

**WIRELINE COMPETITION BUREAU  
LOW-INCOME BROADBAND PILOT PROGRAM  
STAFF REPORT**

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## EXECUTIVE SUMMARY

The Commission launched the Low-Income Broadband Pilot Program to study the key broadband adoption barriers – identified by the Commission in the 2010 National Broadband Plan as cost, digital literacy, and relevance – and how the Lifeline program, which has traditionally been focused on bridging the affordability gap for wireline and mobile wireless voice services, could best be structured to serve its statutory mission in the 21<sup>st</sup> century. On the one hand, the 14 pilot projects shared a set of common elements that reflect the current model of the Lifeline program — e.g., all relied on existing ETCs to provide service, and the ETCs had to confirm that individuals participating in the pilot were eligible and qualified to receive Lifeline benefits — but on the other hand, each project tested different subsidy amounts, conditions to receiving service, and different outreach and marketing strategies. The result was a highly diverse set of projects that employed different methods, implemented different strategies, and provided different services across different geographies.

Participating providers were required to collect and submit a large amount of anonymized data so that the Commission and others could use such information for their own studies and observations. The data collected during each project is being released with this Report to further enrich the public’s understanding of low-income broadband use. This information is also available at <https://www.fcc.gov/encyclopedia/low-income-broadband-pilot-program>. The data provides an important perspective on how various policy tools can impact broadband adoption by low-income consumers.

This Report highlights several important patterns in the data relevant to any consideration of Lifeline support for broadband:

- First, many of the pilot projects provide information about Lifeline-eligible consumers’ preferences for service and their willingness to pay for services or hardware. Within the fixed service projects, in particular, patterns suggest consumers were willing to pay for speeds within the mid-range of options, though there was little interest in the highest speed tiers. For mobile service projects, when consumers were given the option between hotspot plans versus smartphone plans, the majority selected smartphone service plans.
- Second, several of the pilot projects tested varying subsidy amounts or discounts offered to consumers for both the service and a device. Patterns within the data indicate that cost to consumers does have an effect on adoption and which plans they choose. In several of the projects, when given the choice among service plans, new adopters were willing to pay for broadband service, but tended to choose more modest and affordable speeds and data allowances.
- Third, requiring ETCs to offer or provide digital literacy training does not appear to be an efficient or effective model for converting non-adopters to adopters. Participating consumers generally had little interest in training provided by the ETCs. This raises the question of whether other organizations specializing in digital literacy training may be more successful at such training.

Additionally, it is important to note that, by design, the pilot projects only studied broadband adoption among the subset of low-income consumers who were not current subscribers to any broadband service.

The Bureau encourages outside parties to use this Report, which summarizes each project, and the related data, to evaluate this important issue.

## TABLE OF CONTENTS

Heading	Paragraph #
I. INTRODUCTION.....	1
II. BACKGROUND.....	3
III. SELECTION OF 14 PILOT PROJECTS.....	7
IV. DESCRIPTION OF THE SELECTED PILOT PROGRAM PROJECTS.....	14
A. Mobile - Randomized Controlled Experiments.....	14
B. Fixed – Randomized Controlled Experiments.....	24
C. Fixed – Quasi-Experimental.....	31
D. Mobile – Non-Experimental.....	41
E. Fixed – Non-Experimental.....	49
V. CONCLUSION.....	51

### I. INTRODUCTION

1. The Wireline Competition Bureau (Bureau) staff has prepared this Staff Report (Report) to summarize data from the Commission’s Low-Income Broadband Pilot Projects (Pilot Projects or Pilot Program).<sup>1</sup> The Report discusses data collected in each of the 14 Pilot Projects. Together the Pilot Projects studied the effects of varying subsidy amounts, hardware costs, access to digital literacy, technology offered (e.g., wireline, wireless), and service characteristics (e.g., smartphone, aircard).

2. In order to prepare this Report, the staff spoke with the Pilot Project participant-providers for each of the Pilot Projects. The staff also reviewed quarterly and final reports submitted by the Pilot Project participants, as well as survey results and data submitted by the Pilot Project participants at various stages in the funding process to the Universal Service Administrative Company (USAC), the entity that performs the day-to-day administration of the program under Commission oversight.<sup>2</sup> To protect consumer privacy, the Pilot Project participants did not share with the Commission or USAC any personally identifiable information about the consumers who participated in the pilots.<sup>3</sup>

### II. BACKGROUND

3. In February 2010, the Commission published the results of its first Broadband Consumer Survey, which focused on non-adopters and the issues they faced in adopting broadband.<sup>4</sup> The survey results demonstrated how some demographic groups, such as low-income households, were less likely to

<sup>1</sup> See *Lifeline and Link Up Reform and Modernization* et al., Report and Order and Further Notice of Proposed Rulemaking, WC Docket Nos. 11-42 et al., CC Docket. No. 96-45, 27 FCC Rcd 6656, 6800-01, para. 336 (2012) (*Lifeline Reform Order*) (determining to make Pilot Project data public for the benefit of all interested parties, including third parties that may use such information for their own studies and observations).

<sup>2</sup> See generally PR Wireless, Inc. Final Report, WC Docket No. 11-42 (Feb. 12, 2015) (PR Wireless Report); Frontier Communications Final Report, WC Docket No. 11-42 (Jan. 26, 2015) (Frontier Report); Troy Cablevision, Inc. Final Report WC Docket No. 11-42 (Feb. 2, 2015) (Troy Cablevision Report); Virgin Mobile USA, LP Final Report, WC Docket No. 11-42 (March 24, 2015) (Virgin Mobile Report); Nexus Communications, Inc. Final Report, WC Docket No. 11-42 (May 18, 2015) (Nexus Report); XChange Telecom Final Report, WC Docket No. 11-42 (March 3, 2015); TracFone Wireless, Inc. Final Report, WC Docket No. 11-42, (May. 18, 2015) (TracFone Final Report); Partnership for Connected Illinois Final Report, WC Docket No. 11-42 (March 4, 2015); T-Mobile Puerto Rico, LLC, WC Docket No. 11-42 (May 18, 2014) (T-Mobile Final Report).

<sup>3</sup> See *Lifeline Reform Order*, 27 FCC Rcd at 68001-01, para. 336.

<sup>4</sup> John Horrigan, *Broadband Adoption and Use in America* (OBI, Working Paper No. 1, 2010) (Horrigan, *Broadband Adoption and Use in America*) at 11, <http://www.fcc.gov/national-broadband-plan>. At the time, this survey was distinct given its focus on non-adopters of broadband at home. *Id.*

subscribe to broadband at home. Building off these survey results, the 2010 National Broadband Plan recognized that although increasing numbers of consumers had broadband at home, some segments of the population — particularly low-income households — did not subscribe to broadband at levels similar to that of the population at large.<sup>5</sup> The National Broadband Plan identified three major barriers to adoption — cost, digital literacy and relevance — that kept non-adopters from subscribing to broadband service.<sup>6</sup> To help in overcoming cost barriers for low-income consumers, the National Broadband Plan recommended that the Commission implement a low-income pilot program to generate high-quality data about how best to design efficient and effective long-term broadband support mechanisms for low-income consumers.<sup>7</sup>

4. In its 2012 *Lifeline Reform Order*, the Commission established an express goal for Lifeline to ensure the availability of broadband service for low-income Americans.<sup>8</sup> As a first step in achieving this goal, the Commission directed the Bureau to launch a low-income broadband pilot program.<sup>9</sup> In directing the Bureau to launch the Pilot Program, the Commission authorized up to \$25 million to be disbursed directly to eligible telecommunications carriers (ETCs) for up to 12 months of subsidized broadband service, delivered either as a standalone service or as part of a bundle of voice and broadband services.<sup>10</sup> The Commission directed the Bureau to “solicit applications from ETCs to participate in the Pilot Program and to select a relatively small number of projects to test the impact on broadband adoption with variations in the monthly discount (phased down over time or constant) over a 12-month period.”<sup>11</sup> Carriers that sought to participate in the Pilot Program had to be designated as an ETC in the areas for which they proposed to offer service at the time they submitted their proposed projects for Bureau review.<sup>12</sup> To encourage ETCs to partner with third-party organizations whose mission is to increase broadband adoption, the Commission directed the Bureau to give preference in the selection process to ETCs that partnered with non-ETCs to design and implement broadband pilot proposals that included components involving digital literacy and equipment.<sup>13</sup>

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<sup>5</sup> FEDERAL COMMUNICATIONS COMMISSION, OMNIBUS BROADBAND INITIATIVE, CONNECTING AMERICA: THE NATIONAL BROADBAND PLAN at 167-68 (2010) (NATIONAL BROADBAND PLAN), <http://www.broadband.gov/plan>.

<sup>6</sup> *Id.* at 168-69.

<sup>7</sup> *Id.* at 172-73. In 2010, the Commission also hosted a roundtable discussion to solicit input on how to design a pilot program to test the effectiveness of supporting broadband services directed to low-income households. *See Wireline Competition Bureau Announces June 23, 2010 Roundtable Discussion to Explore Broadband Pilot Programs for Low-Income Consumers*, WC Docket No. 03-190, Public Notice, 25 FCC Rcd 7272 (2010), <http://www.fcc.gov/events/roundtable-discussion-explore-broadband-pilot-programs>).

