The Future of California's Communications Grid

En Banc Hearing Summary
May 20, 2019

DISCLAIMER

This summary does not necessarily represent the views of the CPUC, its employees, or the State of California. This paper has not been approved or disapproved by the CPUC nor has the CPUC passed upon the accuracy or adequacy of the information in this summary.

Contents

Introduction

On May 20, 2019, the California Public Utilities Commission's (CPUC) Communications Division held a workshop at Sacramento City Hall to hear from a wide range of stakeholders to better understand the state's communications needs and challenges in the coming years. This workshop was the first in a series of stakeholder engagement opportunities to address how the current processes and regulations will need to evolve to stay relevant to Californians. Although a quorum of Commissioners, their advisors or other decision-makers were present, no action was taken at this event. This En Banc was independent of any CPUC proceeding.

This summary is a distillation of the discussion at the En Banc and includes written comments submitted by stakeholders following the event. The written comments follow the summary. A video recording of this event is archived and should be used as the primary source when referring to comments made at the hearing.

The URL for the archived video (in 2 parts) is:
http://adminmonitor.com/ca/cpuc/en_banc/20190520/1/

Panel Discussions

Affordability and Access Panel (10:35-11:30)

Moderator: Catherine Sandoval, Associate Professor Santa Clara University School of Law
Panelists: Sunne Wright McPeak, President and CEO, California Emerging Technology Fund
              Angela Siefer, Executive Director, National Digital Inclusion Alliance
              Ana Maria Johnson, Program Manager, Public Advocate's Office

The Affordability and Access panel focused on the communications needs of low income and disabled populations in the coming years. The panel touched upon issues arising as network speeds and diversity of devices increase. The panel also discussed the need for a systematic plan to close the digital divide and improve digital literacy and digital inclusion.

Discussion Points:

- The panel noted overlays between digital exclusion and high-risk environment zones, such as wildfire or flood zones. In order to increase economic development, broadband deployment needs to cross over functional silos such as emergency response and economic inequality.
- Broadband deployment is still inadequate. 22% of California households are either under-connected (smartphone only) or un-connected. Moreover, 43% of rural communities have unreliable broadband access.
- We do not know today how many people sign up for low-income broadband service offerings. We do know the churn is about 50% [number of people who drop service, usually due to relocating]. We need to have public disclosure of this information by the internet service providers. The state should consider making disclosure of this information a requirement in any new broadband procurement contracts.
- Affordability and digital literacy need to be addressed on a larger scale. Community-based organizations and local governments can and do play a critical role in this area because they have community trust.
- 70% of Californians don't know about low-income broadband offerings.
- No single technology can provide basic service to everyone, but quality and affordability are important factors. Prices are not always transparent to the consumer, and in some parts of the state there is little consumer choice. Funding for low-income programs needs to be sustainable for the long term.
- There is a lack of broadband competition. The latest CPUC estimate shows only 7% of California households are in census blocks where 3 or more providers can offer speeds of 25 megabits per second downstream and 3 megabits per second upstream or higher. In most areas, the choice is

between a telephone company and cable company. The lack of competition affects prices and service quality.

- The CASF program exists because building broadband in rural areas with low housing density isn't profitable. However, many of the large providers don't want to deal with the bureaucracy (both their own and California's). For example, every one of the large providers is headquartered outside California, and they must go through multiple approvals in headquarter offices to get capital to build networks. Also, it's hard to pull permits in any jurisdiction.
- The CASF infrastructure grant program cannot be administered as a passive grant program, because it will never meet its 98% goal. The program should be more proactive with the CPUC publishing "preferred scenarios" These "preferred scenarios" should come from the regional consortia, because they know where the unserved communities are located. In this approach, the CPUC would look at where the ISPs are relative to the unserved communities and ask where it makes sense to have joint backhaul, access to middle mile? Meet with the ISPs and figure out where they can help, and where they can't fund a build.
- By adopting this "preferred scenario" approach, the state could tie ISP participation in CASF to state procurement contracts.
- Students need broadband at adequate speed and capacity to do homework. This access should be over a fixed connection rather than a mobile device, because with data caps mobile broadband becomes expensive. Also, students can't do homework solely on a small screen.
- There has been a dramatic reduction in the "under-connected." It went from 18% to 10% over the course of two years, mainly due to school-based strategies in low income communities.
- When schools train parents how to use broadband technology, there is a remarkable increase in use.
- California needs data on how much people are paying for broadband. This requires stronger partnerships with providers. California cannot create a strategy without data.
- There is no data on how much people are paying for broadband and for what speeds. Without this data, we can't create a strategy.
- Power companies have a good handle on their low-income customers (through the CARE program), and a facilitator could work with the power companies to connect those customers to low-income broadband service offerings.

