REPORT TO THE VERMONT LEGISLATURE:

Provider Compliance with 911 Backup-Power Obligations of 47 C.F.R. § 12.5 and Best Practices for Minimizing Disruptions to 911 Services During Power Outages

---

Report submitted to the General Assembly as required by Section 26 of H.513 of 2019 by the Vermont Public Utility Commission

December 13, 2019

VERMONT

PUBLIC UTILITY COMMISSION

Table of Contents

Background 1

Compliance with the FCC Rule 4

Best Practices 4

Conclusions and Recommendations 5

Appendix A: Vermont Enhanced 911 Board 7

Appendix B: FCC Rules 13

Appendix C: Vermont VoIP Providers' Business Practices to Achieve Compliance with the FCC Rule 16

Appendix D: Best Practices 20

Appendix E: Communications Security, Reliability and Interoperability Council ("CSRIC") Backup Battery Recommendations 36

Appendix F: Sample VTel Notice of Need for Battery Backup 42

Background

In November 2018, Vermont suffered early winter storms that led to electrical power outages. During an extended power outage many residents living near Shrewsbury, Mount Holly, Tinmouth, Andover, and East Wallingford discovered that they could not make 911 calls. Their phones had no power and there was no wireless service. Neighbors looked out for each other. They found ways to get needed emergency services. Some neighbors had generators and could make calls. No lives were lost, but there was cause for grave concern and an impetus to look at alternatives.

These Vermonters suffered a perfect storm that included not only bad weather but also an extended electrical power outage, a loss of landline phone service, and inaccessibility of wireless service. When the power came back on, they wanted to know why they could not make 911 calls and they wanted it fixed. This report does not fix the problem by itself. But it does identify what caused the perfect storm and makes recommendations that may make it easier for those affected in 2018 and others to get emergency services when they are needed in the future.

This report was drafted in response to section 26 of H.513, which directed the Public Utility Commission ("Commission") to expand the scope of a workshop proceeding in Case No. 19-0705-PET that had been initiated in response to calls for answers from the victims of the perfect

storm.[1] This proceeding included four workshops beginning in April 2019 in Montpelier and several rounds of written comments ending in November 2019. Participants in the proceeding included members of the public, representatives of the Towns of Shrewsbury, Mt. Holly, Tinmouth, and Andover, the Southwestern Vermont Council on Aging, the Vermont Public Interest Research Group ("VPIRG"), a representative of the eight rural local exchange carriers ("RLECs"),[2] Vermont Telephone Company, Inc. ("VTel"), ValleyNet, LLC; Comcast Phone Company of Vermont and Comcast IP Phone LLC ("Comcast"), Telephone Operating Company of Vermont, Inc., d/b/a Consolidated Communications ("Consolidated"), Charter Fiberlink VT-CCO, LLC ("Charter"), the Vermont Enhanced 911 Board (the "E911 Board" described in Appendix A), the Vermont Department of Public Safety—Emergency Management, and the Vermont Department of Public Service.

The perfect storm felt by the residents of these small, rural communities was not a uniquely Vermont phenomenon. The Federal Communications Commission ("FCC") had predicted the circumstances that led to these residents' loss of 911 service and developed a regulatory regime to respond to it nationally with 47 C.F.R. § 12.5, attached as Appendix B to this report.

The FCC fostered the deregulation and the market-based transition of the technology for voice communications nationally from a copper-based line-powered service delivered from a once monolithic telecommunications utility to Voice over Internet Protocol ("VoIP") service delivered over unpowered fiberoptic and coaxial cable by multiple competitive information service companies. An outcome of this transition was that customers with VoIP phones could lose power and then not be able to make 911 calls as they could with traditional copper-line service.

On October 16, 2015, the FCC adopted rules to promote continued access to 911 during commercial power outages by requiring providers of facilities-based, fixed residential voice services, which are not line-powered, to offer subscribers the option to purchase a backup solution capable of eight hours of standby power, and by February 13, 2019, an additional

---

[1] On May 17, 2019, the Vermont Legislature passed H.513, section 26 of which directed the Commission to file a report on or before December 15, 2019, with findings regarding provider compliance with backup-power obligations derived from the workshop proceedings that the Commission had already initiated. Further, section 26 of H.513 specifically directed that the Commission's report:

> Report findings regarding provider compliance with back-up power obligations and shall recommend best practices for minimizing disruptions to E911 services during power outages through:
> (1) Consumer education and community outreach;
> (2) Technical and financial assistance to consumers and communities;
> (3) Cost-effective and technologically efficient ways in which providers or alternative entities can provide such information and assistance; and
> (4) Ongoing monitoring of provider compliance with backup power obligations.

[2] Franklin Telephone Company, Inc., Ludlow Telephone Company, Northfield Telephone Company, Perkinsville Telephone Company, Inc. (the last three, together, the "TDS Companies"), Shoreham Telephone LLC d/b/a Otelco ("Shoreham"), Topsham Telephone Company, Inc. ("Topsham"), Vermont Telephone Company, Inc. d/b/a VTel, and Waitsfield-Fayston Telephone Co., Inc. d/b/a Waitsfield Telecom, d/b/a Champlain Valley Telecom.

solution capable of 24 hours of standby power. The rules also promote consumer education and choice by requiring providers of this service to disclose to subscribers the following information: availability of backup power sources; service limitations with and without backup power during a power outage; purchase and replacement options; expected backup power duration; proper usage and storage conditions for the backup power source; subscriber backup power self-testing and monitoring instructions; and backup power warranty details, if any. The FCC adopted these rules after extensive, nation-wide notice and comment because:

> For over one hundred years, consumers have trusted that they will hear a dial tone in an emergency even when the power is out. Now, as networks transition away from copper-based, line-powered technology, many are aware of the innovation this transition has spurred in emergency services, but many consumers remain unaware that they must take action to ensure that dial tone's availability in the event of a commercial power outage. The FCC's own consumer complaints portal reveals frustration over the failure of service providers to adequately inform subscribers about how to self-provision backup power in order to access 911 services in a power outage. This period of transition has the potential to create a widespread public safety issue if unaddressed.[3]

VoIP customers are dissatisfied with the way the FCC rules attempt to fix the power outage problem. They want the State to fill the gap in the regulation of fiber-based voice service by directing Vermont VoIP service providers to engineer, and pay for, a mechanism to restore the trust that the phone will always work just as it did in the regulated, copper-based, line-powered telecommunication utility days. As one of the Shrewsbury residents who participated in the workshop summarized:

> We are experiencing a regression in public safety courtesy of fiber optics and broadband. In theory there are two choices: (1) fabulous broadband and maybe diminished, sometimes nonexistent phone service, or (2) the same old poor or nonexistent broadband and the good old reliable copper wire telephone service. Those of us who reside in Shrewsbury have no choice and neither will anyone else in the State as broadband expands given the way the system works today. Removing the copper wire system without replacing it with something equally reliable makes no sense to me. We are throwing the baby out with the bath water.[4]

Many of the Vermont VoIP service providers, responsive to these concerns and seeking to maintain their customers, are voluntarily doing more than the FCC rules require. They are also members of the communities they serve and "do not want people to be without service."[5]

---

[3] Ensuring Continuity of 911 Communications, 80 Fed. Reg. 62470, 62471(2015).

[4] Tr. 4/30/19 at 38 (Vanneman).

[5] Tr. 4/30/19 at 53 (Nishi).

Paradoxically, only a few VoIP customers want to buy battery backup while the majority want faster internet speed.[6]

It is also notable that having copper-based line-powered service does not guarantee that a customer will be able to make a 911 call during a power loss. Just as power lines go down, so too do copper phone lines. Also, more than half the homes that have copper phone lines are not powered by a generator at a central telecommunications site. Instead, these copper lines are fed by remote terminals that are also served by batteries that may last only four to six hours.[7]

Vermont VoIP service providers are not conventionally regulated public utilities and do not have the safeguard of a guaranteed rate of return for their service. Instead, they work to ensure their continued ability to sell phone service to Vermont customers by keeping their costs down and investing in what most customers want. With notable exceptions, any VoIP provider investment is guided by the FCC, which requires the consumer, not the provider, to pay for backup batteries or other technology to make 911 calls in a power outage. VoIP customers, including the victims of the 2018 perfect storm, may want battery backup service but to date do not want to pay for batteries, or do not understand why they would need them or how to use them effectively.

Compliance with the FCC Rule

Oversight of compliance with 47 C.F.R. § 12.5 resides with the FCC and is not regulated by the Commission. Nonetheless, workshop participants included Vermont VoIP service providers who provided updates of their compliance status. They uniformly indicated that they are in compliance and provided examples of their business practices used to ensure compliance. Appendix C includes the quoted positions of the companies and their business practices.

Best Practices

The best practices addressed in Appendix D, like the Communications Security, Reliability and Interoperability Council ("CSRIC") recommendations in Appendix E, are ideas that the participants believe would help solve the problem of making a 911 call when the power is out.

