Petrichor broadband

302 N. Mill Street
Colfax, WA 99111

March 17, 2021

VIA ELECTRONIC FILING

Marlene H. Dortsch, Secretary
Federal Communications Commission
445 12th Street, S.W., Room TW-B204
Washington, DC 20554

**Re: Concerns Regarding RDOF Phase 1 Auction Results, WC Docket Nos. 19-126 and 10-90**

Madam Secretary:

We would like to express our deep appreciation for the Commission's continued commitment to improving broadband availability in unserved and underserved locations throughout rural America.

In the attached brief, we identify three issues with the RDOF Phase 1 auction and propose reasonable steps the FCC can take during due diligence to mitigate those issues and facilitate the program's success:

- **Funding short-term partial fixes to a long-term universal need**
- **Incentives to abandon up to 30% of remote, low density areas:**
- **Financial viability due to aggressive bidding:**

To improve Federal broadband programs, including future RDOF rounds, we also offer 3 recommendations:

- **Adopt robust specifications**
- **Improve deployment projects and processes**
- **Require full public transparency**

It is crucial that RDOF succeed. We strongly believe that the measures detailed in the attached brief will help ensure that success.

Sincerely,

| | | |
|---|---|---|
| Joe Poire | Kara Riebold | Tom Reid |
| Executive Director | Chief Operating Officer | Broadband Consultant |

Attachment: **Rural Broadband - The Urgent Mission, comments on WC Docket Nos. 19-126 and 10-90**

REID CONSULTING GROUP

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**Rural Digital Opportunity Fund**

# Rural Broadband – the Urgent Mission

WC Docket Nos. 19-126 and 10-90

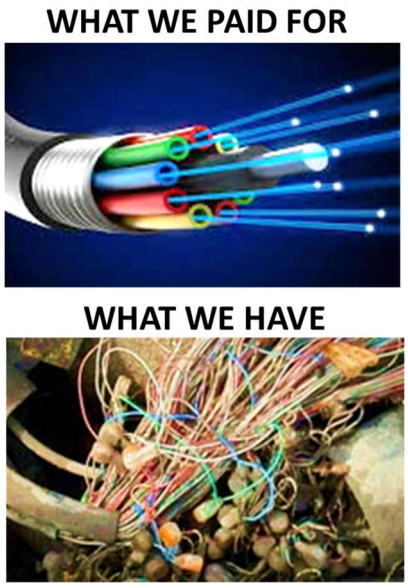
## RDOF: The Mission At-Risk

The FCC's Rural Digital Opportunity Fund (RDOF) Phase 1 auction promised much needed help for 4.5 million rural American households. Unfortunately, our analysis suggests that the $10 billion awarded will be much less effective than it could be due to funding of short-term and partial solutions, financial incentives for abandoning sparsely populated areas and dubious financial viability. The opaque nature of RDOF post-auction reporting limits public oversight, while long deployment timelines and low penalties exacerbate the shortfalls.

**Limiting the Damage:** The current due diligence examination of Phase 1 winners offers the FCC an opportunity to reduce the impact of the following issues:

- Funding short-term partial fixes to a long-term universal need (p. 4)
- Incentives for providers to abandon up to 30% of the geographic footprint won (p. 5)
- Financial viability concerns due to aggressive bidding (p. 7)

## Broadband Programs – Wise Stewardship is Crucial




Since 2000, the FCC has spent $85 billion to improve rural telecommunications[1], more than enough to extend fiber optic broadband to every single home. Yet much of rural America still depends on decrepit, 1950s-era copper cables that cannot even support reliable telephone service, let alone high-speed broadband.

In effect, we paid for a superhighway but wound up with a goat path. This paper examines flaws in the process that led to this situation and proposes common sense measures to improve stewardship of broadband funding.

**Room for Improvement:** The FCC has awarded tens of billions in the past twenty years without specifications other than a minimum target speed for carriers to meet. In theory, this "technology neutral" stance offers flexibility. In practice, the FCC approach has left rural America without telecommunications infrastructure that meets modern standards. Further, the Commission accepts often-overstated coverage claims for the target speeds with no verification or penalties for false statements.[2] This flawed methodology creates an appearance of success while systematically overstating coverage in rural America.

**Common Sense Solutions:** We recommend the following adjustments to improve federal and state broadband programs (p. 9):

- Adopt robust infrastructure specifications to support 30-to-40-year capacity growth and longevity
- Improve deployment projects and processes to achieve the highest value
- Require full public transparency from funding agencies and recipients

[1] Annual Universal Service Monitoring Reports, expenditures on High-Cost Program and Connect America Fund.
[2] See Rebuttal to Frontier RDOF Phase 1 Eligibility Challenge, May 2020, for an example of the issue.

## RDOF Phase 1 Background

**Establishing the "Reserve" Subsidy:** For each eligible census block, the FCC uses a well-refined formula to estimate the full cost to build fiber-to-the-home.[3] The Commission then subtracts projected revenue to identify how much subsidy a private company would need to build and operate a profitable fiber broadband network in that census block. This subsidy is called the "reserve."

In densely populated areas, no reserve is needed. In rural areas, reserve increases as population density decreases. This is a direct result of the need to spread the relatively unchanging cost to build a mile of fiber across fewer households per mile (Figure 1).