Public Comment:

- Ubiquitous wireless service is essential. Kids need 100 Mbps to support video streaming. 75% of internet traffic either originates or terminates on wireless. New satellite technology may be a disrupter to legacy DSL service.
- People sometimes don't choose to connect to the internet because they don't trust their provider. Privacy concerns are critical for some in the decision to adopt broadband.

- We're using a speed benchmark (25 Mbps down/3 Mbps up) that is much slower than the rest of the world. The big ISPs aren't deploying dense fiber networks, and that is going to severely limit availability of 5G service.

Emergency Preparedness and Response Panel (11:30-12:30)

The Emergency Preparedness and Response panel focused on the demands and challenges for emergency communications within the state in the coming years. This included the evolving needs of first responders and victims of natural disasters, changes in the technology realm, and issues with communications services during and after emergencies.

Moderator: Alice Stebbins, Executive Director, CPUC
Panelists: Budge Currier, 9-1-1 Branch Manager, Public Safety Communications, CalOES
              Kevin Guerrero, Staff Chief, Fire Protection Operations, CALFIRE
              Scott Howland, CIO and Chief, Information Management Division, California Highway Patrol

Discussion Points:
- The public assumes that wireless devices will always work. When disaster strikes, infrastructure is damaged and cell sites can go offline or be destroyed.
- There is an expectation of ubiquitous, real-time connectivity for first responders, but many areas of the state do not have broadband or even basic cell phone coverage. This is why first responders still rely on land-mobile radios. There are 177 repeaters across the state, and they have held up during major fires.
- Commercial networks and infrastructure often fail because of a lack of site hardening or insufficient back up power/ diesel generators.
- Broadband is necessary to upload real-time maps and maintain situational awareness. When the network goes down, there is no broadband backup plan, and first responders must rely on land-mobile radio.
- The California Highway Patrol used to rely on just land-mobile radio and a siren. Now, they rely computers and data, and that reliance has increased exponentially.
- Multiple forms of communication are used during emergencies. These forms include first responders to 9-1-1, among first responders, and first responders to the general public.
- There are emerging concerns about first responders having the right connectivity needed to respond to emergencies. As first responders respond to emergencies in remote areas, it is essential to not lose the ability to communicate.
- While technology has provided 24/7 instant news, public safety may struggle to achieve full understanding of an emergency. First responders struggle to maintain situational awareness as they're inundated by multiple forms of communication and information. Incident commanders depend heavily on their cellphones to communicate with other senior leaders (chiefs, commanders, etc.).
- Wireless carriers need to communicate better with each other during emergencies.

- First responders need to be aware of the amount of broadband coverage in areas hit by disasters (e.g. which areas have lost coverage), as well as what level of coverage was present before the disaster.
- Disaster response could be improved greatly with inter-carrier roaming and real-time network status from each carrier.
- There needs to be a dashboard that shows network status of all the carriers in an area. What works in "Area A" may not work in "Area B" due to providers having different coverage maps. Carriers could be more helpful in deploying portable cell sites, offering cloud sharing of documents and maps.
- Challenges in dealing with disaster scenarios include coverage, capacity, reliability, resiliency and cybersecurity.
- When infrastructure is under attack and a high demand is being put on it, network performance suffers. There is not a good understanding or plan to address needs and manage expectations relative to infrastructure serving disaster areas. There is no pre-planning for outages that occur from natural disasters.
- There needs to be a paradigm shift from companies always insisting that their services and network are strong and reliable. Adequate response and recovery require a great deal of integration and planning.
- First responders need to engage communications providers in more productive ways. Redundancy routes need to be created, and we need to partner better with the carriers in emergency planning and response.
- Power generation at cell sites and network nodes is essential. There is a need for more redundancy and network hardening.
- Fiber assets need to be made more transparent in communities. Communities can't continue to be isolated. The issue of backup power for cell towers should be revisited.

Libraries and Education (1:30-2:25)

The Libraries and Education panel focused on the demands libraries and schools will put on the communications grid as the Internet becomes more and more central to daily life. It also addressed some of the challenges libraries and schools face in the coming years.