The Commission does not recommend that these proposed best practices be required. These are best practices that were recommended by the participants. The participants were encouraged to make proposals that would be presented in this report without regard to whether the Legislature should make the best practices mandatory or voluntary or whether the State had the jurisdiction to require them.[8]

---

[6] For example, Comcast represents that while it has offered backup batteries as a VoIP service provider since 2007, less than 1% of their VoIP customers have elected to purchase backup batteries, which now cost the customer approximately $165. Tr. 4/30/19 at 21 (Tarrant).

[7] Tr. 8/20/19 at 66 (Chase).

[8] Tr. 8/20/19 at 27 (Birnbaum).

Conclusions and Recommendations

The Commission concludes that the issue of managing the loss of power to 911 communications during a power disruption is a significant public health and safety concern. We also conclude that this problem requires a public health and safety solution involving various public and private entities working to inform and assist the public with planning for and responding to a loss of power.

We are not persuaded that this is a problem that could or should be fixed by the State of Vermont directing the VoIP service providers in Vermont to augment the federal backup-power standard. The fact that the standard is federal is a reminder that state authority is limited over the entities that must comply with the federal standard. The State clearly has jurisdiction over 911 emergency services (and the E911 Board) regarding health and safety concerns, but the State's jurisdiction over the services from a VoIP provider is still being litigated.[9]

As required by Section 26 of H.513, this report addresses the Vermont VoIP providers' compliance with the federal standard and concludes that those providers that participated in the proceeding are in compliance.[10] The report also summarizes various best practices for minimizing disruptions to E911 services during power outages. The best practices are voluntary measures that may be used by the VoIP service providers and the E911 Board to inform and assist those most at risk when power is lost and a 911 call for emergency services is harder to make.

The best practices addressed here are not additional requirements to ensure compliance with the FCC rules. The FCC concluded that because the different VoIP providers use different technology, an expansive one-size-fits-all solution is not feasible. Discussed below in Appendix D are best practices that could be done voluntarily by the VoIP service providers and others, including the Department of Public Service, the Department of Public Safety—Emergency Management, local officials and community groups, and State emergency service personnel, to solve the remaining problem for Vermonters when there is a loss of power.

While our workshops aired the problem and potential solutions, there remains a dearth of data defining the scope of the problem. The Commission therefore does not recommend that the State direct Vermont VoIP providers to undertake costly technical, financial assistance, and consumer education programs that would ultimately be paid for by their customers in Vermont, in the absence of data supporting such expenditures. Further, the Commission's jurisdiction to direct

---

[9] *See Petition for investigation pursuant to 30 V.S.A. § 202d concerning Vermont 911 Emergency Calling System reliability and planning*; Docket No. 8842, Order of 12/28/18, at 6 (E911 Board has jurisdiction over E911 system, and the Commission's jurisdiction is limited to underlying telecommunication service); *see also*, Vermont Public Utility Commission General Counsel Memorandum to Vermont Legislature Joint Fiscal Committee of 8/31/18; and *Investigation into Regulation of Voice over Internet Protocol ("VoIP") Services*, Docket No. 7316, order of 2/7/18, *motion for reconsideration pending*.

[10] We do not know whether VoIP providers who did not participate are in compliance.

the Vermont VoIP providers to "fix it" is uncertain. Arguing over the extent of our jurisdiction would expend resources needlessly and not result in technical problem solving.

We are, however, confident in our jurisdiction over the electric public utilities in Vermont. Therefore, we plan to initiate an investigation into electrical power losses and their impact on telecommunications resiliency. Specifically, we will seek to gain a better sense of where and when power losses occur and their impact on equipment used by VoIP service providers, wireless cell phone service providers, and copper-based, line-powered telecommunications service providers. Where are the trouble spots in Vermont? How frequently do power losses occur? What information service and telecommunications infrastructure is affected by power losses? We need data to understand the breadth of electric power's impact on telecommunications resiliency in order to identify solutions.

Our investigation into the impact of electrical power losses on telecommunications resiliency combined with the E911 Board's comprehensive review of the data related to losses of 911 service will provide a more complete picture of what technical infrastructure investments the State should encourage to overcome the demonstrated shortfall in telecommunications resiliency.

We recommend that the State expand the duties of the E911 Board to include oversight of both the emergency services responders and the senders of a 911 call who may suffer a power loss when the call needs to be made. The E911 Board should become the State's telecommunications resiliency utility.

The concept of a State-appointed telecommunications resiliency utility, as discussed by the proceeding's participants, is not unlike an energy efficiency utility. The State's telecommunications resiliency utility would be appointed to ensure that essential telecommunications service is available in Vermont in the same way that the energy efficiency utilities have been appointed to reduce energy consumption in Vermont. The telecommunications resiliency utility could provide both financial and technical assistance to Vermonters who need it. It could fill an educational gap. It could work with individual consumers and communities to bolster their resiliency.

We conclude that an E911 Board expanded into a telecommunications resiliency utility working with both the Department of Public Service (with its expertise in telecommunications and consumer affairs) and the Vermont Emergency Management (with its partnerships with local emergency services) can address the perfect-storm 911 call concern now and ensure telecommunications resiliency in Vermont in the future.

Finally, robust education efforts are essential to inform Vermonters about the vulnerabilities and possible solutions to the loss of E911 capability during a power outage.

Appendix A: Vermont Enhanced 911 Board

Vermont Enhanced 911 Board

REPORT TO THE PUBLIC UTILITY COMMISSION DOCKET 19-0705-PET
SERVICE PROVIDER BACKUP POWER OBLIGATIONS

Barbara Neal, Executive Director October 11, 2019

Introduction

At the September 19, 2019 Public Utility Commission (PUC or Commission) workshop regarding service provider backup power obligations, the Enhanced 911 Board (Board or 911 Board) was asked to provide information on its mission, current functions and the role it currently plays, and could potentially play, in supporting any recommended best practices for minimizing disruptions to 911 services during power outages.

Enhanced 911 Board Overview

30 V.S.A Chapter 87[11] established the Vermont Enhanced 911 Board as the single governmental agency responsible for the statewide 911 system. The Board consists of nine members, appointed by the Governor, representing state, local and county law enforcement, emergency medical and fire service, municipalities, and the public.

The Board appoints, subject to the approval of the Governor, an Executive Director, to execute the Board's mission. The Executive Director is authorized to hire additional staff, subject to the approval of the Board. The Board's staff currently consists of nine full-time employees and one part-time support staff member. The Board staff is responsible for day-to-day oversight and management of the 911 system and system provider, GIS and database management, training, quality control, public education, and administrative functions.

The Board has developed, and relies upon, effective partnerships with multiple stakeholders to fulfill its responsibility for management and oversight of the statewide 911 system. The Board works closely with many agencies and organizations – both public and private – to ensure the reliable and effective operation of the 911 system. Stakeholders include, but are not limited to, Vermont's Agency of Digital Services, Public Service Department, Public Utility Commission, Department of Public Safety, Department of Health, regional dispatch centers serving as Public Safety Answering Points (PSAPs), emergency response agencies and their dispatch centers, wireline, cellular and VoIP telephone service providers, and municipal 911 coordinators in every Vermont town.

Currently, the Board contracts with Consolidated Communications for a fully hosted Next Generation 911 (NG911) system. Approximately 200,000 911 calls per year[12] are processed by the system and routed to fully trained and certified 911 call-takers in six geo-diverse PSAPs[13] in the state. The answering PSAP may provide dispatch services for any given emergency or may transfer the call to one of nearly fifty dispatch centers serving Vermont.

[11] 30 V.S.A §7051-7061.

[12] Enhanced 9-1-1 Board, *2018 System Statistics*, January 2019, https://e911.vermont.gov/forms-and-publications/2018-system-statistics

[13] Enhanced 9-1-1 Board, *PSAP Configuration Map*, updated May 1, 2019, https://e911.vermont.gov/sites/nineoneone/files/graphics/PSAPconfiguration%209.16.19.1.jpg

Funding

The enabling statute provided funding for the 911 system through the Vermont Universal Service Fund (VUSF) surcharge on telecommunications bills. The Fiscal Year 2020 budget appropriation is approximately $4.9 million dollars. The Board anticipates a slight decline in the budget request for FY21 due primarily to savings in ongoing system operation costs as we move to a new system provider in July 2020.

Board Staff

As mentioned earlier, the Board's staff currently consists of nine full-time employees and one part-time support staff member. Staff member responsibilities fall into four categories as outlined below:

1. **IT Management** (2 staff members): These two staff members provide supervision and management of Vermont's NG911 system and system provider on a 24 x 7 x 365 basis. The Board's IT staff have the technical expertise to understand and evaluate the work and actions taken by the system provider to ensure Vermont's citizens and visitors have access to emergency services. In addition, the IT Management staff supports the back-office infrastructure and systems to support the mission of the Board.

2. **GIS/Database Administration** (4 staff members): The GIS/Database staff members are responsible for development and maintenance of multiple databases critical to the operation of the NG911 system. GIS/database staff work closely on a daily basis with town officials and telecommunications entities in Vermont to ensure the validity of the databases and the accuracy of its mapping system. The GIS/database department maintains the following key databases: Geographic Information Systems (GIS), Telephone or Automatic Location database (ALI), ALI Discrepancy database, Master Street Address Guide (MSAG), Emergency Service Zones (ESZ), Emergency Service Agencies (ESA), and Citizen Assistance Registry for Emergencies (CARE) data.

