from competing carriers and, hence, decrease the profit it earns from access paid to it by those carriers. (The decrease is proportional to its access margin and the diversion ratio – the percent of the increase in its minutes that came at the expense of other carriers.) Thus, an integrated carrier will treat its marginal cost for outbound calls as its resource marginal cost of termination plus an opportunity cost reflecting the lost access revenue from other carriers. *See, e.g.*, Gary Biglaiser & Patrick DeGraba, *Downstream Integration by a Bottleneck Input Supplier Whose Regulated Wholesale Prices Are above Costs*, 32 RAND J. Econ. 302 (2001), available at http://www.jstor.org/stable/2696411,Yongmin Chen, *On Vertical Mergers and Their Competitive Effects*, 32 RAND J. Econ. 667 (2001), available at http://www.jstor.org/stable/2696387, Patrick DeGraba, *A Bottleneck Input Supplier's Opportunity Cost of Competing Downstream*, 23 J. Reg. Econ. 287 (2003), DOI: 10.1023/A:1023364210896, David Sappington, *On the Irrelevance of Input Prices for Make-or-Buy Decisions*, 95 Am. Econ. Rev. (2005), http://www.jstor.org/pss/4132768. Correspondingly, a reduction in inter-company access payments will induce integrated carriers to cut their retail prices for two reasons: (a) not only because their retail competitors experience marginal cost reductions, and hence cut retail prices, but also (b) because their own opportunity cost of providing outbound calls falls due to the decreased access revenue earned from competitors. For both reasons, the decrease in industry retail prices – and the corresponding benefits to consumers – would be significantly understated if one projected these benefits based only on reductions in inter-company ICC payments (i.e., excluding all internal ICC payments).

Staff arrived at the estimate that less than 20 percent of ICC expenses are internal payments based on the line-shares of AT&T, Verizon and Verizon Wireless, and CenturyLink. This estimate of intracarrier ICC payments is exaggerated because Verizon does not fully own Verizon Wireless, and so payments between these carriers are not entirely internal. Internal transfers within other carriers should be small. Staff squared each integrated firm's share of total voice lines (ILEC, CLEC, and CMRS) to approximate the percentage of all ICC payments that represent calls from that carriers' customers to other customers of the same carrier (assuming all telephone users are equally likely to call all other telephone users). This calculation implies that approximately 18 percent of ICC expenses are internal transfers.

purchase long distance bundled with local service,[14] and then estimated end users' savings based on the type of carrier they purchase this bundled service from (incumbent LEC, competitive LEC, or wireless provider). Staff assumed that to the extent end users' local service provider purchased wholesale long distance service from an unaffiliated provider, the local carrier would realize 100 percent pass through of the ICC savings,[15] but would pass only a fraction of those savings on to its customers.

8. Specifically, staff began by dividing the total ICC savings from reform among incumbent LEC, competitive LEC, and wireless providers, assuming that each group of carriers realize savings in proportion to their share of total lines.[16] Staff then assumed that incumbent LECs will, on average, pass through at least 50 percent of ICC savings to end users, while CMRS providers and competitive LECs will pass through at least 75 percent of these savings.

9. These are conservative estimates. For example, economic theory suggests that a pure monopolist facing the benchmark case of linear demand would have a 50 percent pass through rate,[17] but many incumbent LECs face at least some direct competition from other fixed voice providers, and virtually all incumbent LECs face at least some competitive pressure in the voice market from CMRS providers, and/or from interconnected or over-the-top VoIP providers. Meanwhile, CMRS providers compete with one or more rivals for virtually all their customers, and, even where CMRS competition is limited, consumers may benefit from nationwide wireless pricing plans. Competitive LECs, likewise, face competition from at least one other wireline provider (the incumbent), as well as, to some degree, from wireless providers. Thus, 75 percent pass through by CMRS carriers and competitive LECs is a conservative estimate. Indeed, in the late 1990s, evidence indicates that reductions of access charges for MCI and AT&T resulted in pass through rates that were close to 100 percent,[18] and even in relatively concentrated industries, pass through rates are generally above 75 percent[19] and findings of higher pass through rates are common.[20]

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[14] This simplifying assumption is likely conservative to the extent that end users, including businesses, that purchase long distance as a stand-alone service are likely to receive greater pass-through of ICC savings than those that purchase the service as part of a bundle. *See* T.R Beard, G.S. Ford, R.C. Hill & R. Saba, *The Flow Through of Cost Changes in Competitive Telecommunications: Theory and Evidence*, 30 Empirical Econ. 555 (2005) (finding evidence of near-100 percent pass through rates for MCI and AT&T from past ICC reductions).

[15] The interexchange market has been shown to be competitive, *see id.*, and staff had no evidence that suggests this has changed. Any inaccuracy in this 100 percent long-distance pass through assumption is likely offset by the conservative nature of staff's end-user pass through estimates.