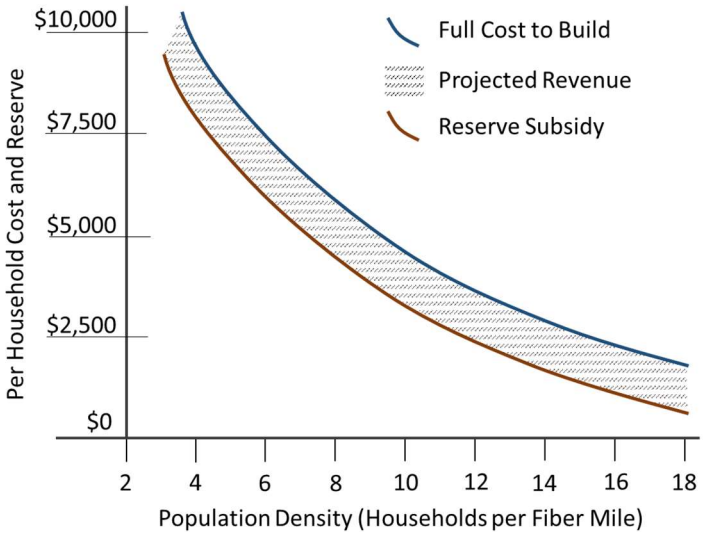



*Figure 1*: Arriving at the FCC "Reserve" Subsidy Value

**Eligible Households:** Nationwide the FCC identified 5.4 million unserved households to be included in Phase 1 of RDOF[4] for a total reserve of $27 billion. Washington's portion covered 103,000 households with a total reserve of $547 million. Per-household reserves in Washington varied from $100 to $27,000, primarily due to population density (Figure 2).

## Misleading Auction "Success"

Rather than using a competitive bidding process, the FCC conducted a reverse auction in which the percentage of reserve decreased each round until only one bidder remained for each census block at its top speed tier.

Completed in late 2020, the auction "cleared" at 60% – the point at which the total of bids nationwide equaled the $16 billion Phase 1 budget. Some areas of the country were awarded at this 60% level, but others were bid much lower.

Nationwide, the average award was just 35% of the reserve with Washington coming in at 41%, bringing the total cost for Phase 1 below $10 billion (total need calculated by the FCC at $27 billion).

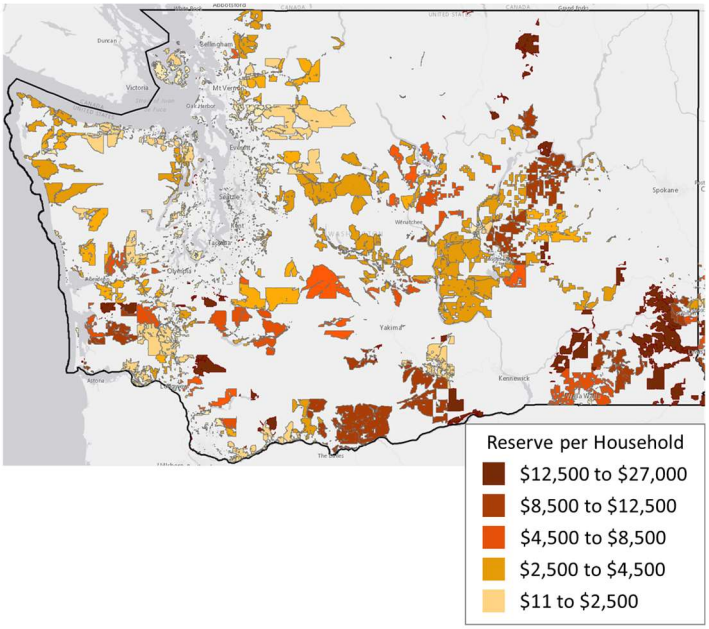



*Figure 2*: Variation in Reserve Subsidy Across Washington

[3] The FCC Connect America Cost Model (CACM) does a good job of accounting for factors such as population density. We advise a significant upward adjustment to the make-ready allowances in the CACM.
[4] Based on numerous challenges to the FCC overstatements of coverage, the total number of unserved rural households is at least triple the FCC figures.