Moderator: Blair Levin, Policy Advisor, New Street Research and Non-Resident Fellow, Brookings Institution Metropolitan Policy Project

Panelists: Anne Neville-Bonilla, Director, California Research Bureau
Geoff Belleau, Education Program Consultant, California Department of Education
Louis Fox, President & CEO, CENIC
Luis Wong, Chief Executive Officer, California K-12 High Speed Network

Discussion Points:
- Libraries provide access to teaching technology. Libraries provide, and will continue to provide, basic services to make sure communities are able to use new tools.
- Libraries are not just about books; they serve as a core community institution, as "economic first responders."
- In times of crisis, communities turn to libraries. Libraries must maintain high capacity during disasters. It is one of the only places people have unrestricted access to, and an abundance of, bandwidth to serve the community.
- There is a lot of usage within schools; broadband connections are always being utilized. However, some schools are still limited to slow DSL connections (still lacking fiber optic connectivity).
- Research institutions, schools, libraries, and community colleges and anchor institutions are important in disasters.
- Schools replaced computer labs with innovation labs. There are students doing stop-animation and using 3D goggles in third grade. Schools are creating action video games by learning how to program.
- The ability to extend classroom instruction to online learning allows people to set their own education goals and track progress. All schools should have the ability to engage students and improve learning outcomes.
- Testing was the main driver behind the Broadband Infrastructure Improvement Grant (BIIG), which brought gigabit speeds to hundreds of K-12 schools.
- Schools will require faster and faster speeds to support new technologies and collaboration in real time, but schools are struggling to keep up. Broadband internet improvement grants can help schools stay up to date.
- In order to help communities lacking capacity and infrastructure in their schools and communities, California should try to do an inventory of community assets and populations

10

served. There should be a sit-down with community anchor institutions, such as businesses, healthcare, and residential services to create a collective strategy. Only through aggregation will communities be able to attract providers able to justify the necessary build-out. Localized solutions are the answer.

- Communities lacking capacity and infrastructure in their schools and communities must be addressed systematically. There was a struggle to connect 10 years ago and it is a continual problem. There are limitations in funding opportunities and there are no uniform solutions.
- Network sharing would lower 5G deployment costs for all providers, but it's unclear how 5G will benefit areas that lack fiber optic infrastructure.
- It is helpful to use subsidies to reach remote communities who want access.
- The lack of redundancy has risen to the forefront. In the areas most prone to disaster, redundancy is a key essential to communities and first responders.

Economic Growth and Prosperity (2:30-3:25)

The panel addressed the lack of broadband options in agricultural and rural areas and how it impacts many businesses outside California's major cities.

Moderator: Hon. Lloyd Levine (Ret. State Assembly), President, Filament Strategies,
Panelists: Eric Brown, President, California Telehealth Network and OCHIN Broadband Network Services
Terrance Rodgers, Economic Development Officer, Rural County Representatives of California
Robert Tse, Office of the Assistant Administrator, Telecommunications Program, USDA
David Witkowski, Executive Director, Civic Technology Initiatives, Joint Venture Silicon Valley

Discussion Points:
- There needs to be planning around how to move forward with bandwidth expansion and which agency would be the best to do that planning.
- In order to meet the needs of communities, fiber optic cable is mandatory. There can't be hesitation toward a top-down approach.
- There are multiple conflicts in local control, because authority is split between local, state, and federal rules. Municipalities are struggling with addressing applications for telecommunications placement in their communities, because many cities lack expertise in that area, and they tend to be understaffed and underfunded. The state could provide resources for cities that are struggling. Rural cities do not have the staff needed to process applications for 4G or 5G.
- Without more done to close the Digital Divide, Telehealth will be hard-pressed to connect clinics and hospitals in rural and urban areas.
- Connectivity in urban areas has improved, and prices have gone down. There needs to be priority a list of priority communities where broadband is needed. There should be organized efforts and focus to address those areas of need first.
- California should look at examples of what other states are doing and how those states coordinate their work on broadband. For example, states like Washington give preference to projects offering 150 Mbps. Indiana's broadband grant program gives preference to projects offering 100 Mbps down and 3 Mbps up.
- Universal availability of fiber is going to ensure California keeps up with changes and the rapid deployment of 5G.
- Patient outcomes are significantly better from expanding remote health care to mobile broadband, because it offers primary care physicians to do consultations with patients at their

home (and saving them time from having to drive long distances to a hospital or clinic). Also, mobile broadband can reduce costs.

