Communities Responding to Natural Disasters Through Network Resilience

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INTRODUCTION

Network resilience is the ability for a network to maintain an acceptable level of service in the face of faults and challenges to normal operation. This may take many different forms from one extreme in surviving an electromagnetic pulse or natural disaster to simply reacting to a slight misconfiguration. As several natural disasters have ravaged the United States from coast to coast which increasingly interfere with reliable access to broadband, planning for network resilience is a recurrent priority.

It is imperative that telecommunications and broadband networks have the requisite fail-safe measures in place to continue to function without interruption even during these natural disasters. Broadband network resilience often requires intense planning and collaboration amongst stakeholders to develop technological solutions and draft strategies to maintain network performance under critical conditions. With few federal guidelines on network resilience, the onus is on local and state officials, broadband providers, and the general public to play a role in the planning process.

From wildfires in California to the hurricanes that devastated Puerto Rico, local officials are confronted with the reality that resilience planning cannot be an afterthought. It has a direct impact on emergency response and public safety before, during, and after a natural disaster. Consequently, local officials are working with providers as well as state and the federal government entities to ensure that there are plans in place to prevent serious loss of connectivity.

This report explores several natural disasters across the nation in which communities worked to ensure their citizens stay connected in the event of an emergency. It also includes five recommendations for Congress and the Federal Communications Commission ("FCC" or "Commission") that reflect insights from local resiliency planning. As we will discuss, the Commission should set minimum standards that state and local governments can build upon as necessary. This in conjunction with funding support from Congress will ensure that each community has a tailored resilience plan that will keep them online even during the worst disasters.

CALIFORNIA

While wildfires are nothing new to California, the 2020 fire season was unique for multiple reasons. The scale, timing, location, and intensity of the fires caused firefighters to group many of the smaller fires into complexes.

The SCU Lightening Complex has burned more than 365,000 acres across parts of the southern San Francisco Bay area, including Santa Clara and Alameda counties.[1] Additionally, the LNU Lightening Complex, located near Napa, has burned more than 357,000 acres. According to the California Department of Forestry and Fire Protection ("Cal Fire"), at least 650 wildfires have raged across California, which has burned more than 1.25 million acres since August.[2] Cal Fire noted that there were close to 11 thousand lightning strikes within a span of three days. This, in conjunction with warm and dry weather conditions, sparked an innumerable number of small wildfires.

The 2020 California wildfire season was also unique because it affected areas that are not regularly stricken by wildfires. For example, the coastal pine forests are generally subject to coastal weather patterns and are therefore cooler and less subject to burning.[3] The conditions in California have been unfortunately perfect for this unprecedented generation of fires over the past year.

While the fires in 2020 are some of the worst that California has ever experienced, the California Public Utilities Commission ("CPUC") has tracked wildfire impacts on California's communications networks. CPUC highlighted that the 2017, 2018, 2019 wildfires, as well as the public safety power shut offs initiated by California's power companies, revealed significant problems for California's communications infrastructure.[4] This loss in service to customers endangered the lives of customers and first responders, and cut directly against the emphasis that the Governor's

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[1] Umair Irfan, *What makes California's current major wildfires so unusual* (Aug. 26, 2020), https://www.vox.com/2020/8/21/21377181/california-wildfire-2020-scu-lnu-lightning-complex-climate-change.

[2] *Id*.

[3] *Id*.

[4] See Order Instituting Rulemaking Regarding Emergency Disaster Relief Program, Rulemaking 18-03-011, Decision Adopting Wireless Provider Resiliency Strategies at3 (2020) (California Public Utilities Commission).