<sup>8</sup> *See Lifeline Reform Order*, 27 FCC Rcd at 6673-74, paras. 33-34.

<sup>9</sup> *See id.* at 6794-96, paras. 323-27.

<sup>10</sup> *See id.* at 6795, paras. 324-25. The Commission determined that support would only be provided for broadband services, and not for the administrative or equipment costs of the ETCs and their partners. *See id.* at 6804-05, paras. 345-49.

<sup>11</sup> *Id.* at 6795, para. 325.

<sup>12</sup> *See Lifeline Reform Order*, 27 FCC Rcd at 6800, para. 334. To afford Tribes an increased opportunity to participate in the Pilot Program, the Commission permitted a Tribally-owned or controlled entity to submit a Pilot Program proposal for the geographic area defined by the boundaries of the Tribal land and associated with the Tribe as long as the Tribally-owned entity had an application for designation pending at the time it submitted its proposal. *Id.* at 6800, para. 335.

<sup>13</sup> *Id.* at 6806, para. 352.

5. In the *Broadband Pilot Public Notice*, the Bureau set forth the application criteria and procedures and set a deadline for application submission.<sup>14</sup> Consistent with the framework established in the *Lifeline Reform Order*, the Bureau notified applicants that the Bureau would strongly favor pilot projects designed as field experiments that would test the impact on how variations on broadband service offerings impact adoption.<sup>15</sup> To be eligible for funding, ETCs seeking to participate in the Pilot Program also had to commit to robust gathering, analysis, and sharing of data.<sup>16</sup> Pilot Project participants were required to collect subscriber data regarding demographics and service usage throughout the course of the Pilot Project and submit such data to USAC. To ensure the Commission received standardized data across all of the projects, the Bureau included the Low-Income Broadband Pilot Program Reporting Form as an Appendix to the *Broadband Pilot Public Notice*, which comprised a uniform set of questions that subscribers participating in the Pilot Projects and the ETCs would need to complete and submit to USAC for collection.<sup>17</sup> The Bureau made clear that all subscriber data collected within each of the projects must be submitted to USAC in anonymized form, and that the data would ultimately be made publicly available in anonymized form.<sup>18</sup> The Bureau also strongly encouraged ETCs submitting applications to commit to the submission of a final report to share additional information with the Commission about lessons learned from the project.<sup>19</sup>

6. In December 2012, the Bureau issued an order announcing the selection of 14 Pilot Projects, authorizing up to \$13.8 million in support for the projects which spanned 21 states and Puerto Rico.<sup>20</sup> The *Broadband Pilot Order* explained that the Pilot Program ran for an 18-month trial period, which began February 1, 2013. The 18 months began with three months for ETCs to implement necessary back-office functions, followed by up to 12 months of subsidized service, and concluding with three months allotted for finalizing the data collection and for analysis.<sup>21</sup> All participating subscribers had to be enrolled in the Pilot Projects within nine months of the commencement of the trial period, or no later than November 1, 2013.<sup>22</sup> Each participating subscriber had the opportunity to receive a maximum of 12 months of subsidized broadband service.<sup>23</sup> As a condition to participation in the Pilot Projects, each

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<sup>14</sup> See generally *Wireline Competition Bureau Announces Application Procedures and Deadline for Applications to Participate in the Broadband Adoption Lifeline Pilot Program*, WC Docket No. 11-42, Public Notice, 27 FCC Rcd 4840 (Wireline Comp. Bur. April 30, 2012) (*Broadband Pilot Public Notice*).

<sup>15</sup> The Bureau explained that “ETCs should submit a detailed description of the experimental design and other experimental protocols used suitable for a replication study, what variations on broadband service offerings [would] be tested (*e.g.*, discount amount, duration of discount, speeds, usage limits, digital literacy training or any other factors impacting broadband adoption) and how the project(s) [would] randomize variations on broadband service offerings (*e.g.*, geographic randomization).” *Id.* at 4841.

<sup>16</sup> See *Lifeline Reform Order*, 27 FCC Rcd at 6800-01, para. 336; see also *Broadband Pilot Public Notice*, 27 FCC Rcd at 4841.

<sup>17</sup> *Broadband Pilot Public Notice*, 27 FCC Rcd at Appendix. The Bureau explained that ETCs may collect the subscriber data themselves and submit to USAC, or may request that USAC collect through an electronic, online survey. *Id.* at 4843.

<sup>18</sup> See *Broadband Pilot Public Notice*, 27 FCC Rcd at 4843. All participating ETCs were required to obtain subscribers’ consent to the collection and sharing of the information contained in the Low-Income Broadband Pilot Program Reporting Form. See *Lifeline Reform Order*, 27 FCC Rcd at 6800-01, para. 336.

<sup>19</sup> See *Broadband Pilot Public Notice*, 27 FCC Rcd at 4843.

<sup>20</sup> See *Lifeline and Link Reform and Modernization*, WC Docket No. 11-42, Order, 27 FCC Rcd 15842, 15842, para. 1 (Wireline Comp. Bur. 2012) (*Broadband Pilot Order*). The Bureau received a total of 24 applications but narrowed its selection to the 14 projects detailed within this Report. *Id.* at 15847, para. 14.

<sup>21</sup> *Id.* at 15849, para. 18.

<sup>22</sup> *Id.*

<sup>23</sup> *Id.*

subscriber had to certify that he/she did not have, at the time of enrollment or within the last 60 days prior to enrollment, the same type of Internet service the ETC was offering in their project.<sup>24</sup> For example, if subscribers were already subscribing to a smartphone service plan prior to enrollment in the Pilot Project, they were precluded from receiving subsidized service for a smartphone service plan but were not otherwise precluded from receiving wireline or wireless high-speed Internet service under the Pilot Project.<sup>25</sup> Each participating subscriber also had to certify that he or she was eligible and otherwise would qualify to receive Lifeline benefits.<sup>26</sup>

**III. SELECTION OF 14 PILOT PROJECTS**

7. Based on review of the 24 applications received in response to the *Broadband Pilot Public Notice*, the Bureau selected the following pilot projects summarized in Table 1 to participate in the Pilot Program.<sup>27</sup>

**Table 1: Low-Income Broadband Pilot Projects**

Project	States	Key Questions	Service & Device	Methodology
TracFone	FL, MA, MD, TX, WA, WI	Effect of monthly price and hardware cost on adoption	Mobile, Smartphone	Geographically randomized controlled trial
Nexus	CA, IA, LA, MI, MS, NJ, NV, OH	Effect of monthly price and digital literacy training on adoption and data plan choice	Mobile, Smartphone or MiFi	Randomized controlled trial
Virgin Mobile	OH, MA	Effect of monthly price and hardware cost on adoption and retention	Mobile, MiFi	Geographically randomized controlled trial
Frontier	OH, WV	Effect on adoption and retention of a digital literacy incentive	Fixed	Geographically randomized controlled trial
Vermont Telephone	VT	Effect of price on adoption and retention	Fixed	Comparison group quasi-experiment
Xchange	NY	Effect of monthly price on adoption	Fixed	Comparison group quasi-experiment
Partnership for a Connected Illinois	IL	Effect of digital literacy offering on adoption and retention	Fixed	Comparison group quasi-experiment
Troy Cable	AL	Effect of monthly price on adoption and retention	Fixed	Comparison group quasi-experiment

<sup>24</sup> *Lifeline Reform Order*, 27 FCC Rcd at 6803, para. 344 (concluding that “using the Pilot Program to subsidize broadband services purchased by consumers who have already adopted such services will not provide [the Commission] with sufficient and useful data about which such subsidies increase adoption”); *Broadband Pilot Order*, 27 FCC Rcd at 15848, para. 15.

<sup>25</sup> *Broadband Pilot Order*, 27 FCC at 15848, para. 15.

<sup>26</sup> See *Lifeline Reform Order*, 27 FCC Rcd at 6796, para. 343.

<sup>27</sup> An expanded description of each selected project is included in Section IV. The ETCs that submitted the selected applications were required to implement their projects pursuant to the terms and conditions contained within each of their applications, and any supplemental information that was filed in response to staff inquiry.

Gila River	AZ	Effect of monthly price on adoption	Fixed	Individual randomized controlled experiment
Hopi	AZ	Effect of monthly price on adoption	Fixed	Individual randomized controlled experiment
PR Wireless	PR	Consumer preferences for devices	Mobile, Smartphone or MiFi	Nonexperimental
T-Mobile Puerto Rico	PR	Consumer preferences for devices	Mobile, Smartphone or MiFi	Comparison group quasi-experimental/Nonexperimental (No variation in offerings, variation in advertising)
Puerto Rico Telephone Co.	PR	Consumer preferences for speeds	Fixed/Mobile, Tablet	Nonexperimental
NTCA	IA, NM	Consumer preferences for speeds	Fixed	Nonexperimental (comparison of non-similar areas)

Table 1 briefly explains what key question(s) each project was designed to answer, what mode of service was studied, what methodological design was employed, and the location of the pilot project.

8. The Bureau selected projects that would provide the most useful data regarding the impact of subsidy amounts on adoption or those that might reveal other useful information such as consumers' preferences for certain types of devices or services. Within the 14 Pilot Projects, the subsidy amount ranged from \$5 per month to as much as \$39.95 per month. The Pilot Projects also tested a range of monthly end-user charges, such as \$40, \$35, \$20 or \$10, with some projects testing lower charges and others testing higher charges. All of the projects included some end-user charge at service inception, periodically throughout the project, or both.

