

**Before the  
Federal Communications Commission  
Washington, DC 20554**

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

**REPLY COMMENTS ON PUBLIC NOTICE DA 12-911:  
MODEL DESIGN AND DATA INPUTS  
FOR PHASE II OF THE CONNECT AMERICA FUND**



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## SUMMARY

In its initial comments, the American Cable Association (“ACA”) proposed that the cost model be based upon a brownfield Digital Subscriber Line (“DSL”) network architecture with a residual economic value, which properly values the network at the end of the five-year period. This approach, which enables all necessary infrastructure upgrades, reflects the most efficient network/technology that price cap local exchange carriers (“LECs”) will actually use to deliver broadband service to satisfy the Commission’s public interest obligations. In contrast, a greenfield DSL deployment, as proposed by the price cap LECs, would provide support for infrastructure that already has been deployed or in fact will not be built. As such, it provides excessive support to the price cap LECs, contradicting the Commission’s intention to leverage existing network investments to enable the lowest-cost broadband build to the maximum number of locations.

ACA agrees with the ABC Coalition and the price cap LECs (jointly, “ABC Coalition”) that the price cap LECs will employ a fiber-to-the-DSLAM (“FTTD”) architecture/technology to meet the performance obligations adopted by the Commission in the *CAF Order*. Where ACA and the ABC Coalition differ is the amount of subsidy the price cap LECs should receive for employing a FTTD network to serve supported locations. The key factor determining the level of support is whether the model is dimensioned as a greenfield model or a brownfield model. A greenfield model is premised on rebuilding the price cap LEC’s entire network, including fiber between the central office and the DSLAM, all DSLAMs, and the entire copper network from the DSLAM to the customer. A brownfield model assumes that the copper network between the DSLAM and the customer can be re-used and only rebuilds the DSLAMs and the fiber between the central office and the DSLAMs. Because the copper network connecting millions of

customers to DSLAMs is the largest portion of the cost of a DSL network, a greenfield model requires more than four times as much capital expenditure as a brownfield build (according to the model submitted by the ABC Coalition).

As discussed in these comments, price cap LECs are going to build relatively little new plant in total to provide 4/1 Mbps broadband service in supported locations, and only in very limited instances will they rebuild copper loops to supported locations. In other words, the price cap LECs are going to undertake a brownfield build, not a greenfield build.

Moreover, Phase II funding will support two types of locations: those where 4/1 Mbps broadband service is not currently available, and those where it is already offered by a price cap LEC. For those unserved locations, a LEC will need to extend fiber, install new DSLAMs, and may need to make limited improvements to the copper network. For those locations where the requisite broadband service is available, a LEC will not need to extend fiber, build new DSLAMs, or make improvements to the copper loops. Thus, it is clear that a greenfield build excessively overfunds carriers for the network investments they will actually make.

Further, developing a brownfield model is feasible. The model the ABC Coalition submitted to the Commission, the Cost Quest Associates Broadband Analysis Tool (“CQBAT” or “CostQuest” model), can be used to dimension the realistic costs of brownfield networks as well as greenfield networks, with minor modifications. In these comments, ACA provides recommendations on modifications to the CQBAT that will allow it to realistically dimension the full costs of a brownfield build. In addition, all models, including the CQBAT, rely on assumptions and estimates. Therefore, while beneficial, it is not necessary to provide complete granular data. In these comments, ACA provides recommended approaches for estimating the realistic costs associated with a brownfield build. The Commission indicated in its *Public Notice*

that it may hold workshops to explore issues in greater depth, and ACA believes the issue of estimating copper plant quality deserves such attention.

Ultimately, the success or failure of the CAF hinges on the reality of whether or not broadband service is offered to unserved and other high-cost locations. Based on the current brownfield version of the CQBAT, the price cap LECs will have more than sufficient incentive to accept support to serve these locations based on several indicia. First, the model as currently dimensioned provides the LECs with a generous return on investment, which is above their cost of capital. Second, setting the cost floor properly will match subsidies to the LECs' actual investments. Third, even the current brownfield version of the model provides the LECs with excess funding for some cost centers. Therefore, the Commission should be confident that the price cap LECs will have an incentive to take the support to provide broadband service to many millions of locations where there is no private sector business case.

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**REPLY COMMENTS OF  
THE AMERICAN CABLE ASSOCIATION  
ON PUBLIC NOTICE DA 12-911**

The American Cable Association (“ACA”) respectfully submits its reply comments in the above-captioned proceedings in response to the Federal Communications Commission (“Commission”) Wireline Competition Bureau’s (“Bureau’s”) *Public Notice* on Model Design and Data Inputs for Phase II of the Connect America Fund (“CAF”).<sup>1</sup>

**I. INTRODUCTION**

In its initial comments, ACA proposed that the cost model be based upon a brownfield Digital Subscriber Line (“DSL”) network architecture with a residual economic value, which properly values the network at the end of the five-year period.<sup>2</sup> This approach, which enables all necessary infrastructure upgrades, reflects the most efficient network/technology that price cap local exchange carriers (“LECs”) will actually use to deliver broadband service to satisfy the Commission’s public interest obligations. In contrast, a greenfield DSL deployment, as

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<sup>1</sup> See *Connect America Fund et al.*, Public Notice, DA 12-911, (rel. June 8, 2012); *Connect America Fund*, WC Docket No. 10-90 et al., Report and Order and Further Notice of Proposed Rulemaking, 26 FCC Rcd 17663 (2011) (“*CAF Order*”).

<sup>2</sup> Comments of the American Cable Association, WC Docket Nos. 10-90, 05-337, (July 9, 2012) (“ACA Comments”).

proposed by the price cap LECs,<sup>3</sup> would provide support for infrastructure that already has been deployed or in fact will not be built. As such, it provides excessive support to the price cap LECs. Moreover, it would contradict the Commission's intention to leverage existing network investments to enable the lowest-cost broadband build to the maximum number of locations.

It is important to understand at the outset that ACA agrees with the ABC Coalition and the price cap LECs (jointly, "ABC Coalition") that the price cap LECs will employ a fiber-to-the-DSLAM<sup>4</sup> ("FTTD")<sup>5</sup> architecture/technology to meet the performance obligations adopted by the Commission in the *CAF Order*. The price cap LECs base their argument for a FTTD build on the fact that fiber-to-the-home ("FTTH") deployment costs are substantially greater and the time frame for support is relatively short (five years).<sup>6</sup> A FTTD build also reflects current actual deployments. In many areas that are likely to be eligible for Phase II support because they are sufficiently high-cost, price cap LECs already have deployed this type of network to provide broadband service with speeds of 4/1 Mbps. Finally, both ACA and the ABC Coalition agree that a FTTH build is neither required to meet the performance obligations nor is it commercially viable for a variety of reasons.

Where ACA and the ABC Coalition differ is the amount of subsidy the price cap LECs should receive for employing a FTTD network to serve supported locations. The key factor determining the level of support is whether the model is dimensioned as a greenfield model or a brownfield model. A greenfield model is premised on rebuilding the price cap LEC's entire

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<sup>3</sup> Comments of United States Telecom Association et al., WC Docket Nos. 10-90, 05-337, (filed July 9, 2012) ("ABC Coalition Comments").

<sup>4</sup> Digital Subscriber Line Access Multiplexer.

