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Service Quality Outage Analysis

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Introduction

The California Public Utilities Commission (CPUC) regulates the service quality of telecommunications carriers. This duty to regulate includes setting standards for establishing an adequate, sustaining level of service quality for essential communications services. Essential communications services contribute to maintaining public safety, public health, access to emergency services, and full participation in society for all Californians. In this outage analysis report, staff examines the recent performances of carriers subject to the existing service quality standards under General Order (GO) 133-D.¹

In addition to GO 133-D service quality standards and measures, staff also examines other outage data and service quality sources. These other sources include data from the CPUC's Consumer Affairs Branch (CAB), the Federal Communications Commission's (FCC) Network Outage Reporting System (NORS) reports, and the 9-1-1 outage data from the California Governor's Office of Emergency Services (Cal OES), to determine their viability and applicability.

This report examines data from 2018 through 2021,² and is intended to inform the Order Instituting Rulemaking Proceeding (R. 22-03-016)³ to Consider Amendments to General Order (GO) 133. The rulemaking will determine whether existing GO 133-D service quality standards and measures remain relevant to the current regulatory environment and market, and whether additional measures are required, including application of GO 133 standards to Voice over Internet Protocol (VoIP), wireless, and broadband services.

Background

Carriers providing voice service within the State of California must comply with GO 133-D. Pursuant to GO 133-D, the CPUC currently collects service quality data⁴ to measure the communications service performance and operations of wireline carriers that provide time division multiplexing (TDM)⁵ voice services in California. During the examination period from 2018 through 2021, 25 wireline carriers⁶ were required to report data to the CPUC on five service quality standards monthly in quarterly filings. These 25 carriers are classified by the following carrier types:

- URF ILECs: incumbent local exchange carriers (ILECs) regulated under the uniform regulatory framework (URF).

¹ General Order 133-D https://www.cpuc.ca.gov/-/media/cpuc-website/files/uploadedfiles/cpuc_public_website/content/proceedings/proceedings_rules/go133d.pdf

² In some instances, the report also examines data from 2017 and 2022.

³ Order Instituting Rulemaking proceeding to consider amendments to General Order 133 <https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M461/K661/461661140.pdf>

⁴ Telecommunications carriers' service quality reports are available on the CPUC website: <https://www.cpuc.ca.gov/industries-and-topics/internet-and-phone/service-quality-and-etc/telecommunications-carriers-service-quality-reports>

⁵ For the purposes of GO 133-D, TDM refers to traditional telephone service.

⁶ **URF ILECs:** U-1001-C AT&T California, U-1002-C Frontier California, U-1024-C Citizens Telecommunications, U-1015-C Consolidated Communications, U-1026-C Frontier Communications Southwest; **URF CLECs:** U-6874-C Time Warner Cable, U-5684-C Cox, U-6878-C Charter, U-6955-C Bright House Networks, U-7002-C Sonic, U-5002-C AT&T Corp, U-6097-C PAETEC; U-6342-C ACN Communications (2018 only); **GRC ILECs:** U-1016-C Sierra Telephone, U-1019-C Volcano Telephone, U-1014-C Ponderosa Telephone, U-1017-C Siskiyou Telephone, U-1004-C Calaveras Telephone, U-1012-C Kerman Telephone, U-1010-C Happy Valley Telephone, U-1009-C Foresthill Telephone, U-1006-C Cal-Ore Telephone, U-1007-C Ducor Telephone, U-1021-C Winterhaven Telephone, U-1011-C Hornitos Telephone, U-1013-C Pinnacles Telephone

- URF CLECs: competitive local exchange carriers (CLECs) operating in territories formerly reserved for the URF ILECs and regulated under the URF.
- GRC ILECs: general rate case (GRC) incumbent local exchange carriers operating under rate of return regulation.

The five service quality standards in GO 133-D are: installation interval,⁷ installation commitments,⁸ customer trouble reports,⁹ out of service repair interval,¹⁰ and answer time.¹¹ The reporting of data to the CPUC regarding compliance with these service quality standards varies by carrier type, number of customers, and Carrier of Last Resort (COLR) designation.¹² Please see Table 1 for details.

GO 133-D Service Quality Standards and Reporting by Carrier Type					
Carrier Type	Out of Service Repair Intervals	Installation Intervals	Installation Commitments	Customer Trouble Reports	Answer Time
URF ILEC	Apply	Do Not Apply	Do Not Apply	>5k customers*	>5K customers**
URF CLEC	Apply	Do Not Apply	Do Not Apply	>5k customers*	>5K customers**
GRC ILEC	Apply	Apply	Apply	>5k customers	>5K customers**

*If URF is a COLR, then it is required regardless of the number of customers

**The reporting unit is a traffic office serving 10,000 or more lines

Table 1: GO 133-D Service Quality Standards and Reporting by Carrier Type

The applicability of the five standards varies by the number of working lines per carrier type. See Table 2 for the breakdown of working lines by carrier from 2018 to 2021. During this time frame, the total number of working lines decreased from 5.9 million to 4.0 million, which represents a 32% decrease. On average, the URF ILECs and the URF CLECs¹³ collectively accounted for almost 99% of the working lines,

⁷ **Installation Interval** measure applies to GRC ILECs and measures the amount of time to install basic telephone service, expressed in business days between the date of service order placement and date of service operation. Minimum standard is 5 business days.

⁸ **Installation Commitments** measure applies to GRC ILECs and pertains to requests for establishment of basic telephone services for residential and small business customers, expressed in count of total commitments and commitments missed. Minimum standard is 95% commitments met, denoted by commitments met divided by total number of commitments.

⁹ **Customer Trouble Reports** measure applies to traditional telephone service (TDM) voice services (traditional telephone service) offered by GRC ILECs, URF Carriers with 5000 or more customers, and carriers of last resort (COLR) regardless of how many customers. Minimum standard is 6% or less – 6 trouble reports per 100 working lines (if 3,000 or more working lines) OR 8% or less – 8 reports per 100 working lines (if 1,001 to 2,999 working lines) OR 10% or less – 10 reports per 100 working lines (if 1,000 or fewer working lines). If fewer than 100 working lines, should combine with other carrier facilities at the same location for reporting.

¹⁰ **Out of Service Repair Interval** measure applies to TDM-based voice services offered by GRC ILECs, URF Carriers with 5000 or more customers, and COLR regardless of how many customers. Minimum standard is restoring 90% of the repair tickets within 24 hours based on Adjusted results and applies only to residential and small business customer tickets. Adjusted results exclude Sundays, federal holidays, delays beyond carrier's control, and catastrophic event.

¹¹ **Answer Time** measure applies to TDM-based voice services (traditional telephone service) offered by GRC ILECs and URF Carriers for traffic offices serving 10,000 or more lines; applies to COLR regardless of how many customers. Measures the time for operator to answer trouble reports and billing and non-billing inquiries. Minimum standard requires 80% of the calls to be answered within 60 seconds.

¹² A Carrier of Last Resort (COLR) is required to serve upon request all customers within its designated service areas.

¹³ U-6342-C ACN Communications submitted GO 133-D reports for 2018 only.

leaving just over one percent being provided by the GRC ILECs. Another notable trend is that in 2018 and 2019, the URF ILECs alone accounted for over 50% of the working lines, but from 2020 onward, the majority of working lines belong to the URF CLECs.

Working Lines Distribution (2018-2021)						
Utility Number	Carrier Name	2018	2019	2020	2021	Average
U-1001-C	AT&T California	2,428,862	1,800,386	1,572,168	1,380,920	1,795,584
U-1002-C	Frontier California	814,980	700,108	530,591	465,792	627,868
U-1024-C	Frontier Citizens Telecommunications Company	73,152	64,827	52,394	47,888	59,565
U-1015-C	Consolidated Communications	22,331	22,043	22,043	10,882	19,325
U-1026-C	Frontier Communications of the South West	5,176	4,241	3,444	3,086	3,987
URF ILEC	line count	3,344,501	2,591,605	2,180,640	1,908,568	2,506,329
Subtotal	% to Total	56.6%	51.5%	48.2%	47.5%	51.5%
U-6674-C	Time Warner Cable Information Services	1,380,850	1,318,247	1,280,558	1,149,835	1,282,373
U-5684-C	Cox California Telecom	613,959	563,013	519,578	473,252	542,451
U-6878-C	Charter Fiberlink	391,226	395,175	392,451	350,443	382,324
U-6955-C	BrightHouse Networks Information Service	51,962	52,820	52,796	48,783	51,590
U-7002-C	Sonic Telecom	50,398	44,610	37,233	30,210	40,613
U-5002-C	AT&T Communications	8,342	6,890	5,796	4,928	6,489
U-6342-C	ACN Communications	5,450	0	0	0	1,363
U-6097-C	Paetec Communications	4,117	3,681	1,995	2,396	3,047
URF CLEC	line count	2,506,304	2,384,436	2,290,407	2,059,847	2,310,249
Subtotal	% to Total	42.4%	47.4%	50.6%	51.2%	47.5%
U-1016-C	Sierra Telephone	15,975	15,537	15,314	15,268	15,524
U-1019-C	Volcano Telephone	9,463	9,500	9,546	9,717	9,557
U-1014-C	Ponderosa Telephone	7,667	7,651	7,831	7,845	7,749
U-1017-C	Siskiyou Telephone	4,919	4,908	4,896	4,768	4,873
U-1012-C	Kerman Telephone	3,600	3,420	2,868	2,710	3,150
U-1004-C	Calaveras Telephone	3,376	3,333	3,359	3,514	3,396
U-1009-C	Foresthill Telephone	2,427	2,397	1,763	1,688	2,069
U-1010-C	Happy Valley Telephone	2,168	2,072	1,993	1,863	2,024
U-1006-C	Cal-Ore Telephone	1,718	1,647	1,632	1,565	1,641
U-1007-C	Ducor Telephone	948	926	884	830	897
U-1021-C	Winterhaven Telephone	580	549	527	520	544
U-1011-C	Hornitos Telephone	423	381	355	341	375
U-1013-C	Pinnacles Telephone	232	216	207	216	218
GRC ILEC	line count	53,496	52,537	51,175	50,845	52,013
Subtotal	% to Total	0.9%	1.0%	1.1%	1.3%	1.1%
Total		5,904,301	5,028,578	4,522,222	4,019,260	4,868,590

Table 2: Working Lines Distribution (2018-2021)

GO 133-D Analysis: Out of Service Repair Interval

Of the five service quality standards, the Out of Service Repair Interval (OOS), which requires 90% of the repair tickets to be restored within 24 hours, was the most frequently failed standard during the four years (2018-2021) examined in this report. See Table 3 for the number of carriers that failed each service quality standard and were subsequently assessed a fine for the specified calendar year.

GO 133-D Standard Failure Counts (2018 - 2021)				
Service Measures	2018	2019	2020	2021
Out of Service Repair Intervals	8	7	7	3
Installation Intervals	0	0	1	1
Installation Commitments	0	1	0	1
Customer Trouble Reports	0	0	0	0
Answer Time	3	3	0	0

Table 3: GO 133-D Standard Failure Counts (2018-2021)

The OOS standard measures the length of time from the receipt of the service outage report to the time when service is restored. Given its nexus to emergency communications services and network resiliency requirements for reliable public safety services, the high count of OOS standard failures is worth further examination in this report. All carriers, regardless of the number of customers, are required to report data on their compliance with the OOS standard. Staff examines four years of OOS reporting from 2018 to 2021 for all carriers and analyzed their performance trends individually^{14 15 16} and by carrier type.

All carriers are required to submit both Adjusted and Unadjusted OOS data to the CPUC. Durations of outages can be accounted for as either Adjusted or Unadjusted. The Adjusted measurement excludes Sundays, federal holidays, delays beyond the carrier's control,¹⁷ and catastrophic events.¹⁸ The Unadjusted measurement does not include any exceptions. For example, for an outage that begins on Saturday at 1pm and is repaired by the following Monday at 1pm, it would be recorded as a 24-hour outage under the Adjusted measurement because the 24 hours on Sunday are excluded. This very same outage, however, would be recorded as a 48-hour outage under the Unadjusted measurement. GO 133-D requires 90% of service outage report tickets to be restored within 24 hours based on Adjusted OOS data.

¹⁴ Refer to Appendix A for URF ILECs Out of Service Repair Interval performance from 2018 through 2021.

¹⁵ Refer to Appendix B for URF CLECs Out of Service Repair Interval performance from 2018 through 2021.

¹⁶ Refer to Appendix C for GRC LECs Out of Service Repair Interval performance from 2018 through 2021.

¹⁷ Per GO 133-D Section 3.4(b), other circumstances beyond the carrier's control include, but not limited, to the following: outage caused by cable theft, third-party cable cut, lack of premise access when a problem is isolated to that location, absence of customer support to test facilities, or customer's requested appointment.

¹⁸ Per GO 133-D Section 3.4(b), a catastrophic event is an event where there is a declaration of a state of emergency by a federal or state authority, and a widespread service outage (an outage affecting at least 3% of the carrier's customers in the state) are circumstances beyond the carrier's control.

Statewide Out of Service Repair Interval Performance

The combined Adjusted OOS for all reporting carriers (URF ILECs, URF CLECs, and GRC ILECS) from 2018 through 2021 ranged from 58.1% to a peak of just 69.1%. The Unadjusted OOS, which does not exclude Sundays, federal holidays, delays beyond the carrier's control, and catastrophic events, consistently performed at about ten percentage points below their corresponding Adjusted OOS. During the same four-year span from 2018 through 2021, the Unadjusted OOS ranged between 48.9% to 60.4%. Both Adjusted OOS and Unadjusted OOS were substantially below the 90% performance standard for all four years with little sign of improvement. Figure 1 depicts how both the Adjusted OOS and the Unadjusted OOS measure up against the 90% standard in each for the four years.

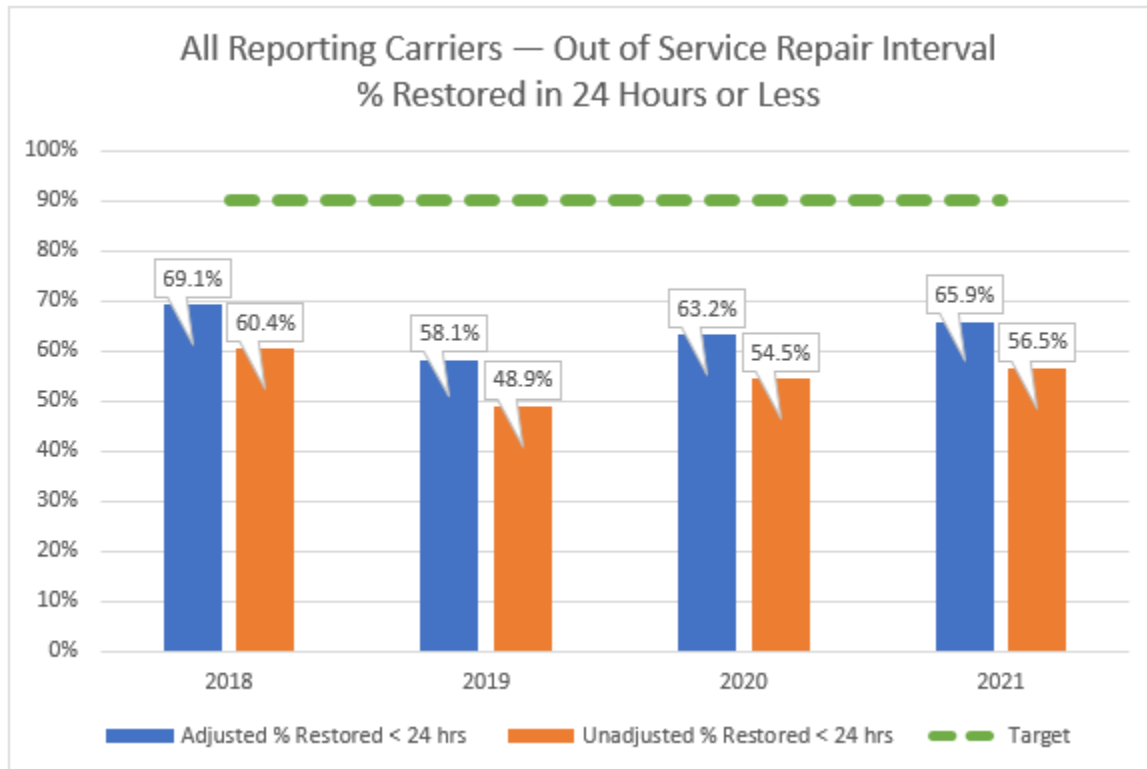


Figure 1: All Reporting Carriers —Adjusted and Unadjusted Out of Service Repair Interval

URF ILECs

In the four-year span from 2018 through 2021, the URF ILECs on average accounted for 51.5% (2.5 million lines) of the working lines in California. Two large carriers, AT&T California (AT&T CA) and Frontier California (Frontier CA), accounted for 97% of those 2.5 million working lines.¹⁹

Collectively, the URF ILECs had the worst OOS performance among the three carrier types. As shown in Figure 2, the highest rate of compliance for URF ILECS was in 2018 during which 59.2% of the Adjusted OOS tickets were repaired within 24 hours. Despite not meeting the OOS standard in 2018, the URF ILECs continued to perform poorly in subsequent years, with the worst level of performance occurring in 2019 when they repaired 44.5% of the Adjusted OOS tickets and 37.0% of the Unadjusted OOS tickets within 24 hours.