- Most of the current uses for the internet are commercial but there will be many more non-commercial uses in the future. Prioritization of these non-commercial uses, such as for tele-medicine will need to be addressed.
- Leadership at the state level rather than regulation is the way to go. Many other states, such as New York, Tennessee and Washington, push from the top. Local leadership wants and sees the need for broadband.
- Building out a statewide fiber optic network may be expensive, but how expensive is it not to build out?
- There are 1,000 water districts, and there are opportunities to leverage their assets to build out broadband.

Public Comment:

- Lots of local resources are invested in economic development. Small business development hinges on local internet. Lack of an open internet is a disadvantage for local businesses.

Cybersecurity and Communications (3:30-4:25)

The Cybersecurity and Communications panel discussed the challenges with cybersecurity and encryption in the current and upcoming years.

Moderator: Danjel Bout, Program Manager, Utility Cyber Security Branch, CPUC
Panelists: Marc A. Glenn, Senior Cybersecurity Intelligence Analyst, Cal-CSIC
                     Vitaliy Panych, Deputy Chief Information Security Officer, CA Dep't of Technology

Discussion Points:
- Today, people often gamble with cyber-security by not fulfilling larger security roles. This is often due to budget constraints. Continuation of this trend will mean cyber-security companies will be able to charge more for services, especially as threats become critical.
- Security threats will become more sophisticated and the number of threats will continue to rise.
- There is a lack of implementing security basics, which are considered the "belt and suspenders" of security. Items are not being implemented, such as patches, or they are being improperly managed.
- There is a misconception that threats are residing on our networks. In the past 5 years, the time an attacker has dwelled on a server has dropped. In general, the number is now less than 100 days.
- "Internet of things" is simply a way to talk about devices people use commonly. Devices are all programmed to speak to one another and there is no market incentive to put security on these devices. Hence, the threat landscape for cyber-security expands exponentially.
- California must have the view that anything can be attacked. Home networks are vulnerable, and there needs to be some type of pro-active measure prior to allowing devices to have access to home networks.
- It would be nice to see some type of legislation established where California forces vendors to put some type of security mechanisms in place. It would force devices to authenticate before having an outbound connection. That ensures it is secure before home networks become more vulnerable.
- Managing and controlling devices at scale is a big problem. There is a different security landscape if there are many devices on servers.
- There must be proper patch basics and basic diligence. There must be management of trust and we must segregate devices. It is basic security 101 due diligence.
- Artificial intelligence (AI) created an explosion of machine learning algorithms. They sort through very large databases and look for patterns in the data protocols. However, AI won't be replacing people anytime soon, because algorithms can't tell you why they make decisions.

- Machine learning and artificial intelligence are very good at finding patterns, but it takes a person to dig into data and determine what the patterns are and why they might exist.
- In the AI community, the philosophy changed from the "need to know" to the "need to share" concept.
- There will always be human interaction with machines, and it will not get to the point where it is solely the machine doing the work. AI is not going to take over human intelligence.
- Basic practices to avoid vulnerabilities are at a low level. There needs to be a county or city agency focused on these practices. The state needs to assist communities in the hiring of personnel. Communities don't have qualified IT staff to maintain the network.
- People that don't have any experience with the internet have trust issues. When people use the internet, they assume it is trustworthy. As a state, California needs to make sure it has cyber-security on behalf of those who that aren't informed.
- California's agencies must make sure they don't operate in silos by ensuring collaboration across offices.
- Implementation of future encryption protocols will require control of the network. Investor-owned utilities can build and control cyber resiliency and have hardening requirements.
- Cybersecurity in energy and water utilities should be analyzed. As the deployment and use of distributed energy resources (DER) comes onto the grid, we must address at home scale or business scale cyber vulnerabilities in DERs. There needs to be encouragement of collaboration at that front and it is important for the DER market.

Comments Submitted to the CPUC

- Steve Castaneda, PDV Wireless
- Benjamin J. Aron, CTIA
- Glenna Barrett, Imperial Valley Economic Development Corporation
- Tom West, North Bay North Coast Broadband Consortium
- Mark Toney, The Utility Reform Network (TURN)
- Peter Hayes, Assistant Vice President, Regulatory, AT&T
- Charlie Born Director, Government & External Affairs, Frontier
- David Espinoza, Northeastern California Connect Consortium and Upstate California Connect Consortium

Steve Castaneda, PDV Wireless
scastaneda@pdvwireless.com

Dear Mr. Osborn,

Thank you for coordinating and hosting the Communication Division En Banc to discuss "The Future of California's Communications Grid."