[16] Line counts are from CTIA Semi-Annual Wireless Industry Survey, June 2011, at 5, http://files.ctia.org/pdf/CTIA_Survey_MY_2011_Graphics.pdf, and Federal Communications Commission, Local Telephone Competition Status, Industry Analysis and Technology Division Wireline Competition Bureau, March 2011, Table 1.

[17] *See, e.g.*, J. Bulow & Pfleiderer, *A Note on the Effect of Cost Changes on Prices*, 91 J. of Political Economy 182 (1983); J. Hausman & G. Leonard, *Efficiencies from the Consumer Viewpoint*, 7 Geo. Mason L. Rev. 707 (1999).

[18] *See* T.R Beard, G.S. Ford, R.C. Hill & R. Saba, *supra* note 14.

[19] *See* Orley Ashenfelter, David Ashmore, Jonathan B. Baker & Signe-Mary McKernan, Identifying the Firm-Specific Cost Pass-Through Rate, Jan. 1998, http://www.ftc.gov/be/workpapers/wp217.pdf (finding 85 percent pass through for an industry-wide cost reduction in a concentrated industy).

[20] *See, e.g.*, Silva-Risso Busse & Zettelmeyer, *$1,000 cash back: The Pass-Through of Auto Manufacturer Promotions*, 96 Amer. Econ. Rev. 1253 (2006) (finding pass through rates for automobile consumer rebates of 70-90 percent, though these fell to 30-40 percent for dealer discounts), D. Besanko, J. P. Dubé, & S. Gupta, *Own-Brand and Cross-Brand Retail Pass-Through*, 24 Marketing Science 123 (2005) (finding pass through greater than 100 (continued...)

10. Based on these assumptions, staff concludes that by the end of ICC reform, end users will gain up to $2.8 billion in annual benefit, compared to 2010, from the reduction of ICC payments subject to the Order's bill-and-keep transition. Because this estimate includes benefits to both businesses and consumers, staff then applied a further discount to account for benefits realized by purchasers of business lines and not passed on to their customers. This leads to an estimate of $2.6 billion in consumer benefits.[21]

11. This number does not fully reflect the consumer benefits directly attributable to reform, however; it is, instead, an upper bound on those benefits. This is because some reduction in carriers' ICC payments, and therefore some savings to consumers, likely would have occurred even absent reform. In particular, evidence suggests that total termination payments have been on a downward trend in recent years, likely reflecting a combination of three sectoral trends in telephone markets: (1) telephone users dropping fixed voice lines in favor of mobile service (because CMRS carriers cannot collect access revenues, total ICC payments go down as users switch to mobile); (2) telephone users shifting from incumbent LECs to cable-affiliated competitive LECs (to the extent competitive LECs collect lower per-line revenues as a result of VoIP disputes, total ICC payments go down as users switch from wireline incumbents to their cable competitors); and (3) telephone users reducing their per-line minutes-of-use (as minutes of use go down overall, total ICC payments go down). Given these trends, comparing consumer ICC savings under the Order with the savings that would have occurred absent reform requires year-by-year projections of ICC payments over time.

12. To generate these projections, staff separately estimated what ICC revenues price cap incumbent LECs, rate-of-return incumbent LECs, and competitive LECs might each have received absent reform in the coming years. Following the ICC recovery baseline estimates used in the Order, staff assumed price cap carrier revenues would have declined approximately 10 percent annually, and rate-of-return carrier revenues would have declined approximately 5 percent annually, in each case resulting from declines in terminating minutes of use.[22] Incumbent LECs' revenue declines would likely have been

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percent for about 14 percent of 78 products analyzed), J.M. Campa &L.S. Goldberg *Exchange Rate Pass-Through into Import Prices*, 87 Review of Economics and Statistics 679 (2005) (finding pass through rates near 100 percent), Besley, T.J. and Rosen, H.S., "Sales Taxes and Prices: An Empirical Analysis," National Bureau of Economic Research Working Paper No. 6667, 1998, available at http://www.nber.org/papers/w6667 (same), O. Ashenfelter, D. Ashmore, J. B. Baker & S. McKernan, *supra* note 19, J. Menon *Exchange Rate Pass-Through*, 9 Journal of Economic Surveys 197 (1998) (same), J.M. Poterba, *Retail Price Reactions to Changes in State and Local Sales Taxes*, 49 National Tax Journal 165 (1996) (same), D. Genesove & W.P. Mullin *Testing Static Oligopoly Models: Conduct and Cost in the Sugar Industry*, 29 RAND Journal of Economics 355 (1998) (same). Given these data, the estimated CMRS pass through rate of 75 percent can be taken, in the absence of any other information, as a plausible estimate between the monopolist rate of 50 percent, *see supra* note 17, and 100 percent.