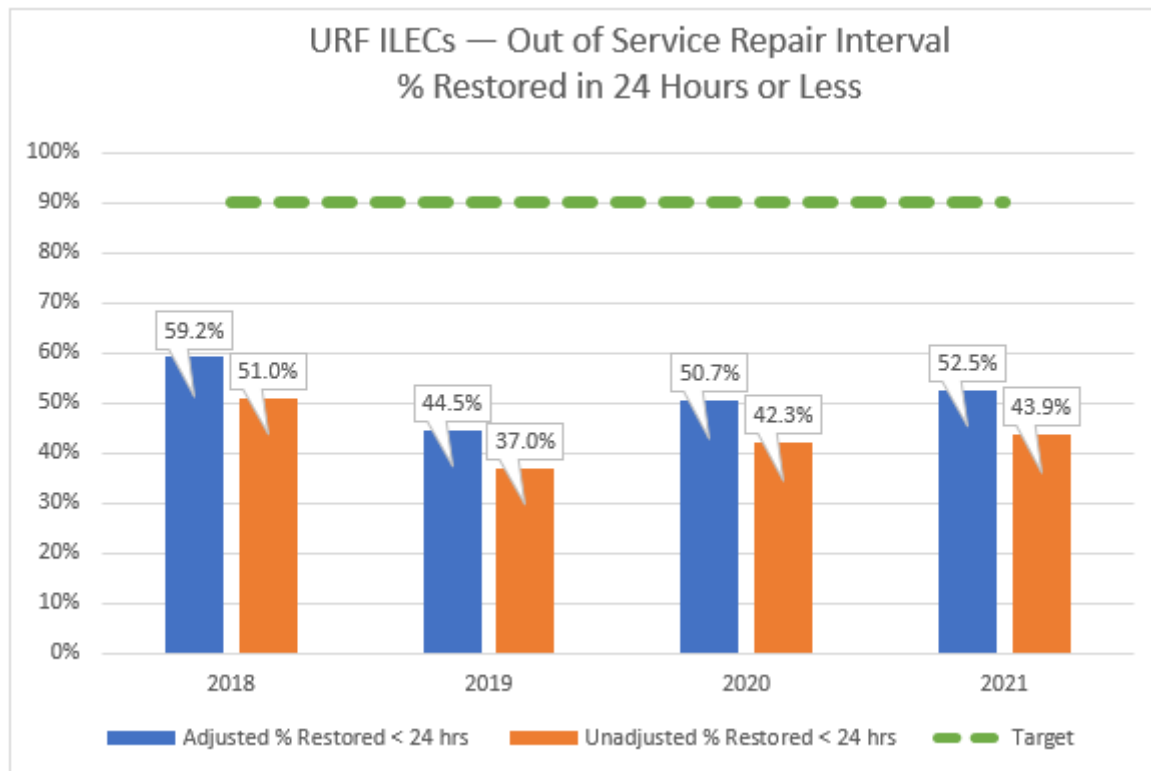


Figure 2: URF ILECs —Adjusted and Unadjusted Out of Service Repair Interval

¹⁹ Please refer to Table 2 for working line distribution by carrier and carrier type.

URF CLECs

During the same four-year span from 2018 to 2021, the URF CLECs on average accounted for 47.5% (2.3 million lines) of the working lines in California.²⁰ The URF CLECs generally performed much better than the URF ILECs in both the Adjusted and Unadjusted OOS. As shown in Figure 3, the Adjusted OOS ranged from 86.7% to 97.5% while the Unadjusted OOS ranged from 79.5% to 85.6%. From 2018 to 2021, the URF CLECs' Adjusted and Unadjusted OOS were at least 28 percentage points²¹ better than the URF ILECs. The difference between the two carrier types is significant, especially when considering that both types account for a similar number of working lines.

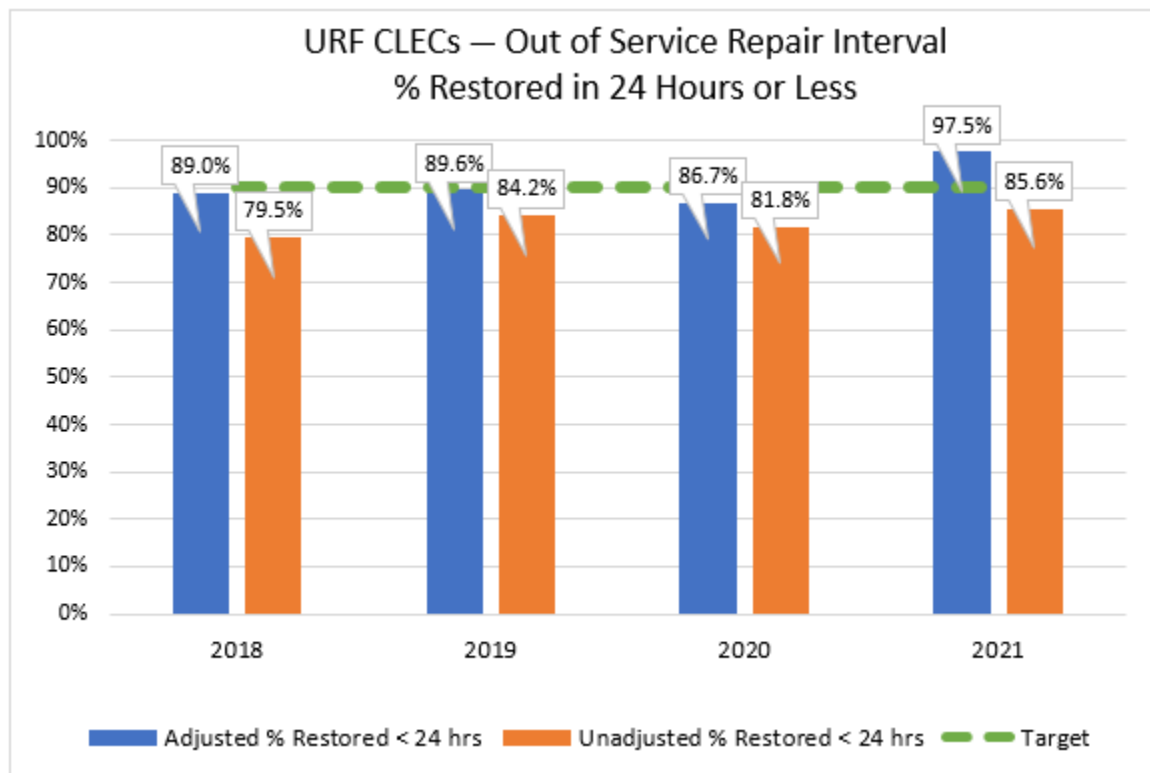


Figure 3: URF CLECs —Adjusted and Unadjusted Out of Service Repair Interval

²⁰ Please refer to Table 2 for working line distribution by carrier and carrier type.

²¹ The URF CLEC's Adjusted and Unadjusted OOS range from 28 to 47 percentage points better than the URF ILECs.

GRC ILECs

The 13 GRC ILECs account for a much smaller percentage of the working lines in California, averaging roughly one percent of the working lines in California from 2018 to 2021. During that four-year span, the number of working lines decreased from 53,496 to 50,845 lines. However, because the working line count for URF ILECs and URF CLECs decreased at a more rapid rate, the GRC ILEC's percent contribution of working lines increased.²²

As a group, the GRC ILECs have consistently met the Adjusted OOS standard every year since the adoption of GO 133-D. In the four-year span from 2018 to 2021, the Adjusted OOS ranged from 94.2% to 97.5%. Similarly, GRC ILEC's Unadjusted OOS also outperformed the other two carrier types, ranging from 79.7% to 86.5% during the four-year span. Please refer to Figure 4 for details.

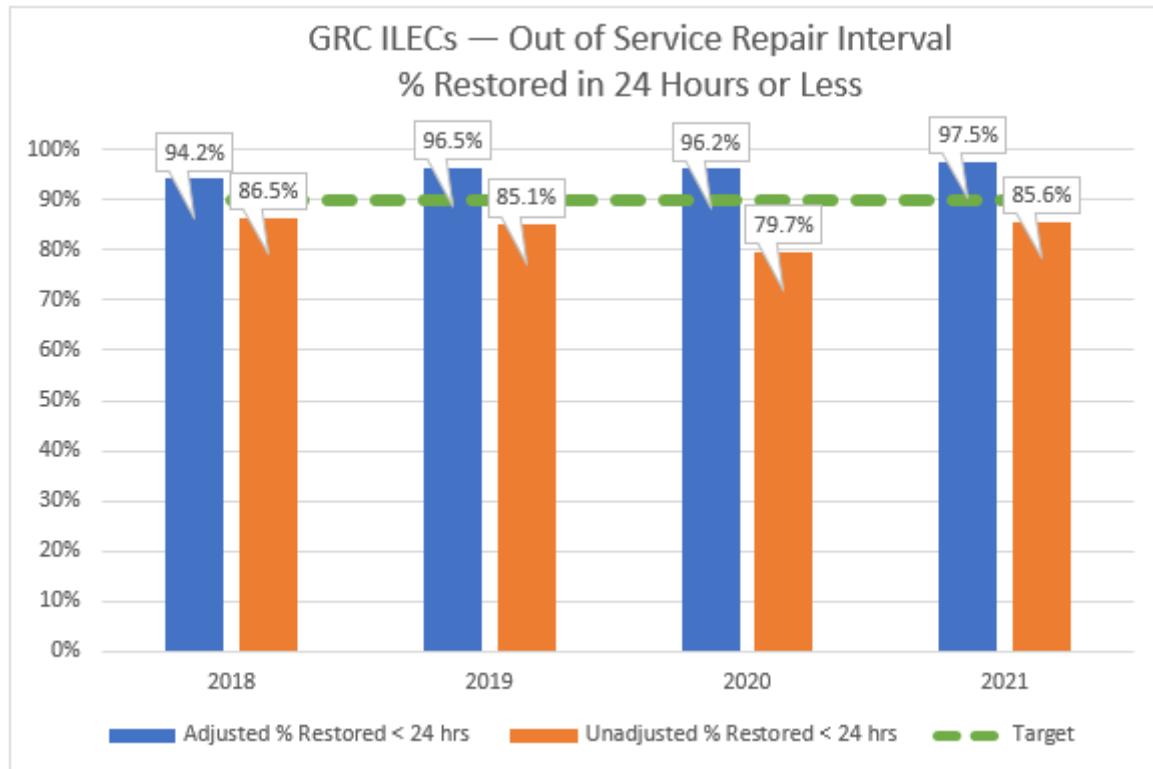


Figure 4: GRC ILECs —Adjusted and Unadjusted Out of Service Repair Interval

GO 133-D Enforcement and Fines

General Order (GO) 133-D § 9 describes the enforcement mechanism and penalty structure for the required service quality measures and standards. This enforcement mechanism and penalty structure only applies to facility-based carriers offering TDM voice service, also known as traditional telephone service. For carriers that offer both TDM and VoIP services, fines apply only to the TDM service. Fines are assessed when carriers fail to meet the minimum standard for three consecutive months, reaching a chronic failure status.²³

²² Please refer to Table 2 for working line distribution by carrier and carrier type.

²³ Fines begin to accrue from the third month of failure onward and are not assessed for the first two months of failure.

From 2018 through 2021, the CPUC assessed a total of \$17,160,826 in fines²⁴ for nine carriers²⁵ for failing to meet service quality standards. The fines for failing to meet the standard for the Out of Service Repair Interval (OOS) measure alone amounted to \$17,052,650. The remaining four measures, Installation Commitment, Installation Intervals, Customer Trouble Reports, and Answer Time collectively accounted for the remaining \$108,176 of assessed fines. See Table 4 below for fines details by service measures during the four-year span.

GO 133-D Assessed Fine Amounts by Service Quality Standard (2018 - 2021)				
Service Measures	2018	2019	2020	2021
Out of Service Repair Intervals	\$5,027,625	\$4,611,300	\$4,147,175	\$3,266,550
Installation Intervals	\$0	\$0	\$150	\$1,200
Installation Commitments	\$0	\$2,100	\$0	\$2,400
Customer Trouble Reports	\$0	\$0	\$0	\$0
Answer Time	\$74,894	\$27,432	\$0	\$0
Total	\$5,102,519	\$4,640,832	\$4,147,325	\$3,270,150

Table 4: GO 133-D Assessed Fine Amounts by Service Quality Standard

If a carrier fails to meet service quality standards, GO 133-D § 9.7 allows the carrier to propose, in its annual filing, to invest in projects to improve service quality in a measurable way within two years. The proposal must demonstrate that 1) the investment on the projects must be at least twice the assessed fine amount, 2) the projects are incremental expenditures with supporting financials (expenditure is in excess of the existing construction budget and/or staffing base), 3) the projects are designed to address service quality deficiencies, and 4) upon completion of the projects, the carrier shall demonstrate the results for the purpose proposed. In such cases, instead of remitting fines to the California's General Fund, the applicable carrier would spend the money on its network infrastructure with the aim of improving service quality performance.

For the service quality standards assessment in Year 2018, the CPUC adopted Resolution T-17651,²⁶ which set forth fines of \$89,609 for six carriers that failed to meet the required service quality standards. For the same assessment year, the CPUC approved investment projects from Frontier CA and

²⁴ Fines are derived from a base fine amount of \$750,000 multiplied by a scaling factor, which is determined by the percentage of the access lines that the carrier provides.

²⁵ U-1001-C AT&T California, U-1002-C Frontier California Inc., U-1010-C Happy Valley Telephone Co., U-1011-C Hornitos Telephone Company, U-1019-C Volcano Telephone Company, U-1021-C Winterhaven Telephone Company, U-1024-C Citizens Telecommunications Co. of Ca., U-1026-C Frontier Communications of the Southwest Inc., and U-5002-C AT&T Corporation are the nine carriers.

²⁶ Resolution T-17651 set forth fines for AT&T Corporation (U-5002-C), Frontier Citizens Telecommunications Company (U-1024-C), Frontier Communications of the Southwest (U-1026-C), Happy Valley Telephone (U-1010-C), Hornitos Telephone (U-1011-C), and Winterhaven Telephone (U-1021-C) for failing to meet performance standards in Year 2018 <https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M298/K537/298537886.PDF>

AT&T CA via Resolutions T-17652²⁷ and T-17655²⁸ respectively. In lieu of paying fines of \$1,310,310 and \$3,702,600, the CPUC allowed Frontier CA to invest \$2,900,913 and AT&T CA to invest \$7,405,200 into network infrastructure projects to improve service quality.

For the assessment in Year 2019, the CPUC adopted Resolution T-17694,²⁹ which set forth fines of \$140,976 for five carriers that failed to meet service quality standards. For the same year, the CPUC adopted two other Resolutions to address the investment proposals from Frontier CA and AT&T CA. In Resolution T-17731,³⁰ the CPUC rejected Frontier CA's investment proposal and instead set forth fines for \$1,277,856. Similarly, in Resolution T-17721,³¹ the CPUC rejected AT&T CA's investment proposal and instead set forth fines for \$3,222,000. In both instances, the CPUC rejected the ILECs' proposals after concluding that prior investments failed to improve service quality.

For the assessment in Year 2020, the CPUC adopted Resolution T-17736,³² which set forth fines of \$3,179,600 for six carriers, including AT&T CA. Frontier CA, however, opted to submit an investment proposal in lieu of paying the fine. The CPUC rejected Frontier CA's proposal via Resolution T-17743³³ and set forth fines of \$967,725.

For the assessment in Year 2021, the CPUC adopted Resolution T-17768³⁴ to set forth fines of \$177,750 for Frontier CA and Happy Valley Telephone combined, neither of which submitted investment proposals for failing to meet service quality standards.

Consistent with previous assessment years, AT&T CA again failed service quality standards for Year 2021, which totaled \$3,092,400. In lieu of paying the fine, AT&T CA proposed to invest in its network. The CPUC proceeded to adopt Resolution T-17769,³⁵ which approved AT&T CA's request to invest at least \$6,184,800 to improve service quality in its service territory in lieu of paying the fine. In addition,

²⁷ Resolution T-17652 approves alternative proposal for mandatory corrective action for Frontier California, Inc. (U-1002-C) for failing to meet performance standards in Year 2018

<https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M298/K193/298193814.PDF>

²⁸ Resolution T-17655 approves alternative proposal for mandatory corrective action for AT&T California (U-1001-C) for failing to meet performance standards in Year 2018

<https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M298/K187/298187988.PDF>

²⁹ Resolution T-17694 sets forth fines for AT&T Corporation (U-5002-C), Frontier Citizens Telecommunications Company (U-1024-C), Frontier Communications of the Southwest (U-1026-C), Happy Valley Telephone (U-1010-C), and Hornitos Telephone (U-1011-C) for failing to meet performance standards in Year 2019

<https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M337/K505/337505057.PDF>

³⁰ Resolution T-17731 sets forth fines for Frontier California (U-1002-C) for failing to meet performance standards in Year 2019 <https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M370/K856/370856288.PDF>

³¹ Resolution T-17721 sets forth fines for AT&T California (U-1001-C) for failing to meet performance standards in Year 2019 <https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M356/K381/356381502.PDF>

³² Resolution T-17736 sets forth fines for AT&T California (U-1001-C), AT&T Corporation (U-5002-C), Frontier Citizens Telecommunications Company (U-1024-C), Frontier Communications of the Southwest (U-1026-C), Happy Valley Telephone (U-1010-C), and Hornitos Telephone (U-1011-C) for failing to meet performance standards in Year 2020 <https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M389/K955/389955507.PDF>

³³ Resolution T-17743 sets forth fines for Frontier California (U-1002-C) for failing to meet performance standards in Year 2020 <https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M399/K410/399410705.PDF>

³⁴ Resolution T-17768 sets forth fines for Frontier California (U-1002-C) and Happy Valley Telephone (U-1010-C) for failing to meet performance standards in Year 2021

<https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M484/K444/484444617.PDF>

³⁵ Resolution T-17769 approves alternative proposal for mandatory corrective action for AT&T California (U-1001-C) for failing to meet performance standards in Year 2021

<https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M501/K324/501324766.PDF>

the Resolution required AT&T CA to provide a Corrective Action Plan³⁶ to provide performance assessment and outage assessment information over a two-year period.