As requested, I am submitting comments for the record to add to the discussion following the Cybersecurity and Communications session.

I have worked in the wireless sector for many years with telecom carriers; in the military as a Signal Officer; as a consultant to SDG&E for building a private broadband network. I can appreciate the need for encryption and secure communications, especially with regard to national security, as was highlighted in the session. However, implementing these security measures and other emerging technologies, like Quantum Key Distribution, requires a level of control and ownership of the network.

I'm sure that the Commission (CPUC) is aware that the FCC has recently issued a Notice of Proposed Rule Making (NPRM) on the licensed 900 MHz spectrum band. The Notice proposes to re-purpose 900 MHz spectrum to be used for the first time by electric utilities to construct and operate a private wireless broadband network in their service territories. The electric utilities will have the opportunity to have private wireless broadband networks that they control, with the cyber-resiliency and hardening requirements that they could not otherwise get from a wireless telecom carrier to protect their mission critical operations. This is a very important FCC docket for cybersecurity reasons that were discussed during the panel.

Having operational control and design of the wireless broadband network is essential for: ensuring ubiquitous coverage; implementing encryption and cybersecurity measures; and for the hardening of facilities to sites that are critical for the communications of the Grid, especially in the high-risk wildfire areas. As the electric IOUs contemplate rolling electric shutdowns due to high fire risk, ubiquitous communications networks running on the 900 MHz spectrum can help reduce shut down time (and impacts on vulnerable people), by providing real time data from weather sensors and video cameras, and being able to take quick action to turn off electricity to damaged lines. I recommend that the CPUC provide incentives for electric IOUs to obtain 900 MHz spectrum to stand up these important private wireless broadband systems to protect their systems from cyberhackers, and to be able to take faster and more effective action against natural disasters.

Sincerely, Steve Castaneda, Sr. Manager, Product Development

Benjamin J. Aron, CTIA
(received from Wendy Pena, WPena@goodinmacbride.com)

Dear Mr. Osborn:

CTIA and its members appreciate the opportunity to comment on the Communication Division's En Banc, "The Future of California's Communications Grid," which was held on May 20, 2019. The allowed seventy-two hours, however, are insufficient to address the wide range of issues that were raised at the En Banc, including on the Emergency Preparedness and Response panel. CTIA notes that the En Banc has been described as the "first in a series of stakeholder engagement opportunities," and CTIA and its members look forward to the opportunity to participate with other stakeholders in an open and robust dialogue regarding issues raised at the En Banc.

Respectfully submitted:
/s/ Benjamin J. Aron

Benjamin J. Aron
Director, State Regulatory and External Affairs
CTIA®

Glenna Barrett, Imperial Valley Economic Development Corporation
glenna@ivedc.com

Good morning:

Please see my responses below.

Thank you,

Glenna Barrett
SBBC Executive Director
and Business Development Services
Imperial Valley Economic Development Corporation
2415 Imperial Business Park Dr., Ste. A Imperial, CA 92251
glenna@ivedc.com Cell: 760.425.0688
Business: 760.353.8332 Fax: 760.353.9149

1. Affordability and Access
Questions: What issues may arise as network speeds increase and devices proliferate, and how will communications services continue to be affordable?

ISPs need to work on making devices and services affordable for everyone. The prices vary between $10.99- 14.99 for low income and then jump up to $75-$125 for non-low-income individuals. As more devices saturate the market prices for devices should decrease.

The SBBC is working with local government agencies to provide refurbishing classes and MiFi devices to low income families for applying for jobs and job training services.

2. Emergency Preparedness and Response
Questions: How will the needs of first responders and victims of natural disasters likely evolve over time?

AT&T and CalOES are working on programs to assist in emergency situations. In the future, backup infrastructure will be in place if the lines go down in a disaster.

3. Libraries and Education
Questions: What challenges do libraries and schools face in the coming years with regards to the communications grid?

Libraries and schools face the same challenge, funding. With ever evolving devices, schools and libraries are left behind because of the lack of funding available for these types of services. The SBBC is working with the Boys and Girls Club and Workforce Development Board to establish Digital Literacy Centers throughout the county for people to have access to the devices they wouldn't normally be able to use.

4. Economic Growth and Prosperity
Questions: What are the challenges to economic growth and prosperity created by the lack of access to the communications grid?

People would not be able to sell their products online, access to telemedicine and online education would not be available if there is no access to the communication grid.