Office of Emergency Services had placed on reliable communications.[5] Specifically, CPUC found that 80% of calls to 911 originated from a wireless device. This reflects just how high the reliance is on communications services including data and wireless communications.[6] Throttling of the communications of Santa Clara County Fire Department in 2018 adversely impacted its ability to support deployed relief efforts during the Mendocino Complex Fire.[7]

The fires in California have also attracted Congressional attention. In September 2020, twenty members of Congress from California issued a joint statement expressing outrage that wireless providers were pushing back against the CPUC's 72-hour backup power safeguards.[8] The members noted that over 700 wildfires are burning throughout California and providers must do all that they can to ensure no consumer is disconnected from any network that could provide them lifesaving information.[9]

In response, CPUC initiated a rulemaking proceeding then released a decision in June of 2020 updating California's mobile wireless network resiliency programs.[10] Its decision takes steps to ensure that wireless signals will continue to be available to California citizens, especially those that are directly impacted by the wildfires that continue to rage. Consequently, mobile carriers are now required to install emergency generators at their cell sites in high fire danger areas, which will allow a

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[5] *Id.* at 4.

[6] R.18-03-011 November 1, 2018 Workshop Transcript at 15. Statement of Mark Ghilarducci, Director of the Governor's Office of Emergency Services.

[7] Public Advocates Office Motion for an Immediate Order Requiring California's Communications Service Providers to Complete Calls and Delver Data Traffic and Provide Other Post-Disaster Consumer Protection Relief, May 21, 2019. Available at: http://docs.cpuc.ca.gov/SearchRes.aspx?DocFormat=ALL&DocID=292932622; and Declaration of Anthony Bowden filed in the U.S. Court of Appeals, D.C. Circuit Case No. 18-1051, August 17, 2018. Available at: https://assets.documentcloud.org/documents/4780226/VerizonFireDeclaration.pdf.

[8] Press Release, Congressman Jerry McNerney, California Members of Congress Issue Joint Statement on Wireless Carriers' Unconscionable Challenge to CPUC's 72-Hour Backup Power Safeguards (Sept. 10, 2020), https://mcnerney.house.gov/media-center/press-releases/california-members-of-congress-issue-joint-statement-on-wireless.

[9] *Id*.

[10] *See generally Order Instituting Rulemaking Regarding Emergency Disaster Relief Program, Rulemaking 18-03-011, Decision Adopting Wireless Provider Resiliency Strategies (2020) (California Public Utilities Commission).*

signal to continue to broadcast for up to seventy-two hours, even if power grids are shut-off as part of a public safety power shut-off.[11]

Additionally, CPUC has mandated that carriers submit a Communications Resiliency Plan within six months that details the carrier's ability to provide a minimum level of service such as 911 and basic Internet browsing during a power outage. Included in the Resiliency Plan are requirements that carriers submit grid outage response plans, and commitments that carriers have the ability to report system outages.[12]

California's mandatory power backup rule is the first of its kind in the United States. The CPUC decision is connected to California State Senate Bill 431 would require

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wireless carriers to provide battery-based power backups to their cellular towers and to warn cellular users when such a backup is running low or about to expire.[13] The California State government reacted strongly to the spate of wildfires, but localities in California also took their own steps to increase and promote network resilience.

In addition to the CPUC's resiliency plan rules, CPUC staff released a pilot proposal in December 2020 that would require investor-owned utilities to install fiber optic conduit or comparable technology when restoring facilities that were destroyed in the 2020 wildfires.[14] Next Century Cities submitted comments supporting the framework and offering suggestions to improve the pilot.[15] The CPUC anticipates a ruling on the proposal in May 2021.[16]

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[11] *Id*. at 74-79.

[12] *Id*. at 85-93.

[13] S.B. 431, 2019-2020 Cal. Reg. Sess. (Cal. 2020).

[14] *See generally* Order Instituting Rulemaking Regarding Broadband Infrastructure Deployment and to Support Service Providers in the State of California, Rulemaking 20-09-001, Administrative Law Judge's Ruling Serving Phase I Staff Proposal (Dec. 30, 2020), https://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M356/K574/356574789.PDF.

[15] Next Century Cities Opening Brief to Order Instituting Rulemaking 20-09-001 (Feb. 1, 2021), https://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M363/K013/363013360.PDF.