For a complete list of assessed fine amounts for service quality standard failures by carrier from 2018 through 2021, please refer to Table 5 for details.

GO 133-D Assessed Fine Amounts by Carrier (2018 - 2021)					
Utility Number	Carrier Name	2018	2019	2020	2021
U-1001-C	AT&T California	\$3,702,600*	\$3,222,000†	\$3,129,300	\$3,092,400***
U-1002-C	Frontier California Inc.	\$1,310,310**	\$1,277,856†	\$967,725†	\$173,850
U-1010-C	Happy Valley Telephone Co.	\$900	\$2,400	\$500	\$3,900
U-1011-C	Hornitos Telephone Company	\$525	\$300	\$900	N/A
U-1019-C	Volcano Telephone Company	N/A	N/A	N/A	N/A
U-1021-C	Winterhaven Telephone Company	\$525	N/A	N/A	N/A
U-1024-C	Citizens Telecommunications Co. of Ca.	\$71,238	\$118,332	\$34,800	N/A
U-1026-C	Frontier Communications of the Southwest Inc.	\$3,821	\$7,344	\$2,400	N/A
U-5002-C	AT&T Corp.	\$12,600	\$12,600	\$11,700	N/A
Total		\$5,102,519	\$4,640,832	\$4,147,325	\$3,270,150

* Resolution T-17655 approves investment in lieu of for \$7,405,200 or more to improve service quality.

** Resolution T-17652 approves investment in lieu of for \$2,900,913 or more to improve service quality.

*** Resolution T-17769 approves investment in lieu of for \$6,184,800 or more to improve service quality.

† The Commission rejecteted the carriers' Corrective Action Plans and instead set forth fines.

Table 5: GO 133-D Assessed Fine Amounts by Carrier (2018-2021)

AT&T California and Frontier California In-Depth Examination

URF ILECs performed significantly worse than URF CLECs and GRC ILECs on the OOS standard. Of the five URF ILECs, AT&T CA and Frontier CA accounted for 98% of the \$17,160,826 in fines assessed during the four-year period from 2018 to 2021. Given the significant fines levied against these two carriers, staff finds it is imperative to further examine their service quality performance and what changes should be considered to service quality standards implemented by the CPUC.³⁷

³⁶ General Order 133-D https://www.cpuc.ca.gov/-/media/cpuc-website/files/uploadedfiles/cpuc_public_website/content/proceedings/proceedings_rules/go133d.PDF

³⁷ U-5002-C AT&T Corp., U-1024-C Citizens Telecommunications Co. of Ca., and U-1026-C Frontier Communications of the Southwest Inc. are not included in this in-depth examination. These three carriers, despite being affiliated with AT&T CA and Frontier CA, accounted for only \$274,835 in fines and did not request for alternative proposals in lieu of fines.

AT&T California Performance Review (2018-2021)

From 2018 through 2021, AT&T CA consistently failed to meet the OOS standard, which requires restoring 90% of outage repair tickets within 24 hours based on Adjusted results. During that four-year span, despite a steady decline in the number of outage tickets, AT&T CA never restored more than 56% of its outage tickets within 24 hours. The total assessed fine for the four years amounted to \$13.1 million.

For the Year 2018 assessment, the CPUC approved AT&T CA's investment proposal of \$7.4 million to improve service quality. (The CPUC had also approved a similar investment proposal from AT&T CA, which totaled to \$4.4 million, for the Year 2017 assessment³⁸). Despite being approved for \$11.8 million worth of investment projects from Year 2017 and 2018 assessments, AT&T CA did not achieve noticeable improvements in service quality in subsequent years. Instead, AT&T CA restored less than 50% of the outage tickets in 2019, 2020, and 2021, demonstrating a regression in their performance over this time. The actual number of outage tickets restored within 24 hours decreased from 123,422 in 2018 to 92,288 in 2019, representing a 25% decrease. This trend continued into 2020 and 2021 when AT&T CA restored only 75,714 and 74,471 outage tickets within 24 hours respectively. See Figure 5 for details.

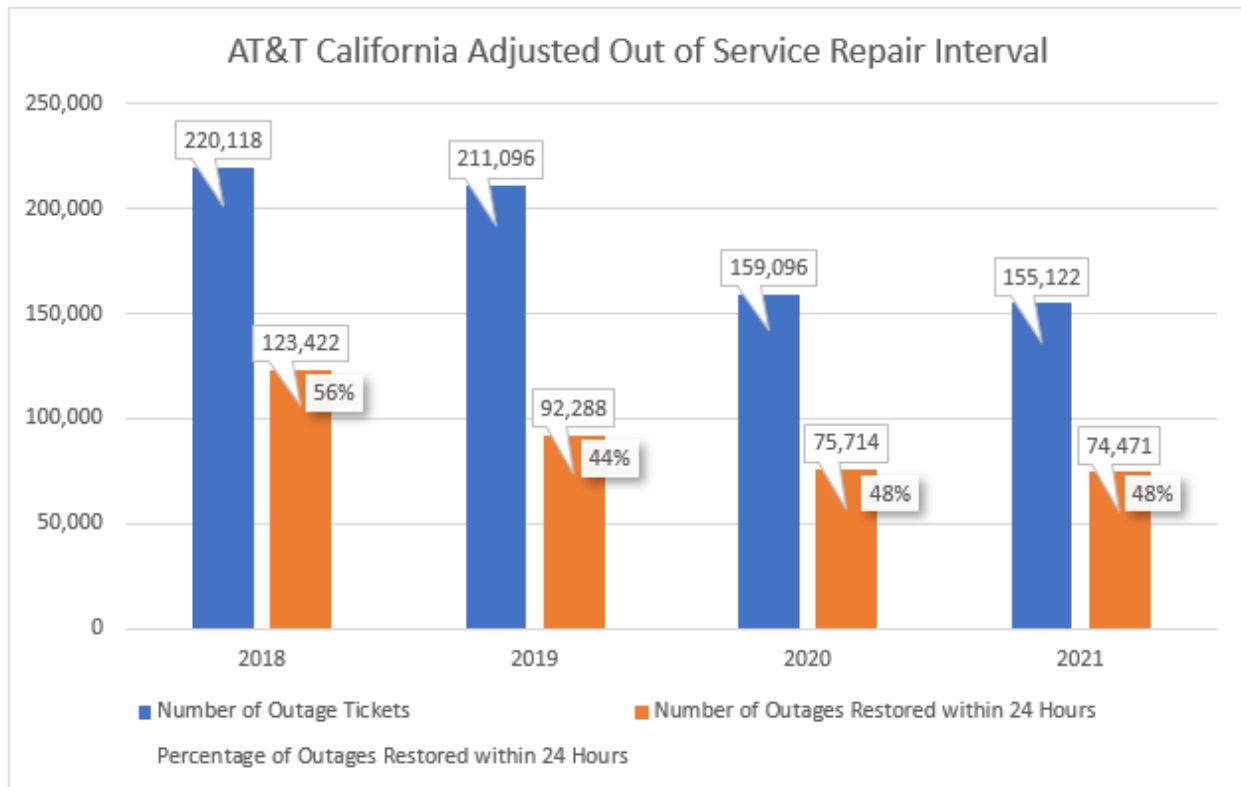


Figure 5: AT&T California Adjusted Out of Service Repair Interval

³⁸ For Year 2017 service quality performance, the CPUC approved an alternative proposal for mandatory correction action that totaled at least \$4,400,000. Together with the \$7,405,200 approved for Year 2018, the reinvestment total for the two years combined for over \$11.8 million.

Further examination of AT&T CA's ability to repair outage tickets based on Adjusted results provides useful information. In the beginning of the four-year span from 2018 through 2021, the carrier had demonstrated the ability to restore a large number of outage repair tickets, but it appeared to have lost its capacity to settle repair tickets within 24 hours over time. In 2018, AT&T CA incurred 220,118 outage repair tickets and restored 123,422 (56%) of them within 24 hours. In 2020 and 2021, AT&T CA incurred about 30% fewer outage repair tickets than in 2018 at 159,096 and 155,122 respectively, but it restored less than half of them within 24 hours at only 75,714 and 74,471 tickets respectively.

In 2018, AT&T CA demonstrated that it could restore 123,422 tickets within 24 hours. If AT&T CA was able to replicate its 2018 performance and restore 123,422 tickets within 24 hours, that would represent restoring 78% and 80% of the outage repair tickets in 2020 and 2021. For a pictorial depiction of such scenario, please refer to Figure 6.

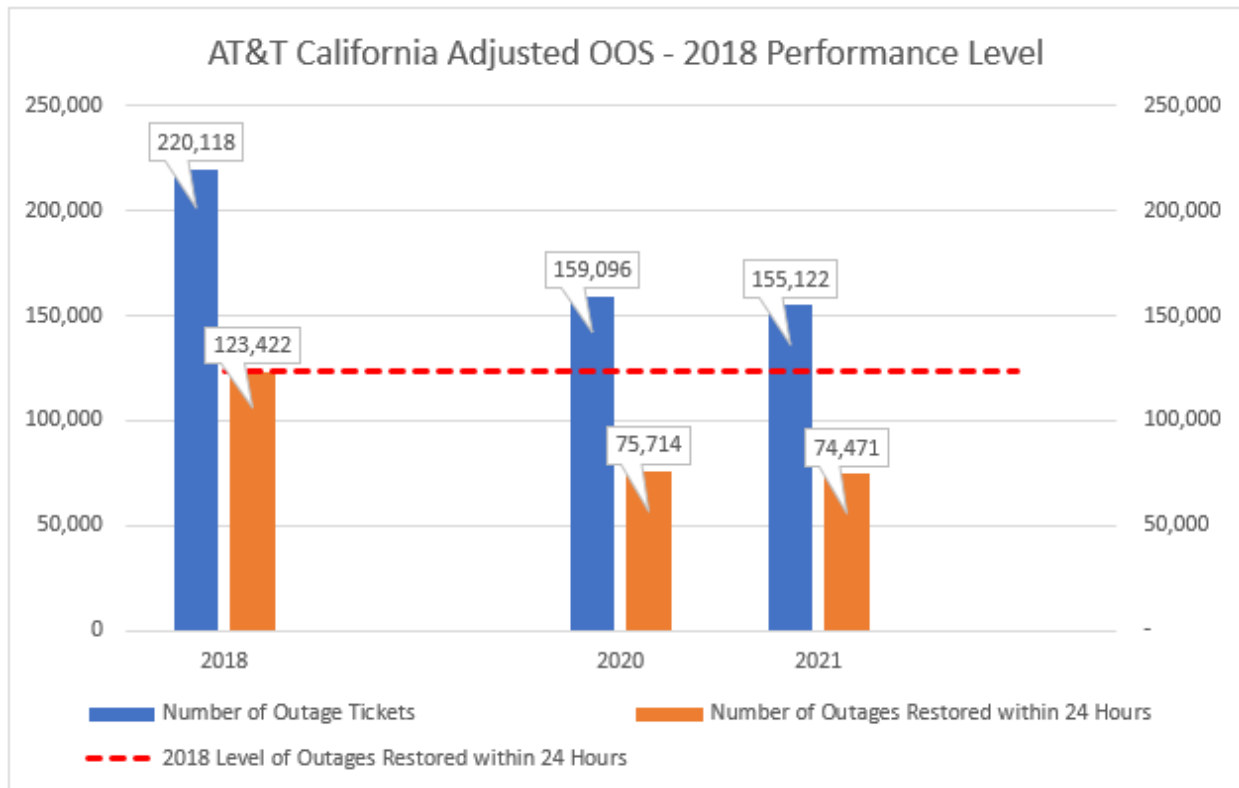


Figure 6: AT&T California Adjusted Out of Service Repair Interval - 2018 Performance Level

Frontier California Performance Review (2018-2021)

Frontier CA also failed to meet the OOS standard of restoring 90% of the outage repair tickets within 24 hours based on Adjusted results during the four-year span from 2018 through 2021. In 2018, in lieu of paying a fine of \$1,310,310,³⁹ Frontier CA opted to invest \$2,900,913 on projects to improve service quality, which the CPUC approved. Frontier CA began to deliver improved results, which included meeting the OOS standard by restoring 91% of the outage repair tickets within 24 hours in 2021.⁴⁰ It is noteworthy to mention that Frontier CA filed for bankruptcy and underwent a reorganization plan in 2020.⁴¹ It is unclear whether that had any impact to the carrier's improved OOS performance. For details on Frontier CA's OOS from 2018 through 2021, please refer to Figure 7.

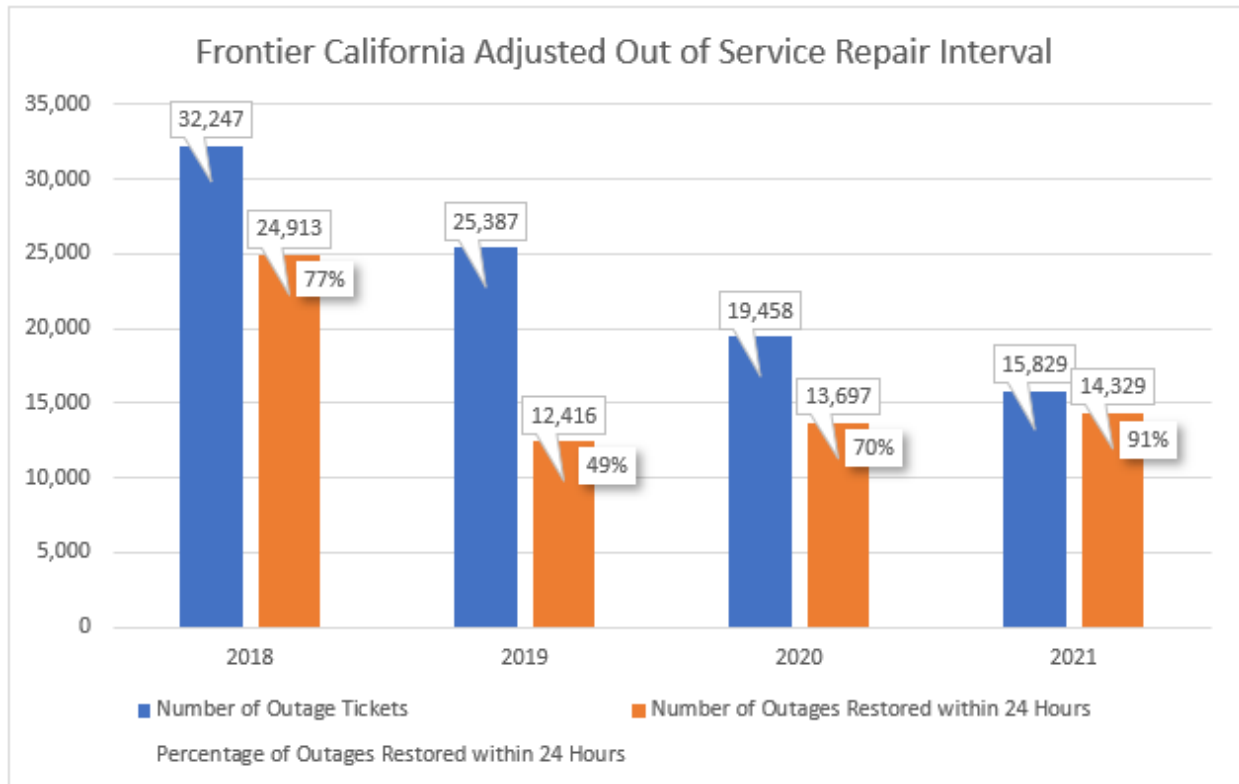


Figure 7: Frontier California Adjusted Out of Service Repair Interval

³⁹ The fine of \$1,310,310 stems from \$1,242,000 for failing out of service repair intervals service measure and \$68,310 for failing answer time service measure.

⁴⁰ In 2021, Frontier California restored over 90% of the outage tickets across the year on average but fell below the 90% standard in four of the twelve months. Two of the four months resulted in chronic failure status and incurred GO 133-D penalties.

⁴¹ Frontier's proposed corporation reorganization fact sheet: <https://www.cpuc.ca.gov/-/media/cpuc-website/divisions/communications-division/documents/licensing-compliance/frontier-transfer-proceeding/cd-suggested-fact-sheet-draft.PDF>

Penalty Mechanism Structure and GO 133-D Performance

The in-depth examinations of AT&T CA and Frontier CA call into question whether the existing GO 133-D penalty mechanism is effective in improving service quality. During the four-year span, both carriers either paid their assessed fines or proceeded with investment proposals that aimed to improve service quality in lieu of paying fines. However, both approaches were generally ineffective. In this section, staff examines various components of the penalty mechanism structure, which may inhibit improved GO 133-D performance.

Flat Rate Fine Calculation

The fines calculation methodology currently utilizes a “flat penalty rate” of \$750,000 weighted by the number of access lines,⁴² which does not account for how much the carrier misses the service quality standard. For example, a carrier can miss the OOS standard by one percentage point or 50 percentage points, the fine in both scenarios would still be imputed from the same penalty rate. Even though both scenarios ultimately miss the OOS standard, the actual number of tickets that do not get repaired within 24 hours are substantially different.

To further illustrate the flat penalty rate issue, please refer to Table 6. In 2021, both AT&T CA and Frontier CA were fined for not meeting the OOS standard of 90%. In January and February, both carriers failed to meet the standard and were assessed fines. Their fine calculations utilized the same flat penalty rate. However, AT&T CA fell short of the 90% standard by over 50 percentage points, whereas Frontier CA fell short by less than four percentage points in those two months.