5. Cybersecurity and Communications
Questions: How will cybersecurity likely to evolve?

At the CENIC conference I attended quite a few cyber security panels and it looks like people are working really hard on this issue. Imperial County just underwent a cyberattack and decided to create a whole new system instead of paying the ransom. This affected the entire county in a negative way. Cybersecurity will evolve and get better because it has to.

Tom West, North Bay North Coast Broadband Consortium
tom@westfamily.org

From: Tom West
Subject: Communications Division En Banc - "The Future of California's Communications Grid": My Comments

Date: May 21, 2019

Thank you for the opportunity to participate in the CPUC Communications Division's En Banc this past Monday. I found it to be very informative; hopefully, all the Commissioners in attendance gained insights into the important challenges and opportunities involved in bringing broadband access to all Californians.

Before turning to my specific comments there is one underlying message I took away from the day:

"Most of the panelists and floor speakers, except the Calspeed guy, agreed: 1) there is a need for a comprehensive, redundant and resilient fiber-based backbone infrastructure throughout California; 2) such a backbone infrastructure does not exist today; and 3) until such a statewide backbone is in place we will not be able to meet the current and future broadband needs of a wide range of consumers and producers of information that drive our economy and satisfy the well-being of our residents."

The following are my comments and suggested actions on a selected number of pertinent points presented and briefly discussed in the various sessions. My comments and suggested actions are not presented in any order of priority.

Affordability and Access
1.   Update Statutes   Comment---I agree with Professor Catherine Sandoval's call for a review and update of the statutes that negatively impact the deployment, adoption and affordability of Broadband access and services.

Suggested Actions---1) Charge Sandoval to produce a report on statutes she believes negatively impact broadband deployment; 2) Form Ad Hoc Task Force, comprised of CPUC staff, ISPs and Regional Consortia representatives, to work with Sandoval to triage this list of statutes; and, 3) Assign the appropriate CPUC staff to craft updates to the statutes, starting with those deemed most obstructive.

2.	Adoption		Comments---Until this meeting I was of the opinion that if you built the infrastructure adoption would follow naturally. Sunne McPeak and Angela Siefer presented facts that refute that notion. While access and affordability to broadband are barriers to adoption, so too is the lack of access to the knowledge and skills on how to use broadband a major barrier for a significant number of individuals.

While I am not intimately familiar with past adoption programs my perception is that they: 1) lacked a common framework of the knowledge and skills an individual needs to learn; 2) were underfunded; and, 3) had mixed results. If we buy into the suggestion that "Digital Equity is a 20th Century Civil Right" we need a comprehensive and targeted game plan to tackle Adoption.
Suggested Actions---Under the leadership of CETF bring together representatives from the units within the California Community College System, State Library and the California Department of Education and community non-profits responsible for programs associated with broadband adoption to: 1) inventory and catalogue these programs and the numbers of learners being served; 2) develop a common programmatic framework to be used all the delivery programs; 3) develop a five-year plan of action with proposed budgets to be submitted to the State with a start date of Fiscal Year 2021-22; and, 4) have an Economic Impact Report prepared by a third party that demonstrates the long-term value of the State's investment.

3.	Affordability	Comments---My take away from the discussion is the providers are all over the place on special program offerings and the consumers lack trust in the financial sustainability of such programs.

Suggested Action----If it can be done by the CPUC, bring all of the providers together to: 1) develop a common framework for such special program offerings so the consumer can better understand and compare the offerings; and, 2) have each provider agree to a fixed price for the service for a given time period, no less than two years.

4.	Consumer Protection and Sustainability of Universal Access and Critical Services
Comments---Anna Marie Johnson clearly stated the challenges the CPUC faces, through its Public Advocacy Unit, in protecting consumers and sustaining the funding for the programs of critical services to ensure universal access to all residents of California.
Suggested Action---The CPUC should hire a consultant to assist in developing a long range funding strategy that will enable the Public Advocacy Unit to continue the scope of its work in protecting the interests of the consumers of broadband services.

Emergency Preparedness and Response
1.	Need for the Statewide Backbone (See my opening statement above)	Comments---These panelists demonstrated that they are knowledgeable about the need for a comprehensive statewide

backbone that has the capacity, reliability, resiliency and security they need, especially in times of disaster.

Suggested Actions---I thought I heard they are already working together at this level. If not, they should be.