9. *Methodology of the Low-Income Broadband Pilots.* The Bureau explicitly sought to fund projects designed as field experiments when requesting applications for participation in the pilot program. The Bureau did this “[t]o ensure that the Pilot Program gathers high-quality data that will help identify effective approaches to increasing broadband adoption and retention.”<sup>28</sup> A field experiment uses randomization and variation of policy variables so that a causal link may be established between a policy and an outcome of interest.<sup>29</sup> Within the Pilot Projects, the Bureau aimed to gather information about how monthly or one-time discounts, digital literacy training, or specific product offerings could influence low-income broadband adoption.

10. Having the right methodological design for the Pilot Projects was helpful for the Bureau in learning about *causal* impacts of the program. In a 2012 report, the Government Accounting Office (GAO) stated that, in order “[t]o isolate the program’s unique impacts . . . an impact study must be carefully designed to rule out plausible alternative explanations for the results.”<sup>30</sup> The GAO explained

<sup>28</sup> *Broadband Pilot Order*, 27 FCC at 15844-45, para. 7.

<sup>29</sup> See, e.g., COUNCIL OF ECONOMIC ADVISORS, 2014 ECONOMIC REPORT OF THE PRESIDENT, CHAPTER 17, at 272-274 (March 2014) <https://www.whitehouse.gov/administration/eop/cea/economic-report-of-the-President/2014>; Steven D. Levitt and John A. List, *Field Experiments in Economics: The Past, the Present and the Future*, *European Economic Review*, Vol. 53, Issue 1, at 1-18 (Jan. 2009) <http://www.sciencedirect.com/science/article/pii/S0014292108001153>; Glenn W. Harrison and John A. List, *Field Experiments*, *Journal of Economic Literature*, Vol. 42, No. 4 at 1009-1055 (Dec. 2004) [http://www.jstor.org/stable/3594915?seq=1#page\\_scan\\_tab\\_contents](http://www.jstor.org/stable/3594915?seq=1#page_scan_tab_contents).

<sup>30</sup> U.S. GOVERNMENT ACCOUNTABILITY OFFICE, REPORT TO CONGRESSIONAL REQUESTERS, GAO 12-208G, DESIGNING EVALUATIONS: 2012 REVISIONS at 39 (2012) (*2012 GAO Report*).

that a number of methodologies are available for evaluation, including “experimental, quasi-experimental, and non-experimental designs”<sup>31</sup> and that “field experiments . . . take place in much less contrived, more naturalistic settings” than laboratory experiments.<sup>32</sup> With this understanding, the Bureau in the *Broadband Pilot Public Notice* specifically encouraged applications for projects designed as field experiments.<sup>33</sup> Unlike a simple survey (a “stated preference” approach), the pilot participants made actual offers to Lifeline eligible households and observed those household’s behavior (a “revealed preference” approach).

11. The 14 selected projects each implemented one of three methodological designs. Using the GAO’s terminology concerning evaluations, these are as follows:

- *Randomized Controlled Experiment* – Compares outcomes for a randomly assigned treatment group and a nonparticipating control group. Multiple treatment groups may also be compared. Randomization may be conducted on the individual level or some other aggregate level, such as a geographic area. Such designs provide the opportunity for highly credible estimates of the causal impact of a policy.
- *Comparison Group Quasi-Experiment* – Compare outcomes for program participants and a comparison group while seeking to control for key characteristics, such as through matching. Such designs provide an opportunity to estimate the impact of policies, subject to how well possible confounding variables are able to be controlled for.
- *Non-experimental* – Does not compare outcomes across groups and therefore cannot be used to draw causal inferences. Such designs may be used to observe behavior, such as how a household behaves when given a choice over multiple options.

12. Several of the Pilot Projects with large customer bases randomly assigned potential subscribers to different offers (such as different price points and hardware discounts) and thus generated data suitable for parsing the independent effects of such factors on low-income adoption.<sup>34</sup> Some of the smaller projects did not use random assignment but offered variations in comparable areas.<sup>35</sup> This non-random approach also had the potential to yield significant information on the most effective approaches to increasing adoption by low-income consumers. Finally, a set of non-experimental projects, while unable to provide data on how differing policies might affect behavior, provided important data in the real-world setting (as opposed to surveys) on what types of plans or devices consumers will choose when given the option.<sup>36</sup> Several projects closely monitored their marketing strategies and number of offers given to eligible consumers and tracked responses.<sup>37</sup> Table 2 reports the total number of unique subscribers included in each project’s pilot data filings with USAC.<sup>38</sup>

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<sup>31</sup> *Id.* at 39.

<sup>32</sup> *Id.* at 41.

<sup>33</sup> See *Broadband Pilot Public Notice*, 27 FCC Rcd at 4841-42.

<sup>34</sup> See, e.g., TracFone Pilot Project; Virgin Mobile Pilot Project; Frontier Pilot Project.

<sup>35</sup> See, e.g., Troy Cablevision Pilot Project; Vermont Telephone Pilot Project.

<sup>36</sup> See, e.g., T-Mobile Pilot Project; NTCA Pilot Project.

<sup>37</sup> See, e.g., TracFone Final Report; Virgin Mobile Final Report, Troy Cablevision Final Report.

<sup>38</sup> For consistency, all data reported in the tables are based on submissions to USAC and not data reported in other places by the pilot participants. Furthermore, the subscriber total in this document are based on the number of subscribers listed in pilot ETC’s “Block E” data submission to USAC. If other data blocks submitted to USAC differed from Block E, the Block E data was used. The datasets released for each pilot contain all data submitted so interested users can explore any such differences. A description of each data block submitted to USAC is available at [http://usac.org/\\_res/documents/li/pdf/broadband-pilot/13.02.25\\_FCC\\_KickOff\\_Presentation.pdf](http://usac.org/_res/documents/li/pdf/broadband-pilot/13.02.25_FCC_KickOff_Presentation.pdf).

**Table 2: Low-Income Broadband Pilot Subscribers, by Project**

<b>Project</b>	<b>Total Pilot Subscribers</b>
TracFone	667
Nexus	274
Virgin Mobile	901
Frontier	118
Vermont Telephone	77
Xchange	214
Partnership for a Connected Illinois	150
Troy Cable	127
Gila River	84
Hopi	111
PR Wireless	2,475
T-Mobile Puerto Rico	3,033
Puerto Rico Telephone Co.	354
NTCA	49

Table reports the total number of unique subscribers included in each project's pilot data filings with USAC. Totals include all subscribers who received service for any period of time during the pilot, whether they received a discount or not.

13. In addition to providing a wealth of quantitative information, many of the pilots also provided qualitative information about ways in which a broadband discount program could be incorporated into Lifeline. Together, the 14 pilot projects provided a highly diverse set of scenarios for studying factors influencing broadband adoption among low-income households and for understanding the preferences of Lifeline-eligible consumers.

#### **IV. DESCRIPTION OF THE SELECTED PILOT PROGRAM PROJECTS**

##### **A. Mobile - Randomized Controlled Experiments**

##### **1. Nexus (OH, MI, IA, NV, CA, LA, MS, NJ)**

14. *Overview and Description of Offerings.* The Nexus Pilot Project, which operated in 8 states, studied the effect of varying subsidy amounts and digital literacy offerings on adoption of mobile offerings. Table 3a shows the characteristics of each treatment offered. Nexus conducted a large, randomized controlled experiment by offering each group of potential subscribers one of the six treatments. Treatments varied by the level of the subsidy and whether an offer of digital literacy training accompanied the solicitation. Groups were randomly offered plans based on the last two digits of their existing Nexus account number, and Nexus directly contacted households with a specific offer. Consumers, having been made an offer, then could choose to either purchase a smartphone or aircard plan (device priced at \$49.99) with a monthly data allowance of 200 megabyte (MB), 500 MB, 1 gigabyte (GB) or 2GB. While the discount amount was the same within each treatment, customers would have to pay more for larger plans. This design allowed for cleanly estimating the causal effect of the discount level on consumer choice.<sup>39</sup> Table 3a sets forth the treatments.

<sup>39</sup> See Application of Nexus Communications, Inc., WC Docket 11-42 (filed July 2, 2012) (Nexus Application); see also Supplement to Nexus Application, WC Docket 11-42 (filed August 22, 2012); Second Supplement to Nexus Application, WC Docket 11-42 (filed September 24, 2012).

Table 3a: Nexus Treatments

Treatment Description	Monthly Subsidy Amount	Equipment Discount	Digital Literacy Offered	Total Subscribers
Control Group - With DL	\$0.00	\$0.00	Yes	0
Control Group - Without DL	\$0.00	\$0.00	No	34
Test Group I - With DL	\$15.00	\$0.00	Yes	1
Test Group I - Without DL	\$15.00	\$0.00	No	55
Test Group II - With DL	\$20.00	\$0.00	Yes	4
Test Group II - Without DL	\$20.00	\$0.00	No	180

15. *Implementation and Results.* Nexus relied primarily on direct marketing texts to existing Lifeline subscribers. However, in Ohio only it also marketed the service to new subscribers located in low-income neighborhoods by conducting in-person direct action outreach, which brought training capabilities directly into the neighborhoods. For new customers subscribing through this outreach, Nexus offered all customers on a given day only one of the treatments containing a digital literacy offer to provide variation in the treatments. Each day Nexus varied the offer available as part of the direct outreach.