<sup>5</sup> FTTD implies that DSL will be used as the broadband access technology, so a brownfield DSL model is equivalent to a brownfield FTTD model, and a greenfield DSL model is equivalent to a greenfield FTTD model.

<sup>6</sup> See ABC Coalition Comments at 7.

network, including fiber between the central office and the DSLAM, all DSLAMs, and the entire copper network from the DSLAM to the customer. A brownfield model assumes that the copper network between the DSLAM and the customer can be re-used and only rebuilds the DSLAMs and the fiber between the central office and the DSLAMs. Because the copper network connecting millions of customers to DSLAMs is the largest portion of the cost of a DSL network, a greenfield model requires more than four times as much capital expenditure as a brownfield build (according to the model submitted by the ABC Coalition).<sup>7</sup>

As discussed briefly above and more elaborately in these comments, price cap LECs are going to build relatively little new plant in total to provide 4/1 Mbps broadband service in supported locations, and only in very limited instances will they rebuild copper loops to supported locations. In other words, the price cap LECs are going to undertake a brownfield build, not a greenfield build.

Moreover, Phase II funding will support two types of locations: those where 4/1 Mbps broadband service is not currently available, and those where it is already offered by a price cap LEC.<sup>8</sup> For those unserved locations, a LEC will need to extend fiber, install new DSLAMs, and may need to make limited improvements to the copper network. For those locations where the requisite broadband service is available, a LEC will not need to extend fiber, build new DSLAMs, or make improvements to the copper loops. Thus, it is clear that a greenfield build excessively overfunds carriers for the network investments that they will actually make.

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<sup>7</sup> See ACA Comments at 13.

<sup>8</sup> By setting the target benchmark (cost floor) to \$0 and the alternative technology cutoff (cost ceiling) to \$100,000, ACA determined that the maximum number of locations that could be served by the fund would be 18,065,001. See ACA Comments at n.25. Of these, 7,793,746 locations are in areas where 4/1 Mbps broadband is not currently available. The other 10,271,255 locations are in areas where 4/1 Mbps broadband is available from price cap LECs, but there is no unsubsidized competitor present.

Further, developing a brownfield model is feasible. The model the ABC Coalition submitted to the Commission, the Cost Quest Associates Broadband Analysis Tool (“CQBAT” or “CostQuest” model), can be used to dimension the realistic costs of brownfield networks as well as greenfield networks, with minor modifications. In these comments, ACA provides recommendations on modifications to the CQBAT that will allow it to realistically dimension the full costs of a brownfield build. In addition, it is important to emphasize that all models, including the CQBAT, rely on assumptions and estimates. Therefore, while beneficial, it is not necessary to provide complete granular data. In these comments, ACA provides recommended approaches for estimating the realistic costs associated with a brownfield build should the LECs not produce complete data. The Commission indicated in its *Public Notice* that it may hold workshops to explore issues in greater depth,<sup>9</sup> and ACA believes the issue of estimating copper plant quality deserves such attention.

Ultimately, the success or failure of the CAF hinges on the reality of whether or not broadband service is offered to unserved and other high-cost locations. Based on the current brownfield version of the CQBAT,<sup>10</sup> the price cap LECs will have more than sufficient incentive to accept support to serve these locations based on several indicia. First, the model as currently dimensioned provides the LECs with a generous return on investment, which is above their cost of capital. Second, setting the cost floor properly will match subsidies to the LECs’ actual investments. Third, even the current brownfield version of the model provides the LECs with excess funding for some cost centers. Therefore, the Commission should be confident that the

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<sup>9</sup> See *Public Notice*, ¶ 5.

<sup>10</sup> ACA presumes the minor modifications it proposes herein can be made to the brownfield option in CQBAT.

price cap LECs will have an incentive to take the support to provide broadband service to many millions of locations where there is no private sector business case.

In these comments, ACA addresses these and other issues raised by the ABC Coalition and other commenters in greater detail.<sup>11</sup>

## **II. THE BUREAU SHOULD MODEL A FIBER-TO-THE-DSLAM ARCHITECTURE**

### **A. Both ACA and the ABC Coalition Agree that the Network Design for the Model Should Be FTTD**

In its comments, ACA submitted that “a price cap LEC, knowing there is not a sufficient ‘unsubsidized’ business case in these [high-cost] areas, will have no financial incentive to invest more than is required...[and] will build the lowest-cost solution to meet government mandated requirements.”<sup>12</sup> It is clear that FTTD, which uses existing copper loops from the DSLAM to customer locations, is the most efficient network technology available to LECs to meet the public interest obligations and will be the technology used by LECs that receive funding.<sup>13</sup> The price cap LECs agree.

In their comments, the ABC Coalition states, “The current practices of price cap carriers generally call for FTTD when deploying broadband to high-cost rural areas, like those that will

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<sup>11</sup> As noted in its comments (at n. 2), ACA does not believe the Commission should extend application of the model for price cap LECs to rate of return LECs. A fundamental underpinning of the price cap model is that the effects of averaging allow it to model costs reasonably accurately across large service areas, such as states. Because rate of return LECs generally serve areas much smaller than a state, use of the price cap model would produce significant anomalies among carriers. Instead, the provision of support for these smaller carriers should be based on a more thorough, granular analysis of the costs to serve locations within their territories.

<sup>12</sup> ACA Comments at 10.

<sup>13</sup> For purposes of the model, copper loop length should be set at 12,000 feet, which, as the price cap LECs have noted, is sufficient for providing 4/1 Mbps broadband. *See* ABC Coalition Comments at 9. While the gauge of copper in some locations would appear to necessitate the shortening of loop lengths, appropriately setting conditioning costs or adding additional functionality that estimates the costs of replacement copper will accommodate for the infrequent scenario when copper actually has to be replaced.

be eligible for CAF Phase II funding.”<sup>14</sup> The reason the ABC Coalition gives is straightforward: “where there is existing plant in sparsely populated, rural areas that will be eligible for CAF Phase II support, the upfront capital costs of deploying FTTP are generally so great as to render that option more uneconomic than FTTD.”<sup>15</sup> The ABC Coalition notes that this is especially the case since Phase II funding will continue for only five years without any assurance of further support.

**B. There Are Cogent Reasons Not to Model a Greenfield FTTP Build**

The National Association of State Utility Consumer Advocates (“NASUCA”) proposed that a fiber-to-the premises (“FTTP”) network be the basis for the model largely because it is scalable and a price cap “carrier may be forced to rip out the network in order to receive funding in the future.”<sup>16</sup> Such an approach is flawed for a number of reasons. First, it provides excessive bandwidth to meet the minimal broadband performance requirements set forth by the Commission. Second, it would be an inefficient allocation of funds. Third, it is not a realistic reflection of the network price cap LECs will build in high-cost areas given their service obligations. Fourth, as the National Broadband Plan discusses, a FTTD network provides a clear upgrade path to FTTH through the extension of fiber feeders closer to locations. This will require changes in electronics, but fiber feeders will continue to be used. For these reasons, the Commission should not adopt NASUCA’s proposal.

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<sup>14</sup> ABC Coalition Comments at 8.

<sup>15</sup> *Id.*

<sup>16</sup> Comments of National Association of State Utility Consumer Advocates, WC Docket Nos. 10-90, 05-337 (July 9, 2012) at 9-10.