3. **Training and Communications** (2 staff members): The Board's training and communications team is responsible for training, certification, recertification, and continuing education of approximately 100 911 call-takers employed by the six PSAPs. This team is also responsible for the Board's quality control program, public education and outreach initiatives, initial training of 911 town coordinators, administration of the CARE program,[14] and development of a new call-taker wellness program.

4. **Administration** (2 staff members -1 full-time, 1 part-time): Provides office administrative functions and support for all other departments and Executive Director. Administers the 911 Compliance Grant Program,[15] coordinates and provides general office functions.

[14] https://e911.vermont.gov/care

[15] https://e911.vermont.gov/compliance-grant-program

Receives, researches and responds to legal subpoenas of call recordings and serves as Clerk to the 911 Board.

Current PSAP Configuration

The 911 Board partners with five law enforcement agencies in Vermont for 911 call handling services. These five agencies operate a total of six PSAPs. Each PSAP is responsible for answering calls from a primary catchment area[16] and is also responsible for handling overflow calls from all other PSAPs.

The Department of Public Safety operates two PSAPs in Williston and Westminster. These PSAPs answer approximately 68% of the total 911 call volume and, between the two facilities, house sixteen of the state's twenty-three 911 workstations.

In addition, there are four regional PSAPs operated by the Hartford, Shelburne, and St Albans Police Departments and the Lamoille County Sheriff's Department. These PSAPs answer about 32% of total 911 call volume and each house two funded 911 workstations. In addition, two unfunded workstations are currently housed at two of the regional PSAPs.

Technology allows 911 calls to be answered at any of these six PSAPs regardless of where the call originated and allows all call-takers access to the same technical resources and equipment. Because the Board has developed standards-based training requirements and call handling protocols, 911 callers receive the same level of service regardless of where their 911 call is answered.

A System of Systems

It is important to understand that when an individual picks up a phone and dials (or texts) the digits "911", a "system of systems" is required to complete the call and ensure an emergency response:

- First, the call traverses the caller's telephone service provider network – whether that is landline, wireless or VoIP. The telephone service provider, in accordance with federal and state laws and regulations, delivers their customer's 911 call to the appropriate 911 system. In Vermont, that 911 system is managed and overseen by the 911 Board.
- Once delivered into the 911 system, the call is routed to a certified Vermont 911 call-taker employed at one of the six Vermont PSAPs.
- Depending on the location of the emergency, the call may be dispatched by personnel in the same PSAP that answered it, or it may be transferred to one of more than 50 other dispatch centers serving Vermont. Each dispatch center has its own governance, equipment, and training requirements. In Vermont, dispatch operations are not under the purview of the 911 Board.

[16] https://e911.vermont.gov/sites/nineoneone/files/graphics/PSAPconfiguration%209.16.19.1.jpg

- The dispatch agency, in turn, notifies the emergency response agency. Emergency responders also have varying governance structures and may be public or private organizations. Emergency response agencies and their operations are also not governed by the 911 Board.
- And finally, the emergency response agency responds to the location of the emergency and determines the needed next steps which may involve a trip to the emergency room, the suppression of a fire, or the investigation of a crime.

If a breakdown occurs at any point in this "system of systems," it is critical to understand what happened, why it happened, and what steps are needed to prevent a recurrence. The 911 Board investigates all concerns promptly and engages with the contracted system provider, any involved telephone service providers, PSAPs, dispatch agencies and/or the emergency responder organizations as needed. For large scale events, certain telephone service provider outages, or unresolved ongoing issues, additional partners such as the Public Service Department, Public Utility Commission and/or the Federal Communications Commissions (FCC) may be contacted in order to ensure the issue is properly investigated and resolved.

Supporting Best Practices for Backup Power Requirements

As has been discussed at the workshops, the FCC has established rules requiring that providers of facilities-based, fixed, residential voice service offer their customers the option of 24 hours of battery backup power. These providers are also required to disclose specific information about their service including service limitations with or without backup power during a power outage. It is essential that providers meet these FCC requirements. The 911 Board has had no indication that providers are not doing so in Vermont.

As required by section 25 of Act 79, the 911 Board is currently developing a rule establishing new outage notification procedures for certain telephone service providers and electric power companies. The information collected as a result of these procedures is intended to assist the 911 Board in an assessment of the impact of these outages on the ability of Vermonters to access 911. The proposed rule will go through the formal rulemaking process this fall and will be presented to the Legislative Committee on Administrative Rules by February 1, 2020. Once sufficient data has been received and evaluated, the 911 Board may be able to provide additional information and recommendations related to this topic.

Consumer education and community outreach: Communications technology has changed dramatically over the past twenty years, and will, without a doubt, continue to evolve. The Board believes it is critically important for consumers to understand the benefits and limitations of the telephone service options available to them, including battery backup options. The Board's website currently contains general information about the various types of telephone service and how each interacts with 911. Links to additional resources, and a list of questions that consumers should consider asking their service provider, are also available on the website.

The Board supports, and can assist in, the development of a coordinated, effective public education and outreach program to ensure consumers are provided the resources and information they need to make the best decisions for themselves about telephone service and backup battery power. The Board feels this would best be accomplished with the input and assistance of relevant state agencies to ensure a clear and consistent message is developed and delivered.

This program would serve as a supplement to the consumer education requirements established for the service providers by the FCC.

Technical and financial assistance to consumers and communities: The 911 Board does not provide technical or financial assistance to consumers or communities related to backup power for non-line powered telephone service. Technical questions about telephone service in Vermont are typically referred to the appropriate telephone service providers. The Board believes this practice should continue as the providers are in the best position to provide their customers with complete, accurate and specific information related to their services.

The Board believes additional information is needed to more fully assess the extent and impact of telephone service and electric power outages on the ability of Vermonters to access 911 before it can make a recommendation regarding the need for a financial assistance program specific to the issue of battery backup power. The purpose of the rulemaking discussed above is to gather that additional information.

Cost-effective and technologically efficient ways in which providers or alternative entities can provide such information and assistance: As mentioned earlier, the 911 Board supports the development of a coordinated public education and outreach program aimed at helping to ensure consumers are aware of the benefits and limitations of all types of telephone service. Part of this consumer education should include education about best practices for emergency preparedness in the event of power outages. The information could be effectively delivered using existing outreach mechanisms, such as agency websites, social media, and community engagement forums such as regional planning commissions, and other local/regional agencies and organizations.

Ongoing monitoring of provider compliance with backup-power obligations: The 911 Board currently does not collect this information but may be able to support and/or assist in the implementation of any best practice recommendations issued by the Commission.

Conclusion

The 911 Board understands the concerns that have been presented by participants at the recent Public Utility Commission workshops. The 911 Board agrees that consistent, reliable access to 911 is critical. We look forward to working together to help ensure Vermonters have the information they need to understand their telephone service provider options, how those services interact with 911 and the benefits and limitations of each.

Appendix B: FCC Rules

The FCC regulates the provision of E911 service by VoIP providers using 47 C.F.R. § 9.5. The FCC's regulations address the notices VoIP providers are required to give to new and existing customers about when E911 service may not be available, including a broadband connection failure or loss of electrical power. VoIP providers must obtain acknowledgement by every subscriber of having received and understood the information provided. Interconnected VoIP providers also must provide warning stickers or other labels warning new subscribers if E911 service may be limited or not available.

The FCC regulates battery backup power provisions using 47 C.F.R. § 12.5, which states:

> (a) Covered service. For purposes of this section, a Covered Service is any facilities-based, fixed voice service offered as residential service, including fixed applications of wireless service offered as a residential service, that is not line powered.
>
> (b) Obligations of providers of a Covered Service to offer backup power. Providers of a Covered Service shall, at the point of sale for a Covered Service, offer subscribers the option to purchase backup power for the Covered Service as follows:
>
> > (1) Eight hours. Providers shall offer for sale at least one option with a minimum of eight hours of standby backup power.
> >
> > (2) Twenty-four hours. By February 13, 2019, providers of a Covered Service shall offer for sale also at least one option that provides a minimum of twenty-four hours of standby backup power.
> >
> > (3) At the provider's discretion, the options in paragraphs (b)(1) and (2) of this section may be either:
> >
> > > (i) A complete solution including battery or other power source; or
> > >
> > > (ii) Installation by the provider of a component that accepts or enables the use of a battery or other backup power source that the subscriber obtains separately. If the provider does not offer a complete solution, the provider shall install a compatible battery or other power source if the subscriber makes it available at the time of installation and so requests. After service

has been initiated, the provider may, but is not required to, offer to sell any such options directly to subscribers.

(c) Backup power required. The backup power offered for purchase under paragraph (b) of this section must include power for all provider-furnished equipment and devices installed and operated on the customer premises that must remain powered in order for the service to provide 911 access.

(d) Subscriber disclosure.