16. When subscribing, customers chose to apply a fixed discount amount to one of several plans that varied by device type or data allowance. The plans available are shown in Table 3b as are the number of customers choosing each plan. The table shows the unsubsidized service and equipment costs to which the discount for a given treatment would be applied. For example, a new subscriber in “Test Group 1” (see Table 3a) would be able to apply a \$15 monthly discount to any of these plans. If the subscriber chose the 200MB Smartphone plan, then the monthly end-user charge would be \$9.99 (= \$24.99 - \$15). As shown in the table, a large fraction (82 percent) of customers chose smartphone plans while the remaining 18 percent chose the data-only device. Furthermore, customers tended to choose smaller and less expensive data allowances.

Table 3b: Nexus Plans

Plan Description	Unsubsidized Monthly Cost	Unsubsidized Equipment Cost	Subscribers
200MB Data Allowance – Aircard	\$24.99	\$49.99	36
200MB Data Allowance – Smartphone	\$24.99	\$49.99	96
500MB Data Allowance – Aircard	\$29.99	\$49.99	8
500MB Data Allowance – Smartphone	\$29.99	\$49.99	95
1GB Data Allowance – Aircard	\$39.99	\$49.99	1
1GB Data Allowance – Smartphone	\$39.99	\$49.99	20
2GB Data Allowance – Aircard	\$49.99	\$49.99	2
2GB Data Allowance – Smartphone	\$49.99	\$49.99	16

## 2. TracFone Smartphone Project (FL, MD, TX, WA, WI, MA)

17. *Overview and Description of Offerings.* TracFone’s Pilot Project studied the effects of varying subsidy amounts and discounted hardware through mobile smartphone service plans—all of which included unlimited voice/text and 2GB of data. The price per month for the service plans offered to TracFone’s existing Lifeline customers differed depending on the amount of the discount applicable to the monthly service and the price charged for the smartphone. In this way, TracFone’s pilot addresses the effect of both recurring monthly discounts and one-time upfront discounts on hardware.

18. *Implementation and Results.* TracFone divided five states (FL, MD, TX, WA, WI) each into five regions and then randomly assigned each region in a state to one of five treatments. The treatments varied in the monthly recurring cost and one-time upfront cost to the consumer. Table 4a shows the

characteristics of each treatment.<sup>40</sup> TracFone received the largest enrollment in the lowest cost plan (free phone, \$10 monthly end-user charge).

19. TracFone also non-experimentally offered digital literacy training and discounted service in Boston to 300 existing customers. This treatment required subscribers to complete digital literacy training provided by Open Air Boston in order to receive a free Android data handset and discounted service. TracFone reported that only 12 approved customers completed the digital literacy course within the [60] day period required, though many more received at least one month of subsidy.<sup>41</sup> The treatment in Boston is shown at the bottom of Table 4a but is not considered part of the experimental design and is not useful for making inferences about the effect of digital literacy on adoption.

Table 4a: TracFone Treatments

Treatment Description	Monthly Subsidy Amount	Equipment Discount	Digital Literacy Offered	Total Subscribers
Free Phone \$10 Service	\$25.00	\$29.99	No	250
Free Phone \$20 Service	\$15.00	\$29.99	No	193
Standard Phone, \$10 Service	\$25.00	\$0.00	No	77
Standard Phone, \$20 Service	\$15.00	\$0.00	No	46
Control Group - Discounted Phone, Paid Service	\$0.00	\$0.00	No	16
Free Phone, \$10 Service w/ Digital Literacy (Boston)	\$25.00	\$120.00	Yes	85

20. TracFone offered a single plan to pilot participants that provided unlimited talk and text and 2GB of monthly data. Table 4b shows the details of this plan.

Table 4b: TracFone Plans

Plan Description	Unsubsidized Monthly Cost	Unsubsidized Equipment Cost	Subscribers
Unlimited voice, Text, 2GB Data	\$35.00	\$29.99	667

### 3. Virgin Mobile (MA, OH)

21. *Overview and Description of Offerings.* The Virgin Mobile Pilot Project studied the effects of a subsidy and discounted equipment through mobile broadband service offerings using MiFi devices. Virgin Mobile randomly assigned offers based on Zip Code and offered one of four pricing options to a large sample. Each plan included up to 1 GB of mobile data. Those low-income consumers in Ohio were also offered digital literacy training, though this was not experimentally varied. Table 5a shows the four main treatment groups, separating each main group by whether digital literacy was offered. While customers receiving the \$20 monthly subsidy paid nothing each month, these customers did have to pay a one-time upfront activation fee of \$20. The \$50 devices offered in the pilot were discounted by \$40 for some treatments and undiscounted for others.

<sup>40</sup> Note that while TracFone's data submission reports an equipment discount of \$29.99, its final report explains that it actually offered better phones but with a larger discount so that the end user charge for the phone remained at \$29.99 for the standard phone and \$0 for the free phone. See TracFone Final Report.

<sup>41</sup> See TracFone Final Report; see also TracFone Wireless, Inc.'s Application to Participate in the Broadband Adoption Lifeline Pilot Program for Smartphones, WC Docket 11-42 (filed July 2, 2012) (TracFone Smartphone Application); see also Supplement to TracFone Smartphone Application, WC Docket 11-42 (filed August 27, 2012); Second Supplement to TracFone Smartphone Application, WC Docket 11-42 (filed September 24, 2012); Third Supplement to TracFone Smartphone Application, WC Docket 11-42 (filed September 27, 2012).

Table 5a: Virgin Mobile Treatments

Treatment Description	Monthly Subsidy Amount	Equipment Discount	Digital Literacy Offered	Total Subscribers
Group 1; No Discount on Device or Service; with Digital Literacy	\$0.00	\$0.00	Yes	24
Group 1; No Discount on Device or Service; without Digital Literacy	\$0.00	\$0.00	No	31
Group 2; Discount on Device and Service; with Digital Literacy	\$20.00	\$40.00	Yes	286
Group 2; Discount on Device and Service; without Digital Literacy	\$20.00	\$40.00	No	178
Group 3; Discount on Service, but not Device; with Digital Literacy	\$20.00	\$0.00	Yes	97
Group 3; Discount on Service, but not Device; without Digital Literacy	\$20.00	\$0.00	No	77
Group 4; Discount on Device, but not Service; with Digital Literacy	\$0.00	\$40.00	Yes	126
Group 4; Discount on Device, but not Service; without Digital Literacy	\$0.00	\$40.00	No	82

22. *Implementation and Results.* Virgin Mobile marketed each of the four offers to approximately 26,000 existing customers in Massachusetts and approximately 38,000 existing customers in Ohio. Each customer received only one offer. Thus, a total of approximately 104,000 Massachusetts customers and 150,000 Ohio customers received an offer for service from Virgin Mobile. All marketing was in the form of a two-sided trifold mailer that contained a description of the program, offer and the necessary qualifications; promoted the benefits of broadband generally; displayed an image of the broadband device; and referred Ohio customers to a technology training program offered at no charge by a partner organization, Connected Nation. Most customers received one mailer, although some received a follow up mailer.<sup>42</sup>

23. Virgin Mobile noted that participation in all of the offers was considerably less than expected. The offer with a \$30 upfront cost (\$10 for the phone and \$20 activation fee) but no monthly recurring charges attracted the most customers. The offer with a \$50 upfront cost for the phone and \$20 monthly recurring charge attracted the fewest customers. In terms of usage, only a handful of participants exceeded 1 GB of data in any given month. The vast majority of participants used well below 1 GB of data. Customers who enrolled from Groups 1 or 4 with a monthly recurring charge could choose to pay and receive service (or not) in any given month, meaning they could opt to manually replenish their service. Groups 2 or 3 had no monthly charge and were automatically replenished for the duration of the pilot.<sup>43</sup>

Table 5b: Virgin Mobile Plans

Plan Description	Unsubsidized Monthly Cost	Unsubsidized Equipment Cost	Subscribers
1GB Data Limit/Month, One Time (Manual Replenish)	\$20.00	\$50.00	263
1GB Data Limit/Month, Recurring Fee (auto)	\$20.00	\$50.00	638

<sup>42</sup> See generally Virgin Mobile Final Report.

<sup>43</sup> See Virgin Mobile Final Report. Virgin Mobile USA, L.P. Application to Participate in the Broadband Adoption Lifeline Pilot Program, WC Docket 11-42 (filed July 2, 2012) (Virgin Mobile Application); see also Supplement to Virgin Mobile Application, WC Docket 11-42 (filed August 31, 2012); Second Supplement to Virgin Mobile Application, WC Docket 11-42 (filed September 7, 2012); Third Supplement to Virgin Mobile Application, WC Docket 11-42 (filed September 24, 2012).

**B. Fixed - Randomized Controlled Experiments**

**1. Frontier (OH, WV)**

24. *Overview and Description of Offerings.* Using fixed broadband service, Frontier, in partnership with Connect Ohio (a subsidiary of Connected Nation) and Future Missions, launched a pilot project throughout the entire Ohio service territory of Frontier North, Inc. and in the area surrounding Parkersburg, West Virginia. Frontier studied the impact of a financial incentive to take digital literacy training on broadband adoption. It also allowed for observing the new adopters’ broadband choices, their willingness to take digital literacy training, and their interest in purchasing computers at a discounted price.