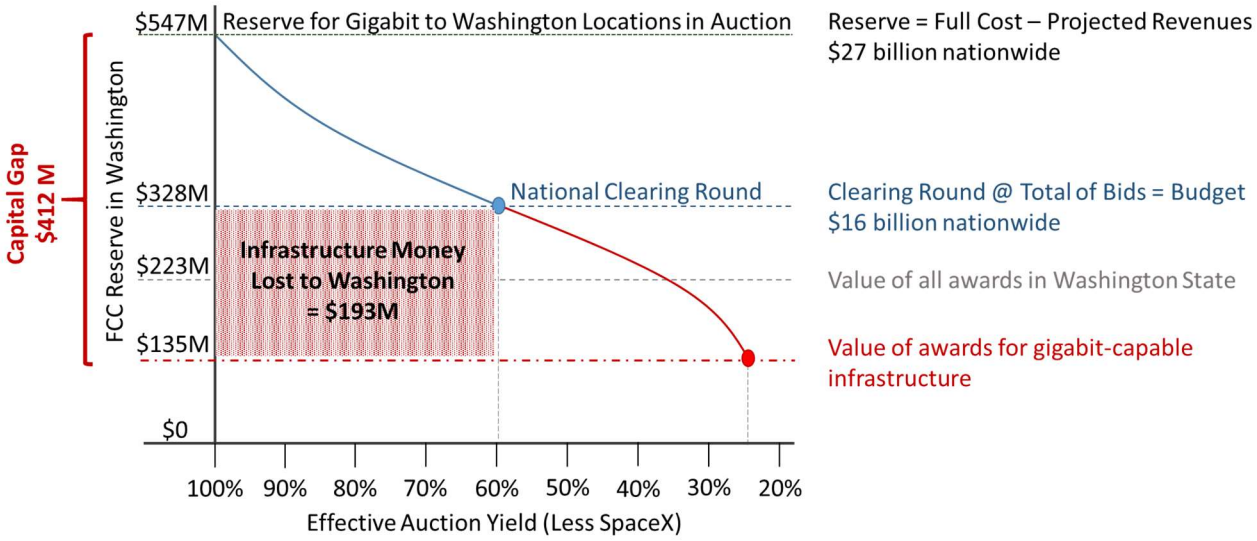



*Figure 3:* Enormous Capital Gap

While the aggressive bidding in the RDOF Phase 1 auction sounds like a victory for the FCC, in reality these results coupled with program design flaws will limit coverage, quality, durability, and longevity of many resulting broadband networks.

In Washington, the FCC established a Phase 1 reserve of $547 million, an average of over $5,300 per household. At the nationwide clearing round of 60%, the reserve in Washington would have been nearly $3,200 per household; however, bidding was surprisingly aggressive. The result was an average per household subsidy in Washington of under $2,200. A detailed table of state-by-state results can be found at the end of this document.

Further diluting the impact of RDOF, SpaceX was authorized to bid in the 100 Mbps tier and won nearly $900 million nationwide and $80 million in Washington. SpaceX will not be building significant terrestrial infrastructure.

Thus the funding for replacing the decrepit copper infrastructure in Washington fell to an effective yield of 25%, a loss of $193 million in much needed infrastructure funding (Figure 3).

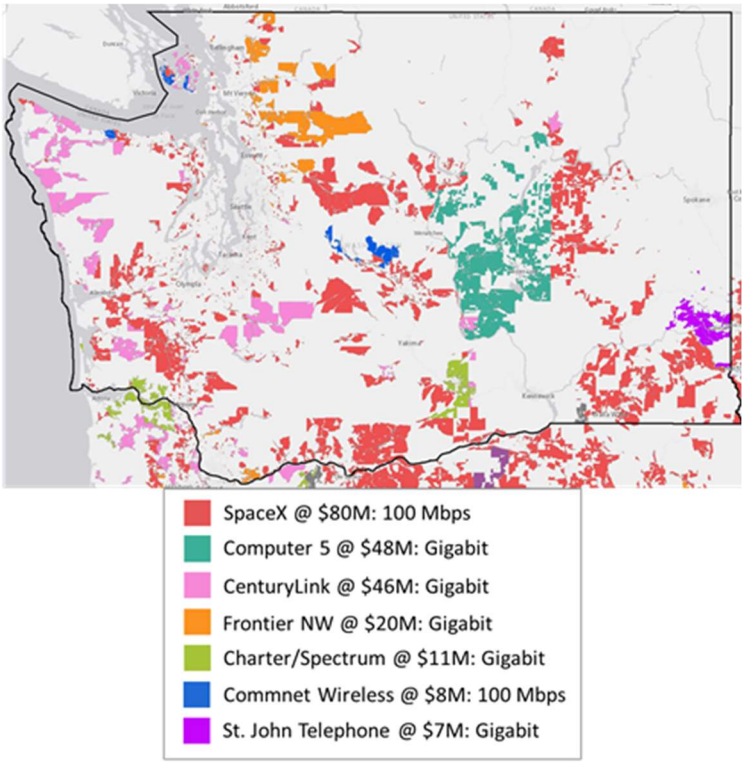
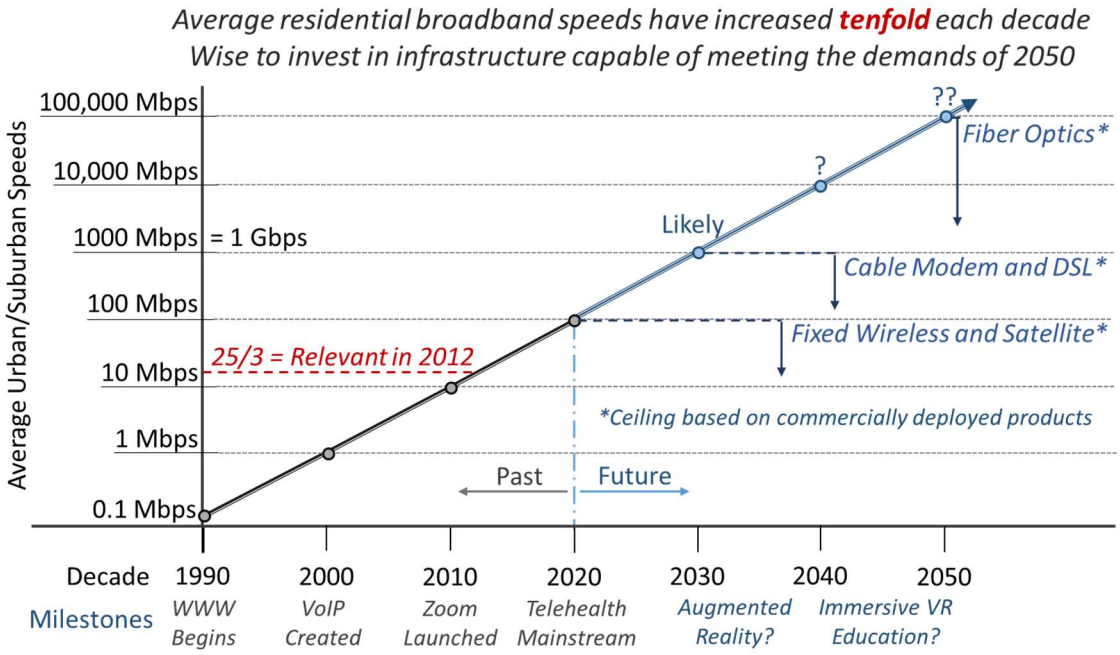