[16] *See* Order Instituting Rulemaking Regarding Broadband Infrastructure Deployment and to Support Service Providers in the State of California, Rulemaking 20-09-001, Assigned Commissioner's Scoping Memo and Ruling (Dec. 28, 2020), https://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M356/K561/356561545.PDF.

In 2018, the City of Los Angeles released a report entitled, *Resilient Los Angeles*. It encompasses four areas including educating individuals on the role they play in resiliency efforts; educating communities on the ways social cohesion and preparedness increase resilience; explaining the strategies the city and its partners are taking to address current and future challenges; and promoting collaboration and partnerships to keep Los Angeles at the forefront of resilience planning.[17] Regarding disaster preparedness and recovery, the report sets goals to train all city departments on disaster preparedness and recovery and to put in place annual training regimes by 2022. It also highlights plans to modernize power grids and expand renewable energy sources by 2036 focusing on deepening storage capacity and broadening emergency backup systems.

An important feature of Resilient Los Angeles is that it expands on existing efforts to connect vulnerable populations to wireless Internet access not only for post-disaster use, but for everyday use as well. Notably, the City of Los Angeles is working to ensure uninterrupted connectivity at public libraries, bus shelters, on streetlights, and at publicly accessible cell phone kiosks including areas that serve homeless populations.[18]

Wildfires continue to threaten broadband networks, and the residents who rely on, them in Oregon, Washington, and Colorado. The steps that CPUC has taken to ensure that residents of California stay connected are building blocks for other local, state, and federal resiliency plans.

PUERTO RICO

Puerto Rico offers a sobering example of the ongoing need for telecommunication resilience planning. When Hurricane Maria devastated Puerto Rico, it left millions without power and caused an estimated 90 billion dollars in damage. 95% of the island lost cell service.[19] Years after the initial damage was done, countless residents

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[17] *See generally* City of Los Angeles, Resilient Los Angeles at 3 (2018), https://www.lamayor.org/sites/g/files/wph446/f/page/file/Resilient%20Los%20Angeles.pdf.

[18] *Id.* at 13, 45, 149.

[19] John Bacon, *Why Puerto Rico faces a monumental recovery effort* (Sep. 26, 2017), https://www.usatoday.com/story/news/nation/2017/09/26/why-puerto-rico-faces-monumental-recovery-effort/703515001/#.

still have unreliable service. Many remote parts of Puerto Rico remain without the necessary telecommunications networks to respond to subsequent hurricane seasons.

While the FCC announced procedures for distributing 691 million dollars for the funding of fixed broadband networks in Puerto Rico and the U.S. Virgin Islands, these funds have yet to materialize the networks as intended.[20] The competitive bidding process for the Uniendo a Puerto Rico Fund Stage 2 auction was released on November 2, 2020. However, due to the extended deadline for providers to submit supplemental information, money has not yet been disbursed to providers.

As Darrick Kouns, the Chief of the Information Technology Disaster Resource Center in Puerto Rico stated in a FCC hearing, the best way for strengthening communications is to move forward is to continue to harden cellular infrastructure.[21] He pointed out that sufficient energy backups are necessary to continue operation in times of disaster. Further, he noted that additional technologies such as very-small-aperture-terminal ("VSAT") could be utilized for temporary additional backhaul. However, it is difficult to entice carriers to implement these suggestions because of the lack of federal regulations stipulating the uptime or standard service level.[22] Mr. Kouns also suggested that the use of Land Mobile Radios could enable direct voice communications between sites without relying on terrestrial networks, ensuring that critical agencies would have a way to relay information between themselves, even if there was a lack of wireless or fixed signals.[23]

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[20] Mike Robuck, *FCC sets up process for up to $691M in funding for networks in Puerto Rico and U.S. Virgin Islands* (Feb. 5, 2020), https://www.fiercetelecom.com/telecom/fcc-sets-up-process-for-up-to-691m-funding-for-networks-puerto-rico-and-virgin-islands.

[21] Statement of Darrick Kouns, Information Technology Disaster Resource Center Operations Chief, Puerto Rico (Feb. 21, 2020), https://www.fcc.gov/sites/default/files/puerto-rico-hearing-02212020-kouns.pdf.