25. As detailed in Table 6a, this project used a test group and a control group. Frontier gave treatment group consumers a choice between (1) not taking digital literacy training but still receiving a \$20 monthly discount, (2) taking digital literacy training and receiving a \$30 monthly discount while also waiving a one-time \$34.99 charge, or (3) taking digital literacy training and having a \$20 monthly discount while also receiving a free computer.<sup>44</sup> The control group was offered a \$20 monthly discount with no other requirements (though digital literacy training was available to this group). This design therefore generated data on the effect of such a “digital literacy incentive” on adoption, how much of a factor “lack of an adequate computer” is as an adoption barrier, and how much some consumers will forego in discounts to not take a digital literacy class. Within Ohio, Frontier randomized the treatment and control offerings by Zip Code while only the control was offered in West Virginia. Regardless of whether a customer was in the treatment or control group, consumers could choose from a menu of maximum download speeds: 1 megabit per second (Mbps); 6 Mbps; 12 Mbps; and 24 Mbps. This provides data on which services low-income, recent non-adopters are willing and able to purchase at a discount.

Table 6a: Frontier Treatments

Treatment Description	Monthly Subsidy Amount	Equipment Discount	Digital Literacy Offered	Total Subscribers
Treatment: Offered Choice of Extra Discount or Free Computer for Taking Digital Literacy Training	\$20.00 if training not taken/\$30 if training taken and discount selected	\$199 if free computer chosen	Yes	92
Control: No Extra Discount for Taking Digital Literacy Training	\$20.00	\$0.00	Yes	26

26. *Implementation and Results.* The solicitation period began May 1, 2013 and ended October 31, 2013. The solicitation was directed to existing and potential customers that did not subscribe at the time to Frontier’s broadband services. Table 6b shows which plans customers chose and how many customers took digital literacy training to obtain either the free computer or the additional \$10 monthly discount and \$34.99 fee waiver. In Table 6b, the treatment and control groups are further separated based on the consumers’ decisions given the offer made to them. The first three sets of rows show for the treatment group what decisions consumers made. Each treatment group member was given the choice to either not take digital literacy training and simply receive a \$20 monthly subsidy, take the training and receive an activation fee waiver of \$34.99 and an additional \$10 subsidy on top of the \$20 subsidy, or take the training and receive a free computer in addition to the \$20 monthly subsidy. The results show that many of the treatment group subscribers opted not to take digital literacy for an additional discount or free computer. The last two sets of rows show the control group, finding that without the incentive few subscribers chose to take digital literacy training. Among the four speed plans, the 6 Mbps plan was the most popular in all groups.

<sup>44</sup> In this way, Frontier tied an attempt to overcome non-price barriers with an attempt to address the price barrier.

Table 6b: Frontier Plans

Plan Description	Unsubsidized Monthly Cost	Unsubsidized Equipment Cost	Subscribers
Treatment: 1Mb & Declined Digital Literacy	\$31.99	\$0.00	3
Treatment: 6Mb & Declined Digital Literacy	\$34.99	\$0.00	30
Treatment: 12Mb & Declined Digital Literacy	\$44.99	\$0.00	0
Treatment: 24Mb & Declined Digital Literacy	\$54.99	\$0.00	0
Treatment: 1Mb & Took Digital Literacy; Waive Non-Recurring/+\$10 per mo.	\$31.99	\$0.00	1
Treatment: 6Mb & Took Digital Literacy; Waive Non-Recurring/+\$10 per mo.	\$34.99	\$0.00	43
Treatment: 12Mb & Took Digital Literacy; Waive Non-Recurring/+\$10 per mo.	\$44.99	\$0.00	0
Treatment: 24Mb & Took Digital Literacy; Waive Non-Recurring/+\$10 per mo.	\$54.99	\$0.00	0
Treatment: 1Mb & Took Digital Literacy, Free Computer	\$31.99	\$199.00	0
Treatment: 6Mb & Took Digital Literacy, Free Computer	\$34.99	\$199.00	15
Treatment: 12Mb & Took Digital Literacy, Free Computer	\$44.99	\$199.00	0
Treatment: 24Mb & Took Digital Literacy, Free Computer	\$54.99	\$199.00	0
Control: 1Mb & Declined Digital Literacy	\$31.99	\$0.00	0
Control: 6Mb & Declined Digital Literacy	\$34.99	\$0.00	24
Control: 12Mb & Declined Digital Literacy	\$44.99	\$0.00	1
Control: 24Mb & Declined Digital Literacy	\$54.99	\$0.00	0
Control: 1Mb & Took Digital Literacy, No Incentive	\$31.99	\$0.00	0
Control: 6Mb & Took Digital Literacy, No Incentive	\$34.99	\$0.00	1
Control: 12Mb & Took Digital Literacy, No Incentive	\$44.99	\$0.00	0
Control: 24Mb & Took Digital Literacy, No Incentive	\$54.99	\$0.00	0

## 2. Gila River (AZ – Tribal)

27. *Overview and Description of Offerings.* The Gila River Pilot Project tested the effect on adoption of discounted prices and access to discounted equipment. Gila River randomly assigned subscribers into five groups which varied by price points, speed, and access to equipment. Households were then presented with a single offer based on their randomly assigned group. As detailed in Table 7, the discount amounts for the broadband plans ranged from \$23.24 to \$38.24 which created variation in the prices paid by the end user. Two groups were also offered a free desktop computer. Consumers were not able to choose their speed but rather were offered a speed at a certain price and consumers decided whether to purchase the service. Since the end-user charge and the speed changed together across treatments, the independent effects of either cannot be estimated (though the cost per Mbps varies independently). Table 7 also shows how many subscribers signed up for each service, and for convenience end-user charges for each treatment is included in the leftmost column.<sup>45</sup>

<sup>45</sup> See Gila River Telecommunications, Inc. Application to Participate in the Broadband Adoption Lifeline Pilot Program, WC Docket 11-42 (filed June 29, 2012) (Gila River Application).

Table 7: Gila River Treatments

Treatment Description	Monthly Subsidy Amount	Equipment Discount	Digital Literacy Offered	Total Subscribers
\$53.19 user cost: 1.5 - 4.8 Mbps/1Mbps	\$0.00	\$0.00	Yes	0
\$14.95 user cost: up to 5 Mbps/1Mbps	\$38.24	\$0.00	Yes	18
\$19.95 user cost: up to 10 Mbps/1Mbps	\$33.24	\$0.00	Yes	16
\$24.95 user cost: up to 15 Mbps/1Mbps - Desktop	\$28.24	\$200.00	Yes	28
\$29.95 user cost: up to 20 Mbps/1Mbps - Desktop	\$23.24	\$200.00	Yes	22

28. *Implementation and Results.* In its Pilot Project, Gila River marketed the broadband offerings to low income consumers by first reaching out to existing Lifeline voice subscribers by invitation to an initial free barbeque information meeting. In that gathering, Gila River held a random drawing to determine which of the 5 groups/offers each subscriber would be included. Telephone numbers were called, not names, to depersonalize how a subscriber was assigned into one of the 5 groups (each offer was defined as its own group). For those subscribers that did not enroll after the information meeting, Gila River continued to contact them to determine interest in the broadband pilot. Once a telephone number was assigned to a group, Gila River did not permit changes from one offer to another. As a final effort to enroll subscribers, Gila River placed print advertisement in the local Gila River Indian Newspaper monthly for the enrollment period.<sup>46</sup>

### 3. Hopi Telecommunications (AZ – Tribal)

29. *Overview and Description of Offerings.* The Hopi Telecommunications Project studied the effects of subsidy amounts and access to discounted equipment by making different offers to a control group and three treatment groups. The groups were chosen by random assignment of households. The control group was offered the choice of two speed plans at full price. The treatment groups were each given one of the following offers: a flat subsidy of \$39.95 for a 1.5 Mbps plan and a financed refurbished computer, a flat subsidy of \$39.95 for a 3 Mbps plan and a financed refurbished computer, or a flat subsidy of \$39.95 and a choice of either speed but no discounted computer.<sup>47</sup>

Table 8a: Hopi Treatments

Treatment Description	Monthly Subsidy Amount	Equipment Discount	Digital Literacy Offered	Total Subscribers
No Discount, choice of 1.5 or 3 Mbps service, low-cost computer financed	\$0.00	\$0.00/financing avail.	Yes	14
Discount on 1.5Mbps service, low-cost refurbished computer financed	\$39.95	\$0.00/financing avail.	Yes	31
Discount on 3 Mbps service, low-cost refurbished computer financed	\$39.95	\$0.00/financing avail.	Yes	36
Discount on either 1.5 or 3 Mbps service, No access to computer	\$39.95	\$0.00	Yes	30

30. *Implementation and Results.* In implementing the pilot, Hopi Telecommunications sent mailers to all existing Lifeline subscribers that were not subscribing to broadband service. Hopi

<sup>46</sup> See *id.* at 7-8.

<sup>47</sup> See Hopi Telecommunications, Inc. Application for the FCC's Broadband Adoption Lifeline Pilot Program, WC Docket 11-42 (filed July 9, 2012) (Hopi Application); see also Supplement to Hopi Application, WC Docket 11-42 (filed August 27, 2012); Second Supplement to Hopi Application, WC Docket 11-42 (filed October 2, 2012).