*Figure 4:* Big RDOF Winners in Washington

## Short-Term Partial Fixes to a Long-Term Universal Need

### Tenfold Bandwidth Growth Each Decade

The average broadband speeds for urban/suburban areas have increased tenfold each decade. To satisfy needs over the next thirty years – the useful life of most broadband infrastructure – we need the capacity to achieve Gigabit speeds by 2030 and beyond in the following decades (Figure 5). To keep rural America, for once, ahead of the demand curve, we must think long-term and deploy networks that will support anticipated growth. The full lifecycle cost of robust networks is lower than the half-measures promulgated by the current programs.




### SpaceX Starlink

The SpaceX Starlink service will provide useful competitive pressure in otherwise monopolized broadband markets. The constellation of low earth orbit (LEO) satellites in early testing appears to deliver broadband speeds adequate to meet the needs of a consumer in 2020. Yet credible analysis suggests that Starlink will struggle to meet its 100 Mbps obligations under RDOF as soon as 2028.[5] By 2030, though, we project demand for Gigabit speeds will be commonplace, well beyond the capacity of LEO-based solutions. Further, in rugged rural Washington, many households will not be able to receive a Starlink signal due to terrain obstructions.

### Fixed Wireless Providers

Fixed wireless providers have issues similar to Starlink in terms of capped performance and terrain obstructions. While the fixed wireless providers will build some fiber to reach towers, the reach will be limited and capacity constrained by the available frequencies.[6]

***Due Diligence Suggestion:*** We cannot afford to spend a decade rolling out partial solutions that will not meet the long-term needs of the rural residents. We urge the FCC to thoroughly vet the technology plans of the RDOF winners with the perspective on long-term needs.

[5] Starlink RDOF Assessment, Cartesian, February 8, 2021
[6] NTCA filing to the FCC, February 1, 2021

## Incentive for Providers to Abandon 30% of the Geographic Footprint Won

As previously noted, per-household costs vary with population density; however, the FCC averages the reserve across the entirety of an ISPs auction winnings within a state. This reserve averaging coupled with low penalties for non-deployment will likely result in "cherry picking." Auction winners will be incentivized to use funds meant for low-density locations to help pay for mid- and high-density areas, ultimately opting-out of serving the most isolated households and census blocks (Figure 6).

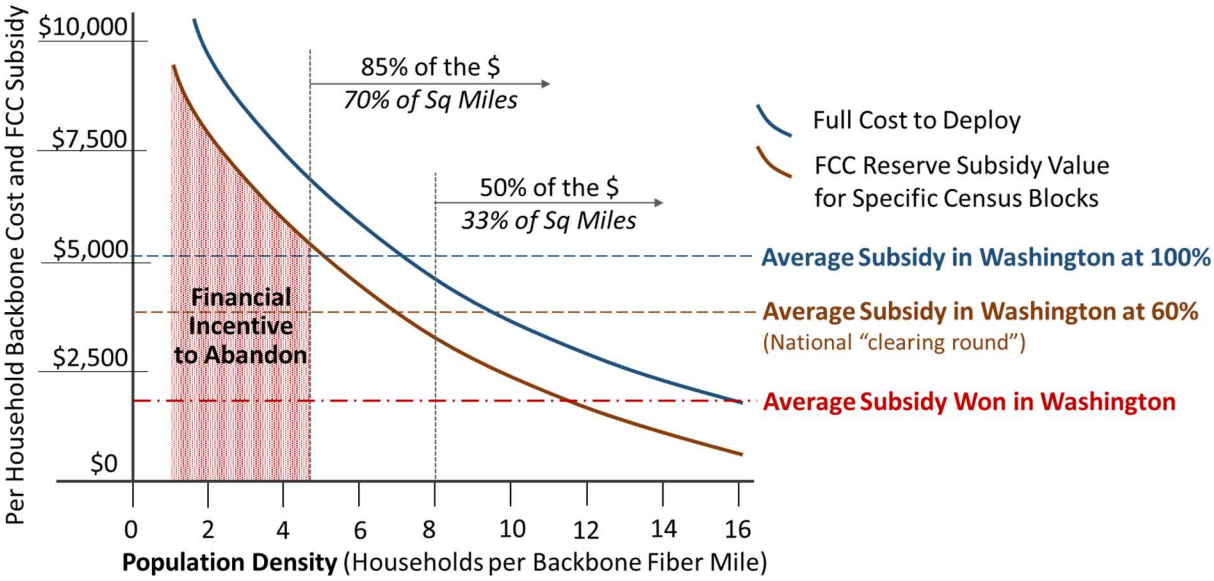
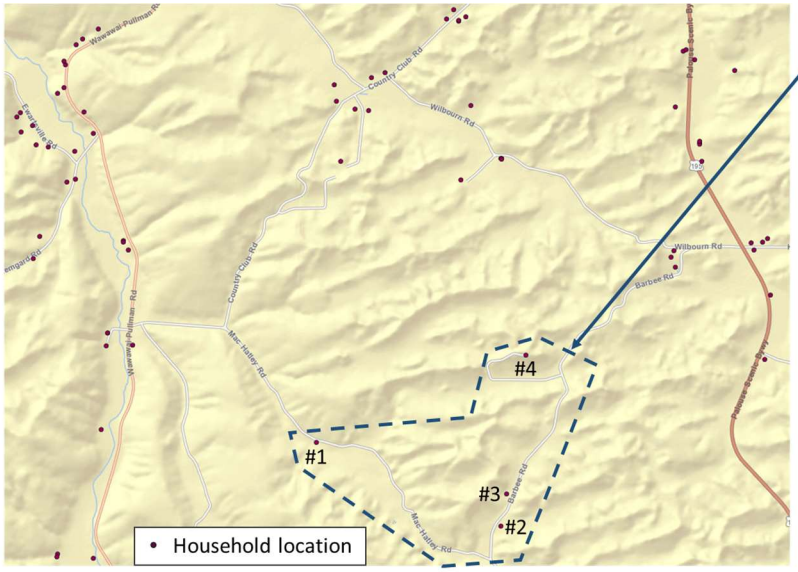