[22] *Id*.

[23] *Id*.

Additionally, Sandra Torres López, President of the Puerto Rico Telecommunications Regulatory Board testified that after many long days of working with government agencies, carriers, and other industry representatives, the board had identified a series of courses of action to bolster Puerto Rico's network resilience in preparation for future disasters.[24] Some of the actions proposed included streamlining permitting and rights of way processes for towers and fiber deployment; establishing a program to deploy municipal hotspots; creating a Communications Steering Committee for Puerto Rico; and developing auxiliary communications capacities with volunteer radio groups and organizations.[25] These steps are designed to help ensure that Puerto Rico's government is able to communicate emergency response information to its citizens regardless of availability of wireless or fixed connections on the island.

Ms. Torres López also highlighted the steps providers have taken to ensure that new networks are deployed and remain reliable, including increasing equipment and inventory stored on the island in order to repair, recharge, or deploy stop gap equipment to keep Puerto Ricans connected. She also described the one thousand miles of fiber line that has been deployed to reduce reliance on wireless network infrastructure.[26]

There are additional steps the Commission should take to help accelerate Puerto Rico's rebuilding process. Importantly, the Commission should not discriminate between natural disasters when a disaster significantly disrupts the communications networks of any area of the U.S. For example, after Hurricane Michael struck Florida the Commission investigated the failure of telecommunications providers to quickly restore service.[27] In the wake of Hurricane Katrina, the Commission authorized an independent investigation to understand the scope of the damage and opportunities to improve emergency preparedness and resiliency planning. However, in an inexplicable move, the Commission did not

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[24] Statement of Sandra Torres López, President, Puerto Rico Telecommunications Regulatory Board (Feb. 21, 2020), https://www.fcc.gov/sites/default/files/puerto-rico-hearing-02212020-torres.pdf.
[25] *Id*.
[26] *Id*.
[27] *Id.* at 7.

convene an independent panel to investigate telecommunications failures after Hurricane Maria which dwarfed the damage caused by other storms.[28]

Critical assessment of any large-scale outage can provide useful information to support clear recommendations on improving resilience efforts. Just as importantly, the Commission must work in conjunction with the impacted communities to provide information and solutions that have worked in previous disasters. It is also helpful for government officials to conduct field hearings and engage with affected communities, allowing residents and local officials who are closest to the issue to inform Commission forward-looking policies.[29]

In 2018, the Government Accountability Office ("GAO") released a report on the industry-led Wireless Resiliency Cooperative Framework ("Framework").[30] The report found that the Commission did not have a means to evaluate the progress of the initial implementation of the Framework.[31] Likewise, the FCC agreed that they had no way to assess progress and accepted the GAO's recommendation to put in place more robust measures to better monitor the deployment of the framework.[32]

As of March 2021, the Commission has not instituted further rulemakings to correct its vulnerability, put in place new regulations to increase their data collection, or measured the effectiveness of the Framework. Without taking these steps the FCC has created a gap in national resilience policy, leaving it up to the states to pick up where the Commission has left off.

State resilience policies are vastly different from one another as each state is impacted differently by natural disasters. Currently, national corporations are required to comply with all of the state policies in the areas in which they serve, which may lead a service provider leaving an area due to an inability or unwillingness to meet a state resilience policy. If the Commission were to take federal leadership on resilience planning, and work with state and local

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[28] Free Press, Connecting The Dots The Telecommunications Crisis in Puerto Rico at 5 (2019), https://www.freepress.net/sites/default/files/2019-05/connecting_the_dots_the_telecom_crisis_in_puerto_rico_free_press.pdf.
[29] *Id.* at 5 (Chairman Pai visited Puerto Rico in November of 2017 and met with government officials and providers alike but did not hold a single hearing).
[30] *Id*. at 12.
[31] *Id*.
[32] *Id*.

governments as well as providers, it will provide more stability and predictability during the increasing number of natural disasters increases nationwide.