[21] Approximately 69 percent of end user lines are residential or single-line businesses. *See* 2010 USF Monitoring Report, Table 7-9, http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-303886A9.pdf. To the extent single-line businesses—which are small businesses—operate in competitive environments, their gains will be passed on to their customers; but even if they are not fully passed on, these gains directly benefit the consumer who operates the small (single-line) business. Likewise, multi-line businesses that operate in a competitive environment will pass on their gains through to customers. If these businesses pass through, on average, 75 percent of cost savings onto their customers, *see supra note* 20 (describing pass through results in the economic literature), then of the total end user gains calculated above, it is likely that less than 8 percent of the passed-through benefits estimate is kept by business owners. (100%-75%) x 31% < 8%. Therefore, staff applied an 8 percent discount to end-user benefits to estimate consumer benefits.

[22] *See supra* Section XIII. The Order notes that the status-quo revenue decline for rate-of-return carriers could be as high as 7 percent per year. Staff tested the robustness of the consumer benefits estimate to this assumption, and found that applying a 7 percent decline assumption in place of 5 percent made no significant difference.

offset in part by new revenue to competitive LECs to the extent end users dropping incumbent LEC lines were switching to cable providers or other competitive LECs. Staff lacked reliable data on competitive LEC revenues, however, so staff took a simplified, conservative approach to estimating competitive LEC revenue trends absent reform. Specifically, staff assumed competitive LEC line counts would be generally constant over time, with new customers won from incumbent LECs roughly offsetting any losses, *e.g.*, to CMRS providers, but assuming competitive LECs' total share of fixed lines does not exceed 45 percent.[23] Staff then projected competitive LEC revenue, as described above, assuming competitive LECs receive 25 percent less ICC revenue per line, on average, than incumbent LECs. The result is that staff projects competitive LEC revenue would have decreased moderately over time in the absence of reform, albeit more slowly than for incumbent LECs.

13. These price-cap, rate-of-return, and competitive LEC projections give us year-by-year estimates for the total ICC revenue carriers would have received, absent this Order, for the elements that the Commission is now reforming. For each year of reform under the Order, a growing fraction of per-minute revenues will be eliminated as ICC rates phase down. For purposes of the analysis of consumer benefits, staff focused on 2016 and beyond, at which point the substantial majority of the ICC revenues subject to reform will have been phased down. Specifically, staff estimated that LEC ICC revenues will be less than 10 percent of the no-reform trend line by this point; that is, staff assumed ICC payors will save, in the aggregate, over 90 percent of the no-reform trend line for each year beyond 2016, with the percentage savings growing each year.[24]

14. Finally, staff estimated the pass through of these savings to consumers using the same basic methodology as above—that is, for each year, staff allocated the savings between ILEC, CLEC, and wireless ICC payors based on national line share, then applied a 75 percent pass through rate for wireless and competitive LEC payors and a 50 percent pass through rate for incumbent LEC payors, and then applied an additional small discount to account for business savings not passed on to consumers. Staff estimated the ratio of wireless to wireline lines in each year of reform based on 7.5 percent annual line loss for wireline carriers and no annual growth for wireless carriers or CLECs. Because wireless and competitive LEC lines are in fact growing, this approach likely understates the wireless and competitive LEC share of ICC savings over time, and therefore again provides a conservative estimate of consumer

[23] This is a conservative assumption. Commission data show that non-LEC lines grew 15 percent from December 2008, when the Commission began line count reporting for interconnected VoIP services, to December 2010. *See* Federal Communications Commission, Local Telephone Competition: Status, as of December 31, 2010, Industry Analysis and Technology Division Wireline Competition Bureau, Oct. 2011, at Table 1, 12 n.1, http://transition.fcc.gov/Daily_Releases/Daily_Business/2011/db1007/DOC-310264A1.pdf. In contrast, not only does the staff analysis assume that competitive CLEC lines do not grow over the next several years, the assumption that their market share does not exceed 45 percent further implies that once the competitive LEC share of all LEC lines has reached this threshold, competitive LECs begin to experience line losses. In addition, the staff analysis conservatively assumes that even after incumbent LEC net losses of subscribers to competitive LECs stops, minutes of use declines, and hence revenue losses, continue.

[24] Staff estimated the percentage savings based on the pre-reform blended rates for price-cap and rate-of-return carriers for the rate elements subject to reform. For price cap carriers, the blended rate is $.011, and for rate-of-return carriers it is $.044. Under the *Order*, these rates will be reduced to nearly $.0007 (a 94 percent reduction) and $.005 (an 89 percent reduction), respectively, by 2016. Weighting these reductions by price-cap and rate-of-return carriers' share of ICC revenues implies a 92 percent reduction in ICC revenues by July 1, 2016. Staff therefore assumed a 90 percent reduction overall in 2016 (including both the January-June period and June-December period), a 94 percent reduction in 2017, and a 98 percent reduction in 2018. Reductions in per minute rates will likely be offset to some extent by increased demand, insofar as lower prices which will result from our reforms will increase consumer usage relative to the no-reform baseline. As described above, however, staff ignored such effects in this analysis in order to be conservative in the estimate of consumer benefits. (Increased usage will translate into increased consumer benefits overall, notwithstanding the additional ICC payments associated with such usage.)