**III. A BROWNFIELD FTTD MODEL MAXIMIZES BENEFITS AND PROVIDES THE MOST REALISTIC AND ACCURATE REFLECTION OF A PRICE CAP LEC BUILD**

**A. Introduction: A Brownfield Build as Modeled by CostQuest**

In its comments, ACA established that a brownfield model most accurately reflects the infrastructure that price cap LECs will actually build and the costs they will actually incur to meet their service obligations under the CAF.<sup>17</sup> In contrast, the ABC Coalition claims that “a brown-field model would produce insufficient levels of support, because it fails to account for all future costs that carriers must recover to remain viable, including operating expense, replacement capital expense, depreciation expense, and a return on capital in existing plant.”<sup>18</sup>

In parsing this difference, first, as discussed above, there is much agreement between ACA and the ABC Coalition on the actual network infrastructure, construction, and operations that price cap LECs will employ to meet the Commission’s performance obligations. In essence, given the minimal service obligations and their existing network infrastructure, price cap LECs are not going to completely rebuild their existing networks in areas where they receive support.<sup>19</sup>

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<sup>17</sup> See ACA Comments at 11-15.

<sup>18</sup> ABC Coalition Comments at 2.

<sup>19</sup> The price cap LECs do not argue that they will undertake a greenfield build. Rather, they argue that they require the amount of support estimated by a greenfield model to provide cost recovery for build-outs undertaken prior to adoption of the new CAF. See ABC Coalition Comments at 3 (Although the Bureau appears to be concerned that a green-field DSL model would compensate carriers for infrastructure that has already been built, the forward-looking cost of that infrastructure cannot be disregarded as if it simply represents the value of the plant that is in the ground. The costs of existing infrastructure cannot properly be treated as simple sunk costs that can be ignored, because carriers must recover the depreciation expense and return on capital associated with undepreciated telecom plant in order to remain whole, and because the associated operating expense and replacement capital expense involve actual monetary outlays. A green-field DSL model allows for a carrier to recover these costs, whereas a brown-field model would not.”).

See also ABC Coalition Comments at 23 (“It is true that a green-field model would compensate a carrier for the cost of building new, undepreciated plant, whereas the

The price cap LECs contend, however, that a brownfield model would not provide sufficient levels of support. ACA disagrees. To begin to understand the flaws in the arguments of the price cap LECs, it is important to understand initially the actual tasks LECs will need to undertake to meet the Commission’s broadband performance requirements and how CQBAT models these tasks:<sup>20</sup>

- 1) What tasks LECs will undertake to provide service to locations where 4/1 Mbps broadband is not currently available (unserved areas)
- 2) What support the brownfield version of the CQBAT models for these unserved areas
- 3) What tasks LECs will undertake to provide service to locations where 4/1 Mbps broadband is available (“served” areas)
- 4) What support the brownfield version of the CQBAT models for served areas

In those areas where 4/1 Mbps broadband service is not currently available – unserved areas – price cap LECs may have to undertake some of the following tasks:

- Add additional DSLAMs or relocate DSLAMs to get DSLAMs within approximately 12,000 feet of all unserved locations
- In places where fiber to the DSLAM exists but the DSLAM needs to be moved, extend fiber to the relocated DSLAM
- Lay new fiber where fiber to the DSLAM does not currently exist
- Remove bridge taps and/or load coils from copper lines (“conditioning”)
- Replace or shorten copper or DSLAMs where it is more cost-efficient to replace than to repair
- Replace or shorten higher-gauge copper with lower-gauge (22 or 24-gauge) copper or shorten the loop length
- Provide ongoing network maintenance and repair for these new broadband lines
- Provide ongoing selling, general and administrative expenses for these new broadband lines

The brownfield version of the CQBAT models most of these costs by:

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existing plant the carrier uses to deploy DSL networks may have been in operation for several years.”).

<sup>20</sup> In Appendix I, ACA provides a table that compares what price cap LECs will actually do to upgrade their networks with the costs supported by the greenfield and brownfield versions of the model. This table provides a simple comparative guide to the bullet points addressed on this page and the following two pages.

- Replacing all existing DSLAMs with new DSLAMs so that all locations are within 12,000 feet of a DSLAM
- Extending fiber to all new DSLAMs
- Conditioning copper lines, which currently covers the removal of bridge taps and/or load coils<sup>21</sup>
- Providing ongoing network maintenance and repair for the non-copper portion of the network (fiber, DSLAMs, routers, etc.)
- Providing ongoing selling, general and administrative expenses for the non-copper portion of the network (fiber, DSLAMs, routers, etc.)

The tasks the brownfield version of the CQBAT does not model are: the capital expenditure involved in replacing any copper (be it due to age or gauge), network maintenance and repair for the copper portion of the network, and selling, general and administrative expenses for the copper portion of the network. Later in these comments, ACA will offer simple solutions to these gaps in the model.

In those areas where 4/1 Mbps broadband service is currently available – served areas – price cap LECs may have to undertake the following tasks:

- Provide ongoing network maintenance and repair for these existing lines
- Provide ongoing selling, general and administrative expenses for these existing broadband lines
- Provide replacement capital expenditure for copper or DSLAMs in cases where it is more cost-efficient to replace rather than repair

The brownfield version of the CQBAT models most all of these costs by:

- Providing ongoing network maintenance and repair for the non-copper portion of the plant (fiber, DSLAMs, routers, etc.)
- Providing ongoing selling, general and administrative expenses for the non-copper portion of the plant (fiber, DSLAMs, routers, etc.)
- Adding new DSLAMs such that all locations are within 12,000 feet of a DSLAM

The brownfield version of the CQBAT model also provides additional funding for tasks carriers will not undertake in served areas:

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<sup>21</sup> To properly account for the conditioning of lines, the conditioning cost needs to be set realistically, which will be addressed in a following section.

- Replacing all existing DSLAMs with new DSLAMs so that all locations are within 12,000 feet of a DSLAM, regardless of whether a DSLAM exists in the vicinity or not
- Extending fiber to all new DSLAMs, regardless of whether fiber connects the area DSLAM or not
- Conditioning copper lines, which currently covers the removal of bridge taps and/or load coils,<sup>22</sup> which do not exist on functioning 4/1 DSL broadband lines<sup>23</sup>

The tasks the brownfield version of the CQBAT does not model are: the capital expenditures involved in replacing any copper, network maintenance and repair for the copper portion of the network, and selling, general and administrative expenses for the copper portion of the network. ACA also will offer simple solutions to these gaps in the model.

Therefore, a flexible tool for developing a brownfield model exists, in an option present in the CostQuest model provided by the price cap LECs. With relatively minor modifications, this model can be optimized to produce a realistic estimate of the actual costs carriers will incur in a brownfield build.

**B. The Price Cap LECs Should Not Receive Capital Recovery for Existing Networks Supported by the Previous High-Cost Fund**

In their comments, the price cap LECs seek recovery of capital expended to build broadband to locations in high-cost areas that were subsidized by universal service funds prior to adoption of the CAF:

Although the Bureau appears to be concerned that a green-field DSL model would compensate carriers for infrastructure that has already been built, the forward-looking cost of that infrastructure cannot be disregarded as if it simply represents the value of the plant that is in the ground. The costs of existing infrastructure cannot properly be treated as simple sunk costs that can be ignored, because carriers must recover the depreciation expense and return on capital associated with undepreciated telecom plant in order to

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<sup>22</sup> To properly account for the conditioning of lines and replacement of some distribution plant, the conditioning cost needs to be set realistically, which will be addressed in a following section.