(1) The provider of a Covered Service shall disclose to each new subscriber at the point of sale and to all subscribers to a Covered Service annually thereafter:

(i) Capability of the service to accept backup power, and if so, the availability of at least one backup power solution available directly from the provider, or after the initiation of service, available from either the provider or a third party. After the obligation to offer for purchase a solution for twenty-four hours of standby backup power becomes effective, providers must disclose this information also for the twenty-four-hour solution;

(ii) Service limitations with and without backup power;

(iii) Purchase and replacement information, including cost;

(iv) Expected backup power duration;

(v) Proper usage and storage conditions, including the impact on duration of failing to adhere to proper usage and storage;

(vi) Subscriber backup power self-testing and -monitoring instructions; and

(vii) Backup power warranty details, if any.

(2) Disclosure reasonably calculated to reach each subscriber. A provider of a Covered Service shall make disclosures required by this rule in a manner reasonably calculated to reach individual subscribers, with due consideration for subscriber preferences. Information posted on a provider's public Web site and/or within a subscriber portal accessed by logging through the provider's Web site are not sufficient to comply with these requirements.

(3) The disclosures required under this paragraph are in addition to, but may be combined with, any disclosures required under § 9.5(e) of this chapter.

(e) Obligation with respect to existing subscribers. Providers are not obligated to offer for sale backup power options to or retrofit equipment for those who are

subscribers as of the effective date listed in paragraph (f) of this section for the obligations in paragraph (b)(1) of this section, but shall provide such subscribers with the annual disclosures required by paragraph (d) of this section.

(f) Effective dates of obligations.

(1) Except as noted in paragraphs (b)(2) and (f)(2) of this section, the obligations under paragraph (b) of this section are effective February 16, 2016, and the obligations under paragraph (d) of this section are effective 120 days after the Commission announces approval from the Office of Management and Budget.

(2) For a provider of a Covered Service that (together with any entities under common control with such provider) has fewer than 100,000 domestic retail subscriber lines, the obligations in paragraph (b)(1) of this section are effective August 11, 2016, the obligations in paragraph (b)(2) of this section are effective as prescribed therein, and the obligations under paragraph (d) of this section are effective 300 days after the Commission announces approval from the Office of Management and Budget.

(g) Sunset date. The requirements of this section shall no longer be in effect as of September 1, 2025.

Appendix C: Vermont VoIP Providers' Business Practices to Achieve Compliance with the FCC Rule

Appendix C summarizes and restates in the indented quotations the positions of the Vermont VoIP providers who participated in this proceeding about their compliance with the FCC Rules.

Comcast

Comcast represents that it has comprehensive battery backup notification and related E911 acknowledgement practices in place that comply with federal regulations. Comcast has been a VoIP provider in Vermont since 2007 and was an active participant in this workshop proceeding. Along with addressing the requirement that its VoIP customers acknowledge the limitations of E911 service during a power loss as required by 47 C.F.R. § 9.5, Comcast commented that it engaged in the following customer outreach activities in compliance with 47 C.F.R. § 12.5:

> At the point of sale and annually, Comcast provides Xfinity Voice customers with the following information:
>
> - *The availability of backup power sources*. Comcast informs Xfinity Voice customers about the availability of backup batteries from Comcast.
>
> - *Service limitations with and without backup power during an outage.* Comcast specifically informs Xfinity Voice customers that the service will not operate during a power failure without a backup power source, and that during a power outage they will need backup power to make emergency calls from their home phone. When a customer orders Xfinity Voice service over the phone, this information is specifically read to them.
>
> - *Purchase and replacement options.* Comcast informs customer about their option to purchase a battery at the time of installation and subsequently. Comcast also provides information on how to install and replace a backup battery.
>
> - *Expected backup power duration.* Comcast specifically informs customers about the availability of backup batteries, which now support 24 hours of standby time.
>
> - *Proper usage and storage conditions for the backup power source.* Comcast's notice informs customers that battery performance is diminished if the battery is not kept in a dry condition and within a temperature range of -40° to 158° F.

- *Subscriber backup power self-testing and monitoring instructions.* Comcast provides information on how customers can check the status of the backup battery by checking the indicator lights on the modem or battery unit.

- *Backup power warranty details, if any.* Comcast provides information on the battery warranty at the time of installation. Warranty information is also on the Battery Information Card that is included with all battery shipments to customers.

Comcast provides its customers with information on how its Xfinity Voice service works, and of the importance of installing a backup battery so that E911 calls can be completed during a power outage. [Comcast's] annual notice regarding batteries is included in customer bills and additionally, the above information is available at any time on Comcast's website. Comcast respectfully recommends that further inquiry into backup power obligations of providers of fixed voice services is not required at this time.[17]

Consolidated

Consolidated Communications offers voice services utilizing a copper-based, line-powered network for all service territory except for a small amount of "fiber to the premises" in Vermont. Consolidated does not have a current schedule to replace its copper network with a complete fiber network but does and will continue to meet the FCC battery backup obligations for locations served by non-line-powered facilities.

For those customers of "fiber to the premises," Consolidated represents that it is in compliance with the FCC rule by engaging in the following business practices:

- At the point of sale, Consolidated notifies new residential subscribers of non-line-powered voice service capabilities during commercial power outages and advises that the subscriber has the option to purchase a backup power solution that provides at least 8 or 24 hours of standby power during a commercial power outage.
- Upon submission of the customer's order for non-line-powered voice service, Consolidated sends a customer notice that explains using their landline telephone service for 911 and other calls during a power outage. This notification explains the service capabilities if electrical power is lost at their home, how they can purchase and manage the backup batteries and explains

[17] Comments of Comcast, May 24, 2019, at 1-2.

the battery backup will not power cordless phones and other devices in the event of a power outage. This notice provides additional information regarding battery lifespan and management.[18]

Charter

Charter represents that it complies with the FCC rules, and:

> [P]rovides its residential voice customers in Vermont information about the option to purchase a battery for their voice modem both at the point of sale and annually. Though the requirement to offer a 24-hour backup solution took effect on February 13, 2019, Charter began offering a 24-hour on January 15, 2019 in addition to the 8-hour backup it already made available. Customers can choose to have the battery installed at the time of installation of service or may purchase a battery later. Charter makes professional installation available.
>
> Charter informs customers at point of sale and annually of:
>
> • The capability of the service to accept backup power, and availability of backup power solutions available directly, or, after the initiation of service, available from either the provider or a third party;
>
> • Service limitations with and without backup power;
>
> • Purchase and replacement information, including cost;
>
> • Expected backup power duration;
>
> • Proper usage and storage conditions, including the impact on duration of failing to adhere to proper usage and storage;
>
> • Subscriber backup power self-testing and monitoring instructions; and
>
> • Backup power warranty details.
>
> Charter does not believe that that further inquiry into backup power obligations of providers of fixed voice services is required at this time.[19]

[18] Comments of Consolidated, August 12, 2019.
[19] Charter Comments, 5/24/19

VTel

The issue of backup power arose in VTel's service territory, and VTel responded as follows:

> VTel has been meeting and exceeding the FCC's backup power requirements since it began transitioning customers from copper to fiber in 2013: Specifically, while the FCC rules required providers to offer for sale at least one option with a minimum of eight hours of standby backup power (47 C.F.R. § 12.5(b)(l)), VTel installed battery backup units at each customer location as part of its network-wide fiber deployment, rather than simply offering the solution for sale. The batteries included in these units last an estimated 9.6 hours of runtime under nominal conditions. Although the Shrewsbury Selectboard claims that VTel's batteries "do not last for eight hours," the performance of any battery is affected by factors such as battery age, temperature, and load.
>
> Furthermore, recognizing the potential for communications disruptions during extended power outages, the battery backup units VTel has been providing to customers since 2013 can accommodate three additional units, with each additional unit adding 20AH, (240 watts) or about 26.6 hours of additional run time. In short, VTel offers customers an option for total standby backup power runtime that exceeds 80 hours or more than three days.[20]

Rural Local Exchange Carriers ("RLECs")

VTel is one of the eight RLECs that participated in the workshop. Not all the RLECs are VoIP providers. The remaining RLECs that are providers state that they comply with the FCC standard.[21]

[20] Letter from Gordon Matthews, VTel Legal & Regulatory Affairs, to June Tierney, Commissioner of the Department of Public Service, dated February 4, 2019.
[21] RLECs' Comments, 9/12/19, at 8.

Appendix D: Best Practices

Appendix D summarizes and restates in the indented quotations, the comments of the of the participants regarding best practices.

The Commission does not recommend that these proposed best practices be required. These are best practices that were recommended by the participants. The participants were encouraged to make proposals that would be presented in this report without regard to whether the Legislature should make the best practices mandatory or voluntary or whether the State had the jurisdiction to require them.

Comcast

Comcast made the following comments regarding best practices:

> Comcast also believes the FCC's regulations on backup batteries constitute best practices. The FCC carefully considered factors such as duration, technical methods of provisioning, and the costs in developing the regulations. The FCC recognized that different service providers use different technologies and that a one-size-fits all solution is not workable. Accordingly, the FCC does not require the use of specific technical solution or combination of solutions. The FCC also concluded that it should not require consumers to pay for a backup power option that they do not want or does not work in their situation. Notably, in reaching this conclusion, the FCC considered the backup options that had been identified by the Communications Security, Reliability and Interoperability Council ("CSRIC").[22]
>
> In sum, voice service providers have different networks with different technologies requiring the use of different types of customer premises equipment, all of which change over time. Any supposed "best practice" technical backup battery solution would not fit all voice providers and should be voluntary.[23]

[22] Comcast Comment, 10/11/19 at 4-5 (citing *Ensuring Continuity of 911 Communications*, 80 Fed. Reg. 62470 (2015)).
[23] Comcast Comment, 10/11/19 at 6.