Telecommunications notified such subscribers of a 2 day sign-up event in which each household would be randomly assigned into one of the groups/offers. Table 8b shows the unsubsidized price of each plan and the number of customers who chose each plan.

**Table 8b: Hopi Plans**

Plan Description	Unsubsidized Monthly Cost	Unsubsidized Equipment Cost	Subscribers
1.5Mbps speed	\$59.95	\$211.00	52
3Mbps Speed	\$69.95	\$211.00	59

## C. Fixed – Quasi-Experimental

### 1. Partnership for Connected Illinois (PCI) (IL)

31. *Overview and Description of Offerings.* The Partnership for a Connected Illinois Project (PCI)<sup>48</sup>, in partnership with Connected Living, Inc., Citizens Utility Board, studied the effects of access to digital literacy and consumers' choice among plans offering varying speeds using fixed broadband among the member ETCs within their study areas. All participating subscribers were able to receive a one-time \$60 credit toward installation fees, a free modem, or necessary connection device (subsidized by the ETC), and a \$30 monthly discount on broadband services and the option to purchase a refurbished desktop computer from Computer Banc at discount.<sup>49</sup> That is, there was no variation in subsidy amounts across subscribers. Rather, the PCI project focused solely on the effect of offering digital literacy training.

32. Within each ETC study area, PCI identified a treatment group area and a control group area for this project. The treatment groups tended to be an area around the main town in the ETC's territory while the control group was the rest of the area in the ETC's territory. Subscribers in the treatment group had the option to participate in no-cost digital literacy training, whereas subscribers in the control group were not offered digital literacy training. PCI tracked usage and retention of service during the pilot project to determine if such training helped subscribers overcome adoption hurdles.<sup>50</sup> Table 9 shows the offers for each treatment and control group.

**Table 9: PCI Treatments**

Treatment Description	Monthly Subsidy Amount	Equipment Discount	Digital Literacy Offered	Total Subscribers
Treatment Group	\$30.00	Varies by ETC	Yes	89
Control Group	\$30.00	Varies by ETC	No	61

33. *Implementation and Results.* PCI developed marketing materials advertising the program benefits, with pricing tailored to each ETC's rates.<sup>51</sup> Flyers were placed in community areas and

<sup>48</sup> The Partnership for a Connected Illinois Project is comprised of Adams Telephone Cooperative, Cass Telephone Company, Harrisonville Telephone Company, Madison Telephone Company, Mid-Century Telephone Cooperative, Shawnee Telephone Company, and Wabash Telephone Cooperative.

<sup>49</sup> The following ETCs participating in the PCI project: Adams Telephone Cooperative; Cass Telephone Company; Harrisonville Telephone Company; Madison Telephone Company; Mid-Century Telephone Cooperative; Shawnee Telephone Company; and Wabash Telephone Cooperative. *See* Partnership for a Connected Illinois Project Broadband Adoption Lifeline Pilot Program, WC Docket 11-42 (filed July 2, 2012) (Partnership for a Connected Illinois Project); *see also* Supplement to Partnership for a Connected Illinois Project, WC Docket 11-42 (filed August 28, 2012); Second Supplement, WC Docket 11-42 (filed September 26, 2012).

<sup>50</sup> *See generally* PCI Final Report.

<sup>51</sup> For specific pricing options and ETC-specific equipment discounts offered by pilot ETCs, refer to the data set released for the PCI project.

postcards were mailed to every household in ETC area Zip Codes. Throughout the project, each ETC marketed via newspaper advertisements, editorials, billing inserts, school district competitions and via television, depending on the marketing budget for each ETC. Because multiple ILECs participated in the PCI pilot, each applied the same \$30 discount to different menus of broadband offerings.

34. Based on survey data provided by the PCI pilot, 73 percent of the subscribers had never had broadband access in their home prior to enrolling in the pilot and noted that the main reason for not having broadband was due to cost. This project also studied the choices subscribers made in determining speeds because they were permitted to choose from speed packages offered by each participating ETC. Of the subscribers able to choose multiple speed tiers, 79 percent chose the slowest speed package, which also came with the smallest monthly fee. In regards to retention, 66 percent of the participants remained connected to broadband service once the subsidy ended.<sup>52</sup>

**2. Troy Cablevision (Troy Cable) (AL)**

35. *Overview and Description of Offerings.* Troy Cablevision, in partnership with the Alabama Department of Economic and Community Affairs, tested the effects of subsidy amounts on adoption by offering a \$14 subsidy off a wireline broadband plan within two counties and offered a \$24 discount off the same wireline broadband plan in two separate counties.<sup>53</sup> Table 10a shows these two test groups.

**Table 10a: Troy Cable Treatments**

Treatment Description	Monthly Subsidy Amount	Equipment Discount	Digital Literacy Offered	Total Subscribers
Test Group I	\$24.00	\$0.00	Yes	102
Test Group II	\$14.00	\$0.00	Yes	25

36. *Implementation and Results.* During the summer of 2013, Troy Cable distributed signup packets to all local school systems within the four-county footprint covered by the pilot: Pike, Dale, Coffee, and Crenshaw counties. Each packet contained a flyer describing the pilot, as well as application and survey forms to be completed. With the approval of each school superintendent, Troy Cable delivered all copies to the Boards of Education for distribution. The following is a list of packets sent within each county: Pike County: 5,260; Dale County: 3,780; Coffee County: 2,250; and Crenshaw County: 1,630. Additionally, Troy Cable sent 825 mailers to non-profit organizations and 6,500 existing Troy Cable customers.<sup>54</sup> Table 10b shows the price of the 4 Mbps/1 Mbps service to which a subscriber’s subsidy amount was applied.

**Table 10b: Troy Cable Plans**

Plan Description	Unsubsidized Monthly Cost	Unsubsidized Equipment Cost	Subscribers
4Mb/1Mb	\$33.99	\$5.00	127

**3. Vermont Telephone (VT)**

37. *Overview and Description of Offerings.* Vermont Telephone, in partnership with Connected Nation, operated a pilot project that tested the effect of subsidy on wireline broadband adoption by offering different prices to customers in selected wire centers, while customers served by other wire centers were only offered service at un-discounted prices. Vermont Telephone sought to randomize

<sup>52</sup> See PCI Final Report at 7.

<sup>53</sup> See Troy Cablevision, Inc. Application for Low Income Broadband Pilot Program, WC Docket 11-42 (filed July 2, 2012) (Troy Cablevision Application); see also Supplement to Troy Cablevision Application, WC Docket 11-42 (filed August 10, 2012); Second Supplement to Troy Cablevision Application, WC Docket 11-42 (filed August 30, 2012).

<sup>54</sup> See Troy Cable Final Report.

which wire centers were given each offer.<sup>55</sup> The treatment group offer was either (a) to maintain a uniform \$9.95 end-user charge for the full 12 months if the customer subscribed to a long-distance plan or (b) to be charged a \$9.95 end-user charge for the first three months, followed by a \$14.95 end-user charge for the remaining 9 months. To achieve this end-user charge structure in the treatment groups, the subsidy varied over the year. The undiscounted wire centers paid \$29.95/month with long-distance and \$34.95/month without long distance.<sup>56</sup> Table 11a shows the characteristics of each experimental group.

Table 11a: Vermont Telephone Company Treatments

Treatment Description	Monthly Subsidy Amount	Equipment Discount	Digital Literacy Offered	Total Subscribers
Treatment Group	\$5 months 1-6 & \$20 months 7-12 if bundled with long distance; \$0 months 1-3 & \$20 months 4-12 if no long distance	\$350.00	Yes	73
Control Group	\$0.00	\$350.00	Yes	4

38. *Implementation and Results.* In implementing the pilot, Vermont Telephone sent mailers and bill inserts to existing voice and video subscribers that were not subscribing to the company's Internet service and also to households that may qualify for Lifeline service but do not currently use it. Table 11b shows which plans pilot subscribers purchased.

Table 11b: Vermont PR Plans

Plan Description	Unsubsidized Monthly Cost	Unsubsidized Equipment cost	Subscribers
BB w/LD (Long Distance)	\$14.95 months 1-6; \$29.95 months 7-12	\$350.00	0
BB w/LD and TV	\$14.95 months 1-6; \$29.95 months 7-12	\$350.00	0
BB w/LD – Device	\$14.95 months 1-6; \$29.95 months 7-12	\$350.00	31
BB w/LD - TV & Device	\$14.95 months 1-6; \$29.95 months 7-12	\$350.00	0
BB Only	\$9.95 months 1-3; \$34.95 months 4-12	\$350.00	4
BB w/ TV	\$9.95 months 1-3; \$34.95 months 4-12	\$350.00	0
BB w/ Device	\$9.95 months 1-3; \$34.95 months 4-12	\$350.00	42
BB w/TV and Device	\$9.95 months 1-3; \$34.95 months 4-12	\$350.00	0

#### 4. XChange Telecom (XChange) (Brooklyn, NY)

39. *Overview and Description of Offerings.* XChange, in partnership with City University of New York Computer Sciences Department and School of Public Affairs, Baruch College, and City University of New York, operated a pilot project that tested different subsidy amounts: \$10, \$15 and \$20. By varying the subsidy offered to buildings and neighborhoods, XChange's Pilot Project allowed for

<sup>55</sup> Vermont Telephone sought to randomize the wire centers, though due to the limited number of wire centers it is debatable whether the experiment should be considered truly experimental or quasi-experimental.