2021 Adjusted Out of Service Repair Interval (% Restored in 24 Hours or Less)												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
AT&T California	37.5%	38.6%	55.8%	57.1%	60.3%	57.8%	59.2%	62.3%	58.3%	52.5%	57.7%	26.6%
Frontier California	86.5%	88.3%	92.0%	95.4%	94.0%	94.6%	89.4%	86.5%	92.0%	90.2%	91.6%	91.0%

Red fonts indicate chronic failure status where carrier fails to achieve 90% for more than two consecutive months

Table 6: 2021 AT&T CA and Frontier CA Adjusted Out of Service Repair Interval

⁴² An access line (hardwire and/or channel) is a line that runs from the local central office, or functional equivalent, to the subscriber’s premises. A channel can be provided with or without wires.

Chronic Failure Status

Another component of the penalty mechanism worthy of further examination is “chronic failure status.” This is defined as failure to meet the minimum standard for three consecutive months. A carrier will only begin to incur a fine when it reaches chronic failure status. As such, a carrier can fail to meet the minimum standard for two consecutive months and not be penalized if it meets the standard the following month. For example, despite not meeting the 90% standard, Frontier CA did not incur any penalty in October and November of 2020 and in July and August of 2021 because it did not fall into chronic failure status in those four months. See Table 7 for details; unpenalized months that failed to meet the 90% standard are highlighted in yellow.

2018 Adjusted Out of Service Repair Interval (% Restored in 24 Hours or Less)												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
AT&T California	43.1%	68.0%	60.8%	69.0%	68.0%	55.8%	53.9%	59.3%	59.9%	59.4%	55.1%	35.3%
Frontier California	64.0%	75.9%	73.0%	75.9%	86.6%	84.1%	79.8%	83.0%	85.1%	72.1%	88.8%	71.9%

2019 Adjusted Out of Service Repair Interval (% Restored in 24 Hours or Less)												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
AT&T California	36.8%	36.9%	48.2%	61.3%	53.5%	42.5%	43.7%	36.5%	47.8%	52.5%	57.7%	26.6%
Frontier California	47.5%	14.9%	52.9%	46.2%	58.4%	61.0%	56.5%	57.8%	54.0%	78.6%	79.2%	37.6%

2020 Adjusted Out of Service Repair Interval (% Restored in 24 Hours or Less)												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
AT&T California	44.3%	54.9%	45.5%	41.3%	49.2%	48.3%	47.8%	42.8%	49.7%	52.5%	57.7%	26.6%
Frontier California	41.7%	74.8%	46.0%	55.0%	73.1%	63.8%	77.5%	88.4%	92.6%	89.1%	89.8%	87.7%

2021 Adjusted Out of Service Repair Interval (% Restored in 24 Hours or Less)												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
AT&T California	37.5%	38.6%	55.8%	57.1%	60.3%	57.8%	59.2%	62.3%	58.3%	52.5%	57.7%	26.6%
Frontier California	86.5%	88.3%	92.0%	95.4%	94.0%	94.6%	89.4%	86.5%	92.0%	90.2%	91.6%	91.0%

Table 7: AT&T CA and Frontier CA Adjusted Out of Service Repair Interval (2018-2021)

Other Penalty Mechanism Elements

The penalty mechanism for failing the OOS standard is based on Adjusted results, which exclude Sundays, federal holidays, delays beyond the carrier's control, and catastrophic events. Naturally, with these exclusions, restoring 90% of the outage repair tickets within 24 hours based on Adjusted results will always outperform those based on Unadjusted results, which contain no exclusions.

From 2018 through 2021, AT&T CA and Frontier CA displayed two very different patterns when comparing their performances based on Adjusted data versus Unadjusted data. For AT&T CA, the gap between Adjusted and Unadjusted is very consistent, hovering between five to six percentage points apart for all four years. See Figure 8 for details.

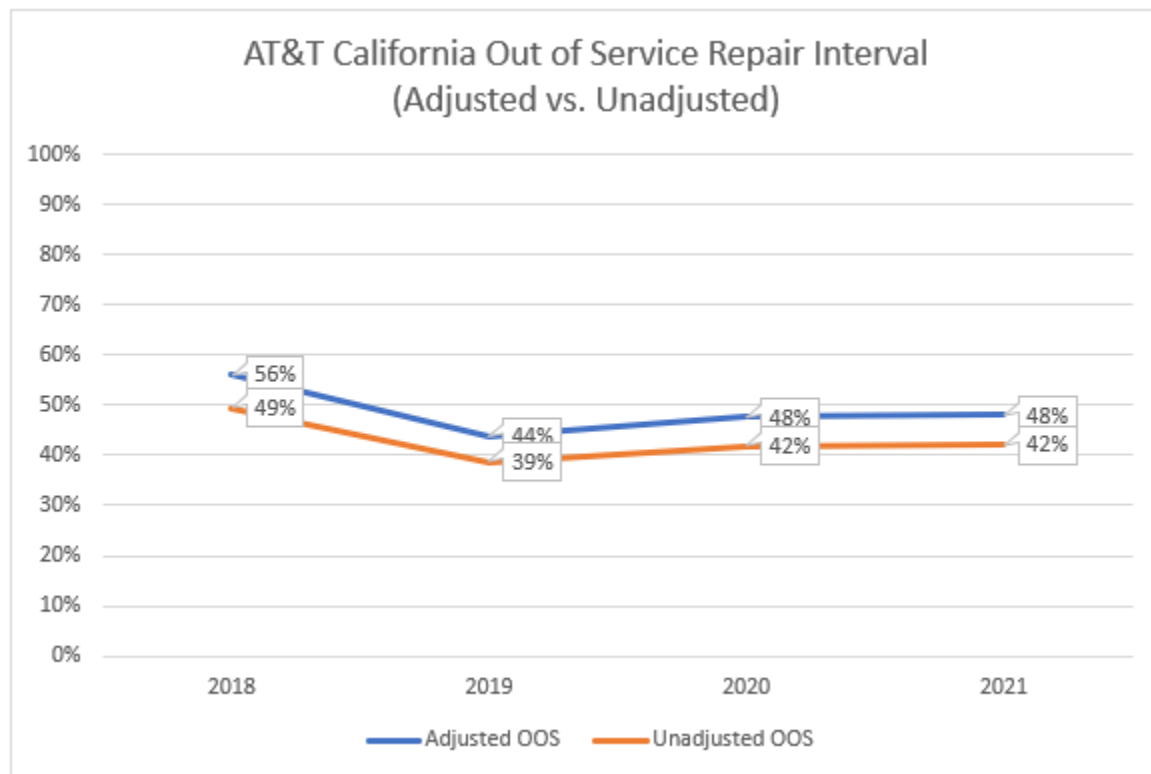


Figure 8: AT&T California Out of Service Repair Interval - Adjusted vs. Unadjusted (2018-2021)

For Frontier CA, the gap between Adjusted and Unadjusted ranges from 17-percentage point gap in 2018 to a 32-percentage point gap in 2021. See Figure 9 for details. Even though the carrier averaged above the 90% OOS standard based on Adjusted results in 2021, Frontier CA's OOS performance based on Unadjusted results was at only 58%. Such disparity between Adjusted and Unadjusted is noteworthy because it means an additional 30% of the outage tickets do not get repaired within 24 hours if they occur on a Sunday or federal holiday, or during delays beyond the carrier's control or catastrophic events.

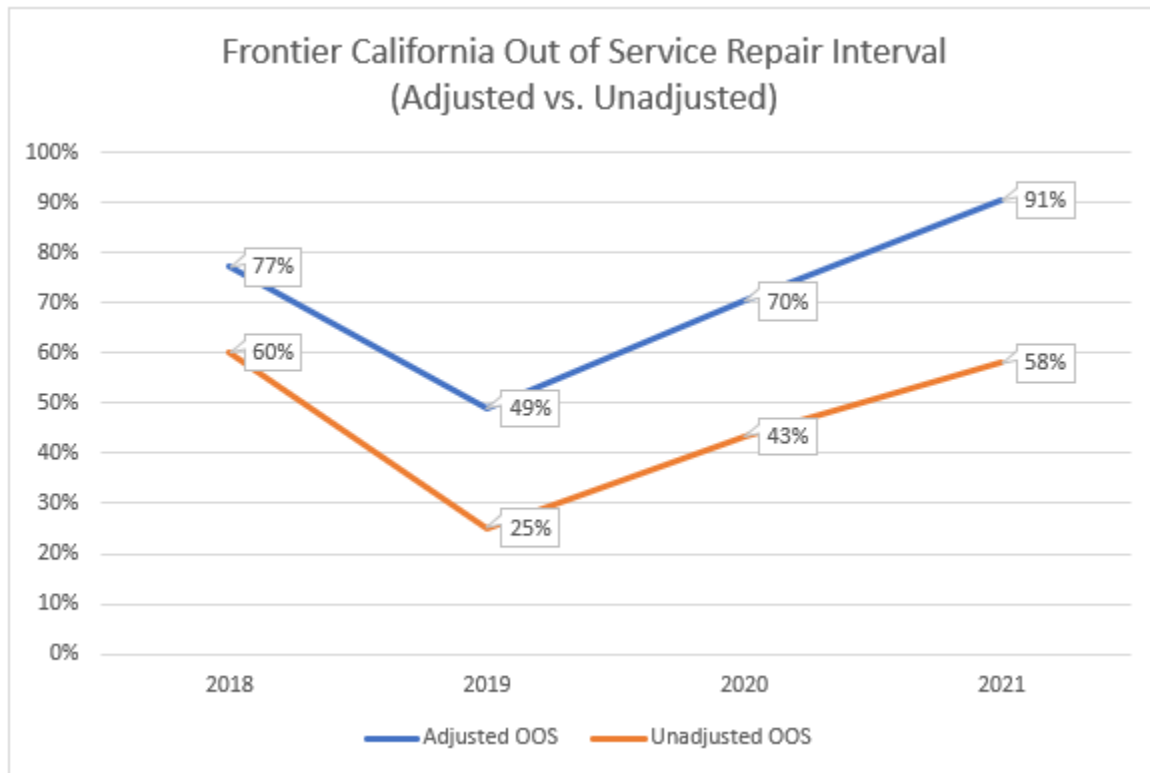


Figure 9: Frontier California Out of Service Repair Interval - Adjusted vs. Unadjusted (2018-2021)

Under current GO 133-D rules, carriers are not assessed fines for their OOS performance based on Unadjusted results. In the case of Frontier CA, it restored over 90% of the outage repair tickets based on Adjusted results in 2021, but less than 60% when using Unadjusted results. While some of the factors of the Unadjusted measurement can be attributed to unexpected delays or catastrophic events like wildfires, the rest are attributed to routine occurrences, such as Sundays and federal holidays. Communications services should be accessible on Sundays, federal holidays, and during an emergency. Therefore, staff recommends reexamining whether the Adjusted measurement is the best means of assessing service quality performance.

Another element of the OOS standard is that it relies on a noncomprehensive, binary benchmark – under 24 hours or over 24 hours – to measure service quality as it relates to outages. Outages of one-day, two-day, three-day, and over three-day durations have varying impacts on consumers and their ability to access critical communications services.

Lastly, the only technology being captured in GO 133-D is TDM for all five measures. However, voice services are being provided by other networks like VoIP and wireless. According to the Federal Communications Commission Form 477 filings, VoIP accounted for 14% or more of the voice lines in

California from 2018 through 2021, whereas wireless accounted for no less than 75%. Wireline, however, accounted for no more than 10% during that four-year period. See Table 8 and Figure 10 for details. Even from a mere data collection standpoint, GO 133-D falls short of assessing service outages and ensuring a high level of service quality for the full universe of voice consumers in California.

California Voice Lines by Network Type					
		2018	2019	2020	2021
Wireline	Line Count	5,556,533	4,754,586	4,205,147	3,656,217
	% to Total	9.9%	8.4%	7.4%	6.4%
VoIP	Line Count	8,145,109	8,200,593	8,318,922	8,601,628
	% to Total	14.5%	14.4%	14.6%	15.0%
Wireless	Line Count	42,613,923	43,838,073	44,429,974	45,101,624
	% to Total	75.7%	77.2%	78.0%	78.6%
Total	Line Count	56,315,565	56,793,252	56,954,043	57,359,469

Table 8: California Voice Lines by Network Type per FCC Form 477 filings (June snapshots from 2018 through 2021)

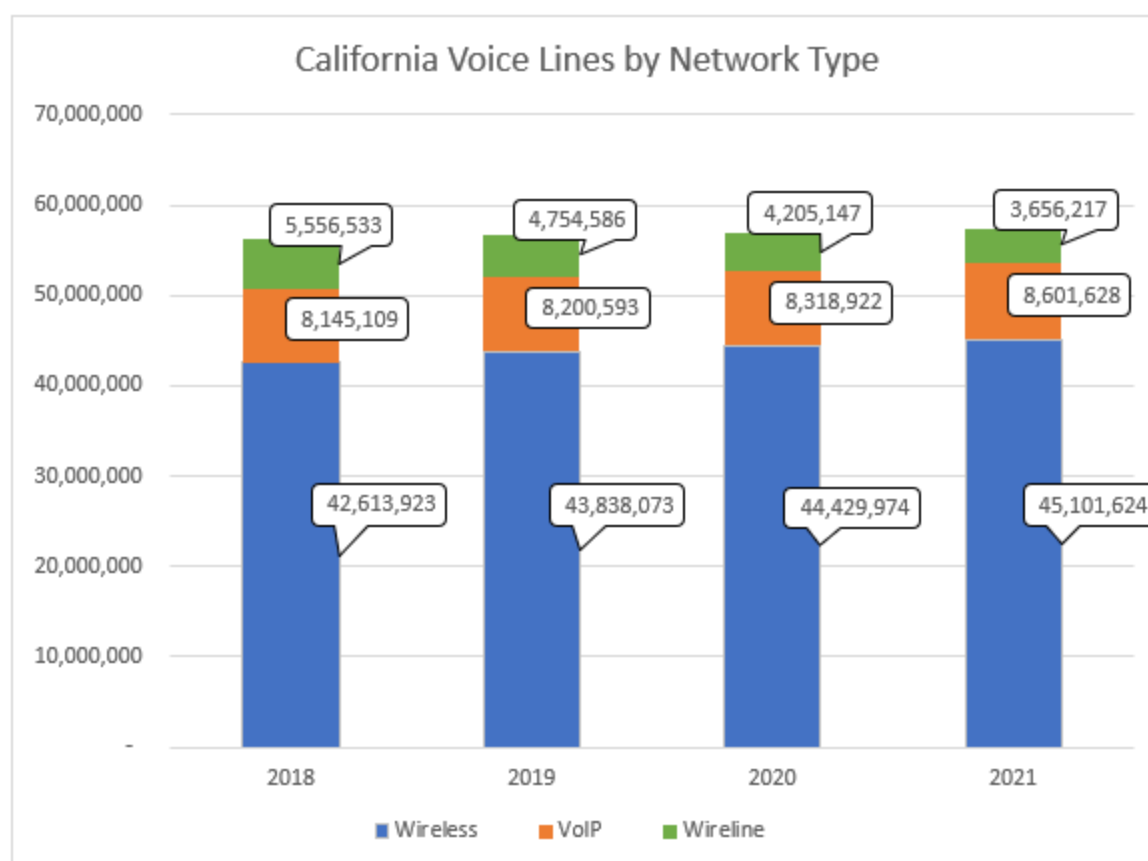


Figure 10: California Voice Lines by Network Type per FCC Form 477 filings (June snapshots from 2018 through 2021)

Other Service Quality Measurements and Benchmarks

In addition to GO 133-D service quality standards, other information sources also provide useful analyses for the CPUC to examine the effectiveness of GO 133-D and to identify areas of opportunity to improve service quality for Californians. The following subsections summarize useful data and applicable analyses from the CPUC's Consumer Affairs Branch (CAB), the Federal Communications Commission, and the California Governor's Office of Emergency Services.

The CPUC's Consumer Affairs Branch

The CPUC's CAB, whose primary role consists of answering questions and resolving utility complaints⁴³ submitted by consumers regarding utility services, can gauge how utility services impact consumers by analyzing the information in its database. Consumers can interact with CAB via phone call and/or in writing (regular mail, fax, web interface, or e-mail). CAB creates a case record⁴⁴ for every interaction with consumers and designates the cases across eight broad categories⁴⁵ and over 100 subcategories.⁴⁶ Due to data availability constraints, the analysis below focuses on data collected in 2020 and 2021.

Staff's analysis of CAB data predominantly focuses on the "service" category. In 2020 and 2021 combined, there were 3,266 cases designated in the "service" category for communications service providers. See Table 9 for a breakdown of the reported case records by case count and by percent contribution by primary reason. "Outage," by a significant margin (40% in 2020, and 38% in 2021), is the most popular reason for utility complaints during both years, followed by "delayed order or missed appointment" and "call quality." These three reasons, which align with the GO 133-D service measures – out of service repair intervals, installation intervals, and installation commitments – collectively account for 76% of the total cases across the two years.

⁴³ If consumers cannot resolve the problem after talking with the utility's customer service, they may file an informal complaint with the CPUC's Consumer Affairs Branch <https://www.cpuc.ca.gov/consumer-support/file-a-complaint>.

⁴⁴ Case records are assigned to one of the following case types: complaint, informal complaint, inquiry, and phone contact.

⁴⁵ The eight categories are billing, service, not regulated – no jurisdiction, Lifeline, policy and practices, public purpose programs, unknown, and rates.

⁴⁶ CAB uses the term, sub-category, in its database to represent the reason for the consumer's interaction with CAB.