Libraries and Education

1.   How to Extend this Big Silo to Serve Communities that Surround these Anchor Institutions
         Comments---CENIC is a huge success story (I am biased) in that they have deployed a statewide backbone infrastructure into all 58 counties and serve over 10 million users by connecting K-12 schools, community colleges, CSU campuses, UC campuses, Cal Tech, Stanford, USC, Post Graduate Naval School, community libraries, Native American Tribal communities and other non-profit organizations to its CalREN backbone network. In doing so they have created a very large silo effect in many communities across the State. And, given CENIC's mission and through various contracts and funding sources it is prohibited from extending services to the communities that surround these anchor sites. However, until there is a comprehensive competitively open statewide backbone this silo should preserved and pointed to as an example of what we want to achieve.

In the panel discussion, Louis Fox, CENIC, cited the fact that both federal and state funding programs had specific requirements that prevented CENIC or anchor institutions' from using fiber infrastructures these programs have funded to connect surrounding communities.

Suggested Action---Charge Fox, working with CENIC's members, to develop a strategy paper that would enable the combination of multiple funding sources to not only serve targeted anchor sites but to be used to extend services to surrounding communities. The CPUC, or some other State entity can promote this strategy at the State and Federal levels.

Economic Growth and Prosperity
1.   Fiber Backbone Infrastructure in Rural California   Comments---I concur with Terrence Rodgers', RCRC, call for the deployment of the comprehensive backbone infrastructure throughout rural California.

Suggested Actions—RCRC should join forces with the appropriate Regional Broadband Consortia (RBC) to pursue and secure funding to hire a consultant to assist in: 1) developing and designing such a backbone infrastructure; 2) projecting the costs of building this backbone; and, 3) identifying alternatives for ownership, management and operation of the infrastructure. Then RCRC and RBC should 1) develop a budget proposal for State and Federal funding to build the infrastructure; 2) and,

hire a third party to develop an Economic Impact Report that shows the State's investment provides a positive long term return in economic development.

2.   Oversight and Regulation and/versus Leadership Responsibilities   Comments---Robert Tse, USDA, called for the creation of a unit within State Government that provides the leadership for Broadband development. He cited other states that have done it and pointed to the successes. At the same time, David Witkowski, Joint Venture Silicon Valley, stated that the entity responsible for leadership should not be the same one responsible for regulation.

I agree with Witkowski and partially with Tse. I believe the CPUC has demonstrated that it does an excellent job in regulation. To ask it to take on a major leadership role could create significant stress and tension within the CPUC.

As for the leadership role, I thought that was already the responsibility of the California Broadband Council (CBC). The State should provide the CBC the right kind of staff to lead.

Cyber-security and Communications
 No comments or suggested actions. I was not present for this session.

Mark Toney, The Utility Reform Network
(received from Christine Mailloux cmailloux@turn.org)

Cynthia and Rob,

Thank you both again for your time and leadership to plan the En Banc on Monday. TURN found it to be a valuable and productive discussion of a wide range of issues that highlighted critical common themes.

We will use this opportunity to provide follow up comments as a way to highlight points that we thought were particularly salient to your planning of next steps and to add TURN's own thinking to the discussion. We look forward to working with the Commission on many of these issues.

Commission Must Take Leadership in Defining Communications as an Essential Service

TURN fully supports the policy goals, expressed several times by many speakers on all the panels and by the Commissioners themselves, that the Commission should look at communications capability as an essential service for California consumers. Some went so far as to call it a fundamental right and "a modern-day civil right," that should be provided on a nondiscriminatory basis to all Californians. This is an encouraging and important policy statement that must serve as the basis for many decisions going forward. Once this statement is embraced, the Commission can move forward to implement it by defining the "essential service" and ensuring robust, reliable, and affordable access.

As TURN and several other panelists also noted, the Commission has a role in this process. Indeed, as the expert agency on the industry, the state is expecting the Commission to take a leadership role, perhaps in partnership with other state agencies, to ensure that consumer needs are met and affordable access to this essential service is secure. In addition, more directed efforts are needed so that the Commission's leadership and knowledge can support coordinating and directing:

1) the establishment and enforcement of minimum standards for infrastructure and communications to support safety and emergency response;

2) the development of programs to ensure affordable access by residents, educational and research entities, and other consumers;

3) support for policies that encourage economic development in hard to reach and unique communities, and enforcement of transparent procuresses that protect ratepayer and

public assets; and

4) consumer protections, privacy and security through coordination for our state's communications network.