After Hurricane Maria, Puerto Rico had to undergo a complete rebuild of its telecommunications networks. Today, it has taken significant strides to rebuild, future-proof, and harden its networks so that a natural disaster will not take the entire island offline again.

NEW YORK CITY

When Superstorm Sandy struck New York City, telecommunications outages followed the pattern of utility power outages and flooding. Utility power failures immediately disabled cable and Internet services in homes and businesses. As flooding and winds increased, so too did damage to electrical switchgear, backup generators, and overhead wiring. Cable infrastructure experienced outages while water infiltrating legacy copper networks disrupted both cable and telephony services.[33]

New York City found that longer-term communications outages were caused by flood damage to commercial and residential buildings and, specifically, to the internal or external telecommunications hardware attached to those buildings. New York City noted that cell service outages were often caused by loss of power, loss of backhaul, or physical damage to the antenna.[34]

In the aftermath, New York City developed and released a report detailing the damage to the City's systems, what improvements can be made to existing systems, and what strategies can be adopted to best improve network resilience. The report contained a risk assessment in which the City concluded that gradual hazards do not present more than a minor risk as they are not imminent. However, the assessment found that New York's facilities still face a significant and increasing risk of flooding due to extreme events such as storm surges.[35]

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[33] The City of New York, A Stronger, More Resilient New York at 166 (2013), http://s-media.nyc.gov/agencies/sirr/SIRR_spreads_Lo_Res.pdf.
[34] Id. at 168.
[35] Id. at 169.

Resilience planning is an iterative process. Accordingly, New York has undertaken a series of initiatives to improve resilience and prepare for the next disaster. First, New York City established an office within the New York Department of Information Technology & Telecommunications that focuses on telecommunications regulations and resilience planning. This department is intended to provide resources and assist providers in navigating city processes regarding increasing conduit infrastructure and resiliency.[36] Second, the City began to use the renewal of franchise agreements with cable providers to establish standards for repair timeliness and data reporting and publishing requirements.[37] Before franchise agreements were up for renegotiation, the City encouraged providers to increase disaster preparedness and also required providers to submit business continuity plans which must be updated on a regular basis. Finally, the City also undertook initiatives to create flood protection standards that ensure the hardening of all critical facilities.[38]

Superstorm Sandy forced New York City to investigate the places where its planning and resiliency efforts had fallen short. Damage to legacy infrastructure and the requisite response efforts accelerated efforts to replace copper networks with more resilient fiber cables.[39] While it is unfortunate that it took a natural disaster to upgrade networking technology, the actions taken by New York City will help to ensure that, if anything similar happens in the future, network disruptions will be drastically reduced.

TEXAS

In February 2021, Winter Storm Uri impacted the United States from coast-to-coast, spreading heavy snowfall and damaging ice from the Northwest into the South, Midwest and Northeast.[40] The places most heavily impacted were southern states such as Texas. Many Texas cities saw record snowfall with at least 80% of Texas

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[36] *Id.* at 171

[37] *Id.*

[38] *Id*. at 172.

[39] *Id.* at 166.

[40] The Weather Channel, *Winter Storm Uri Spread Snow, Damaging Ice From Coast-to Coast, Including the Deep South (Recap)* (Feb. 16, 2021), https://weather.com/safety/winter/news/2021-02-14-winter-storm-uri-south-midwest-northeast-snow-ice.

being covered.[41] This snowfall combined with a historic winter cold front left many Texas homes without power and greatly affected internet and cell phone service within the state. On Wednesday, February 17, 2021 the FCC reported there were 208 reported outages in Texas.[42] This caused an estimated 369,918 wireless users and 34,868 wireline users to lose access to their internet connections.[43] This was the highest day of the three days the Commission has released data on.

The catastrophic winter storm showcases the interdependence of electrical utilities and broadband infrastructure. As the FCC highlighted the failure of the Texas electrical grid forced many providers to rely on generator power to continue operation. However, due to icy and unsafe road conditions, fuel delivery to these systems was delayed.[44] The Commission also points out the frigid temperatures also caused fuel reserves to gelatinate and become unusable. The challenges that arose as a result of the failing of one type of critical infrastructure have shown a light on the interdependencies between infrastructure sectors.