<sup>23</sup> Bridge taps and load coils are always removed before a DSL line is activated.

remain whole, and because the associated operating expense and replacement capital expense involve actual monetary outlays.<sup>24</sup>

The price cap LECs are unclear about whether the capital recovery should only be for broadband investments, or for voice as well, and for what areas it should cover (*e.g.*, CAF-eligible areas only versus all locations supported under the previous high-cost fund).<sup>25</sup> Regardless of the past investments for which they seek recovery, under the CAF, no support whatsoever is to be provided in areas where unsubsidized providers are offering the requisite broadband service. In addition, no support is to go towards locations where the costs do not exceed the target benchmark.

In those areas eligible for CAF funding, ACA agrees that the price cap LECs should not be unjustly penalized for expanding broadband by using support from the previous High-Cost regime. By the same token, they should not be unjustly rewarded. The former support regime only mandated and purposefully subsidized voice service to high-cost locations. To the extent that price cap LECs provided DSL to those high-cost locations, it is reasonable to assume they had a commercial motivation for doing so.

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<sup>24</sup> ABC Coalition Comments at 3. The ABC Coalition also claims that “the green-field model ... provides a current value for the economic depreciation and return on capital of the existing network.” *Id.*, at 23. ACA contends this statement is incorrect. The green-field model does not provide the current value for the economic depreciation and return on capital of the existing network, but rather the current value of the economic depreciation and return on capital of complete replacement of the existing network. The current value of the economic depreciation and return on capital of the existing network is much less than the current value of a replacement network, due to the many years of depreciation associated with the various components of the network.

<sup>25</sup> The price cap LECs variously refer to “existing infrastructure” (ABC Coalition Comments at 13, 15, 19, 22), “sunk network investments” (*Id.* at 15), “unamortized depreciation and return on capital” (at 16), “embedded plant” (*Id.* at 16, 23), “the existing network” (*Id.* at 16), “capital cost of the plant that remains in use” (*Id.* at 17), “existing plant” (*Id.* at 22, 23) and “sunk costs” (*Id.* at 22), without ever specifying to which plant they are referring.

As ACA discusses herein and its initial comments,<sup>26</sup> price cap LECs are rational providers that act on their commercial interests. In areas where there is no commercial justification to deploy and operate a network, they will only build assets sufficient to satisfy the minimum service obligations imposed by regulators. To the extent that a price cap LEC builds a network exceeding these minimum service obligations, it is safe to assume that it had a commercial reason to provide service in excess of the obligations (*i.e.*, 4/1 Mbps broadband service in addition to mandated voice service). In much the same way, the Commission assumes in the *CAF Order* that any area served by an unsubsidized competitor is commercially viable and therefore ineligible for CAF disbursements. In other words, investment decisions made by private entities to provide broadband service without subsidy are assumed to be commercial decisions. Therefore, wherever a price cap LEC made the decision to extend broadband to locations where they did not receive broadband subsidy, the Commission's logic dictates that that the LECs did so for commercial, and not altruistic, reasons. Consequently, for those locations where only voice support was provided under the previous regime, a price cap LEC should not now receive funding to allow for capital cost recovery for plant used to provide broadband.

Further, the price cap LECs cannot claim cost recovery for the undepreciated portion of the networks they already built, because as the *CAF Order* notes, the new CAF is based on a “goal of providing support to price cap companies on a forward-looking cost basis, rather than based on embedded costs....”<sup>27</sup> In addition, the previous high-cost model funded investments

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<sup>26</sup> See *e.g.* ACA Comments at 9-10.

<sup>27</sup> *CAF Order*, ¶ 129.

that are incompatible with the goals of the CAF, such as TDM switching,<sup>28</sup> and produced less reliable cost estimates due to out-dated customer location modeling techniques like clustering and rectilinear distribution and feeder design.<sup>29</sup> Continuing to support investments made under a model that neither serves the Commission's goals nor apportions funding realistically would be fundamentally in opposition to the concept of providing support on a forward-looking basis.

However, because the model is intended to be forward-looking, it should model support for future operating expenses for locations already served by price cap LEC broadband where there is no unsubsidized competitor. If these operating expenses exceed the cost threshold, then, a price cap LEC should receive funding for lines already served. In this way, price cap LECs will neither be penalized nor rewarded for aggressive DSL build-outs to remote locations.

**C. In Contrast to Modeling a Brownfield Build, a Greenfield-Based Model Will Produce Excessive Support Per Location**

As discussed above, in a greenfield model, a price cap LEC will receive support based on replacement of all plant to supported locations when in actuality it will replace little of the plant. To understand the scale of this excess funding, under the price cap LECs' original proposal for a \$2.2 billion fund based on greenfield FTTD, they would use support to serve 2.1 million unserved locations and 2 million locations already served by broadband.<sup>30</sup> Reducing this amount to \$1.8 billion (by reducing the cost cutoff for the Remote Areas Fund) would provide greenfield funding for 2 million unserved locations and 1.9 million served locations. Put in another way, 2

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<sup>28</sup> See C.A. Bush, D.M. Kennet, J. Prisbrey and WW Sharkey, FCC, Computer Modeling of the Local Telephone Network, (Oct. 1999) at 3.

<sup>29</sup> See CostQuest Associated Letter to FCC Re: Connect America Fund, WC Docket Nos. 10-90, 05-337 (Apr. 17, 2012), slides 6-10 ("CostQuest Letter").

<sup>30</sup> *Id.*, Attachment No. 2 at 2.

million homes will be funded as if the entire network up to the home needs to be rebuilt when in actuality little, if any, of the plant will be rebuilt.

**IV. THE COSTQUEST MODEL (COBAT) PROVIDES A FOUNDATION FOR ACCURATELY MODELING THE COSTS CARRIERS WILL INCUR IN PROVIDING BROADBAND SERVICE TO SUPPORTED LOCATIONS**

As discussed herein, the price cap LEC proposal is flawed, primarily because it proposes dimensioning funding based on a greenfield DSL build. However, the model developed by CostQuest is a relatively flexible tool for apportioning network costs on a granular geographic basis. ACA has manipulated the model in various ways and has found that this tool can be used fairly easily to meet the desired outcomes. For example:

- As noted in the ACA's previous filing, setting the Greenfield toggle to "N" (that is, brownfield) applies a series of logical inclusions and exclusions to numerous categories of capital investment. Inclusions include additions of DSLAMs to reach 12,000 feet from supported locations, extension of fiber to DSLAMs and COs and conditioning costs
- The value of the conditioning assumption can easily be changed

However, ACA recognizes that the brownfield version of the model does not perfectly capture all of the costs associated with the brownfield build. In some cases, it over-estimates costs, such as by providing funding for additional DSLAMs and fiber that price cap LECs are unlikely to rebuild, such as the DSLAMs and fiber that support locations already served by 4/1 Mbps broadband from the price cap LEC. It also under-estimates costs in the following ways:

- It does not account for the capital that price cap LECs will expend in limited cases where the copper plant needs to be replaced, either because of high gauge or poor condition
- It does not account for the operating expenses (both network maintenance and sales, general and administrative expenses) associated with the copper portion of the plant
- It does not allow for applying conditioning costs on a more granular basis than every subscriber or passed home across the country

But, given the functionality that is employed in the rest of the model and the flexible SQL code that underlies the model, adding functionality to address these flaws should not be difficult.