Consumer Affairs Branch Service Case Records (2020-2021)						
Primary Reason	2020		2021		Total	
	Case Count	% to Total	Case Count	% to Total	Case Count	% to Total
Outage	686	40%	588	38%	1,274	39%
Delayed Order or Missed Appointment	400	23%	372	24%	772	24%
Call Quality	192	11%	228	15%	420	13%
Number Portability - Wireless or Landline	97	6%	117	8%	214	7%
Disconnection Non Payment	126	7%	78	5%	204	6%
Disconnected In Error	80	5%	85	5%	165	5%
Refusal To Serve	46	3%	14	1%	60	2%
Dead Zone or Dropped Call	23	1%	27	2%	50	2%
VoIP (Voice over Internet Protocol)	22	1%	28	2%	50	2%
Out of Service Credit	13	1%	15	1%	28	1%
Other Charges	6	0%	2	0%	8	0%
High Bill	6	0%	1	0%	7	0%
Operator Services	1	0%	3	0%	4	0%
Abusive Marketing	2	0%	0	0%	2	0%
Bill Adjustment	2	0%	0	0%	2	0%
Bundled Services	2	0%	0	0%	2	0%
Early Termination Fee	0	0%	1	0%	1	0%
Internet Service/Equipment	0	0%	1	0%	1	0%
Safety	1	0%	0	0%	1	0%
Voltage Level	1	0%	0	0%	1	0%
Total	1,706	100%	1,560	100%	3,266	100%

Table 9: Consumer Affairs Branch Service Case Record

The Federal Communications Commission's Network Outage Reporting System

The Federal Communications Commission (FCC) created the Network Outage Reporting System (NORS) to receive "rapid, complete, and accurate information on significant communications service disruptions that could affect homeland security, public health or safety, and the economic well-being of the nation."⁴⁷ Wireline, cable, satellite, wireless, and Signaling System 7⁴⁸ (SS7) providers are required to report network outages that last at least 30 minutes and meet other specific thresholds. After identifying an outage, all reporting service providers must submit a NORS notification within 120 minutes to 24 hours based on the nature of the outage and then provide a final report within 30 days of discovering an outage in their networks. The FCC created the following list of 16 reasons with respective thresholds to determine whether a network outage must be reported:⁴⁹

- Wireline – report if 900,000 or more user-minutes are impacted.
- Wireless – report if 900,000 or more user-minutes are impacted.
- Cable telephony – report if 900,000 or more user-minutes are impacted.
- VoIP – report if 900,000 or more user-minutes are impacted.

⁴⁷ See <https://www.fcc.gov/network-outage-reporting-system-nors>.

⁴⁸ Signaling System 7 is a protocol standard that defines how the network elements in a public switched telephone network exchange information and control signals.

⁴⁹ See <https://www.fcc.gov/file/12265/download> at 41.

- Mobile Switching Center – report if failure occurs at a mobile switching center.
- Enhanced 9-1-1 (E911)⁵⁰ – report if E911 or some aspects of E911 service is affected.
- VoIP – E911 – report if E911 on a VoIP platform or some aspect of E911 service on a VoIP platform is affected.
- Blocked Calls – report if one or more blocked calls trigger an outage.
- 667 OC3 minutes⁵¹ – report if affected by outage and is out of service by more than 30 minutes.
- OC3 – Simplex greater than 4 Days – report if the unprotected simplex service is not repaired within 4 days.
- SS7 – MTP Messages – report if the outage affects the SS7 service.
- Airport – report if outage takes place at an airport.
- Other Special Facilities – report if impacted service is enrolled in the Telecommunications Service Priority Program at Levels 1 and/or 2.
- Paging – report if outage impacts paging network and affect paging users.
- Satellite – report if the outage affects satellite facilities.
- Other – report if other contributing factors trigger an outage.

NORS only allows the selection of a single reason for an outage even if other reasons may also apply. The FCC enables the selection of the “reportable reason” at the network provider’s discretion. From 2018 through 2021, the FCC received over 15,000 NORS final reports, which were predominantly (77%) comprised of wireline network outages. Of the 12,008 wireline reports, 577 reports were reported under the reasons “VoIP – E911” and “VoIP,” which collectively accounted for about five percent of the total reports.

The outage breakdown between wireline and wireless networks remained consistent across the four years being examined (2018 through 2021). 2018 had the fewest number of outages with 2,030 reported; 1,524 were for wireline and 506 were for wireless. The number of reports then climbed to 4,028 in 2019 (3,171 for wireline and 857 for wireless) and remained above 4,600 outages in 2020 and 2021. In terms of contribution by network type, the breakdown between wireline and wireless has been consistent. During the four years being examined, wireline accounted for anywhere between 74% to 79% of the total outages, whereas wireless accounted for between 21% to 26%. See Table 10 for the exact breakdown by year from 2018 through 2021.

NORS Final Reports by Network Type (2018-2021)										
Network Type	2018		2019		2020		2021		Total	
	Report Count	% to Total	Report Count	% to Total	Report Count	% to Total	Report Count	% to Total	Report Count	% to Total
Wireline	1,524	75%	3,171	79%	3,824	78%	3,489	74%	12,008	77%
Wireless	506	25%	857	21%	1,076	22%	1,204	26%	3,643	23%
Total	2,030	100%	4,028	100%	4,900	100%	4,693	100%	15,651	100%

Table 10: NORS Final Reports by Network Type (2018-2021)

⁵⁰ Enhanced 9-1-1 (E911) is a system used in North America to automatically provide the caller's location to 911 dispatchers.

⁵¹ 47 CFR § 4.9 <https://www.ecfr.gov/current/title-47/chapter-I/subchapter-A/part-4>

In addition to outage occurrences, NORS reports also capture and delineate outage durations. See Table 11 and Table 12 below for wireline and wireless outages delineated by specific durations: under 24 hours, 24-48 hours, 48-72 hours, 72-96 hours, and above 96 hours. Aggregating all outages from 2018 through 2021 for both wireline and wireless, most outages (58% for wireline and 61% for wireless) were under 24 hours. However, it is noteworthy that 29% of the wireline outages and 12% of the wireless outages were above 96 hours.

NORS Wireline Outage Duration						
	2018	2019	2020	2021	Total	% to Total
Under 24 Hours	860	1,884	2,214	1,973	6,931	58%
24-48 Hours	111	293	256	271	931	8%
48-72 Hours	49	111	127	93	380	3%
72-96 Hours	25	72	82	64	243	2%
Above 96 Hours	432	799	1,137	1,076	3,444	29%
Blank*	47	12	8	12	79	1%
Total	1,524	3,171	3,824	3,489	12,008	100%

*Some of the NORS final reports did not indicate a duration for the outage. The analysis labels these instances as "Blank" in the tables.

Table 11: NORS Wireline Outage Duration

NORS Wireless Outage Duration						
Duration Length	2018	2019	2020	2021	Total	% to Total
Under 24 Hours	336	630	668	604	2,238	61%
24-48 Hours	88	109	183	230	610	17%
48-72 Hours	33	45	62	68	208	6%
72-96 Hours	11	8	42	41	102	3%
Above 96 Hours	31	41	109	254	435	12%
Blank*	7	24	12	7	50	1%
Total	506	857	1,076	1,204	3,643	100%

*Some of the NORS final reports did not indicate a duration for the outage. The analysis labels these instances as "Blank" in the tables.

Table 12: NORS Wireless Outage Duration

Lastly, NORS reports examine the root cause of outages; there are 19 different root causes altogether.⁵² For comparison purposes, these 19 root causes are grouped into the following six categories: hardware,⁵³ environment,⁵⁴ insufficient data,⁵⁵ planned maintenance,⁵⁶ power failure,⁵⁷ and other.⁵⁸

Across both wireline and wireless networks, the hardware category accounts for the majority of the outage root causes at 49% and 52% respectively. This is followed by insufficient data, which accounts for 32% of the wireline and 17% of the wireless outages. For the complete rundown of outage root cause by categories for both wireline and wireless networks, please see Table 13 and Table 14.

Wireline Root Cause for NORS Outage Report						
	2018	2019	2020	2021	Total	% to Total
Hardware	892	1,541	1,850	1,650	5,933	49%
Insufficient Data	232	1,165	1,288	1,159	3,844	32%
Power Failure	62	146	208	238	654	5%
Planned Maintenance	123	126	240	155	644	5%
Other	149	109	147	145	550	5%
Environment	66	84	91	142	383	3%
Total	1,524	3,171	3,824	3,489	12,008	100%

Table 13: Wireline Root Cause for NORS Outage Report

Wireless Root Cause for NORS Outage Report						
	2018	2019	2020	2021	Total	% to Total
Hardware	248	379	607	676	1,910	52%
Insufficient Data	68	137	194	231	630	17%
Power Failure	69	176	141	190	576	16%
Environment	59	68	60	48	235	6%
Planned Maintenance	42	77	54	45	218	6%
Other	20	20	20	14	74	2%
Total	506	857	1,076	1,204	3,643	100%

Table 14: Wireless Root Cause for NORS Outage Report

⁵² The 19 root causes are: 1) cable damage, 2) cable damage/malfunction, 3) hardware failure, 4) environment (external), 5) environment (internal), 6) insufficient data, 7) other/unknown, 8) planned maintenance, 9) power failure (commercial and/or back-up), 10) design - firmware, 11) design - hardware, 12) design – software, 13) diversity failure, 14) procedural – other vendor / contractor, 15) procedural – service provider, 16) procedural – system vendor, 17) simplex condition, 18) spare, and 19) traffic / system overload.

⁵³ Hardware encompasses the following NORS root causes: cable damage, cable damage/malfunction, and hardware failure.

⁵⁴ Environment encompasses the following NORS root causes: environment (external) and environment (internal).

⁵⁵ Insufficient data encompasses the following NORS root causes: insufficient data and other/unknown.

⁵⁶ Planned maintenance encompasses the following NORS root cause: planned maintenance.

⁵⁷ Power failure encompasses the following NORS root cause: power failure (commercial and/or back-up)

⁵⁸ Other encompasses the following NORS root causes: design - firmware, design - hardware, design – software, diversity failure, procedural – other vendor / contractor, procedural – service provider, procedural – system vendor, simplex condition, spare, and traffic / system overload.

California Governor's Office of Emergency Services

The California Governor's Office of Emergency Services (Cal OES)⁵⁹ requires communications service providers that offer access to 9-1-1 service to electronically submit community isolation outage notifications via e-mail.⁶⁰ All reporting service providers must notify the Cal OES within 60 minutes of discovering a community isolation outage that limits the ability to make 911 calls or receive emergency notifications.⁶¹ Per Title 19 California Code of Regulations (CCR) Division 2 Chapter 1.5,⁶² a community isolation outage is an outage that meets the below threshold criteria for each service type:

- TDM (wireline) voice service – for telecommunications service provided by facilities-based carriers, other than mobile telephony service⁶³ or Voice over Internet Protocol (VoIP) service, herein referred to as wireline, an outage that lasts at least 30 minutes and potentially affects (A) at least 100 end users in a single zip code, or (B) at least 50% of end users in a ZIP code with fewer than 100 end users.
- Voice over Internet Protocol (VoIP) service – for telecommunications service provided by VoIP or Internet Protocol enabled service,⁶⁴ an outage that lasts at least 30 minutes and potentially affects (A) at least 100 end users in a single zip code, or (B) at least 50% of end users in a zip code with fewer than 100 end users.
- Wireless voice service – for telecommunications service provided by mobile telephony service, an outage that lasts at least 30 minutes and affects at least 25% of a carrier's coverage area in a single zip code.

According to Senate Bill (SB) 670,⁶⁵ all reporting service providers are required to create an incident ticket with the Cal OES to track the troubleshooting of the repairs and any construction efforts that are scheduled for network maintenance or service quality improvement. In turn, the Cal OES is required to

⁵⁹ Cal OES is California's state agency responsible for overseeing and coordinating emergency preparedness, response, recovery, and homeland security activities within the state.

⁶⁰ See 19 Cal. Code Regs. § 2480.3

⁶¹ See California Government Code § 53122(c)(1).

⁶² See Title 19 CCR § 2480.1(a).

⁶³ As defined in PU Code § 224.4(d), "Mobile telephony service" means commercially available interconnected mobile phone services that provide access to the public switched telephone network (PSTN) via mobile communication devices employing radiowave technology to transmit calls, including cellular radiotelephone, broadband Personal Communications Services (PCS), and digital Specialized Mobile Radio (SMR). "Mobile telephony services" does not include mobile satellite telephone services or mobile data services used exclusively for the delivery of nonvoice information to a mobile device.

⁶⁴ As defined PU Code § 239(b) ("Internet Protocol enabled service" or "IP enabled service" means any service, capability, functionality, or application using existing Internet Protocol, or any successor Internet Protocol, that enables an end user to send or receive a communication in existing Internet Protocol format, or any successor Internet Protocol format through a broadband connection, regardless of whether the communication is voice, data, or video.")

⁶⁵ Bill Text - SB-670 Telecommunications: community isolation outage: notification. SB 670 became Section 53122 to the California Government Code [See https://leginfo.ca.gov/faces/billCompareClient.xhtml?bill_id=201920200SB670&showamends=false]

notify reported outage information to the county offices of emergency services, sheriff offices, Public Safety Answering Points (PSAPs),⁶⁶ and other agencies affected by the outage.⁶⁷

Additionally, SB 341⁶⁸ requires all reporting service providers to adhere to several measures with regards to outages. The measures include the following requirements:

- Service providers maintain active outage map(s) on their public-facing website during active outages.
- The Cal OES, in consultation with the CPUC, adopts regulation requirements for those outage maps.
- The Cal OES provides the CPUC with all the information it received from service providers as part of the telecommunications service provider's community isolation outage notification.
- The Cal OES aggregates the data and posts them on its public-facing website.⁶⁹

The Cal OES officially began collecting data in August 2020. The data collected from 12 different carriers⁷⁰ provide information such as outage details and emergency contacts. However, it does not address the root cause of the outage like the NORS Report. As such, instead of analyzing root causes, the analysis using Cal OES data focuses on outages by network type, specifically wireline, VoIP, and wireless. As Table 15 indicates, VoIP outages alone account for more outages than all other network types combined, including reports that selected two or more network types (denoted as "multiple").

The Cal OES: Outages by Network Type (2021-2022)						
Network Type	2021		2022		Total	
	Report Count	% to Total	Report Count	% to Total	Report Count	% to Total
Wireline	1,185	8%	1,759	12%	2,944	10%
Wireless	3,315	22%	3,319	22%	6,634	22%
VoIP	9,000	59%	8,421	56%	17,421	57%
Multiple*	1,791	12%	1,580	10%	3,371	11%
Total	15,291	100%	15,079	100%	30,370	100%

* Reports that selected two or more network types

Table 15: Outages by Network Type reported to the Cal OES

⁶⁶ Public Safety Answering Points, sometimes known as Public Safety Access Points, function as dedicated call centers for answering emergency phone calls and dispatching appropriately.

⁶⁷ See California Government Code § 53122.

⁶⁸ SB 341 amended Section 53122 of the Government Code, added Section 776.2 to the Public Utilities Code, and amended Section 910 of the Public Utilities Code
https://leginfo.ca.gov/faces/billCompareClient.xhtml?bill_id=202120220SB341&showamends=false.

⁶⁹ See <https://public.outage.ca.nga911.com/dashboard>.

⁷⁰ U-1001-C AT&T California, U-3021-C AT&T Mobility, U-6878-C Charter Fiberlink, U-5698-C Comcast Digital Phone, U-5684-C Cox Communications, U-1002-C Frontier California Inc., U-1017-C The Siskiyou Telephone Company, U-3062-C Sprint PCS, U-3056-C T-Mobile, U-1010-C TDS Telecom, U-1014-C The Pondersosa Telephone Company, and U-3001-C Verizon Wireless

Conclusion

The current service quality standards established by GO 133-D address only the tip of the iceberg in ensuring reliable essential communications services for Californians. The information assessed indicates that the existing enforcement mechanism has been largely ineffective.