*Figure 6:* Incentive to Abandon Remote Territory

Consider an example in Whitman County where the bidder won an average subsidy of $6,733 per location to provide Gigabit services over fiber optics to 1,057 locations. It is easy to see that there are some reasonably concentrated clusters of homes and others that are quite remote such as the four locations circled (Figure 7).




- Drop the four remote locations outlined
- Eliminate 4.6 miles of fiber construction
- Reduce build costs by $230,000 to $345,000
- Pay FCC penalty of $27,000 to $40,000
- Net savings of $190,000 to $320,000
- Given intervening terrain, only location #4 likely to be reachable via wireless

*Figure 7:* Examples of Isolated High-Cost Households

**Low Penalties:** This sample exemplifies the impact of the low FCC penalties in incentivizing ISPs to drop isolated sites. The four remote locations can be dropped from the project saving the winning ISP between $230,000 to $345,000 in costs while incurring FCC penalties of only $27,000 to $40,000 (Figure 7). This unintended incentive arises because the fines are calculated on the average reserve subsidy a bidder won across the state rather than the reserve subsidy for the specific census block. Only mission-driven organizations such as rural electric cooperatives would be likely to build to such high-cost households and areas.

**Impact on the Abandoned:** Under RDOF Phase 1 rules, a winning ISP could draw 85% of its total subsidy while declining to serve 30% of the geographic footprint (Figure 6), leaving the least populated areas stranded until the 2030s (Figure 8). Because these households and areas would appear on maps as "going to be served" based on RDOF, they would be ineligible for other sources of broadband funding to avoid overbuilding. Perversely, the higher reserve values assigned to these abandoned areas would end up subsidizing deployments in lower cost, less remote areas.

These issues were previously reported to the FCC[7] prior to the finalization of the RDOF rules.

***Due Diligence Suggestion:*** We urge the FCC to minimize the impact of this financial incentive to abandon the most remote households, particularly for auction winners in the highest-cost areas of the nation. Adding public disclosure requirements regarding project schedules and progress reports before authorizing funding would strengthen RDOF.

[7] Buckeye Hills Regional Council comments on RDOF, 19 Sept 2019, on FCC ECFS

## Financial Viability Concerns

**Financial Viability:** The winning bidders in Washington have pledged to deliver Gigabit and 100 Mbps services with on average only 41% of the subsidy the FCC identified as necessary to build a sustainable business case. One could argue that this is a victory for the FCC, with the results demonstrating that the Washington broadband market is ultra-competitive. Yet the FCC's own formula states that a private company would need an average subsidy of $5,311 per household and a high of $27,000 per household to construct and operate a profitable broadband network in RDOF-eligible areas. It strains credibility to believe that these same goals can be achieved for just 41% of this sum on average.

No magic solution exists for the high cost of building terrestrial networks, so capital demands on auction winners will be substantial. Given that the FCC's cost formulas are reasonably accurate, **winning bidders in Washington must demonstrate access to $412 million in investment funds to meet their deployment obligations** (Figure 3).

**Narrow Path to Sustainability:** To establish a sustainable business case with the intent of serving 100% of covered households at the 41% of reserve won in Washington, the auction winners would need:

- "Patient capital" available to them at 0% interest to provide the needed $412 million[8]
- 70% take rate with an average revenue per subscriber of $90 per month, well above the levels experienced by rural electric cooperatives who have successfully deployed fiber networks[9]
- "Not-to-exceed" agreements with utility pole owners regarding make-ready costs for aerial projects[10]

If a provider does not meet the above conditions, it is highly unlikely that they will deploy to all of the areas they won in Washington during Phase 1. Further, extremely low subsidy levels will amplify the "incentive to abandon" explained earlier in this document (Figure 6).