As a result, the House Oversight Committee is investigating the agency that operates the Texas power grid, and is in the process of seeking information and documents about the lack of preparation for Winter Storm Uri.[45] In a letter to the Chief Executive Officer of the Electric Reliability Council of Texas, U.S. Representative Ro Khanna voiced his concerns that the loss of electric service will happen again unless Texas adequately prepares for an increase in extreme weather events.[46] Additionally, the House Energy and Commerce Committee has announced its intention to hold a hearing examining the importance of building a more resilient power grid.[47] However, the FCC has yet to announce whether it intends to undertake

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[41] *Id*.

[42] Public safety and Homeland Security Bureau, *Winter Storm Uri Update* (Feb. 18, 2021), https://docs.fcc.gov/public/attachments/DOC-370095A1.pdf.

[43] *Id.*

[44] *Id*.

[45] Associated Press, House panel investigating Texas grib operator over lack of winter storm preps that led to deadly blackouts (Mar. 3, 2021), https://ktla.com/news/nationworld/house-panel-investigating-texas-grid-operator-over-lack-of-winter-storm-preps-that-led-to-deadly-blackouts/.

[46] Letter from Ro Khanna, U.S. Rep., CA-17, to Bill Magness, Chief Exec. Officer, Electric Reliability Council of Texas (Mar. 3, 2021) (available at https://oversight.house.gov/sites/democrats.oversight.house.gov/files/2021-03-03.Khanna%20to%20ERCOT%20re%20Winter%20Storms%20in%20Texas.pdf).

[47] House Committee on Energy & Commerce, E&C Announces Oversight Hearing on Texas Power Crisis & Energy Hearing on Electric Grid Resilience (Mar. 15, 2021) (https://energycommerce.house.gov/newsroom/press-releases/ec-announces-oversight-hearing-on-texas-power-crisis-energy-hearing-on).

an investigation into the resilience frameworks that Texas internet and mobile service providers have in place to ensure they will be able to operate independently of a functioning power grid.

Winter Storm Uri stands as a glaring example of just how interconnected our infrastructure truly is. Texans across the state who rely on wireless hotspots or mobile connections to get information or communicate with loved ones were simply unable to because of rolling blackouts. Ensuring resiliency of infrastructure at every level of the supply chain is necessary to reduce points of failure in the face of a natural disaster, even if it is unexpected.

HURRICANE KATRINA

In 2005, Hurricane Katrina wrecked the Gulf Coast. Millions of Americans were left without homes, power, food, and Internet access. In the aftermath, the FCC set up an independent panel to review the impact of the disaster on the communications networks in the affected areas. The panel identified several significant impediments to the recovery efforts including uncertainty regarding access to affected areas by repair crews, limited security for infrastructure and personnel, lack of back-up equipment, and lack of established coordination between the industry and state and local governments. The panel also concluded that industry communication with the federal government was effective in facilitating coordination.[48]

To address these impediments, the panel developed working groups that discussed and examined the response procedures regarding infrastructure resilience, recovery coordination procedures, and emergency communications.[49] The panel found that while many of the towers public safety communications networks remained standing, the length and damage caused by the storm exceeded the capabilities of the backup generators that were intended to keep them online.[50] Similarly, the failure of public switched telephone networks significantly hampered public safety response. Specifically, more than 1000 base station sites were

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[48] Independent Panel Reviewing the Impact of Hurricane Katrina on Communications Networks, Report and Recommendations to the Federal Communications Commission at 5 (2006), https://transition.fcc.gov/pshs/docs/advisory/hkip/karrp.pdf.
[49] *Id*. at 3-4.
[50] *Id.* at 7.

impacted, but not destroyed, and 80% of the affected sites were able to be restored to service within a week of the storm.[51] In more affected areas cellular base stations on wheels were deployed to help boost connectivity where traditional base stations required more substantial repair.[52]