Consolidated

Jeff Austin of Consolidated recommended further study to identify the most vulnerable areas that are subject to power outages and have limited cellular and fixed copper- or fiber-line voice service options and focus on educating the consumers in those areas.

Kingdom Fiber

Michael Birnbaum of Kingdom Fiber commented that the State agencies working together with local emergency management coordinators could help close the knowledge gap at the local level. Mr. Birnbaum recommended that communities establish physical locations where those most in need of emergency service, the elderly and handicapped, can find refuge and connectivity during disasters. He observed that "best practices" is an unfortunate term because such practices are very subjective: "One person's best practices are another person's minimal practices, and what we really want are the best achievable practices, the most appropriate practices."[24]

Mr. Birnbaum also offered that:

(1) by placing analog adaptors or other methodologies for getting VoIP in front of the router, away from the browser with its Roku device and Netflix streamer, the battery will last longer when power is lost. If the adaptor is placed behind the router and can power the browser it will readily lose power if the browser is used after a power loss. And,

(2) voice-activated devices may also draw power from the backup batteries during a power loss and should be turned off to avoid battery drawdown.

RLECs

Paul Phillips, representing the RLECs, took the position that his clients have for 40-plus years been reliant on state and federal subsidies to continue in operation. He asserted that those subsidies have obligations attached that compel his clients to roll out more fiber and increase connectivity speeds. The result is that there are limited funds available to the RLECs for backup

[24] Tr. 10/21/19 at 41 (Birnbaum).

power without raising rates and challenging their competitiveness in the marketplace. The Vermont RLECs oppose the concept that expenses should fall more heavily on traditional voice providers than on providers using competing technologies.

The RLECs provided Table 1 to summarize their recommended voluntary best practices.

Table 1. Additional Backup Power Services Currently Provided by One or More Vermont RLECS

A. Backup Power Access & Usage	
1	First 8-hour backup power pack provided at no charge, with charge for additional 16 hours of backup power.
2	Battery packs have signal lights (green—yellow—red) to show level of remaining battery power.
3	Some battery backs have on/off switches that allow the customer to use the battery power only when needed, thereby extending battery life.
4	The provider's equipment can separate the voice service from other communications services and provide backup power just to the voice service so as to extend battery life.
5	Remote monitoring of batteries and notification to customer of battery condition when equipment manufacturer has provided monitoring capabilities.
B. Customer Outreach and Education	
1	Customer service reps read a backup power script that provides all required disclosures to new customers at the time they call to initiate service.
2	The provider delivers educational materials to all new customers at the time they initiate service, with step-by-step instructions regarding backup power installation and operation and with all necessary backup power disclosures.
3	The provider mails a high-color/high-contrast cardstock notice to educate customers about backup power requirements and to provide all necessary disclosures both at the time service commences and annually thereafter.
4	The provider provides a DIY (Do It Yourself) instructional video on its website that demonstrates exactly how to install and operate the battery packs.
5	For battery packs without on/off switches, the provider offers instructions to the customer on how to de-power the battery when not in use so as to extend battery life.

Vermont Emergency Management

Erica Bornemann, the Director of Vermont Emergency Management, commented on Vermont Emergency Management's role in assisting local governments to prepare for disasters and respond to emergencies. In the past, Vermont Emergency Management has relied on Community Emergency Response Teams to do this. Community Emergency Response Teams were made up of local volunteers who were trained using federal funding to help their communities respond to disasters. Because of a shortfall in federal funding there are now only

two Community Emergency Response Teams in Windham and Windsor Counties with a total of approximately a dozen volunteer members, with no State employees overseeing their activities. While the Community Emergency Response Teams are mostly dormant they, could serve as a grassroots community vehicle to help inform their neighbors of the backup battery issue and be trained to assist their neighbors with being prepared for a loss of power or other disaster where 911 communications would be needed.[25]

Ms. Bornemann also observed that towns have designated emergency management directors or coordinators whose responsibility is emergency management preparedness for their communities. These individuals are also volunteers appointed by their selectboards. Ms. Bornemann offered that Vermont Emergency Management could work with the local emergency management coordinators to help close the knowledge gap about the backup batteries' use and importance in an emergency.[26]

E911 Board

Barbara Neal, the Executive Director of the E911 Board, offered that the E911 in partnership with the Department of Public Service and Vermont Emergency Management could provide consumer education that would help close the knowledge gap about the backup batteries' use and importance in an emergency, including an extended power outage.[27]

The Mount Holly Selectboard

The Mount Holly Selectboard recommended the following best practices:

- Backup batteries should be a standard component provided by telecom companies. That battery should have at least 24 hours of power. It should be installed, monitored, serviced, and replaced at the telecom company's expense.

- Twice a year, on customers' bills, there should be a detailed explanation about the loss of phone service during prolonged power outages with information about backup batteries, their use, and their limited life during power outages.

[25] Tr. 10/21/91 at 15-19 (Bornemann).
[26] Tr. 10/21/91 at 20-22 (Bornemann).
[27] Tr. 10/21/91 at 26-27 (Neal).

Once a year, this should be supplemented with a separate informational piece devoted exclusively to backup battery power information.

- A toll-free call-in number should be established for customers with questions about the use, function, testing, monitoring, life, and replacement of backup batteries, with technicians available to make house calls free of charge.

- Telecom providers are in the business to provide phone service, whether it be day or night, summer or winter, sunny or stormy, with power or not. Best practice is to provide that service, whatever it takes, without passing on additional costs to the customer.[28]

East Wallingford

Thomas Barone of East Wallingford offered the following best practices in a September 27, 2019, letter to Sen. Cheryl Hooker, Sen. Brian Collamore, and Rep. Dave Potter:

- The telephone company should be required to replace the main battery in the homeowners' system at the telephone company's expense. What is the cost savings to the telephone company not to have to purchase the power to operate their system since each telephone connection is powered by the customer's electrical system? Maybe this cost saving should be shifted to battery maintenance since the customer is paying to power the system.

- At the very least the telephone company should stock batteries for homeowners to purchase if they are not required to replace them at the telephone company's expense. Their bulk purchasing should be less expensive than buying retail and assure the customer the correct battery for their system.

- The customer should not have to research in hope they have purchased the correct item of questionable quality and shelf life. Many of our elderly are not capable and do not have the wherewithal or resources to perform this task.

- The customer should not have to call multiple vendors or to travel countless miles to local suppliers to purchase batteries; many of our elderly do not have the resources for this task.

[28] Mt. Holly Comment, 10/11/19 at 1.

- The phone company should be required with no added cost to the customer to install the batteries for all customers who cannot perform the task themselves.

- Per a comment from the VTel presenter, it has the capability to tell the condition of the phone system battery. The telephone company should be required to notify the customer by any means available i.e. phone, internet or a bold notice on your monthly statement of the batteries' condition/charge status. If a new battery is required, they can ship said battery and/or make an appointment to replace it at no cost [and] if the customer so states, installation is required.

- Any customer that the local electric utility cannot under severe weather conditions reasonably guarantee normal electric power restoration in 8 hours and [who] does not have cell service available or has medical conditions that require "lifeline" or require lifesaving medical devices should have extended life batteries installed and maintained by the Telephone Company until such time as the electric utility can guarantee 8 hour restoration under severe weather conditions or cell service available or the customer no longer needs the service.

- A land-line telephone system in rural Vermont is still a required necessity and at times a lifesaving tool, when cellular service may be non-existent or useless to a lifeline user. The land-line system should be treated and maintained as such by a public utility.[29]

Along with Mr. Barone's recommendations above, Cecile Betit of East Wallingford made the following recommendations:

- Around the clock telephone service—for incoming as well as outgoing calls [should] be provided as essential for the personal and public safety of residents and first responders as well as communications from emergency management centers and personnel.

- That the PUC and the DPS closely examine the issue of telecommunication reliance upon electricity and require utilities to implement solutions that do not further burden residents:

[29] Betit Public Comment, 10/14/19, at 4-5.

- We request State agencies work with all appropriate legislative House and senate committees and/or subcommittees to examine these topics and draft legislation with statutory deadlines to ensure utilities engage in Best Practices beyond mere compliance with Federal requirements for minimizing disruptions to the E911 services. The Town of Wallingford is not in favor of the State and/or utilities advising residents to purchase additional backup batteries or generators to be used in the event of outages. Why should townspeople pay the cost of the unintended consequences as a result of VTel's fiber optics upgrade?
- We recommend that utilities be required to stock, install and maintain extended backup batteries system-wide to ensure limited disruption in telephone service.

- That every effort be made to ensure that telephone service continues during power outages as it once did. This may require forging new paths and many in the State seem ready to do so. The dependence of cell phones on electricity during an outage must be part of proposed solutions.