***Due Diligence Suggestion***: We urge the FCC to reject those Phase 1 auction winners who have not detailed a path to sustainability in their "long form"[11] due diligence filing.

[8] The difference between the FCC-calculated reserve in Washington and the value of the actual awards as in Figure 6 can reasonably be translated at the required capital the winners need as per the FCC's own formulas.
[9] Rural Electric Cooperative Broadband Benchmarking Report, NRTC, November 2020, indicates a median take rate of 45% and average revenue per household of $79.
[10] The utility pole owners charge ISPs to attach to their poles, often requiring substantial percentage of poles to be replaced to meet required clearances with the ground and maintain structural integrity. Make-ready costs vary widely and cannot be predicted in advance, ranging in rural areas from $20,000 to $70,000 per mile. Burying the fiber avoids make-ready but costs substantially more than aerial builds. Where rock is near the surface, underground installation costs rise even further.
[11] Unlike many grant programs, the FCC performs the detailed due diligence AFTER the auction. Winners submit FCC Form 683 also called the "long form" along with related materials. The review by the Commission is currently underway and expected require 4 to 8 months to conclude. Public disclosure is de minimis.

## Opaque Reporting and Lax Timelines

FCC funding recipients face few public disclosure requirements, and the Commission's process for monitoring those providers is opaque. Deployment schedules and progress reports are treated as "proprietary" and thus exempt from disclosure. For example, we sought copies of progress and funding reports for Connect America Fund allocations made by the FCC in 2014-2015. The materials we received had been so heavily redacted that they offered no useful information about schedules, progress or spending. A supportive Congressman intervened on our behalf and received the same useless, redacted reports. All indications point to the FCC doing the same with materials filed by RDOF funding recipients.

Given this lack of transparency, consumer advocates and local communities will have difficulty holding providers accountable. The only way for a stakeholder to monitor the progress of RDOF winners will be through the reporting of service locations. Unfortunately, those reports are only required once a year.[12]

The FCC's timeline reflects a similar lack of accountability. Should a provider miss a milestone, the consequences are minimal. Missing a year 3, 4, or 5 milestone by 15% or less simply increases reporting requirements from yearly to quarterly. The "consequence" of missing the Year 6 milestone is an extra year to comply, and non-deployment penalties do not take effect until year 8 at the earliest. Because RDOF progress is measured as a percentage of households served in the state, providers can game the milestone system until late in the six-to-eight-year project timeline by focusing on high population density locations and waiting to abandon high cost locations until near the end of the timeline.

It will take five to ten years before the public can determine whether RDOF auction winners are actually deploying the promised networks. Likewise, the combination of an overly elongated deployment timeline and lax enforcement will keep the public in the dark on RDOF results for most of the current decade (Figure 8). In the meantime, these same areas may be blocked from receiving funding from other state and federal programs.

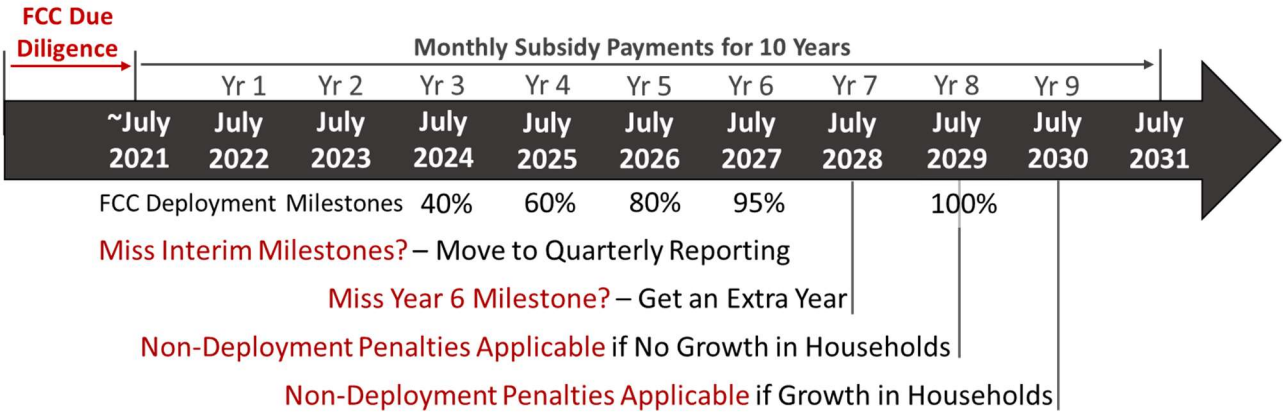



*Figure 8:* Long Deployment Timelines and Lax Enforcement

[12] The FCC requires RDOF recipients to report household subscriber deployments via the High Cost Universal Broadband portal but only on an annual basis.

## Common Sense Solutions

We recommend the following approaches for improving Federal broadband programs including future rounds of RDOF.

1. **Use robust, terrestrial infrastructure specifications that can deliver 30-to-40-years of capacity growth and longevity, preferably with "open" fiber standards to enable competition in every market.**

   Rural America desperately needs new terrestrial telecommunications infrastructure to replace its decrepit copper.[13] Multiple sources already exist for the infrastructure specifications required to build fiber-optic networks that will stand the test-of-time.