To account for replacement capital expenditures for low-quality copper, CostQuest could modify the model to allow for some portion of every census block's copper to be replaced each year, based either on accounting useful lives or survival curves. This could be accomplished by assuming some fraction of each census block's copper will be replaced each year (*e.g.*,  $1/20^{\text{th}}$ , since the economically useful life of copper is often assumed to be 20 years) and adding in this capital expense to each census block's levelized cost. The capital expenditure associated with replacement copper can be developed using CQBAT's extant capability of modeling the cost for building all new copper in the greenfield version of the model. Put another way, replacement capital expenditure is simply some percentage times the cost of replacing all the copper. While the results would not be exact in the particular, they would be realistic on average and in aggregate, given the Commission's state-wide election process.

Operating expenses for the copper portion of the plant could be addressed in a similar way. To account for these expenses, CostQuest could modify the brownfield version of the model to initially dimension a full greenfield build of the copper plant, apply the existing operating expense factors to that plant, and then exclude the capital involved in building the copper plant from the final levelized cost. This simple solution would provide a realistic picture of the operating expenses associated with existing copper plant.

Finally, applying conditioning costs on a more granular level should not be difficult given the fact that a number of costs are applied on a state-wide, or sub-state, level. Plant mix, for example, is applied on a state and morphological (urban vs. suburban vs. rural) basis. Sales tax and property tax are applied on a state-wide level. Labor cost factors are applied on the basis of

Zip3 geographic units (*e.g.*, all census blocks within zip codes 017xx). Conditioning costs could therefore be applied on a state-wide or more granular basis.

Consequently, the Commission has a sound basis on which to build its model. The Commission should not view current, limited shortcomings in the brownfield model as an insurmountable barrier to adopting a model that accurately reflects the costs of the networks price cap LECs will actually build and use.

V. **ENSURING THE PROVISION OF SUFFICIENT DATA ON THE AGE AND GAUGE OF COPPER PLANT FOR A BROWNFIELD MODEL**

A. **Introduction: Price Cap LECs Should Produce Documentation on Inputs; Lack of Detailed Data Does Not Undermine Use of a Brownfield Model**

In its comments, ACA agreed with the Commission that the model should be data driven<sup>31</sup> and asked the Commission to place the onus on the price cap LECs to provide documentation on the quality of their plant, particularly the copper loops.<sup>32</sup> After all, the price cap LECs control these data. Moreover, the copper loops to be supported by the CAF were built with government support from the prior High-Cost fund, and the LECs should be able to demonstrate (or at least have some burden of demonstrating) to the Commission that these subsidies were properly expended.

In their comments, the ABC Coalition argues that a brownfield model would not be workable "in practice because it requires detailed input data that are not currently available, would be extremely costly and time-consuming to collect, and could not feasibly be available in

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<sup>31</sup> See *Public Notice* at 6 ("Collect Sufficient Market Data to Support Accurate Modeling – The cost model should be based on actual market data to the maximum extent possible. The Commission has consistently sought to achieve data-driven results. In developing the cost model, the Commission should be rigorous in ensuring that sufficient data is collected especially for aspects that are critical to determining the amount of funding per location and the geographic allocation of funding.").

<sup>32</sup> See ACA Comments at 25-26.

the timeframe necessary for CAF Phase II implementation."<sup>33</sup> Consequently, they believe the Commission should provide support based on a greenfield build.

ACA submits that the Commission should summarily reject the ABC Coalition's argument because the cost of funding a greenfield build is so excessive, vastly exceeding the cost of conducting field studies the price cap LECs claim are required in a brownfield model to record the age and gauge of plant. As ACA noted in its previous filing, outputs from the CostQuest model demonstrate that the capital cost to build greenfield DSL is more than four times the capital cost to build brownfield DSL.<sup>34</sup>

The arguments of the ABC Coalition are flawed for other reasons. First, the fact that the price cap LECs lack data about the quality of their plant – and reject proposals to gather that data – suggests that the age of copper loops is not a critical factor in the oversight, operation, and replacement of their networks. In other words, if it is not a high priority to the LECs, it is unlikely that the plant is subject to a regular replacement schedule.

Second, the ABC Coalition's concern that a lack of data on the condition of existing copper plant makes modeling brownfield costs impractical applies a standard of data precision to a brownfield model that the price cap LECs themselves did not apply to their greenfield model. It is standard modeling practice to use cohort-wide assumptions and averages to generate results

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<sup>33</sup> ABC Coalition Comments at 3. The ABC Coalition argues that the price cap LECs “do not keep these data, or do not keep them in an easily accessible electronic form...[and] much of these data may be inaccurate or outdated.” *Id.* at 20. ACA contends that sweeping generalizations like this add little to the process of creating an accurate cost model. Rather, if, as the ABC Coalition contends, the process for producing these data would be “extremely costly and time-consuming,” the LECs should provide a more precise description of the data available and not available. *Id.* at 20. This will enable the Commission to conduct a benefit-cost analysis for producing the data or a determination whether surrogate methodologies are available. As ACA notes in these comments, placing a greater burden on the price cap LECs is especially justified because a brownfield model would provide support for broadband service to millions more locations than the ABC Coalition's proposed greenfield model.

<sup>34</sup> See ACA Comments at 13.

that are not accurate in the particular, but are realistic in aggregate and on average.<sup>35</sup> The CostQuest model uses high-level assumptions or regression analysis to estimate the following key inputs, among other data points:

- The actual locations of business customers in individual census blocks<sup>36</sup>
- The actual locations of residential customers in individual census blocks<sup>37</sup>
- The actual plant mix (aerial vs. buried vs. underground) in individual census blocks<sup>38</sup>
- Operating expenses<sup>39</sup>

For these reasons, ACA again asks the Commission to require price cap LECs to submit data on the condition of the copper plant. However, should the Commission deem this request to be too onerous, ACA proposes below alternative methods that will allow for price cap LECs to be compensated fairly for problems with their existing copper network in areas to be supported by the CAF.

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<sup>35</sup> See CostQuest Letter, Attachment No. 3, at 14 (“It is important to note that variances in capex accuracy (somewhat driven by the quality of service location data) at the Census Block level will tend to be mitigated as the model results are viewed at larger area aggregations.”).

<sup>36</sup> See *id.*, Attachment No. 3, at 7 (“National data to pinpoint the precise location of both business and residential customers do not exist (and currently are not economically feasible to obtain). As such service location data must be estimated using a combination of secondary data sources.”).

<sup>37</sup> See *id.*, Attachment No. 3, at 10 (“For residential data, Census Block-based estimates were used. ... Using CostPro, these residential data were then randomly placed along the roads in a Census Block, to arrive at an unbiased estimate of residential locations to drive the network build.”).

<sup>38</sup> See *id.*, Attachment No. 3, at 10 (“Plant mix will be specific to each state.”).

<sup>39</sup> See *id.* Attachment No. 3, at 15-16.