In light of these findings, the panel proposed several recommendations to the Commission. They included positioning industry protocols so that documentation on response and readiness procedures would be readily available to the public in order to understand how industry is preparing for the next disaster.[53] Additionally, the panel recommended improving recovery coordination by engaging other appropriate federal agencies in coordinating response.[54] Further, the panel recommended that the Commission work with state and local governments, as well as, the communications industry to better utilize state and local response assets.[55] Other recommendations included improving operability and interoperability of public safety communications and improving emergency preparedness communication with the public.[56]

The Commission instituted a rulemaking and, upon its completion, ordered the Public Safety & Homeland Security Bureau ("PSHSB") to work with industry to develop voluntary industry-sector readiness checklists, and to publicize them as they were completed.[57] The Commission also directed the PSHSB to implement an awareness program to educate public safety agencies about alternative technologies and to encourage agencies to provide regular training on these technologies.[58] Additionally, the Commission's goal was to assist the emergency medical community, ordering PSHSB to provide further guidance and assistance to state and local government, health care providers, and law enforcement on the use of Land Mobile Radio equipment and ensure that robust emergency plans were in place.[59]

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[51] *Id*. at 9.
[52] *Id.*
[53] *Id.* at iii.
[54] *Id.*
[55] *Id.* at iv.
[56] *Id.* at v.
[57] *Recommendations of the Independent Panel Reviewing the Impact of Hurricane Katrina on Communications Networks*, EB Docket No. 06-119, Order, 22 FCC Rcd 10541 at para. 8, (EB 2006).
[58] *Id*. at 4-5.
[59] *Id*. at 5-6.

The Commission encouraged PSHSB to continue to work with state and local governments. In a critical move, it refused to take action to prohibit states and localities from imposing emergency preparedness requirements on industry.[60] This provided communities who needed to tailor their preparedness strategies to their community with the freedom to do so without concern of a communications provider refusing to work with them.

Congress also made calls for an increase to resiliency efforts in the wake of Hurricane Katrina. In 2005, U.S. Senators Susan Collins and Joe Liberman introduced the Assure Emergency and Interoperable Communications for First Responders Act. This proposal was designed to provide $3.3 billion in grant funding to state and local agencies to build interoperable communications systems over five years. The bill would also have tasked the Department of Homeland Security with assessing current technological capabilities and evaluating emerging ones that could be adapted to a national framework promoting interoperability and information sharing. While this proposal ultimately did not pass, it provided a framework for how a program that supports state and local resiliency efforts could be established. Importantly, it highlighted the need for more research to be done into what technologies are available, what technologies are forthcoming, and how they can be most effectively used to mitigate damage caused to the nation's telecommunications networks as a result of natural disasters.

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[60] *Id*. at 8.

RECOMMENDATIONS

As natural disasters increase in both frequency and intensity, both the Commission and Congress must take renewed steps to ensure our nation's telecommunications and broadband networks remain operational. While there is no singular solution to network resilience and unique situations require unique and specific solutions. However, there are some steps that can be taken to ensure that when disaster's do strike, communities are not left both confused and in the dark.

#1 The FCC Should Not Discriminate Between Which Large-Scale Natural Disasters That Disrupt Telecommunications Networks Should Be Documented.

Part of the Commission's mission is to ensure the integrity of our national networks. In pursuit of this mission, the Commission must ensure that it is collecting all of the information available. It does residents a disservice to pick and choose which disasters deserve to be investigated and which do not. Failing to take action regarding a natural disaster's impact on a telecommunications network ensures that communities may not see relief for long periods of time.

Additionally, failing to investigate large scale outages does not prepare federal, state, and local agencies to respond when similar events occur in the future. If investigations are done in a timely manner, resources can be efficiently deployed to help get communities back online far faster than they would if left to communities to fend for themselves.

#2 The Commission Should Require Providers to Submit Regional Resiliency Plans and Devise Procedures to Hold Them Accountable for Noncompliance.