   Including a requirement in the specifications that the underlying physical infrastructure be "open" will enable competition in serving rural households. Given the difficulty in cost-justifying rural broadband infrastructure, such "open" networks will avoid establishing a single monopoly provider.

2. **Improve deployment projects and processes to achieve the highest value.**

   To better organize deployment of the telecommunications infrastructure, we recommend:

   - Defining logical service areas to enable sustainable operations
   - Determining the subsidy offered by:
     - Estimating the cost to deploy fiber-to-the-home in the specified service area using the existing FCC tool[14] with an upward adjustment to the make-ready allowances
     - Deducting anticipated revenues relative to the median household income within the specified service area
   - Award funding based on overall value rather than lowest bid with a requirement to serve 100% of households within four years[15]
   - Engage public and/or third-party partners to verify awardee performance as a condition of subsidy payments

3. **Require full public transparency from funding agencies and recipients, including detailed project plans, monthly progress data reporting, and third-party infrastructure inspections tied to release of payments.**

   At present, the FCC treats reports from those they fund as proprietary, and most reporting only occurs on an annual or semi-annual basis. This prevents consumer advocates from gaining access to crucial information about when and where deployments will occur. The public needs and deserves full disclosure of how broadband funds are spent by recipients. Data collection such as reporting of household deployments can and should be required on a monthly basis, and disbursements should be tied to the independent, third-party review to ensure work is completed.

[13] The nearly $1 billion awarded to SpaceX in the RDOF Phase 1 auction will NOT fulfill this need. Space-based solutions can be a helpful source of competition, and they may be the only option in "frontier" areas.
[14] Well-refined FCC Connect America Cost Model
[15] Fiber construction projects do require ramp-up periods, and lead-times for fiber are quite long at present. Nonetheless, once the engineering teams, construction crews, and supply chain are in place, most networks can be completed in a four-year window

## RDOF Phase 1 Results, State-by-State

Below is a listing of the states sorted by "% of Reserve" that was awarded in RDOF Phase 1.