**B. An Alternative to Requiring Price Cap LECs to Produce Complete Documentation on Copper Plant: Conducting an Analysis of Wireline Revenues**

ACA submits that, as an alternative to gathering complete data on the quality of copper plant, the price cap LECs should conduct an analysis of their wireline revenues to determine the average cost of conditioning this plant. The Commission can then use this estimate as an input to the model to determine the cost required to ensure the copper plant is capable of meeting the 4/1 Mbps broadband performance requirements. ACA's proposed process is based on the reasonable assumption that the LECs maintain detailed records of customer revenues. LECs often charge customers according to a pre-determined schedule for the work required to condition loops for the provision of DSL service, either due to the presence of bridge taps or load coils or the need to replace higher-gauge copper.<sup>40</sup>

To determine the average cost of conditioning for new DSL lines, the Commission should request that price cap LECs conduct a revenue analysis of their DSL customer base as follows:

- Filter subscribers by customers who have requested new DSL service over as long a period as is available
- Aggregate the total conditioning revenues received from these customers. In the case that the revenues are not itemized as conditioning revenues (such as bridge tap removal), carriers can use non-recurring expenses, less any standard one-time activation fees or modem costs, if applicable

The total non-standard non-recurring expenses divided by the number of new DSL customers will produce a realistic picture of the average conditioning cost per subscriber.<sup>41</sup>

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<sup>40</sup> See e.g., CenturyLink Wholesale Guidelines: Preorder Loop Qualifications (post-May, 2010) at 8-9.

<sup>41</sup> The Commission should request that the price cap LECs make the data set granular and large enough to allow for a state-by-state analysis, which would closely match the means by which funding will be rewarded. In addition, ACA recognizes that data may be proprietary, and the LECs would want to keep it confidential. ACA expects the Commission would handle such request under its normal practices.

**C. If Complete Data is not Collected, the Commission Has Other Mechanisms to Develop Estimates of Copper Plant Condition**

As ACA has argued, models by their nature employ cohort-wide averages and assumptions. ACA suggests the following as additional approaches the Commission should pursue to obtain realistic costs associated with replacing copper plant due to the age or gauge of the plant:

- Request that CostQuest add additional functionality to the CQBAT model that can attribute additional costs due to copper plant replacement either on a nationwide or more granular basis
- Hold a workshop (or series of workshops) with telecommunications engineering experts to provide estimates on the age and gauge mix of existing price cap LEC plant
- Using techniques such as regression analysis, weighted averaging and/or survival curve analysis, recommend appropriate age and gauge mix to apply to the model, either on a nationwide or more granular basis

If, as the Commission<sup>42</sup> and the price cap LECs<sup>43</sup> have argued, the age and gauge of existing copper plant are crucial to producing accurate cost estimates of a brownfield build, ACA believes the Commission is obliged to pursue a process that will provide estimates of copper age and gauge useful enough to produce realistic results at the state-wide service area level.

**D. The Cost Model Should Only Apply Conditioning Costs to Unserved Subscribers**

For a brownfield build, the CostQuest model applies one-time conditioning costs across all passed homes<sup>44</sup> despite the fact that:

- The model assumes that 10 percent of locations will not subscribe to broadband<sup>45</sup>

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<sup>42</sup> *See Public Notice* at 12.

<sup>43</sup> *See ABC Coalition Comments* at 21.

<sup>44</sup> In the CQBAT input set labeled Capex V7FTTD, the line item for Conditioning is associated with the “CostDriver” “Locations,” as opposed to “Subscribers” or another category.

<sup>45</sup> *See CostQuest Letter, Attachment No. 3* at 18, 19.

- By definition, homes that are already served by broadband do not require conditioning, and thus served locations should not be eligible to share the cost of conditioning
- As a practice, carriers do not condition all lines in their network, but only those lines where a customer has requested service

Therefore, the model should only apply the cost of conditioning on the basis of assumed subscribers in areas without broadband and not on the basis of all homes passed.

**VI. A PROPERLY DIMENSIONED BROWNFIELD MODEL WITH PROPERLY ESTABLISHED SUPPORT BENCHMARKS PROVIDES SUFFICIENT INCENTIVE FOR CARRIERS TO ACCEPT PHASE II SUPPORT TO PROVIDE BROADBAND SERVICE IN AREAS WHERE THERE IS NO PRIVATE SECTOR BUSINESS CASE**<sup>46</sup>

In determining whether a brownfield build provides the price cap LECs with sufficient support to deliver broadband service to high-cost served and unserved locations, it is essential to examine how the current version of the CostQuest model treats this build. First, the CostQuest model permits the price cap LECs to receive a return that is above and beyond their cost of capital, providing recipients with a 9 percent rate of return on their investment.<sup>47</sup> ACA has analyzed current market rates, and a 9 percent return is in excess of the five largest price cap LECs' cost of capital by 125-400 basis points.<sup>48</sup> This indicates that these carriers will not only

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<sup>46</sup> As discussed above, a key to modeling brownfield costs accurately is to properly determine the cost of conditioning. ACA discusses an approach for calculating the appropriate conditioning cost herein.

<sup>47</sup> See CostQuest Letter, Attachment No. 3 at 18.

<sup>48</sup> ACA's analysis is attached as Appendix II. In brief, ACA conducted a two-fold analysis. First, it disaggregated the weighted average cost of capital ("cost of money" or "discount rate") into its component parts (cost of debt, cost of equity, share of debt, share of equity, market rate of return, risk-free rate of return, and beta, which is a measure of an industry's volatility relative to the market as a whole). ACA then analyzed these data, which demonstrated that a 9 percent return exceeds price cap LECs' actual cost of capital by 200 to 400 basis points—in other words, their actual cost of capital is between 5 percent and 7 percent, not 9 percent. In addition, ACA collected benchmarks for the

be compensated for their borrowing costs and opportunity costs, but they will receive an additional return beyond their point of indifference.

In addition, not only does the brownfield version of the CQBAT provide a more than sufficient return on capital, it provides excessive funding for a number of cost centers:

- It adds new DSLAMs in all price cap areas where there is no unsubsidized competitor, regardless of whether a DSLAM exists within 12,000 feet of end-users or whether a local DSLAM currently provides 4/1 Mbps broadband to end-users. LECs will only replace existing DSLAMs in a minority of cases
- It lays new fiber from the existing central offices (“COs”) to these new DSLAMs, regardless of whether fiber exists between the CO and existing DSLAMs. In areas already served by 4/1 Mbps broadband, there is no rationale for why LECs would rebuild fiber between the DSLAM and CO

If the brownfield model is modified in the ways discussed in the previous section, the brownfield version of the CQBAT will provide funding in excess of price cap LECs’ needs for the provisioning of 4/1 Mbps broadband service.

The question of whether the price cap LECs will have the correct incentive to accept Phase II support also depends on properly establishing the support benchmarks (low-end threshold). As ACA argued in its initial comments, the target benchmark should be set to reflect “the average revenue offset per subscriber that price cap LECs would reasonably expect in areas where they face no competition.”<sup>49</sup> When carriers in the real world are calculating the investment case for new network builds, they assess the costs in relation to the revenue they can command from the locations to which they are considering building, with an assumed return

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weighted average cost of capital for the five largest price cap LECs from telecommunications analysts at six major investment banks (Deutsche Bank, JP Morgan, Macquarie, Piper Jaffray and RBC), and found the weighted average cost of capital is between 7.37 percent and 7.74 percent, depending on how you treat certain benchmarks. In other words, a 9 percent return exceeds price cap LECs’ actual cost of capital by 125 to 160 basis points.