<sup>56</sup> See Vermont Telephone Company, Inc. Application to Participate in Broadband Adoption Lifeline Pilot Program, WC Docket 11-42 (filed July 2, 2012) (Vermont Telephone Application) *see also* Supplement to Vermont Telephone Application (filed September 5, 2012).

estimating the effect of the subsidy amount on adoption.<sup>57</sup> For the group with the largest subsidy (Discount Group III), XChange also varied whether it offered digital literacy training. Table 12a sets forth the treatments XChange used.

Table 12a: Xchange Telecom Treatments

Treatment Description	Monthly Subsidy Amount	Equipment Discount	Digital Literacy Offered	Total Subscribers
Control Group, No Discount	\$0.00	\$34.00	No	0
Discount Group I	\$10.00	\$34.00	No	13
Discount Group II	\$15.00	\$34.00	No	19
Discount Group III - without Digital Literacy	\$20.00	\$34.00	No	182
Discount Group III – with Digital Literacy	\$20.00	\$34.00	Yes	0

40. *Implementation and Results.* In implementing the pilot, XChange sent nearly 9,000 mailers to their existing subscriber base. XChange also expanded its marketing by sending direct mailings and postcards, and making phone calls to households in selected Zip Codes within King County (Brooklyn). Consumers could complete applications and surveys either online, via fax or over the phone. Subscriber could choose from a menu of plans and apply their discount to this plan. These plans varied by the type of voice service (if any) the broadband was bundled with. XChange also offered a filtering service with each plan for an additional \$10 per month. Table 12b provides an overview of unsubsidized plan prices and enrollment data.<sup>58</sup>

Table 12b: Xchange Telecom Plans

Plan Description	Unsubsidized Monthly Cost	Unsubsidized Equipment cost	Subscribers
Non-Bundled - Without Filtering	\$24.99	\$34.00	0
Bundled Plan A (Local) - Without Filtering	\$24.99	\$34.00	20
Bundled Plan B (Metro) - Without Filtering	\$24.99	\$34.00	13
Bundled Plan C (USA) - Without Filtering	\$24.99	\$34.00	181
Non-Bundled - With Filtering	\$34.99	\$34.00	0
Bundled Plan A (Local) - With Filtering	\$34.99	\$34.00	0
Bundled Plan B (Metro) - With Filtering	\$34.99	\$34.00	0
Bundled Plan C (USA) - With Filtering	\$34.99	\$34.00	0

## D. Mobile - Non-Experimental

### 1. T-Mobile Puerto Rico LLC (T-Mobile) (Puerto Rico)

41. *Overview and Description of Offerings.* This project studied the effects of outreach methods and varying usage limits with mobile broadband service offerings. T-Mobile offered a flat-rate subsidy of \$20 off broadband plans with the choice of either 5 GB or 2 GB of data and free hotspot or smartphone device.<sup>59</sup>

42. *Implementation and Results.* Rather than varying the subsidy amount or digital literacy offering, T-Mobile's project sought to test certain advertising and outreach methods to determine which

<sup>57</sup> See XChange Telecom Corp. Application to Participate in the Broadband Adoption Lifeline Pilot Program, WC Docket 11-42 (filed July 2, 2012) (XChange Application); see also Supplement to XChange Application, WC Docket 11-42 (filed August 17, 2012).

<sup>58</sup> See XChange Final Report.

<sup>59</sup> See T-Mobile Puerto Rico, LLC Application to Participate in the Broadband Adoption Lifeline Pilot Program, WC Docket 11-42 (filed July 2, 2012) (T-Mobile Application); see also Supplement to T-Mobile Application, WC Docket 11-42 (filed August 15, 2012).

type of outreach most effectively impacted enrollment.<sup>60</sup> T-Mobile divided its marketing approach into three months (May 2014 – July 2014). In the month of May, it implemented a direct mail strategy and advertising in retail store fronts. In the month of June, it launched a television, print and “out of home campaign.” Television advertising was the main driver for enrollment in this pilot, followed by the print strategies, which led to the highest enrollment of all of the pilot programs. For the month of July, T-Mobile implemented an SMS strategy along with advertising in retail store fronts. T-Mobile notes that most of the July sales were customers that came to the stores in June but due to excess demand were given appointments for July.<sup>61</sup> Table 13a shows the various treatments, in this case advertising methods, T-Mobile used and the number of subscribers T-Mobile credits as being attracted by each method.

**Table 13a: T-Mobile Puerto Rico Treatments**

Treatment Description	Monthly Subsidy Amount	Equipment Discount	Digital Literacy Offered	Total Subscribers
Mass Media (TV, Print, OOH)	\$20.00	Hotspot - \$70.50 / Tablet \$265.01	Yes	2830
Targeted Outreach (DM Letter, SMS)	\$20.00	Hotspot - \$70.50 / Tablet \$265.01	Yes	179
Retail and Lifeline Location Outreach	\$20.00	Hotspot - \$70.50 / Tablet \$265.01	Yes	2
Educational Institutions	\$20.00	Hotspot - \$70.50 / Tablet \$265.01	Yes	22

43. T-Mobile’s pilot conducted in Puerto Rico also allowed customers to choose from a variety of options and apply the \$20 monthly discount. Customers could choose from data-only plans to be used with a MiFi device, bundled smartphone plans with some amount of voice, text, and/or data, and data plans that the customer could choose to add-on to an existing voice-only account, which T-Mobile referred to as “SOC.” For each of the plans, T-Mobile offered the device at no cost to the customer. For T-Mobile’s pilot customers, as shown in Table 13b the overwhelming majority chose the \$11.49 per month (after the discount) plan which offered 2GB and 300 minutes of voice (local + unlimited incoming) with no text.<sup>62</sup>

<sup>60</sup> Since T-Mobile did not vary the subsidy, this project was non-experimental. However, since the pilot varied advertising over time the pilot may be considered quasi-experimental, having compared across time periods.

<sup>61</sup> See T-Mobile Final Report.

<sup>62</sup> This explains the low percentage choosing the smartphone option with voice, text, and data since most subscribers already have voice service.

Table 13b: T-Mobile PR Plans

Plan Description	Unsubsidized Monthly Cost	Unsubsidized Equipment Cost	Subscribers
Broadband Only, 2GB	\$39.99	Hotspot \$70.50 / Tablet \$365.00	51
Broadband Only, 5GB	\$49.99	Hotspot \$70.50 / Tablet \$365.01	11
Smartphone Bundle, Unlimited Voice/Text 2GB	\$64.99	option 1 - \$130.90 / option 2 - \$327.99 / option 3 - \$518.99	3
Smart Phone, Unlimited Voice/Text, 5GB	\$74.99	option 1 - \$130.90 / option 2 - \$327.99 / option 3 - \$518.100	0
Smartphone Bundle, 300 Minutes, no Text, 2GB	\$44.99	option 1 - \$130.90 / option 2 - \$327.99 / option 3 - \$518.101	2928
2GB Smartphone Data SOC	\$25.00	option 1 - \$130.90 / option 2 - \$327.99 / option 3 - \$518.102	5
5GB Smartphone Data SOC	\$35.00	option 1 - \$130.90 / option 2 - \$327.99 / option 3 - \$518.103	35

**2. PR Wireless (Puerto Rico)**

44. *Overview and Description of Offerings.* PR Wireless, in partnership with Connected Nation, operated a pilot project that offered service at a discounted rate. PR Wireless offered eligible consumers a flat subsidy of \$25 off two different wireless broadband plans, each with the same end-user charge and usage limits, but with access to different equipment (hotspot modem (mi-fi) and smartphone) that the subscriber paid for at a discount. PR Wireless referred to this as the treatment group. All plans sold to customers included up to 5 GB of monthly data.<sup>63</sup> PR Wireless also reports a small number of subscribers in a control group, though it is unclear where this offering was made. PR Wireless’s final report says nothing of control or treatment groups it had originally proposed. For this reason, and based on PR Wireless’s description of its pilot activities, it appears this was a non-experimental design.

Table 14a: Puerto Rico Wireless Treatments

Treatment Description	Monthly Subsidy Amount	Equipment Discount	Digital Literacy Offered	Total Subscribers
Control Group - Current Lifeline Subscribers	\$0.00	\$113.00	No	7
Treatment Group - Current Lifeline Subscribers	\$25.00	\$113.00	Yes	2468

45. *Implementation and Results.* During the pilot, PR Wireless had an average of 2,002 subscribers, 75 percent of which subscribed to the smartphone plan consisting of voice and data services, and 25 percent subscribed to its MiFi hotspot plan.<sup>64</sup> Table 14b sets forth enrollment by plans offered in the pilot.

<sup>63</sup> See PR Wireless Application to Participate in the Broadband Adoption Lifeline Pilot Program, WC Docket 11-42 (filed July 2, 2012) (PR Wireless Application); see also Supplement to PR Wireless Application, WC Docket 11-42 (filed August 3, 2012); Second Supplement to PR Wireless Application, WC Docket 11-42 (filed September 25, 2012); see also PR Wireless Final Report.