Staff identifies the following shortcomings in the service quality standards set out in GO 133-D:

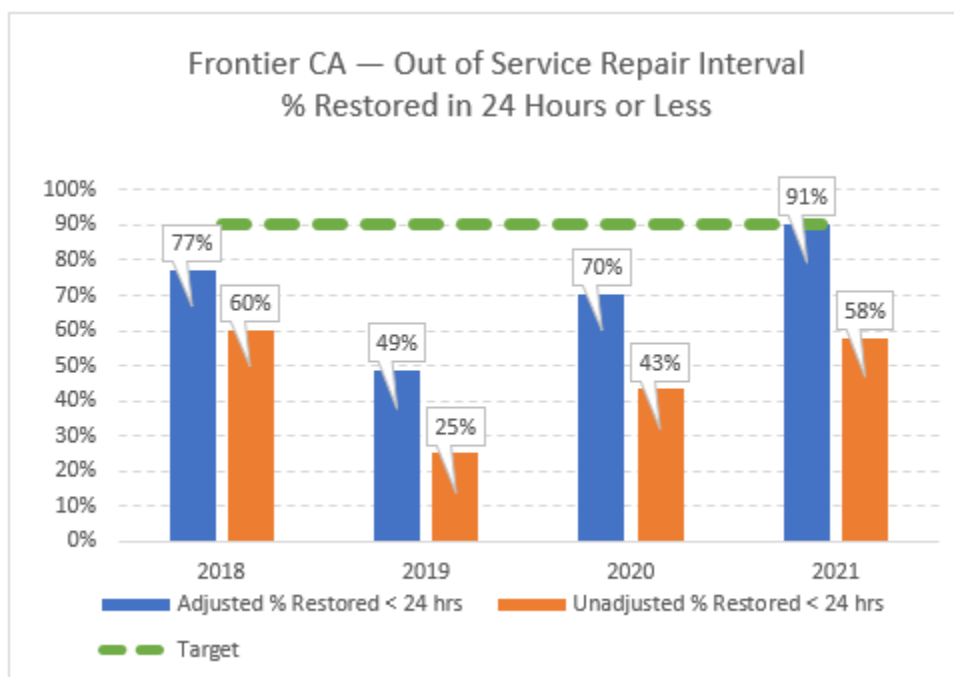
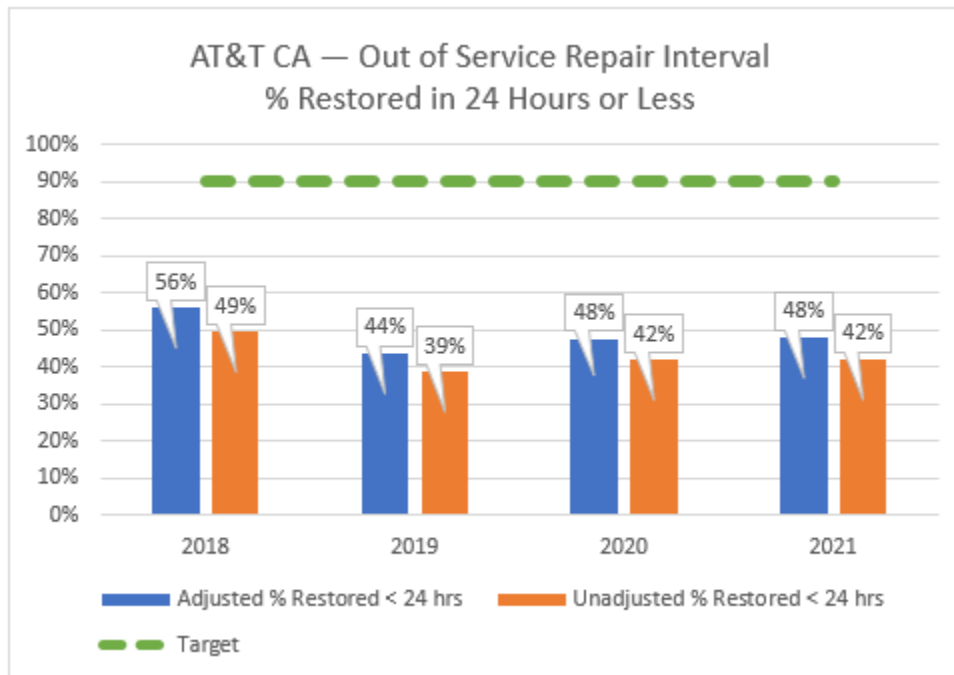
- Service quality requirements vary by carrier type.
- The Out of Service Repair Interval (OOS) standard is limited in its binary approach (within 24 hours, over 24 hours) and does not consider outages of longer durations to quantify the exact impact in each demographic area.
- Sundays, federal holidays, delays beyond the carrier's control, and catastrophic events are excluded from the enforcement mechanism of the OOS standard.
- Investment plans in lieu of fines have been ineffective in improving service quality.
- The fines are calculated from an outdated base fine amount of \$750,000, which has not been adjusted for inflation.
- Enforcement pertains only to TDM-based voice service but excludes other networks like VoIP and wireless that also provide essential voice services.

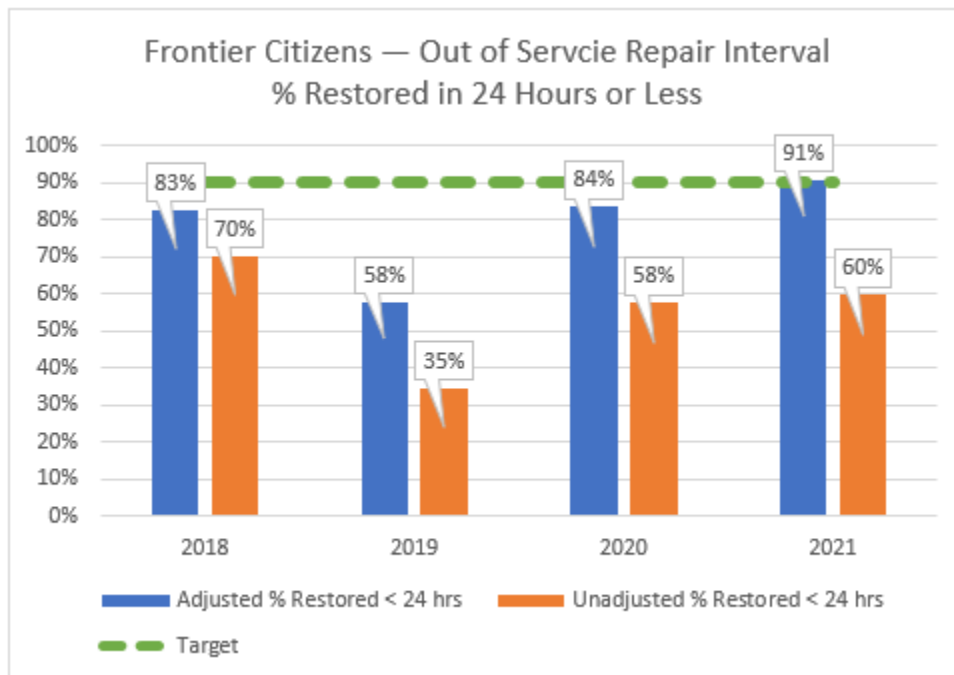
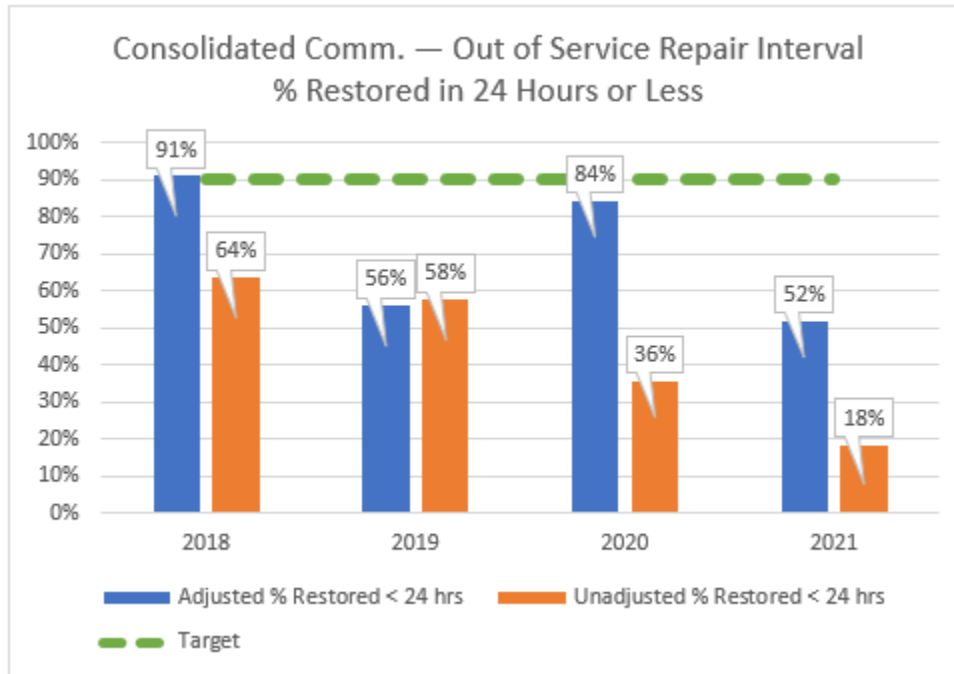
To further its efforts to improve service quality standards for Californians, the CPUC shall take additional data and benchmarks into consideration. The case records from the CPUC's CAB confirm that "outage" is the primary source of complaints among consumers. The FCC's NORS delineates outages across different durations as opposed to a binary approach against a single benchmark. The outage notifications that the Cal OES receives from reporting service providers indicate that VoIP and wireless networks account for the majority of outages.

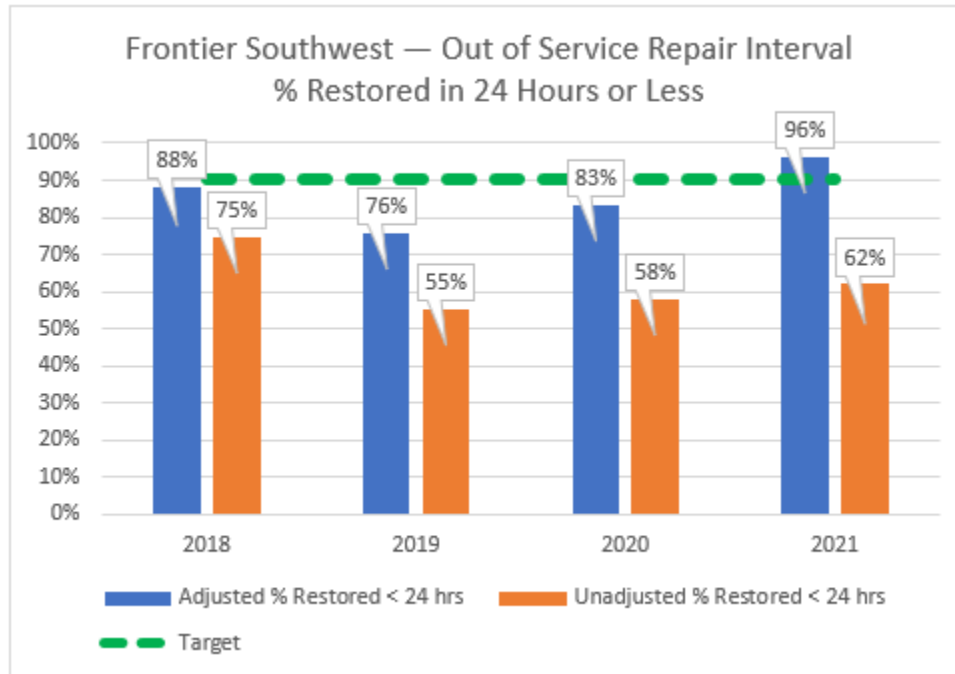
Examining both the shortcomings of GO 133-D and the additional information provided by other agencies, staff offers the data and analyses in this report to inform the CPUC, Parties, and public on how to improve overall service quality standards via R. 22-03-016 to Consider Amendments to GO 133.

Appendix A

URF ILECs Out of Service Repair Interval – Adjusted vs. Unadjusted

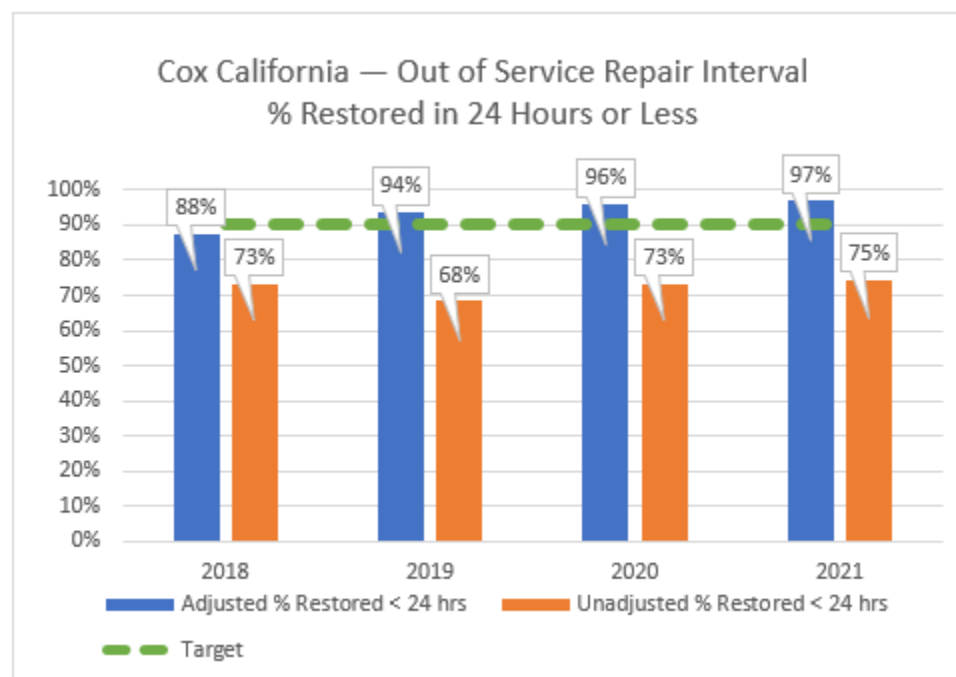
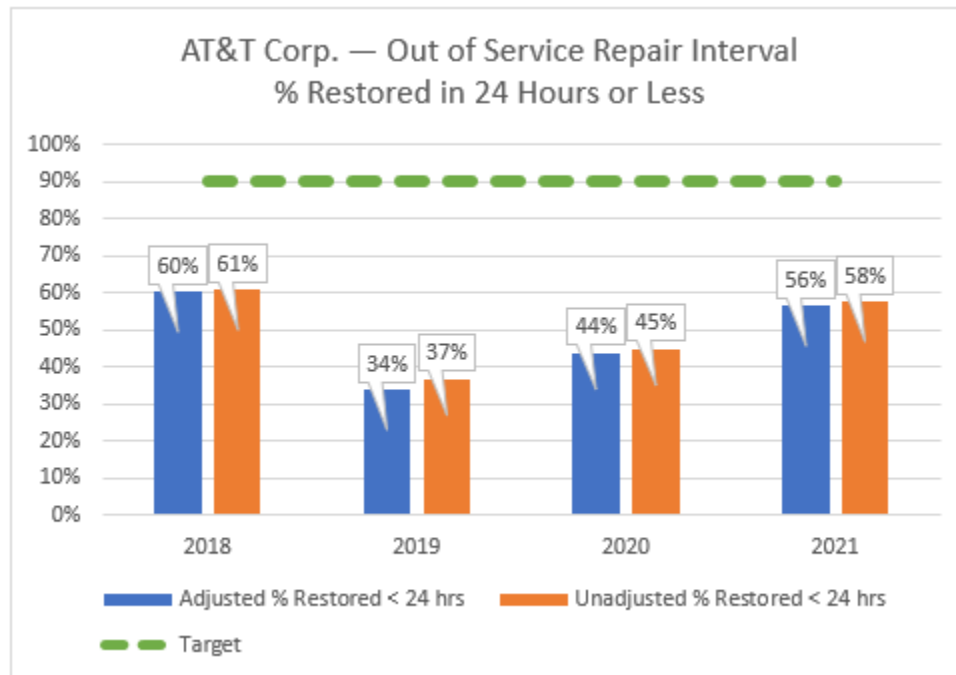


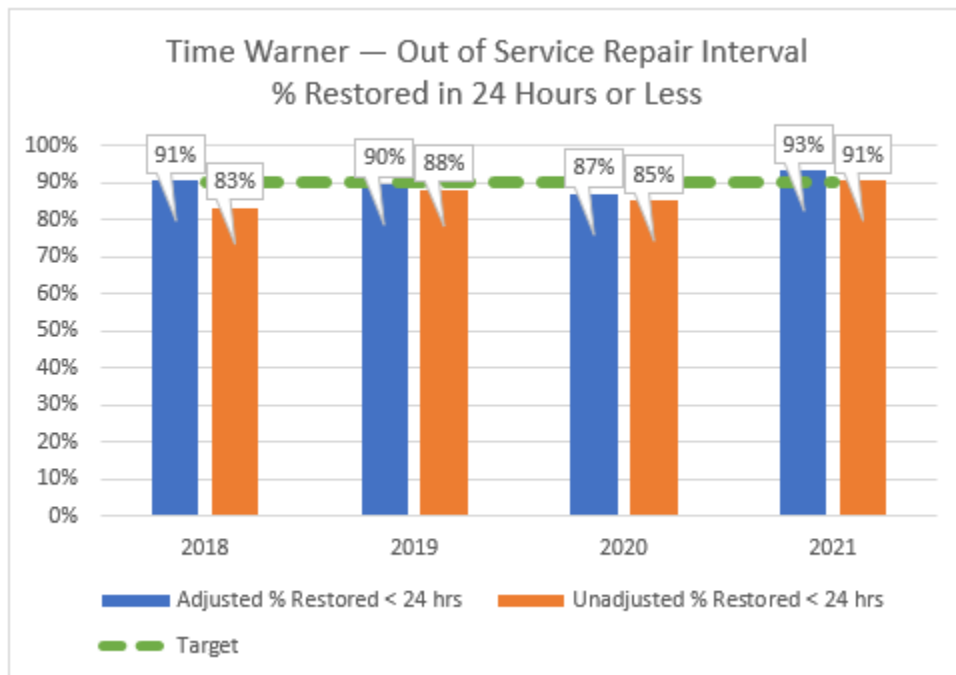
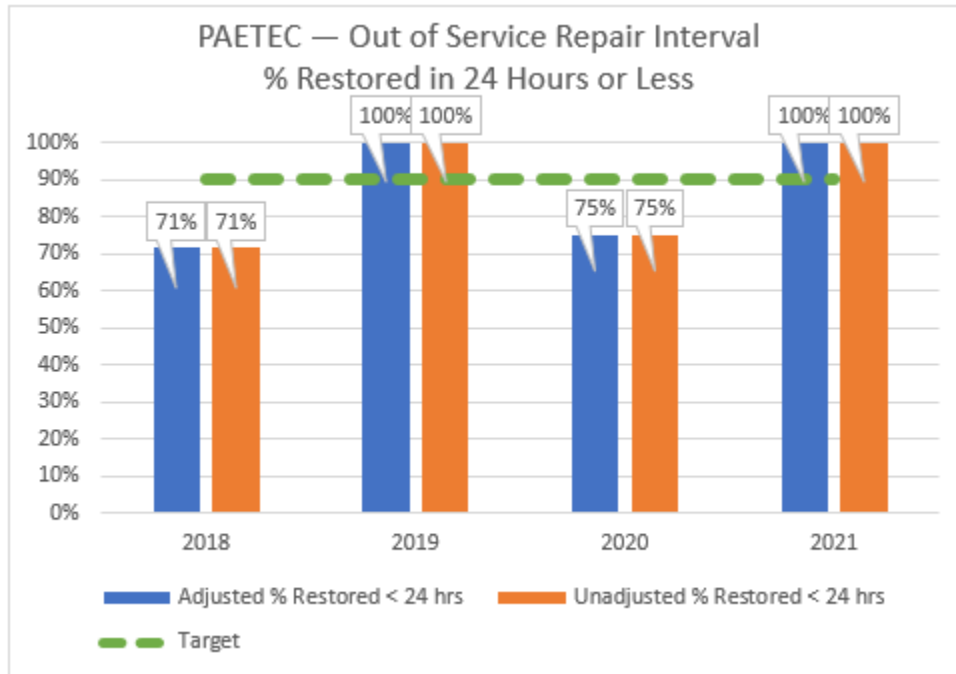