- That going forward, alternative/redundant systems be in place when safety may be compromised whether these involve items in hand or require additional ones. Customers should not be at risk or bear the cost for innovation—particularly taxpayer-funded ones.

- That the present and future business climate for Vermont's independent phone companies be reviewed: how these companies collaborate or compete may well affect how Vermonters are served. A case in point is VTel's role with Vermont broadband and cell service—cell service is not available in many of VTEL's service areas.

- That a broadly diverse task force examine the range and scope of safety implications of dependency on electric power and its outages. Given the number of extended power outages in Vermont, it seems odd that we are not using good stewardship in encouraging increasing dependency on electricity. The number of those in California who recently suffered outages approached the population of Vermont. Those power outages were not an act of nature but rather required to avoid forest fires. While most of those affected had cell service for at least some time, we can wonder how an extended outage and large-scale evacuation with electric cars would be managed in a Vermont disaster.

- That the Legislature seek to build a coalition to fund competitive grants to:

- Develop options to mitigate the effects of power outages on landlines, Lifeline and internet.
- Explore energy alternatives for housing units that would offer more ease of use than current generators in terms of size and weight.
- Develop cost-effective ways to manage electric cable so that Vermont would not be at so much risk with snow, ice, and flooding.
- Develop creative ways of looking at Vermont's future energy needs.[30]

Shrewsbury

Jonathan Gibson of Shrewsbury submitted the following recommended best practices:

- Utilities should be required to replace the eight-hour battery in customers' homes with the now federally mandated 24-hour battery (or equivalent). This should be done at the utility company's expense.

- All telecoms should be required to acquire and to keep in stock several high-quality batteries of varying capacity to replace customers' batteries when these expire. Corporate bulk purchases will reduce battery cost to consumers and will enable consumers to avoid mistakes in ordering incompatible batteries, as well as eliminate long-distance shipping and handling charges for individual orders. Utilities can use existing Regulatory Recovery Fees (RRF) collected in monthly bills from their customers to cover the cost, or these costs can be rate-based to ensure reliable service and public safety.

- Phone companies should be required to install new 24-hour batteries or replacement batteries with their own personnel on request from their customers. This service should be available at no added cost to the subscriber.

- Since the telecoms have the capability to monitor the condition of a customer's backup battery, the companies should be required to notify the customer if the battery is in a low-charge condition or otherwise non-functional. The customer can then request delivery and installation of a replacement battery.

- The Commission should recommend the full-service backup power option – batteries provided and installed at utility expense – in its Report to the Legislature. The Commission may also want to outline the service-for-fee option requiring utilities to provide and install the batteries but allowing them

[30] Betit Public Comments of 11/4/19, at 1, 2.

to cover their costs (i.e. not add a parts or labor markup). This is the approach some telecoms have adopted. All companies should be required to offer this approach at a minimum.

- The recommendation above may be affordable for some customers, but certainly not for all. Customers who are on lifeline service or who may otherwise have difficulty in affording to purchase – or in installing – batteries must be provided with these services at no cost or for reduced cost. The PUC cannot fail to recommend provisioning of reliable backup power to the most vulnerable segments of our state's population.

- From both common sense and from the presentations of a number of rural towns, individuals, and organizations, the PUC must recognize that there is not a widespread awareness of the vulnerability to loss of regular and emergency calling service during extended power outages. This must be addressed through recommendations in the Report for greatly improved consumer education and community outreach by the telecoms. In some cases, such as for the elderly or handicapped, people with disabilities, and the like, individualized contact and assistance with battery monitoring and replacement will be necessary. The Report must address this specific need.

- Annual notices and website information are inadequate to inform or to impress upon consumers the shift in responsibility for maintaining telephone infrastructure or for maintaining, obtaining, and replacing batteries. (*See* Appendix F: Sample VTel Notice of Need for Battery Backup.) To remedy this deficiency, the PUC Report should recommend an "enhanced notification" requirement that utilities do the following:
  - provide colored (or multi-colored) notices to each consumer containing all necessary backup power information;
  - provide, either electronically or otherwise, an instructional video about battery maintenance, upgrade, and replacement to all subscribers (customers to receive individually, not by visiting a website);
  - provide a toll-free telephone number and personnel for customer assistance and troubleshooting on battery matters;
  - include in their mailings and on their website a reasonably complete listing of local, state, and national sources from which backup power can be obtained (not just a few hardware stores, battery suppliers, or solar installers in a limited area);
  - undertake coordination with local governments and community outreach on measures by which jurisdictions and individuals can reduce disruptions to E911 continuity; and

- produce an updated disclosure form to be signed and returned by each customer stating clearly that the subscriber acknowledges and accepts full responsibility for all aspects of "self-provisioning" for E-911 continuity during power outages.

- In the three workshops held to date by the PUC, the telecoms have steadfastly maintained that they are in compliance with the FCC's 2015 requirements regarding backup power and do not wish to incur any additional costs to minimize disruptions to E911 services during power outages. Given this now obvious fact, that the telecoms can't or don't want to do it, the PUC should recommend one or more alternative approaches – or as the statute says, entities – to get the job done.

- Discussion in the workshops has suggested a variety of actions and mechanisms that may be helpful: more educational efforts by state agencies (and the utilities), better coordination and action by emergency management agencies, greater involvement of local governments, and possibly an expanded role for the E911 Board. All of these have their place, but two considerations are paramount.
  - First, the telecoms cannot "get off the hook" – they shifted from the POTS (plain old telephone service) system to an electricity-dependent communication system, and the primary responsibility to replace what was taken away rests with them. Second, without a specific, primary, and focused mandate to provide technical and financial assistance to Vermonters on an individual house-by-house basis, it is unrealistic to think that the needed backup power support services will be made available.
  - This is why the PUC should, and in fact, must, include in its array of recommendations for possible action the creation of what we prefer to call a "telecom backup power utility" (rather than strictly an "E911 utility"). Such an entity would be established by Order of Appointment similar to Efficiency Vermont and funded by telecom consumers through an appropriate rate charge. The PUC staff, which is familiar with efficiency utilities, should examine and develop this concept more fully as an option to include in the Report for consideration by the Legislature.

- The fourth topic in Sec. 26 (b) of Act 79's directive to the PUC has not been addressed in the first three workshops, i.e. minimizing E911 disruptions through "ongoing monitoring of provider compliance with backup-power obligations." Rulemaking by the E911 Board per the Act's Sec. 25 may address this issue, but utility capacity to monitor individual battery conditions is a very relevant factor in assessing outage scope and duration. Best practices to

achieve this goal can be discussed at the Oct. 21 workshop and should be included in the Dec. 15 Report. Outage reporting requirements for utilities should be recommended in the Report.

- Recommend that in its Ten-Year Telecommunications Plan, the Department of Public Service provide a full discussion, with specific actions to be undertaken, to address the issue of the dependency of telephone service, and 911 service especially, on electricity and the attendant vulnerability and public safety issues.

- Recommend that no new broadband systems receive approval, obtain state financing, or be installed by any utility in Vermont until the utility has made a showing to the approving authority that adequate consumer notification and provision of technical and financial support with backup power will be provided to all potential subscribers in the proposed service area.[31]

Mr. Gibson recommended that a survey be conducted to determine precisely the levels of awareness and concern about losing the ability to make 911 calls in emergencies. This would allow for targeted investment in both education efforts and infrastructure improvement.[32]

Mr. Gibson recommended the following CSRIC Best Practices:

- Affordable backup batteries – As of February 2019, 24-hour batteries are the FCC requirement. The current best practice is for utilities themselves to offer to supply and install, at cost or subsidized, 24-hour batteries to any subscriber who so requests.

- Work with vendors to develop alternative powering technologies.

- Battery on/off switches to extend battery life during outages.

- Battery standardization – also encourage standardization among utilities.

- Provider supplying spare and replacement batteries at reasonable cost.

[31] Gibson Comments, 10/11/19, Attachment 1.
[32] Tr. 10/21/91 at 75, 77 (Gibson).

- Work with vendors to ensure remote battery status monitoring – and notification to consumers and replacement.

- Emergency weather event notification – by automated phone/text/e-mail alerts.

- Offer of whole home power protection – coordinated with electric or "telecom resilience" utility.
- Detailed, step-by-step instructions regarding backup batteries – and in video.

- Battery disposal/recycling information and recycling mailing kit.[33]

Mr. Gibson recommended the following best practices for monitoring providers' compliance with backup power obligations:

> By stand-alone rule or included in any more far-reaching rule it may issue regarding "enhanced backup power obligations," the PUC should require companies to submit an annual report with supporting exhibits to describe and document how they are complying, if a covered provider, with FCC Rule 15-98 or any successor rule or with any supplemental "Best Practices" rule the PUC may promulgate. This report will include the following:
>
> - Service Disruption:
>   - Any telecom loss of service their system has experienced: where, when, for how long, and number of subscribers affected (perhaps above a threshold such as 1-2 hours, 20-25 subscribers). Utilities should submit this data to [the] PUC, even if required by Act 79, Sec. 25 rule to submit it to the 911 Board.
>   - The number of consumer inquiries, requests, or complaints about service disruption or backup power received during preceding year and how the company responded.
>
> - Back Up:
>   - Whether they provide, by fee or subsidized, installation or maintenance of backup power equipment, and the type, consumer cost, and volume of such installations in the past year.
>   - Names/locations of backup power venders or sources to which subscribers are referred.