<sup>49</sup> ACA Comments at 20.

built into the recoverable revenue assumptions. The recoverable revenue per location is their investment hurdle rate. If the costs exceed the investment hurdle rate, the carrier will not invest. For those locations that exceed the investment hurdle rate, only a subsidy will provide the proper incentive to invest. For high-cost (rural and less dense) locations, a subsidy is necessary to provide carriers with the cost recovery and return they typically seek from commercially viable locations. By setting the floor for the subsidy at the carriers' investment hurdle rate, the Commission will match subsidies to actual carrier investments.

Setting the target benchmark to match incremental average revenue offset per subscriber is also compatible with the goal of limiting the number of locations supported by the Remote Areas Fund to no more than 1 million.<sup>50</sup> Using current assumptions from the CostQuest model, the target benchmark can be set as low as \$19.45/month and a brownfield-model with \$1.8 billion funding will still cover all high-cost and extremely high-cost served and unserved locations (6.1 million), obviating the need for the Remote Areas Fund. The component costs of a brownfield build would have to increase massively to exceed the "1-million location" limitation on the Remote Areas Fund. For example, if the conditioning cost were to increase ten-fold, to \$1,000, one could still fund all high-cost locations, including extremely high-cost locations, above a target benchmark of \$30.50/month, for \$1.8 billion. Thus, by adopting ACA's proposed methodology for establishing the target benchmark, the Commission also should have confidence that it is providing proper and sufficient incentives for the price cap LECs to accept support.

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<sup>50</sup> See *CAF Order*, n. 274.

**VII. THE COMMISSION SHOULD PROCEED DELIBERATELY TO DEVELOP AN ACCURATE COST MODEL TO MEET ITS BROADBAND OBJECTIVES**

As the Commission noted in the *Public Notice*, it intends to pursue “an open, deliberative process to develop the final model design and inputs.”<sup>51</sup> With the CostQuest model as a basis, the Commission should feel confident it can reach its objective using this process, and it should not be rushed into adopting a model that does not provide a realistic reflection of price cap LECs’ actual costs. While “simplicity and administrative feasibility”<sup>52</sup> are worthy objectives, the Commission’s top priority should be ensuring the model is as accurate as possible. There is too much at stake for other broadband providers, as well as for consumers that could be reached using Phase II support and for the integrity of the universal service process. Of course, the Commission has provided a backstop so that it can continue to meet its broadband objectives without rushing into any decision on the cost model. In the *CAF Order*, the Commission notes that if Phase II support is not initiated at the beginning of 2013, it will continue providing Phase I support to the price cap LECs.<sup>53</sup> In addition, price cap LECs will receive traditional high-cost support.

**VIII. CONCLUSION**

The Commission’s overriding objective in adopting CAF Phase II support is to ensure as many locations as possible have access to broadband service. Development of an accurate and realistic cost model is essential for distributing support efficiently to achieve this aim. In these reply comments, ACA builds on its prior comments to demonstrate that a brownfield FTDD model most accurately reflects the activities LECs will realistically undertake to meet the

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<sup>51</sup> *Public Notice*, ¶ 5.

<sup>52</sup> ABC Coalition Comments at 6.

<sup>53</sup> *See CAF Order*, ¶ 148.

Commission's performance obligations. In contrast, adoption of a greenfield FTTD model would produce inefficient outcomes, providing excessive support per location, and would result in fewer locations receiving broadband service. Contrary to the price cap LECs' claims, a brownfield FTTD model can dimension the full realistic costs that are associated with a brownfield FTTD build. With relatively few modifications and limited additional data collection, the CostQuest model can be adapted to dimension these costs. Once these modifications are made and inputs collected, the brownfield FTTD model will provide more than sufficient incentive for price cap LECs to accept the funding, while obligating the price cap LECs to provide broadband to millions more homes than would be supported by a greenfield FTTD model. ACA recognizes that there are various issues the Commission will need to explore as it develops the cost model, and it looks forward to working with the Commission to provide solutions so that Phase II funding can be distributed on as sound basis as soon as possible.

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# Appendix I

Carrier Real-World Activities to Upgrade and Maintain DSL Network vs.  
CQBAT (US Telecom's Model) Modeled Activities



The greenfield version of the ABC Coalition’s model (CQBAT) provides funding to rebuild and maintain the entire network, while the brownfield version provides funding to rebuild and maintain portions of the network

**Carrier Activities to Upgrade Existing Network vs. CQBAT Model**

Key	
✓	= 100% of locations
✓✓	= <50% of locations
✗	= 0% of locations

		Likely Carrier Activities to Upgrade Existing Network		CQBAT Model			
				Greenfield Option		Brownfield Option	
		Telco Broadband-Served Locations	Telco Broadband-Unserved Locations	Telco Broadband-Served Locations	Telco Broadband-Unserved Locations	Telco Broadband-Served Locations	Telco Broadband-Unserved Locations
Capital Expenses	Add New DSLAMs	✗	✓✓	✓	✓	✓	✓
	Relocate DSLAMs	✗	✓✓	✓	✓	✓	✓
	Replace DSLAMs	✓✓*	✓✓	✓	✓	✓	✓
	Extend Fiber to DSLAMs	✗	✓	✓	✓	✓	✓
	Condition Existing Copper	✗	✓	✓	✓	✓	✓
	Replace Existing Copper Plant	✓✓*	✓✓**	✓	✓	✗	✗
Operating Expenses	Copper Plant Maintenance & Repair	✓	✓	✓	✓	✗	✗
	Other Plant Maintenance & Repair	✓	✓	✓	✓	✓	✓
	Copper Plant Sales, General & Administrative Expenses	✓	✓	✓	✓	✗	✗
	Other Plant Sales, General & Administrative Expense	✓	✓	✓	✓	✓	✓

\* This will be done in a minority of cases where it is more cost-effective to replace plant than repair it.

\*\* A minority of copper plant to unserved locations will need to be replaced either because it is not of sufficient quality or because it is more cost-effective to replace than repair.