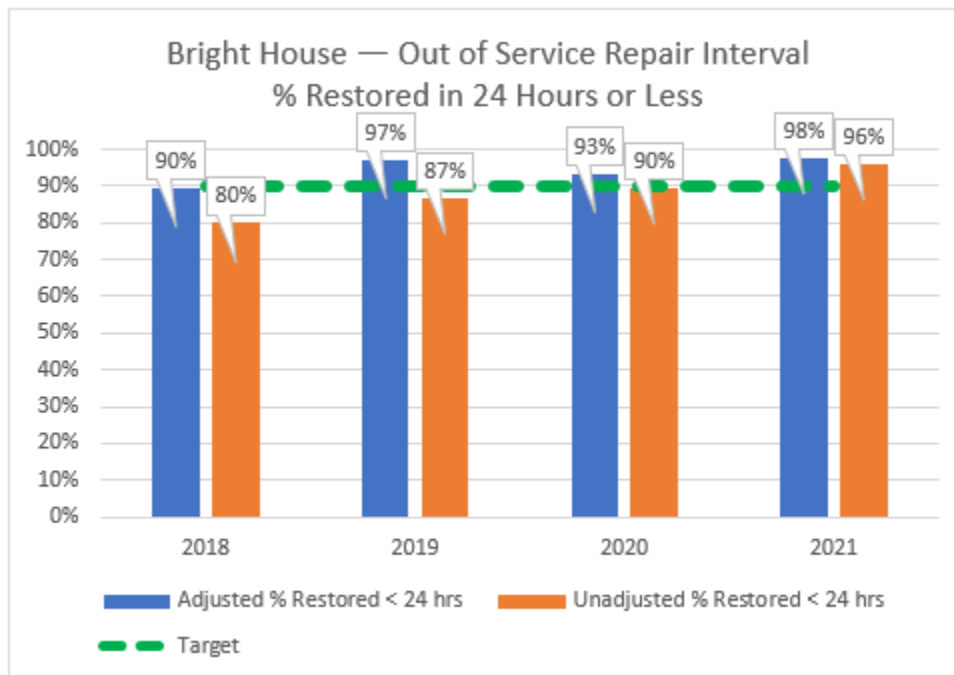
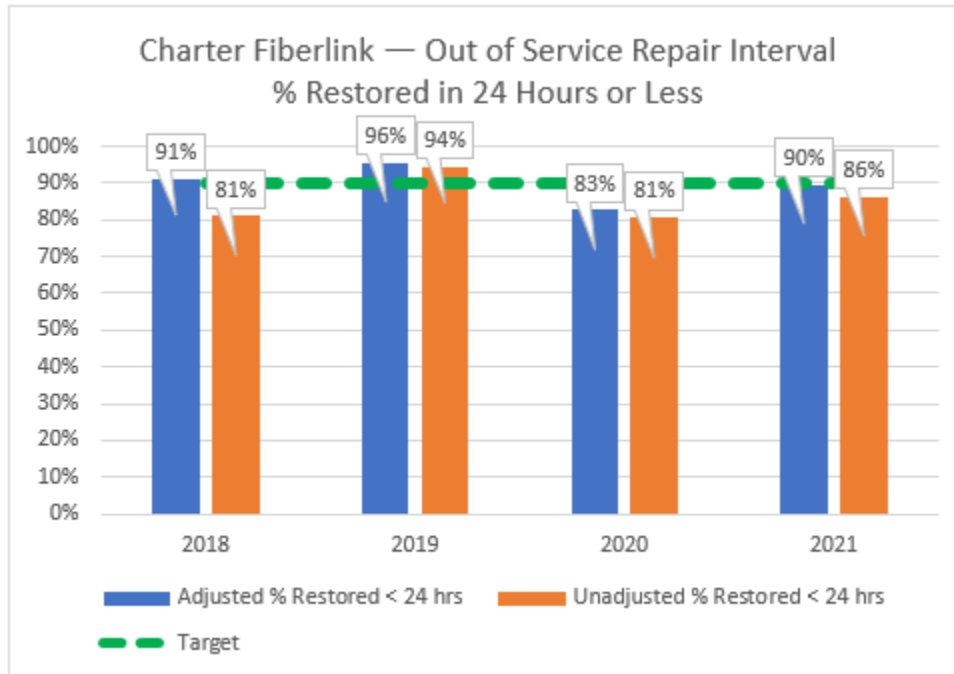


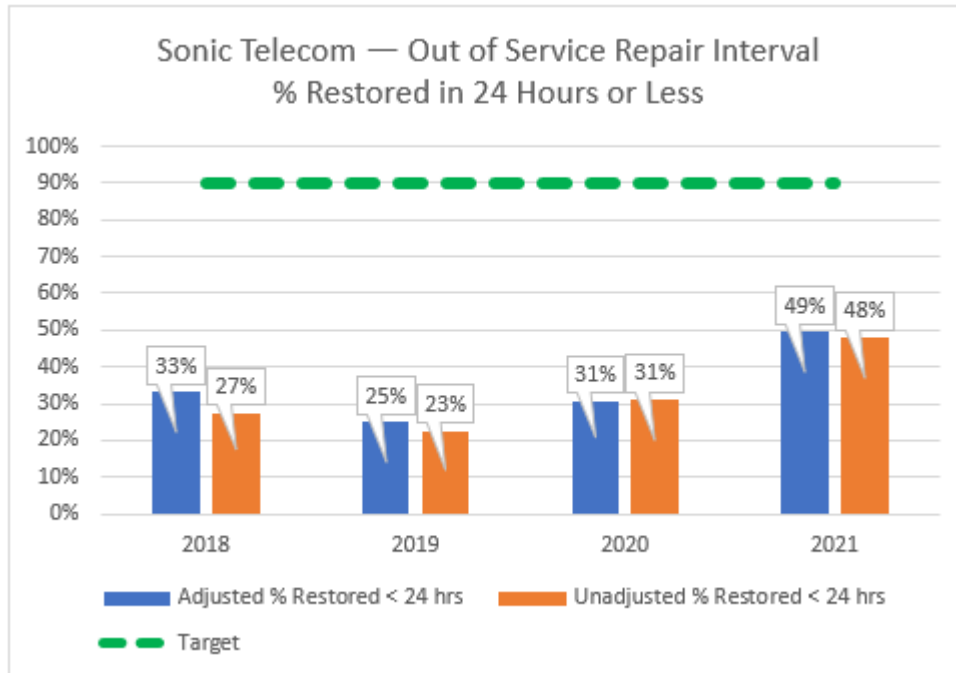
Appendix B

URF CLECs Out of Service Repair Interval – Adjusted vs. Unadjusted



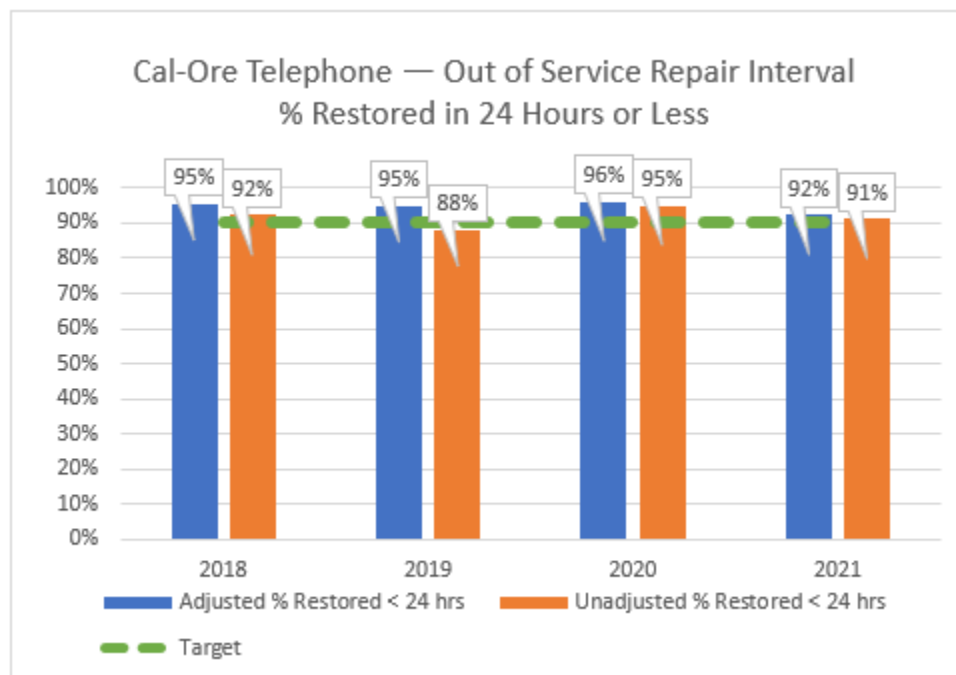
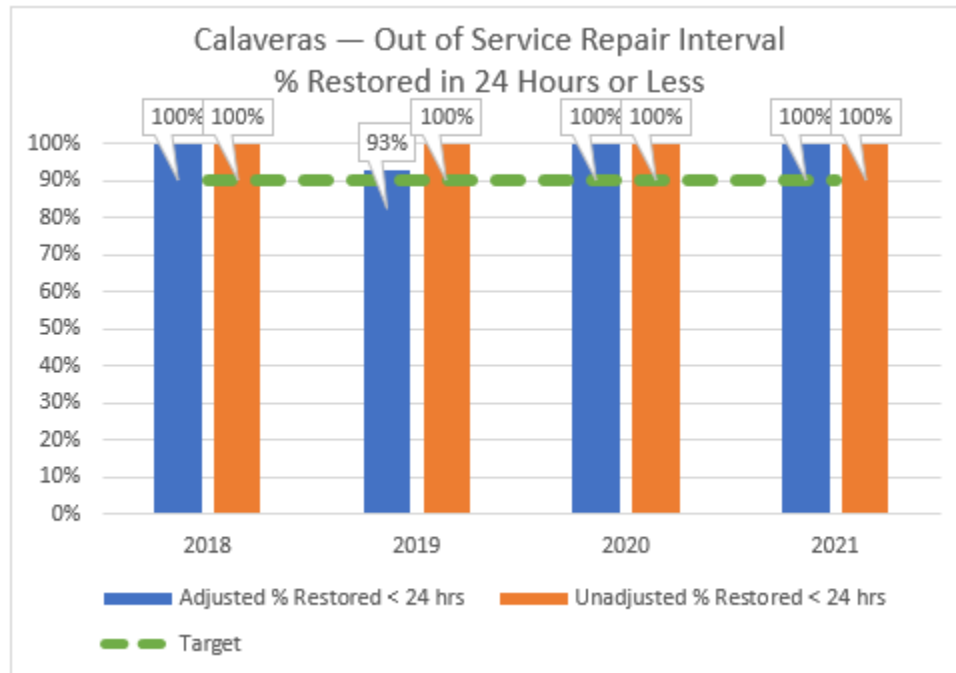


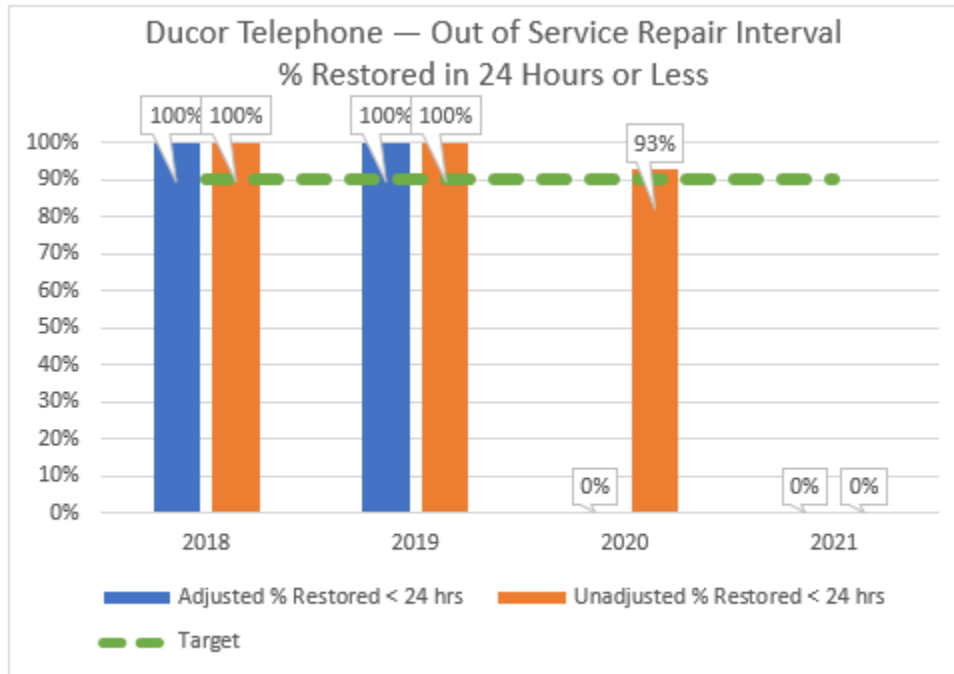




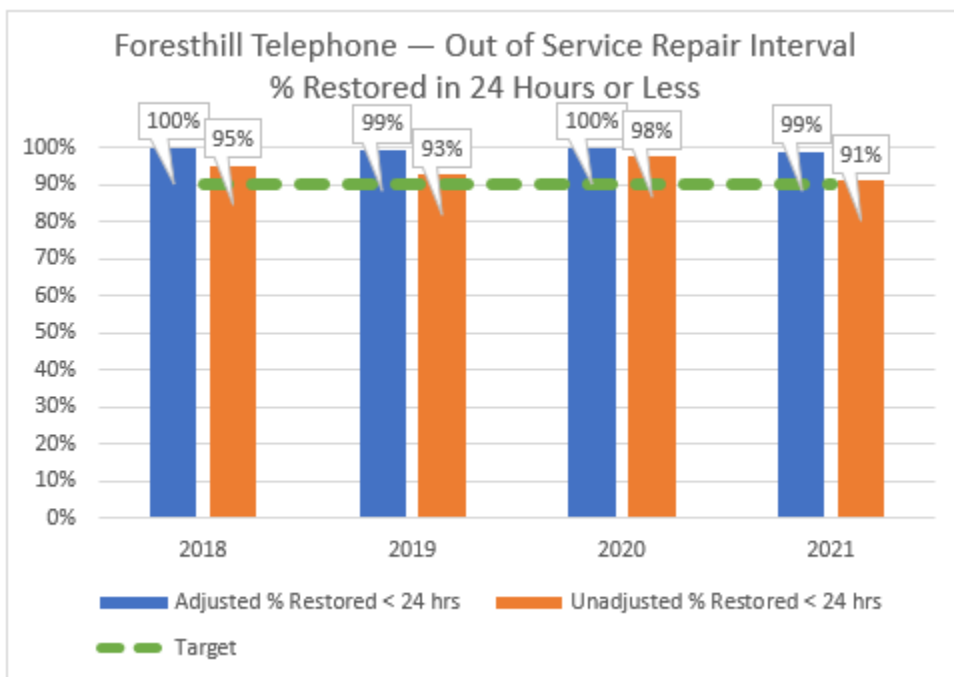
Appendix C

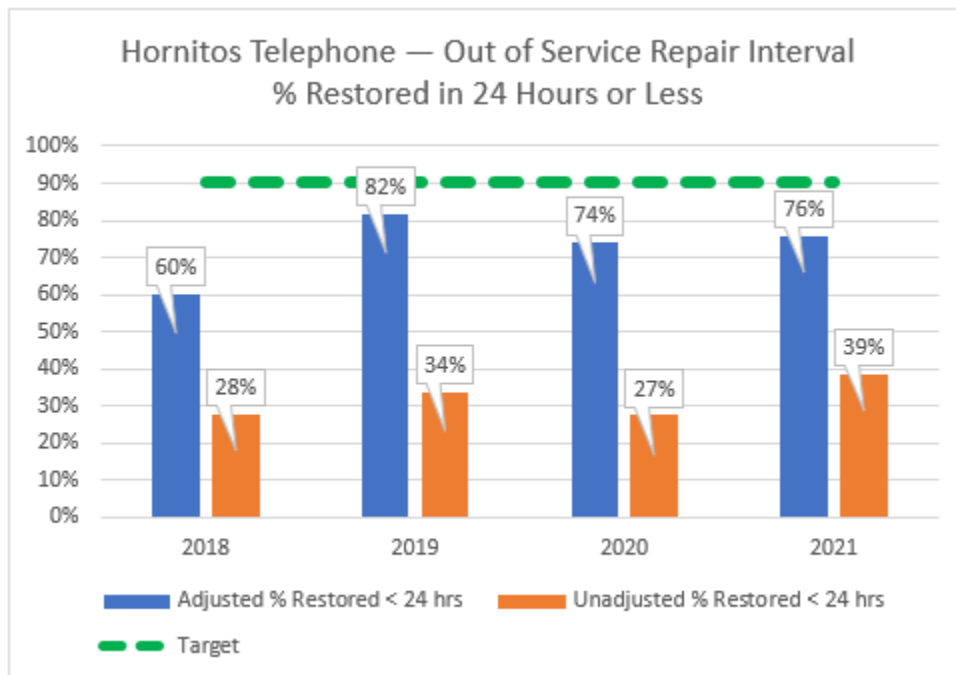
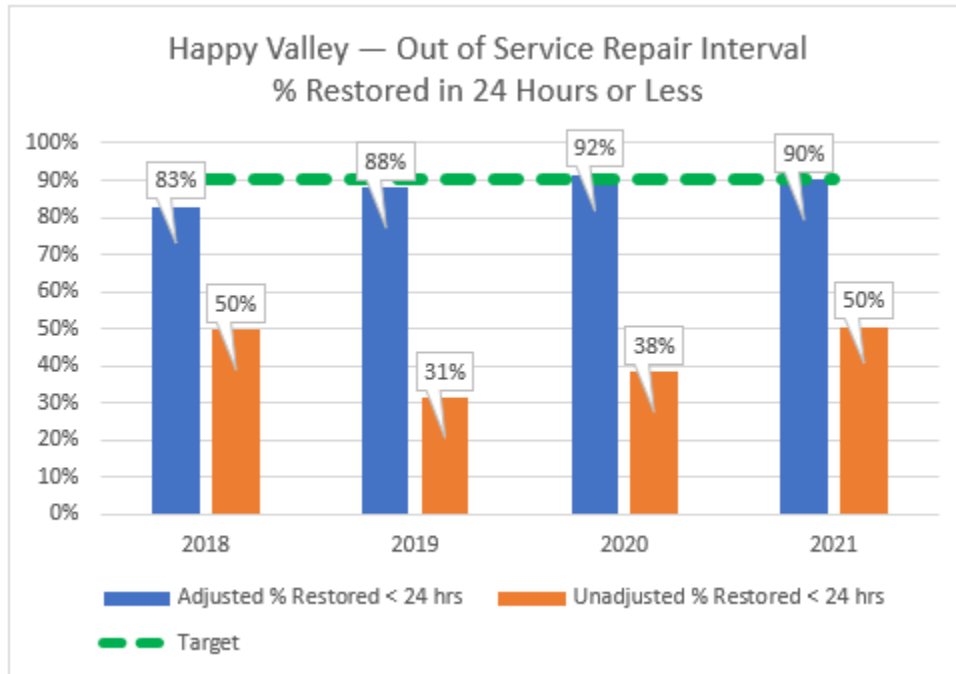
GRC LECs Out of Service Repair Interval – Adjusted vs. Unadjusted