[33] Gibson Comments, 11/3/19 at 2.

- Copies of any backup power information materials provided to consumers, whether by mail (periodic or special mailings) or on a website, including written and video materials.

- Batteries:
  - Whether they stock backup batteries or other equipment for direct purchase by subscribers.
  - The number of sales during preceding year.
  - Whether they provide any battery monitoring and notice service, and details thereof.
  - Whether they have a technical assistance or call-in service to help subscribers with batteries.

- Community Outreach and Education:
  - Number, location, and description of any community education events.
  - Describe any local government, emergency management, fire department or other public safety organization to which they have helped and nature of the assistance.

- Improvement Efforts:
  - Any action the company has taken to improve E-911 continuity, e.g. microcells, call stations, remote terminal capability upgrades, provision of equipment to consumers, or the like.
  - The company's achievements in finding venders who can provide technological solutions to address loss of continuity during power outages, such as an on-off switch to conserve battery power that is easily accessible from living space (not at the battery housing), etc.[34]

Mr. Gibson recommended that the Commission conduct an investigation into telecommunications resilience with the goal of minimizing disruptions to all communications services during power outages. He recommended that the investigation address:

- Specific need for back-up power at each critical component of the E911 system.

- Integration of battery backup for E911 services will complement other aspects of resilience in Vermont's telecommunications system and its electric grid.

[34] Gibson Comments, 11/3/19 at 3.

- The fundamental role of interoperability to ensure that wireless communications system improvements by single providers benefit all Vermont residents and visitors.[35]

Chuck Finberg of Shrewsbury commented that the State agencies working together with local emergency management coordinators could help close the knowledge gap at the local level. He recommended that the goal of any future efforts should be the economical and efficient achievement of complete, uninterrupted E911 access throughout Vermont.[36]

VPIRG

VPIRG participated in all four workshops in this proceeding and made the following conclusions:

- As to the question of telecom compliance with FCC rules 47 C.F.R. § 12.5 – while nothing in the workshops pointed to outright failure of any provider to comply with these rules, the uneven and, at-times confusing, ways in which this compliance was achieved highlight the inadequacy of the rules themselves. Put another way, whether providers are complying with the rules, it remains clear that many Vermonters are unaware of the vulnerability posed by a switch to non-line-powered voice communications, and those that are aware may lack the financial or technical wherewithal to actually achieve the backup options envisioned by the FCC rules.

- Because of this, we believe the PUC report should recommend the legislature pursue additional state-level protections to ensure the resiliency of Vermonters' telecommunication abilities – particularly in the areas of consumer education, financial assistance and technical assistance.

- Further, the workshops have surfaced the need for the state to explore the question of telecommunications resiliency more broadly as that issue extends well beyond the narrow question of battery backup for non-line-powered voice communications.[37]

Based on these conclusions, VPIRG made the following specific recommendations:

[35] Gibson Comments, 11/3/19 at 4-5.
[36] Tr. 10/21/91 at 35, 38 (Finberg).
[37] VPIRG Comments 11/4/19 at 1.

- Requirements that improve annual notification to consumers required by the FCC rules – more specifically requirements that such notice be included as a separate bill insert and presented as conspicuously as possible (e.g. colored paper, large font, etc.)

- Requirements that providers provide simple, direct web addresses (e.g. provider.com/batterybackup) and direct toll-free numbers to consumers with clear step-by-step instructions relating to the installation and maintenance of one's backup battery system – with explanatory videos where possible.

- Requirements that providers provide simple, direct web addresses (e.g. provider.com/buybatteries) and direct toll-free numbers that allow for direct purchase of available and compatible batteries – coupled with an ongoing requirement that those providers who do not sell the batteries directly verify the availability and stock of their batteries with their chosen vendor and periodically report on that availability to the State.

- Requirements with regards to financial and technical assistance, including ongoing monitoring and alerts to backup battery health. We'll note that these are areas where the resources of the various telecom providers likely vary markedly. That is to say, that some larger providers may have both the staffing and financial resources to make backups available at free or reduced costs and/or provide direct technical assistance, while smaller providers likely cannot. Nevertheless, it is our position that Vermonters should not have to choose between this month's grocery bill and buying a potentially life-saving backup battery.

- The State should play a role. That's why we also support further exploration of the creation of a Telecommunication Resiliency Utility (TRU). A hypothetical TRU could provide both financial and technical assistance to Vermonters who need it. It could fill an educational gap. It could work with individual consumers and communities to bolster their resiliency. It could also potentially address some of the questions regarding resiliency beyond the scope of battery backups – for instance, the issue of power loss to pole-mounted amplifiers.[38]

[38] VPIRG Comments 11/4/19 at 1-2.

Other Participants Comments

Martha Sirjane of Cuttingsville recommended that the E911 Board track data for all 911 outages.

Stephen Whitaker of Montpelier argued that the battery backup issue is not a reflection of a knowledge gap. "It's an accountability gap and a planning gap" that the Commission could correct as part of an upcoming alternative rate plan proceeding with Consolidated.[39] Mr. Whitaker also recommended that the Commission open an investigation into telecommunications resiliency in Vermont addressing all technologies, including wireless, powered-wire, and VoIP over hybrid coaxial cable and fiber, and also identify every electricity-dependent network element.

David Healy of Calais filed a public comment recommending that the State develop a statewide utility infrastructure data base as a priority database consistent with the State's 1989 Geographic Information Services Plan that was developed as part of the Growth Management Act of 1988 (Act 200).[40]

[39] Tr. 10/21/91 at 31 (Whitaker).
[40] Healy public comment at 1.

Appendix E: Communications Security, Reliability and Interoperability Council ("CSRIC") Backup Battery Recommendations

Another aspect of the robust federal review of the backup battery regulations that occurred was the assessment of their impact by the CSRIC. The FCC chartered the CSRIC. The findings of the various CSRIC working groups informed the language and standards finally adopted in the FCC rules.

The CSRIC's continuing mission is to provide recommendations to the FCC to ensure, among other things, optimal security and reliability of communications systems, including telecommunications, media, and public safety. CSRIC's members focus on a range of public safety and homeland security-related communications matters, including: (1) the reliability and security of communications systems and infrastructure, particularly mobile systems; (2) 911, Enhanced 911 (E911), and Next Generation 911 (NG911); and (3) emergency alerting.

CSRIC Working Group 10A spent more than six months in 2014 researching, analyzing, and evaluating consumer recommendations and notification best practices. During this time members participated in dozens of conference calls, identified gaps, and researched new recommendations and best practices, and they also dedicated countless hours to editing and revising the final report. CSRIC Working Group 10A included members from the FCC, academia, Time Warner Cable, CenturyLink, Comcast, AT&T, Verizon, and Cox, and concluded that:

> Consumers are increasingly seeking out and converting to VoIP technologies. In order to prepare the consumer for the VoIP conversion, telecommunication service providers, industry organizations, and the FCC should provide guidance to the consumer on how to prepare for a loss in commercial power.[41]

[41] CSRIC Working Group 10A Final Report (June 2014) at 3.

CSRIC Working Group 10B included a similar membership and work schedule but was more precisely tasked with addressing best practices in light of its review of nine different VoIP consumer deployment models. CSRIC Working Group 10B effort was focused on recommending best practices to offer solutions to power losses that can last multiple days or even weeks, in the case of catastrophic damage such as from a major storm.[42]

The CSRIC reports provide examples of notification requirements and best practices that were developed for application across the country. The participants in the Commission's workshops were informed of and were provided access to CSRIC Working Group 10A's and 10B's Final Reports. The recommendations of CSRIC Working Group 10A and 10B helped shape the participants' recommendations in this proceeding and are therefore included here.

CSRIC Working Group 10A recommended that consumers be educated about their backup power equipment so they can be as prepared as possible and developed a checklist for a consumer to use in preparing for a loss of power. CSRIC Working Group 10A also created the tables to summarize their VoIP service providers:

Area	Category	Best Practice
Service Provider	Consumer Outreach	VoIP service providers, as part of consumer education efforts, should provide a full explanation of emergency use capabilities, battery back-up units, and how to access detailed information about battery back-up units through its Company website, in its installation/confirmation of service materials, and/or as part of a technician's explanation of the service at the customer's premise.
Service Provider	Consumer Outreach	VoIP service providers should ensure back-up battery information is available to all consumers including persons with disabilities so that consumers are able to fully understand their Customer Premise Equipment (CPE) in order to maintain critical services.
Service Provider	Consumer Outreach	As VoIP service providers introduce new technologies and services, they should provide a full explanation of emergency use capabilities, battery back-up units, and how to access detailed information about battery back-up units through its Company website, in its installation/confirmation of service materials, and/or as part of a technicians' explanation of the service at the customer's premise.
Service Provider	Consumer Outreach	VoIP service providers should review and update their back-up battery communications plans annually.

[42] CSRIC Working Group 10A Final Report (September 2014) at 5.