| | RDOF Phase 1 Eligible | | | RDOF Phase 1 Auction Results | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| State | 100% of Reserve 10-Yr | # of Households | Avg per Household | Awarded 10-Yr | # of Households | Avg per Household | % of Reserve | % of Households | Number of Winners |
| NE | $ 517,959,340 | 43,445 | $ 11,922 | $ 60,377,537 | 43,435 | $ 1,390 | 12% | 100% | 10 |
| KS | $ 452,880,510 | 46,827 | $ 9,671 | $ 62,107,483 | 46,827 | $ 1,326 | 14% | 100% | 12 |
| OH | $ 840,269,310 | 191,832 | $ 4,380 | $ 170,038,205 | 191,093 | $ 890 | 20% | 100% | 11 |
| RI | $ 6,080,410 | 3,428 | $ 1,774 | $ 1,273,784 | 3,678 | $ 346 | 21% | 107% | 1 |
| TX | $ 1,623,802,860 | 310,322 | $ 5,233 | $ 362,662,934 | 310,962 | $ 1,166 | 22% | 100% | 22 |
| IN | $ 710,420,620 | 162,980 | $ 4,359 | $ 169,379,965 | 152,983 | $ 1,107 | 24% | 94% | 11 |
| AZ | $ 817,201,640 | 131,949 | $ 6,193 | $ 195,847,668 | 129,445 | $ 1,513 | 24% | 98% | 7 |
| TN | $ 579,504,230 | 169,750 | $ 3,414 | $ 148,625,826 | 155,220 | $ 958 | 26% | 91% | 11 |
| MO | $ 1,315,019,860 | 200,336 | $ 6,564 | $ 346,297,660 | 199,211 | $ 1,738 | 26% | 99% | 17 |
| IA | $ 543,253,830 | 55,017 | $ 9,874 | $ 143,892,544 | 53,819 | $ 2,674 | 26% | 98% | 11 |
| WI | $ 1,291,985,660 | 241,341 | $ 5,353 | $ 373,715,051 | 240,546 | $ 1,554 | 29% | 100% | 14 |
| IL | $ 1,256,376,760 | 166,777 | $ 7,533 | $ 378,310,111 | 159,967 | $ 2,365 | 30% | 96% | 19 |
| CA | $ 2,305,498,500 | 425,533 | $ 5,418 | $ 695,158,129 | 364,878 | $ 1,905 | 30% | 86% | 15 |
| OK | $ 486,907,760 | 127,081 | $ 3,831 | $ 154,556,451 | 126,153 | $ 1,225 | 32% | 99% | 13 |
| KY | $ 449,643,370 | 99,315 | $ 4,527 | $ 148,978,767 | 98,909 | $ 1,506 | 33% | 100% | 11 |
| UT | $ 93,535,610 | 10,784 | $ 8,674 | $ 31,384,526 | 10,373 | $ 3,026 | 34% | 96% | 3 |
| ID | $ 327,476,610 | 40,921 | $ 8,003 | $ 112,489,828 | 40,706 | $ 2,763 | 34% | 99% | 8 |
| SC | $ 350,252,170 | 109,301 | $ 3,204 | $ 121,245,987 | 108,833 | $ 1,114 | 35% | 100% | 9 |
| MI | $ 1,009,159,630 | 253,386 | $ 3,983 | $ 362,985,056 | 249,263 | $ 1,456 | 36% | 98% | 13 |
| OR | $ 580,316,790 | 82,659 | $ 7,021 | $ 212,027,091 | 81,634 | $ 2,597 | 37% | 99% | 10 |
| MN | $ 1,078,056,710 | 148,718 | $ 7,249 | $ 408,150,746 | 142,841 | $ 2,857 | 38% | 96% | 22 |
| MT | $ 326,081,010 | 46,156 | $ 7,065 | $ 125,815,440 | 45,984 | $ 2,736 | 39% | 100% | 6 |
| VA | $ 615,714,220 | 190,137 | $ 3,238 | $ 238,644,934 | 186,475 | $ 1,280 | 39% | 98% | 16 |
| NH | $ 63,576,370 | 18,243 | $ 3,485 | $ 25,257,661 | 17,740 | $ 1,424 | 40% | 97% | 4 |
| WY | $ 143,995,030 | 19,139 | $ 7,524 | $ 57,471,543 | 18,966 | $ 3,030 | 40% | 99% | 11 |
| NJ | $ 26,687,990 | 11,933 | $ 2,236 | $ 10,739,474 | 8,686 | $ 1,236 | 40% | 73% | 1 |
| AR | $ 1,053,285,490 | 201,944 | $ 5,216 | $ 424,243,218 | 200,612 | $ 2,115 | 40% | 99% | 15 |
| CO | $ 618,202,930 | 78,397 | $ 7,886 | $ 249,833,710 | 76,216 | $ 3,278 | 40% | 97% | 8 |
| AL | $ 818,428,360 | 202,369 | $ 4,044 | $ 330,804,828 | 196,460 | $ 1,684 | 40% | 97% | 13 |
| WA | $ 547,293,200 | 103,155 | $ 5,306 | $ 222,768,533 | 100,422 | $ 2,218 | 41% | 97% | 9 |
| NV | $ 154,924,590 | 31,623 | $ 4,899 | $ 63,536,611 | 30,584 | $ 2,077 | 41% | 97% | 5 |
| NM | $ 399,141,680 | 64,978 | $ 6,143 | $ 165,209,719 | 64,170 | $ 2,575 | 41% | 99% | 18 |
| MD | $ 115,232,740 | 40,406 | $ 2,852 | $ 48,023,869 | 37,761 | $ 1,272 | 42% | 93% | 5 |
| VT | $ 76,969,100 | 19,468 | $ 3,954 | $ 32,533,635 | 19,330 | $ 1,683 | 42% | 99% | 4 |
| FL | $ 451,277,110 | 147,162 | $ 3,067 | $ 191,753,610 | 141,625 | $ 1,354 | 42% | 96% | 11 |
| CT | $ 9,764,580 | 3,281 | $ 2,976 | $ 4,210,411 | 2,899 | $ 1,452 | 43% | 88% | 2 |
| GA | $ 756,182,900 | 184,019 | $ 4,109 | $ 326,454,112 | 179,455 | $ 1,819 | 43% | 98% | 15 |
| NY | $ 231,187,780 | 47,024 | $ 4,916 | $ 99,891,716 | 46,647 | $ 2,141 | 43% | 99% | 10 |
| NC | $ 383,808,590 | 163,277 | $ 2,351 | $ 166,580,442 | 155,137 | $ 1,074 | 43% | 95% | 9 |
| MA | $ 70,906,830 | 29,491 | $ 2,404 | $ 32,631,916 | 25,480 | $ 1,281 | 46% | 86% | 2 |
| SD | $ 112,626,970 | 10,738 | $ 10,489 | $ 52,285,517 | 10,051 | $ 5,202 | 46% | 94% | 6 |
| LA | $ 733,611,530 | 176,951 | $ 4,146 | $ 342,207,315 | 175,692 | $ 1,948 | 47% | 99% | 13 |
| WV | $ 766,216,280 | 121,013 | $ 6,332 | $ 362,066,660 | 119,267 | $ 3,036 | 47% | 99% | 9 |
| ME | $ 146,491,560 | 27,967 | $ 5,238 | $ 71,175,908 | 27,755 | $ 2,564 | 49% | 99% | 4 |
| HI | $ 48,329,500 | 8,081 | $ 5,981 | $ 24,740,782 | 8,081 | $ 3,062 | 51% | 100% | 2 |
| ND | $ 40,366,170 | 3,025 | $ 13,344 | $ 20,824,521 | 2,780 | $ 7,491 | 52% | 92% | 8 |
| PA | $ 698,536,360 | 190,325 | $ 3,670 | $ 368,743,200 | 184,505 | $ 1,999 | 53% | 97% | 13 |
| MS | $ 936,362,090 | 221,685 | $ 4,224 | $ 495,725,800 | 218,990 | $ 2,264 | 53% | 99% | 12 |
| DE | $ 23,797,870 | 7,757 | $ 3,068 | $ 13,302,048 | 7,757 | $ 1,715 | 56% | 100% | 2 |
| **Overall** | $27,004,601,010 | 5,391,446 | $ 5,009 | $9,226,982,480 | 5,220,303 | $ 1,768 | 34% | 97% | 10 |