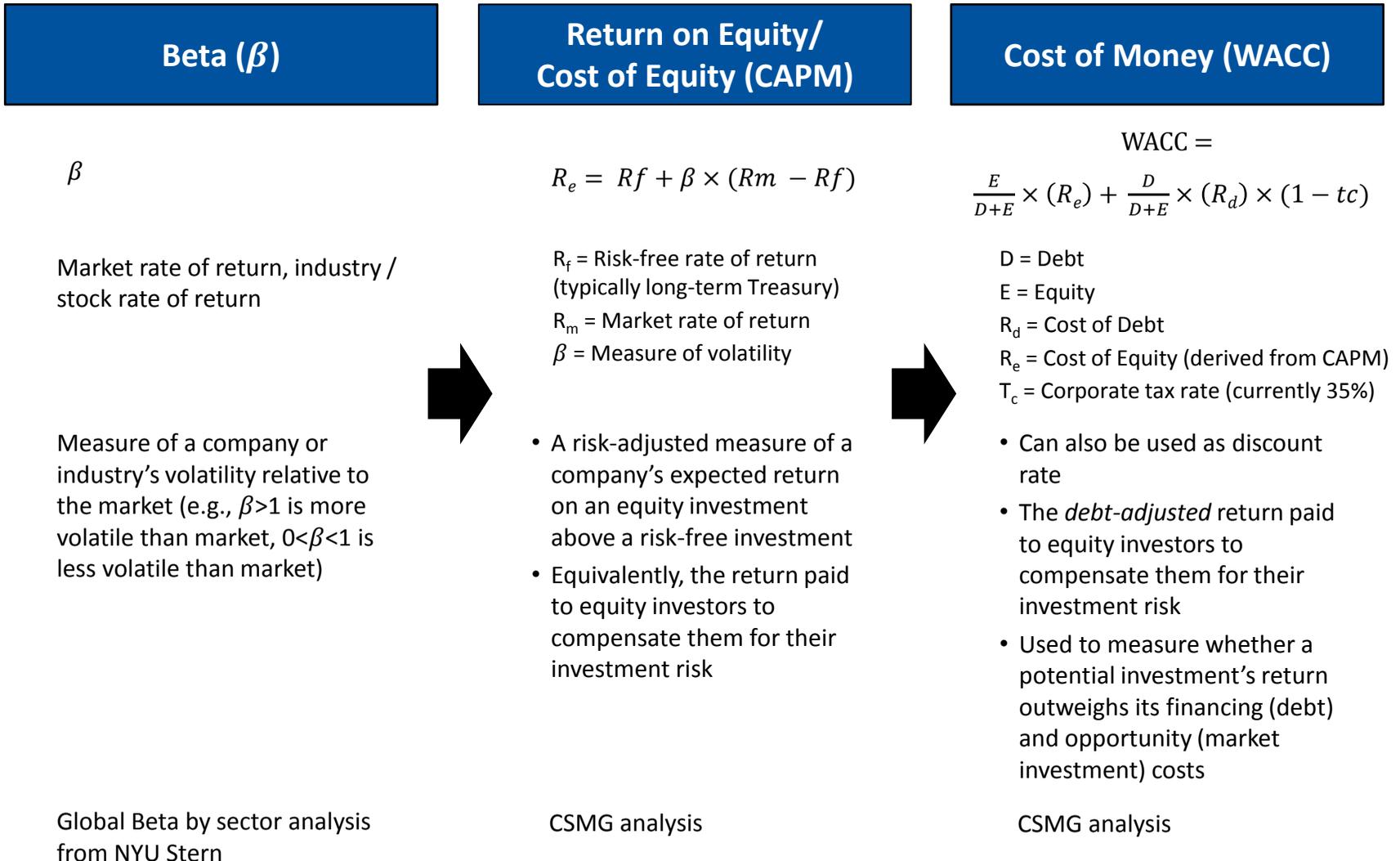


# Appendix II

## Assessing the Cost of Money in CQBAT



We developed the cost of money from the standard formula for cost of money (WACC), the Capital Asset Pricing Model (CAPM) and an outside analysis of beta ( $\beta$ )



We used data points from the top five ILECs—who are slated to receive 98% of proposed CAF funding under the US Telecom plan—to build our Cost of Money

**Inputs for Generating Cost of Money**

	Symbol	Input	High Input	Low Input	Rationale for Assumptions	ABC Coalition Assumption
CAPM Inputs	$R_f$	Risk-free Rate	3%	1.75%	<ul style="list-style-type: none"> <li>3% = 30-year T-bill (May 16, 2012)</li> <li>1.75% = 10-year T-bill (May 16, 2012)</li> </ul>	1.75%
	$\beta_e$	Beta	0.76	0.52	<ul style="list-style-type: none"> <li>0.76 based on 5-year volatility for 74 public telecom cos (telecom service sector)</li> <li>0.52 based on 5-year volatility for 25 public telecom cos (telecom utilities sector)</li> <li>Betas sourced from study from NYU Stern School of Business</li> </ul>	Unknown
	$R_m$	Market Rate of Return	9.97%	9.42%	<ul style="list-style-type: none"> <li>9.97% = 1971-2011 annualized S&amp;P 500 return, including dividends</li> <li>9.42% = 1960-2011 annualized S&amp;P 500 return, including dividends</li> <li>Rate will be higher if start date is 1980, lower if start date is 2000</li> </ul>	15.93%
WACC Inputs	$R_e$	Return on Equity	8.3%	5.7%	<ul style="list-style-type: none"> <li>Calculated from CAPM</li> </ul>	9.67%
	$R_d$	Cost of Debt	6.1%	5.2%	<ul style="list-style-type: none"> <li>High input based on weighted average cost of all debt for top 5 ILECs</li> <li>Low input based on weighted average cost of debt for 2011 issuances for top 5 ILECs</li> <li>Sourced from 2011 10-Ks for top 5 ILECs</li> </ul>	7.0%
	$E$	Equity	69% of D+E	69% of D+E	<ul style="list-style-type: none"> <li>Based on market caps for top 5 ILECs from Yahoo! Finance, May 16, 2012</li> </ul>	75% of D+E
	$D$	Debt	31% of D+E	31% of D+E	<ul style="list-style-type: none"> <li>Based on debt totals for top 5 ILECs from Yahoo! Finance, May 16, 2012</li> </ul>	25% of D+E
	$t_c$	Corp. Tax Rate	35%	35%	<ul style="list-style-type: none"> <li>US statutory federal corporate tax rate for all cos. with more than \$18M in taxable income</li> </ul>	39.3%

Given the significant difference between the average cost of capital for the price cap carriers and the ABC Coalition assumption of a 9% cost of money, the ABC Coalition model provides sufficient incentive to invest

**Cost of Money Using Varying Assumptions**

$\beta$  Assumption

Cost of Debt Assumption:		Telecom Utilities		Telecom Services	
		2011 Debt Issues	Total Debt	2011 Debt Issues	Total Debt
Market rate of return assumption	<b>1960-2011 Market RoR</b>	10-Year T-Bill for Risk-Free RoR 5.01%	5.19%	6.27%	6.45%
	30-Year T-Bill for Risk-Free RoR 5.42%	5.60%	6.48%	6.66%	
	<b>1971-2011 Market RoR</b>	10-Year T-Bill for Risk-Free RoR 5.20%	5.39%	6.56%	6.74%
	30-Year T-Bill for Risk-Free RoR 5.62%	5.80%	6.76%	<b>6.95%</b>	



Higher COM



Higher COM

Analysts are in consensus that the cost of money for the top five ILECs should be at least 109 basis points below the ABC Coalition's assumption of 9%

***Cost of Money (Discount Rate) Benchmarks from Analysts' Reports on ILECs***

	Deutsche Bank	JP Morgan	Macquarie	Piper Jaffray		RBC	Average (w/Piper Jaffray Near-Term)	Average (w/out Piper Jaffray Near-Term)
				Near-Term (to 2015)	Terminal			
<b>AT&amp;T</b>	7.1%	7.5%	6.8%	9.6%	8.0%	N/A	<b>7.8%</b>	<b>7.4%</b>
<b>Verizon</b>	7.1%	7.5%	6.3%	9.3%	8.2%	N/A	<b>7.7%</b>	<b>7.3%</b>
<b>CenturyLink</b>	N/A	7.0%	6.7%	7.6%	7.1%	N/A	<b>7.1%</b>	<b>6.9%</b>
<b>Windstream</b>	N/A	N/A	N/A	7.2%	7.0%	12.5%	<b>8.9%</b>	<b>9.8%</b>
<b>Frontier</b>	N/A	N/A	N/A	9.3%	8.5%	N/A	<b>8.9%</b>	<b>8.5%</b>
<b>Average:</b>							<b>7.91%</b>	<b>7.66%</b>
<b>Weighted Average:</b>							<b>7.74%</b>	<b>7.37%</b>

- All discount rate benchmarks are taken from reports dating from March to May 2012
- The weighted average is based on companies' enterprise values on May 21, 2012