Resilience planning is crucial to timely and efficient response to natural disasters. Clear indications of how a provider will respond is an essential component of local emergency preparedness planning and provides information before consumers are directly affected by a natural disaster. Providers have a much better

understanding of their own networks and should be required to collaborate with all levels of government to craft and submit resiliency plans.

The Public Safety and Homeland Security Bureau at the FCC already collects data regarding network status and situational awareness, but the reporting is voluntary, and providers are not required to do so. Considering that the Commission is already working with providers during the voluntary reporting process, it makes sense to require sharing of information on how providers plan to keep their networks operational during a crisis or the steps that it will take after its networks have been damaged to reestablish connectivity in an affected area. State and municipal governments would benefit from federal expertise when it comes to resiliency planning.

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#3 When Crafting Resilience Plans, Providers Should Work with State and Municipal Governments to Ensure That They Account for the Unique Features of the Region.

Communities must determine what the assets and costs in their communications networks are, determine the most likely challenges that will be faced during a natural disaster, and what policies are already in place and how they may interact with a new resiliency plan. These types of engagement by municipalities will allow them to improve their communications systems and promote their resilience. Likewise, providers may have the greatest insight into how their networks will perform under stress, however, many state and municipal governments understand how the geography and topography of their communities will affect how they are affected by natural disasters.

Ensuring collaboration between providers, state, and municipal governments will ensure that each has the opportunity to share the assets they have and the challenges they face. Similarly, during implementation of these plans,

communication remains key. The lack of communication can delay emergency services or repair crews, which can increase damage to critical infrastructure. Thus, standardizing procedures by which providers communicate with state and local officials can streamline response efforts and help to ensure that there is a clear roadmap detailing the role each stakeholder will play.

#4 **Providers Should Not Wait Until a Disaster Strikes to Replace Legacy Networks with New Technologies. Instead, Outdated Infrastructure Should Be Replaced in Order to Increase Resilience.**

Flooding, high winds, and earthquakes have the potential to seriously damage cables that have been undergrounded or placed on poles. However, technologies such as copper wire are more susceptible to damages than are contemporary networking solutions such as fiber optic cables.

Providers should not wait until a disaster has impacted a community to decide that it is time to upgrade its legacy systems. Taking a proactive approach and determining where legacy systems are likely to be impacted the greatest and either replacing those systems with new technologies that are more resilient, or hardening conduits against the elements may prove to be the difference between a neighborhood maintaining an Internet or phone connection and it being left without any meaningful way to gain access to information during a natural disaster.

#5 **Congress and the FCC Should Make Appropriate Resources Available to State and Municipal Governments to Implement Measures That Reduce Natural Disasters' Effect on Broadband Networks.**

Often the largest barrier to adopting programs at a local level is funding. Hiring consultants, doing research, and building the avenues through which programs are implemented are serious financial burdens that localities often cannot shoulder themselves. Since Congress and the FCC agree that resilience planning is essential, both should work to ensure funds as well as coordination and oversight are provided to accelerate restoration and bolster network resilience.

Additionally, state and local officials must be made part of the process in designing and governing any funding program so as to put resilience funding to the best use. Those needs may range from manpower or technical support to train its employees to support for distributing information to the public. The best time for Congress and the FCC to work with state and municipal governments on preparing for a natural disaster is before the next emergency strikes.

CONCLUSION

As local governments begin to look at the communications networks present in their communities, they must not only focus on how to expand them so that all their citizens are connected but develop strategies to ensure that they remain operational under the most stressful conditions. During a natural disaster, cellular and broadband connections are used to get weather updates, procure information regarding evacuations, shelter in place orders, or other governmental alerts that are intended to keep citizens appraised of the current situation.

It is time for federal entities to prioritize network resilience planning. Ensuring that citizens have the most basic form of access, even during natural disasters, will increase public safety and prevent much of the anxiety and fear felt by citizens when they cannot reach family, friends, or trusted sources of information during a crisis. Planning for the future is necessary and essential, especially as weather grows more extreme and, nationwide, residents have become increasingly reliant on broadband connectivity for key information.