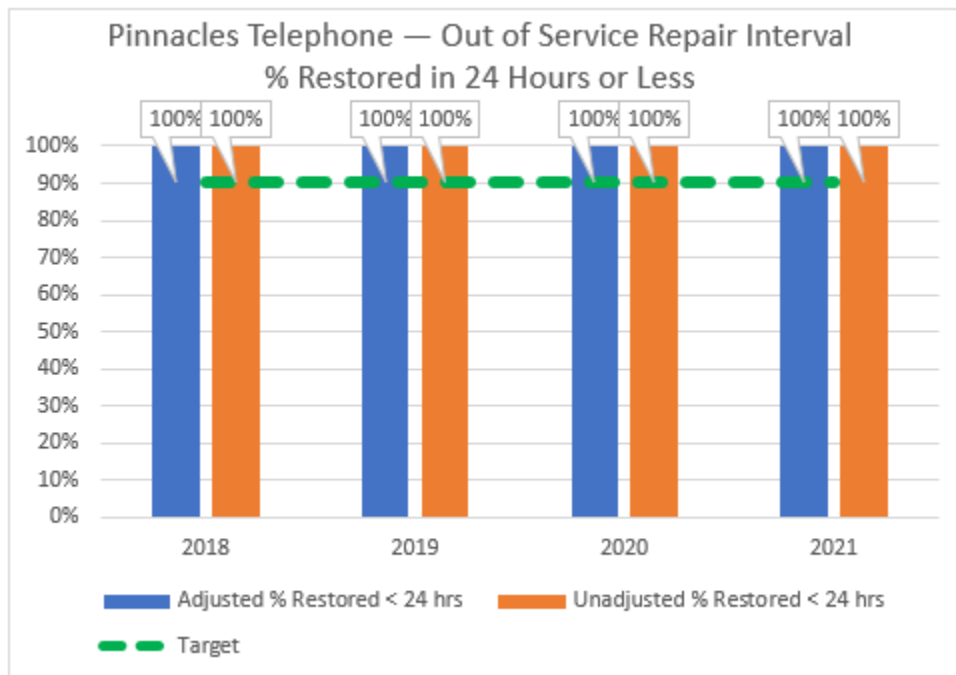
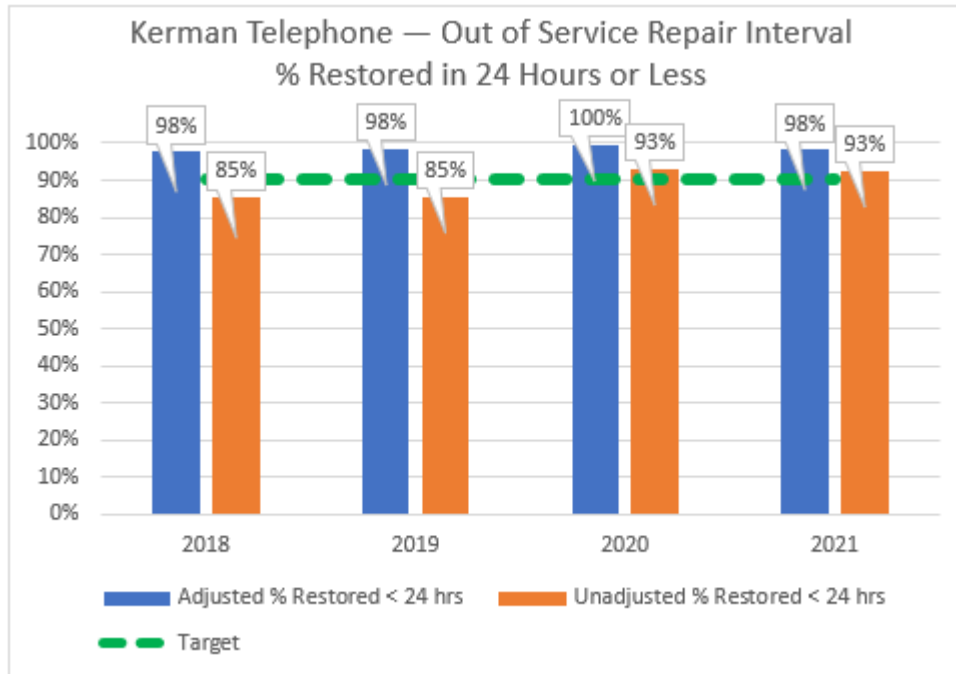


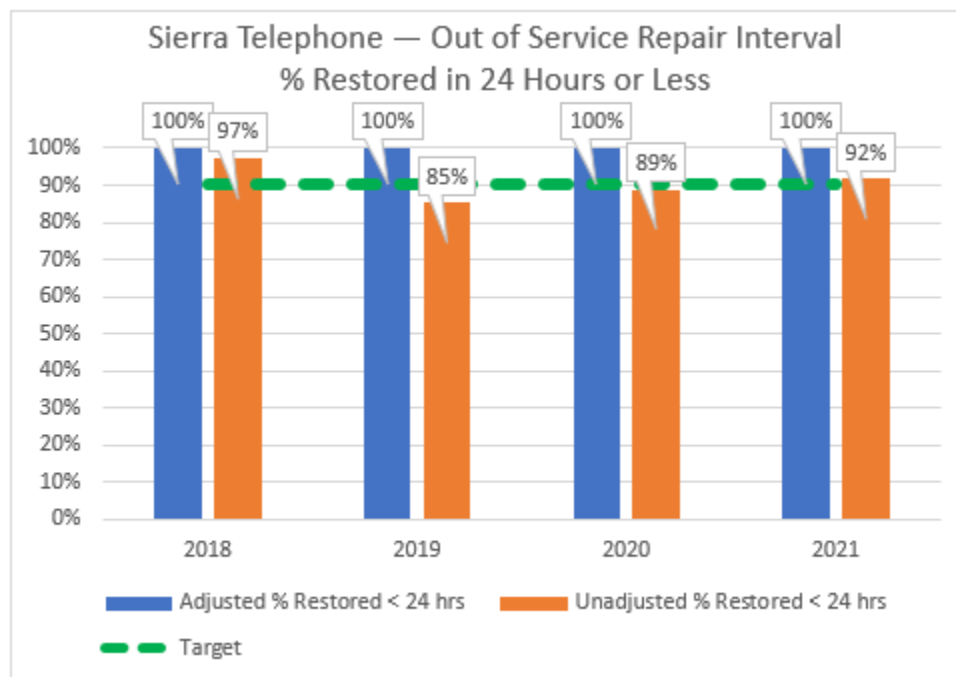
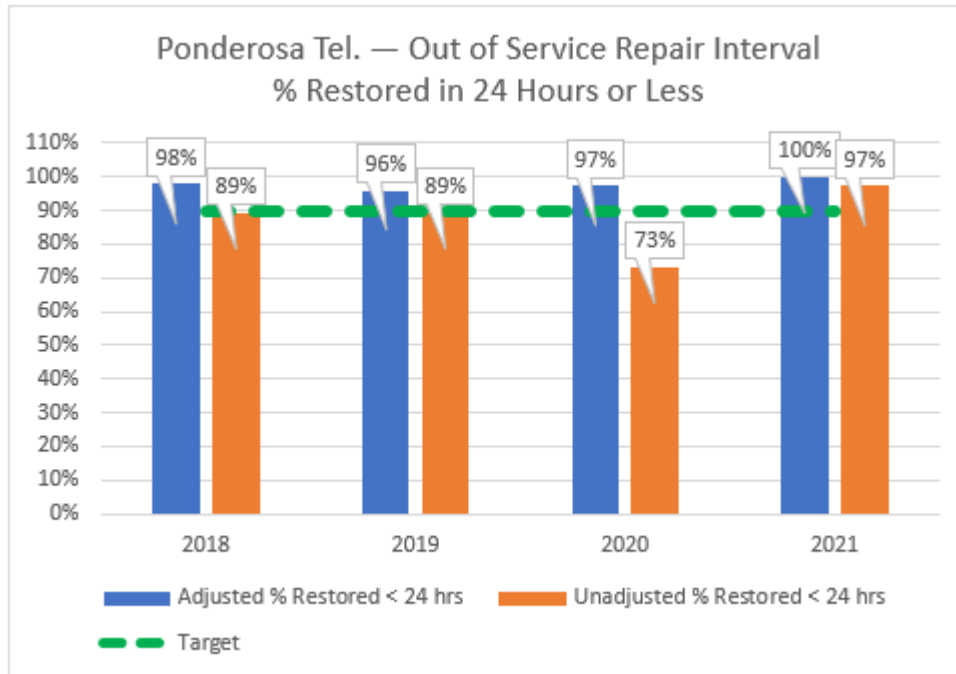


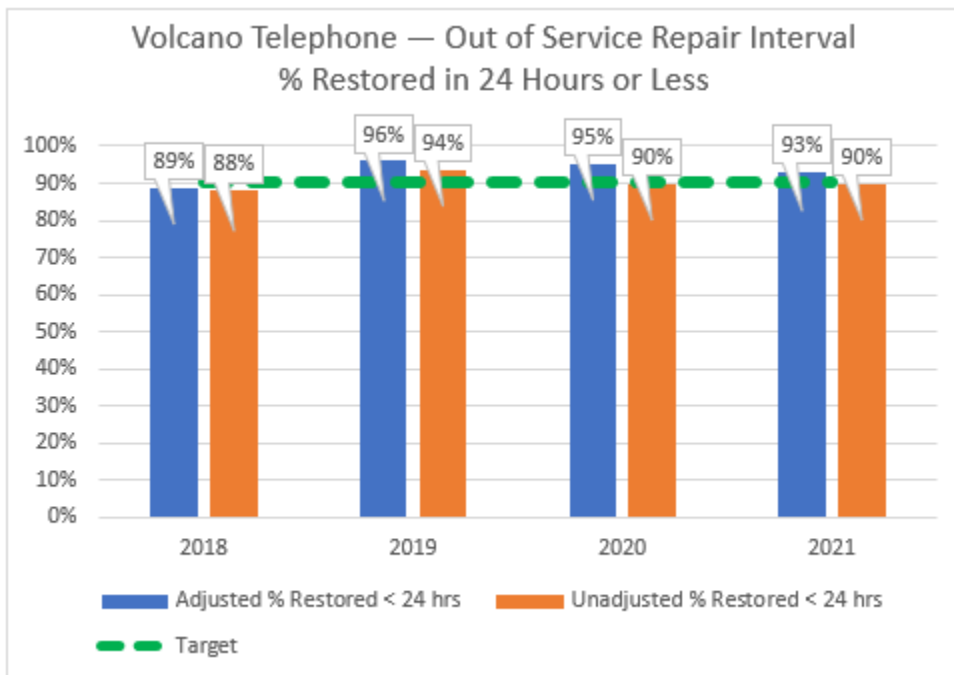
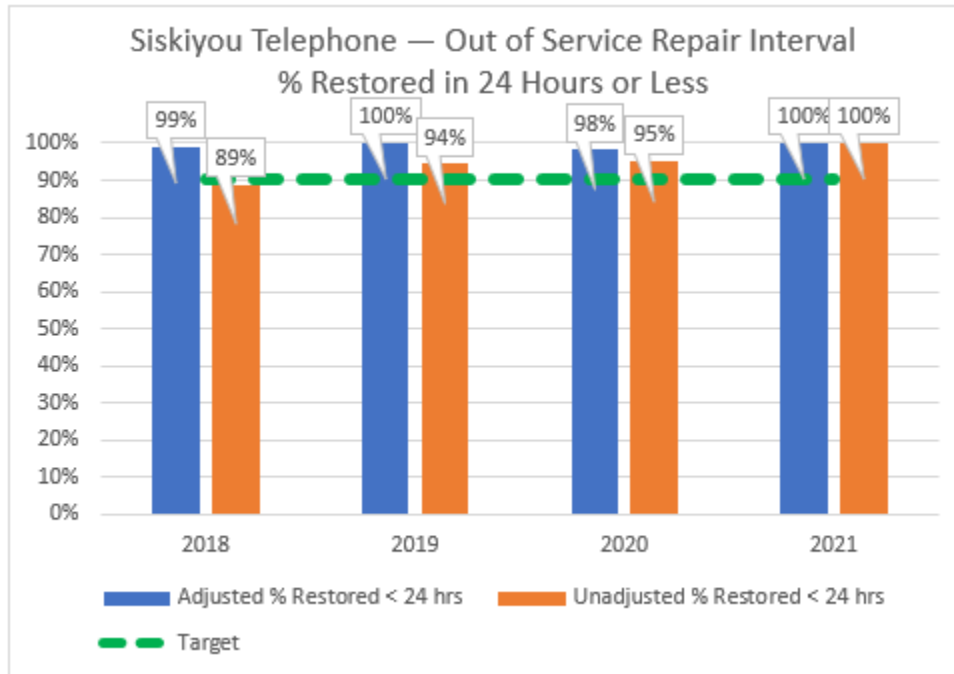
The following data points were inconclusive: 2020 adjusted, 2021 adjusted, and 2021 unadjusted.

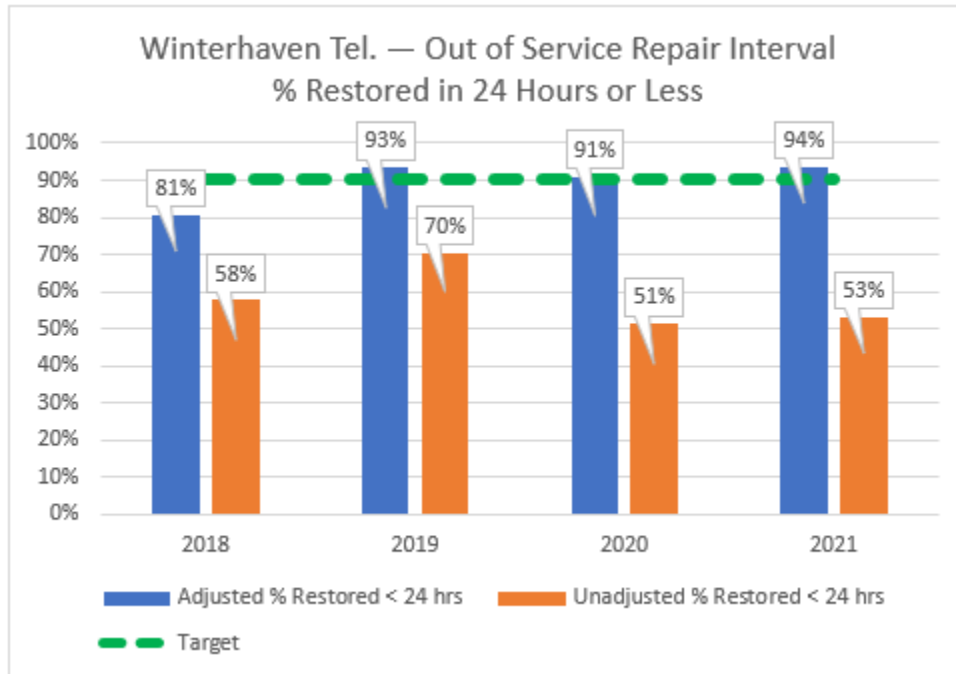












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