<sup>64</sup> See PR Wireless Final Report.

Table 14b: PR Wireless Plans

Plan Description	Unsubsidized Monthly Cost	Unsubsidized Equipment cost	Subscribers
USB Modem Plan	\$45.00	\$163.00	18
HotSpot Plan	\$45.00	\$168.00	293
Tablet Plan	\$45.00	\$401.00	0
Laptop Bundle	\$45.00	\$401.00	0
Smartphone 4G LTE	\$60.00	\$196.00	2164

### 3. Puerto Rico Telephone Company (PRT) (Puerto Rico)

46. *Overview and Description of Offerings.* This project examined consumers' choice of wireline or wireless broadband, speeds for wireline broadband, and usage limits for wireless broadband. PRT offered subscribers the option to choose among four different project offerings with differing end-user prices. One option gave consumers the choice of wireline broadband bundled with wireline voice service at speeds of either 2 Mbps download, 1 Mbps upload or 4 Mbps download, 1 Mbps upload. PRT offered consumers a \$5 subsidy off the wireline broadband plans. The other three offerings gave consumers the option of purchasing a wireless broadband plan with different usage limits of either 2 GB or 3 GB, which were either stand-alone broadband or bundled with wireline voice service. PRT also offered consumers the option of a \$5 subsidy off the bundled wireless plan, or \$18.50 off the stand-alone broadband plans.<sup>65</sup> Table 15a shows the subsidy provided and the number of subscribers.

Table 15a: Puerto Rico Telephone Treatments

Treatment Description	Monthly Subsidy Amount	Equipment Discount	Digital Literacy Offered	Total Subscribers
No Treatment Variation	\$5.00 (fixed)/\$5 if bundled or \$18.50 if standalone (wireless)	\$0.00	Yes	354

47. *Implementation and Results.* For marketing and outreach, PRT utilized a broad range of mediums, including television, newspaper advertisements, advertisements within retail stores, bill inserts to existing subscribers who do not subscribe to Internet service, and SMS.

48. The PRT pilot project provided the only opportunity of all the projects to observe consumers' direct choice between fixed and mobile connections. Table 15b shows the percentage of new adopters choosing each mode of service from PRT. Since pilot households did not have broadband prior to enrolling in the pilot, this comparison suggests many newly adopting households value a fixed connection (in this case DSL) over a mobile connection. Over 70 percent of households in the PRT pilot project paid at least \$37.49 per month for a DSL connection and voice instead of choosing 2G or 3G mobile options (without voice) at lower end-user charges.

<sup>65</sup> See Puerto Rico Telephone Company, Inc. Application to Participate in the Broadband Adoption Lifeline Pilot Program, WC Docket 11-42 (filed July 2, 2012) (PRT Application); see also Supplement to PRT Application, WC Docket 11-42 (filed August 16, 2012); Second Supplement to PRT Application, WC Docket 11-42 (filed August 30, 2012).

Table 15b: Puerto Rico Telephone Plans

Plan Description	Unsubsidized Monthly Cost	Unsubsidized Equipment cost	Subscribers
DSL w/Voice, Tablet (WiFi), 2Mb/1Mb	\$42.49	\$180.00	170
DSL w/Voice, Tablet (WiFi), 4Mb/1Mb	\$49.50	\$180.00	95
Mobile Broadband w/voice, Tablet (SIM), 2GB Data Limit	\$34.99	\$200.00	0
Mobile Broadband w/voice, Tablet (SIM), 3GB Data Limit	\$42.00	\$200.00	0
Mobile BB, Tablet (SIM) - Postpaid, 2G Data Limit	\$31.24	\$150.00	70
Mobile BB, Tablet (SIM) - Postpaid, 3G Data Limit	\$41.24	\$150.00	9
Mobile BB, Tablet (SIM) - Prepaid, 2G Data Limit	\$24.99	\$150.00	9
Mobile BB, Tablet (SIM) - Prepaid, 3GB Data Limit	\$34.99	\$150.00	1

## E. Fixed - Non-Experimental

### 1. National Telecommunications Cooperative Association (NTCA) (IA, NM)

49. *Overview and Description of Offerings.* The NTCA Pilot Project studied customer choices in adopting broadband, in some cases when providing a decreasing subsidy amount. The NTCA project included Alpine Communications (IA) and Leaco Rural Telephone (NM), in partnership with Connected Nation.<sup>66</sup> The pilot offered a range of wireline broadband plans in one state with a flat subsidy amount of \$25 per month for all 12 months. In the other state, the pilot offered a range of wireline broadband plans with a sliding scale subsidy that was initially \$40 per month for the first quarter and was reduced each quarter thereafter in increments of \$10 (leaving a subsidy of \$10 per month for the final quarter). In each case, customers were able to choose from several speed plans, subject to what technologies the provider had available at the customer's location.<sup>67</sup> Table 16a describes each treatment.

Table 16a: NTCA Treatments

Treatment Description	Monthly Subsidy Amount	Equipment Discount	Digital Literacy Offered	Total Subscribers
Flat Discount	\$25.00	\$49.99	Yes	47
Sliding Discount	\$40/\$30/\$20/\$10	\$49.95	Yes	2

50. *Implementation and Results.* Each of the ETCs within the NTCA pilot project utilized a number of different strategies and venues for publicizing the pilot program within their service territories. These included: direct mailings, flyers delivered to sites such as libraries, banks, elderly meal provider sites, letters sent to existing Lifeline subscribers, school districts, etc.<sup>68</sup> The results are detailed in Table 16b. Since availability of technology varies within each provider's region, customers' choices of service were sometimes restricted.

<sup>66</sup> While ostensibly the NTCA project compared two different subsidy schemes in two different areas, it would be difficult to classify this pilot as quasi-experimental given the vastly different geographic areas involved.

<sup>67</sup> See Amendment to Application of Rural Carriers, WC Docket 11-42 (filed August 21, 2012) (NTCA Application); see also Supplement to NTCA Application, WC Docket 11-42 (filed September 24, 2012). While ostensibly the NTCA project compared two different subsidy schemes in two different areas, it would be difficult to classify this pilot as quasi-experimental given the vastly different geographic areas involved, thus it is best treated as non-experimental.

<sup>68</sup> NTCA Application at 17.

Table 16b: NTCA Plans

Plan Description	Unsubsidized Monthly Cost	Unsubsidized Equipment cost	Subscribers
Alpine: 3Mb/512Kb; DSL; Bundled	\$39.95	\$49.95	2
Alpine: 3Mb/512Kb; DSL; Standalone	\$54.95	\$49.95	0
Alpine: 6Mb/512Kb; DSL; Bundled	\$49.95	\$49.95	0
Alpine: 6Mb/512Kb; DSL; Standalone	\$64.95	\$49.95	0
Alpine: 6Mb/500Kb; FTTH; Bundled	\$39.95	\$0.00	0
Alpine: 6Mb/500Kb; FTTH; Standalone	\$54.95	\$0.00	0
Alpine: 12Mb/1MB; FTTH; Bundled	\$49.95	\$0.00	0
Alpine: 12Mb/1MB; FTTH; Standalone	\$64.95	\$0.00	0
Leaco: 768KBS/512KB; DSL	\$28.99	\$49.99	14
Leaco: 1.5MB/768KB; DSL	\$39.99	\$49.99	8
Leaco: 3MB/1MB; DSL	\$49.99	\$49.99	18
Leaco: 5MB/1MB; DSL	\$59.99	\$49.99	3
Leaco: 1.5MB/768KB; FTTH	\$29.99	\$49.99	1
Leaco: 3MB/1MB; FTTH	\$49.99	\$49.99	0
Leaco: 5MB/1.5MB; FTTH	\$59.99	\$49.99	2
Leaco: 12MB/3MB; FTTH	\$119.99	\$49.99	0
Leaco: 16MB/5MB; FTTH	\$129.99	\$49.99	0
Leaco: 1.5 MB/256Kb; 3G Aircard	\$39.99	\$129.99	0
Leaco: 768Kb/512Kb; Unlicensed Wireless	\$29.99	\$49.99	1
Leaco: 1.5MB/768KB; Unlicensed Wireless	\$39.99	\$49.99	0
Leaco: 3.0MB/1MB; Unlicensed Wireless	\$49.99	\$49.99	0

## V. CONCLUSION

51. The Commission, in launching the Pilot Program, recognized that the major barriers to adoption—cost, relevance and digital literacy—are intertwined. There is widespread consensus that an individual’s willingness to pay for broadband is directly related to the perceived relevance of the broadband and how “digitally literate” the individual is in using the service. In selecting the pilot projects, Commission staff struck a balance between allowing ETCs enough flexibility in the design of the pilots and ensuring the structure of each project would result in data that would be statistically and economically relevant. Moreover, given the condition that participation was limited to consumers that had not subscribed to broadband within the last 60 days, Commission staff also recognized that there was a substantial risk of depressed enrollment in each of the projects relative to the initial ETC projections. As a result of this limitation, ETCs had to market the limited-time project offerings to consumers that either could not afford broadband service or, until that time, did not understand the relevance of broadband.

52. As shown from the data summarized above, the Low-Income Broadband Pilots provide an important perspective on how various policy tools can impact broadband adoption by low-income consumers. The Bureau anticipates this report and the underlying data will prove valuable to both the Commission and outside parties.