CSRIC Working Group 10B provided the following more comprehensive set of new recommended best practices for service providers and local public safety officials address to use in each of the nine examined consumer deployment models:

New Best Practice Number	Use Cases	Description
New 01	1,2,3,4, 5,6,7,8, 9	Service providers should provide consumers an affordable option for battery backup of the CPE device that contains the ATA function. Service providers need to inform consumers of the implications for their voice service during power interruptions, if they choose not to have battery backup.
New 02	1,2,3,4, 5,6,7,8, 9	Service providers should educate consumers of the need to be informed about the specific impact on their chosen VoIP use case, if not backed up with batteries during a power outage.
New 03	1,3	Service providers should embed the ATA function in network devices that are easily backed up with batteries. Use cases that require multiple devices to be backed up with batteries should be discouraged by service providers as less reliable.
New 04	2,4,5,6, 7,8,9	Service providers should work with their network device and CPE vendors to develop approaches for battery backup for use cases where little or no backup is offered today.
New 05	4,5,6,7, 8,9	Service providers should work with their network device vendors to develop alternative powering technologies, such as Power-Over-Ethernet, so that network devices can act as sources to power cordless base stations and phones with embedded ATAs.
New 06	1,2,3,4, 5,6,7,8, 9	Service providers should work with their vendors to provide consumers a mechanism for extending the time period of available battery power by including an on/off switch on the battery unit for use by consumers. This allows battery power to be saved for when calls need to be made

ATA= Analog Telephone Adaptor function

New 07	1,2,3,4, 5,6,7, 8,9	Local public safety officials should create disaster response plans that include plans for backup battery supplies in the same way they have a plans for food, water, and fuel during power outages.
New 08	1,2,3,4, 5,6,7,8, 9	Service providers should work with their vendors to standardize on DC power supplies and connector interfaces for network devices and CPE so that a common battery backup unit can be used in the home, with multiple devices.
New 09	1,2,3,4	Battery backup power is a finite resource, CPE equipment should by default turnoff all communication services, except voice when on battery. Voice line will be in standby mode. The difference between talk time and standby time as it relates to the depletion of backup battery is significant. Talk time (using the phone) will deplete the battery faster than when the phone is in standby mode (not being used).
New 10	4,5,6,7, 8	In those cases where VoIP service utilizes an Ethernet port on the network device, the Service Provider should ensure that the Ethernet port is powered during the commercial power outage.
New 11	1,2,3,4, 5,6,7,8, 9	Service providers should have mechanisms in place to ensure adequate network capacity for emergency calls during commercial power outages.
New 12	1,2,3,4, 5,6,7,8, 9	Service providers should offer consumers who choose battery backup spare batteries, at reasonable cost, for use during times of extended duration power outages or to replace batteries.
New 13	1,2,3,4, 5,6,7,8, 9	To prolong battery and device reliability, the network or CPE device with the ATA function should be placed in a location that provides adequate ventilation (e.g. ensuring proper airflow exists around the device and vents are not blocked or restricted). Also ensure the ATA device is not placed in an unusually hot, cold or damp location.
New 14	1,2,3,4, 5,6,7,8, 9	Service providers should work with their vendors to provide a mechanism to monitor battery status and determine whether the battery is degraded. This can be through remote monitoring of batteries as part of the service offered to consumers or through LEDS visible to consumers.
New 15	1,2,3, 4,5, 6,7,8,9	The UPS or network device with ATA and embedded batteries can have LEDs for visual battery status monitoring. The LEDs for status of embedded batteries should include battery missing, battery charging, replace battery, and battery full.
New 16	1,2,3,4, 5,6,7,8, 9	Indoor network devices must be grounded in compliance with applicable National Electric code standards and other applicable state and local ordinances
New 17	3	Network devices with an embedded ATA function mounted outside must be properly grounded. A typical outdoor installation will include a ground plate on the enclosure that must be directly bonded to the building's AC utilities earth ground electrode using a #6 AWG copper conductor (stranded or solid).Service providers should follow Article 250 of the NEC for appropriate grounding procedures.
New 18	1,2,3,4,	Service providers, as part of consumer education efforts,

	5,6,7,8, 9	should provide a full explanation of emergency use capabilities, battery backup units and how to access detailed information about battery backup as part of the service providers' explanation of the service at the customer premise.
New 19	1,2,3,5, 6,7, 8,9	Service providers should proactively notify consumers prior to an anticipated extreme weather event. The service provider should include detailed information about emergency use capabilities, battery backup units, or how to access detailed information about battery backup units. This consumer outreach can be achieved through specifically designated storm preparation information, through routinely listed information on the provider's website, or other means to ensure reaching all consumers.
New 20	1,2,3,5, 6,7,9	If service providers rely on any hardware to be placed at customer premise by the customer, they should provide a full explanation of operations during power outage, including detailed information about battery backup units, in their installation manual and on their website.
New 21	1,2,3	Service providers that offer remote battery monitoring through status reporting telemetry should offer a battery replacement service for an additional fee to the consumer.
New 22	2,4,5,6, 7,8	Service providers should educate consumers that DC power supplies and batteries for network devices and other customer premises equipment are not interchangeable.
New 23	1,2,3,4, 5,6,7,8, 9	Service providers with no battery monitoring capability should offer a voluntary program to notify consumers, who choose to be reminded, to check battery status based on the installation date, or the battery's manufacturing date, and the theoretical average life expectancy of the battery.
New 24	1,2,3,4, 5,6,7,8, 9	Service providers should provide information about where consumers can purchase replacement batteries, model numbers, and price on their website.
New 25	1,2,3,4, 5,6,7,8, 9	Service providers should provide clear instructions to consumers as to the proper disposal/recycling options for their used batteries. The battery purchase or replacement process in the service provider agreement must instruct the subscriber on proper battery recycling or disposal. Batteries for recycling are accepted at no charge at various locations identified at www.call2recycle.org or 800-8BATTERY. It should be noted that that many localities and states have regulations regarding battery recycling.
New 26	1,2,4,5, 6,7,8	Service providers should offer consumers a battery recycling kit part of the battery backup service. The recycling kit is then sent to the customer along with the replacement battery. Upon receipt, the customer is to install the replacement battery, put the used battery in the recycling bag, affix the pre-paid shipping label to the bag, and ship the used battery to a pre-designated recycling center.
New 27	1,2,3,4, 5,6,7,8, 9	Service providers should offer, as an option to consumers, the additional purchase of whole home power protection device placed at the main electrical panel to prevent damage

		to CPE devices, including the device with the ATA function during extreme weather conditions
New 28	8	Service providers should ensure that users understand that both the network device and the Femtocell base station must work together to provide connectivity to the cellular phone. Assuming the in-home cellular coverage is poor, in order for a cellular phone to continue to work during a power outage through a Femtocell, both the network device and the Femtocell base station need to have battery backup.
New 29	1,2,3,4, 5,6,7,8, 9	Service providers should offer detailed instructions along with step by step photos or drawings of the battery replacement procedure.

Notably, these CSRIC recommended best practices were not adopted as FCC rule requirements. The FCC sought to ensure that the technology could continue to evolve and that the marketplace should drive the technology, not the FCC rule.[43] The FCC determined that it would encourage the use of these best practices as appropriate, but:

> We are not convinced that the voluntary adoption of these practices without a standard, mandatory baseline will eliminate consumer confusion. We therefore address these concerns by requiring minimum subscriber disclosure obligations, while at the same time encouraging providers to voluntarily follow additional CSRIC best practices regarding backup power.[44]

The Commission similarly recommends voluntary rather than mandatory best practices given the diversity of technologies available for consumer choice in the marketplace, the potential cost to providers of mandatory best practices, and the likelihood that mandatory best practices would not necessarily resolve consumer confusion.

[43] Ensuring Continuity of 911 Communications, 80 Fed. Reg. 62470, 62477 (2015).
[44] *Id*. at 62479.

Appendix F: Sample VTel Notice of Need for Battery Backup

VTel
354 River Street
Springfield, VT 05156
www.vermontel.com

Backup Power for Home Phone Services during Power Outages
For many years, your home phone would allow you to stay connected to emergency voice services during a power outage. However, many of today's advanced home phone services require backup battery power to continue functioning during an outage. To avoid a disruption of home voice service during an outage, and to maintain the ability to connect to 911 emergency services, we, at VTel, install battery backup power for your home phone when we convert a home to the fiber optic network.

Without a backup battery or alternate backup electrical source, such as a generator, customers will not be able to make any calls, including emergency calls to 911 during a power outage. In order to preserve the life of the battery during a power outage, internet and television services are not powered by the backup battery. Battery replacement is the sole responsibility of the customer. Replacement and extended life batteries can be purchased from a number of retailers. Additional information can be found at https://www.vermontel.com/about/fiber/battery-information or by US mail by calling 611 from any VTel phone.

We at VTel are committed to improving the customer experience, and to bringing world class technology to rural Vermont. As we continue to invest in the products and services that we deliver, we occasionally need to adjust prices and fees to cover rising operating costs. One rising cost is the maintenance of internet equipment that is located at a customer's premise. We have previously offered our customers the use of a standard internet router at no charge while they have our internet service.