It is critical for the Commission to actively oppose any attempts by communication providers to use the legislative and regulatory processes to hinder or strip its oversight authority to hold carriers accountable to delivering a high-speed reliable communications grid that is accessible to all residents and businesses. Only through active engagement in the legislative process in opposing efforts like AB 1366 and other deregulation proposals, can the CPUC maintain its leadership position in driving the future of the communications grid. Monday's discussion clearly demonstrated that these critical consumer and economic issues transcend regulatory classifications and technology silos. These are issues where the "market" will not directly serve the needs of the state and where advocates, industry, and the Commission will need to work together to support communications policy in the public interest.

TURN Supports the Following Key Findings from Panel Discussions

Affordability and Access
- Essential services should include both voice and broadband and robust essential services must be brought into the home. As the network evolves, Universal Service policies must continue to be technology neutral.
- The role of the Commission's Public Purpose Programs must be clear, obtainable and transparent. These programs serve a critical role to ensure access to essential services along with other goals expressed above, but this must be balanced with cost effective solutions to protect ratepayer funding.
  - To ensure meaningful customer choice these programs must be flexible and functional to better understand consumer needs and change with the times regarding phones, plan prices, services, bundles, speed/capacity, and discounts
  - The benefits must be real and meaningful and cannot solely consist of a small discount on a significant bill or deployment of technology that is obsolete before it is deployed which would result in millions to the companies but not much benefit to consumers,
  - TURN believes additional resources and emphasis on neutral, third party outreach and education about all of these programs will result in increased participation
  - The Commission must not trade off accountability and fairness just to encourage carrier participation at consumers' expense
- The Commission's policies to ensure affordable access to essential services cannot solely rely on Public Purpose Programs. Working poor and other constituents that may not qualify for these programs must have access to an affordable essential service.

- Attention to the "invisible infrastructure" is important. Access is not helpful if one does not know how to use broadband services. But, digital literacy and adoption efforts must also ensure accountability, fairness, and meaningful benefits.
- Use your intervenors and partners at the local level as an insight into consumers' needs; "cookie cutter" solutions do not work for every community
- Integration of silos, including technology and regulatory silos, is critical to good public policy. Using government procurement tools, electric utilities for outreach and even service provision, other state and local agencies are critical
- Data gathering and transparency are critical as a first step to ensuring access to essential services and other policy goals- but it cannot be the primary achievement. Data gathering is a tool to addressing larger policy goals.

Safety and First Responders
- Overarching Goal: If we expect infrastructure and services to be available during natural disasters and emergencies for use by consumers and first responders to ensure public safety, these services must first be available during the sunny days. General policy goals of affordability, service quality and access are fundamental to support public safety and emergency access.
- First responder and emergency access must be technology neutral. Regardless of regulatory classifications and technology delivery, first responders need good data, reliable services, coordination efforts, and robust capabilities to communicate with each other and the public, to ensure public safety
    - o Ubiquitous coverage is an essential, not a convenience
- Outreach, education, and translation services are critical and require an "all hands" effort between policy makers, regulators, industry and consumer advocates; Consumers' expectations need to be managed so they understand a wireless phone may not work during an emergency and to learn other steps to take to stay connected
- Portable generation, non-traditional backhaul, interoperability, and universal roaming are all policy goals that the "market" will not provide. Must have policy and regulatory requirements here.
- De-Energization practices are the new normal. Current infrastructure, policies, practices and communications services are not prepared for these long outages. Commission must take the lead to address this.
- Universal call for better data reporting on outages, even reporting of small outages that last a long time is critical for first responders to have situational awareness. Informal efforts and good relationships do not go far enough to ensure systematic reporting efforts. Need to work collaboratively to resolve providers' propriety concerns that are currently a road block to outage reporting
    - o First responders need to know what is broken to facilitate repairs and restoration

- Universal call for investment in hardened and resilient infrastructure, regardless of profit or market demand
- TURN looks forward to reviewing the Network Study and supports the Commissioners' calls for further investigation into communications safety practices, resilient infrastructure to prevent of future outages and other service quality and public safety matters. TURN also urges comprehensive data analysis to understand how the Commission can best address technology transitions and changes, while ensuring public safety and reliable access TURN supports the first responders' commitment to engage with the Commission and provide their experiences so that the Commission can more adequately address any shortfalls

Education
- Access to robust broadband and voice communications for educational and research institutions could have exponential impact on California communities and consumers if designed properly;
  - Including support for public safety and first responders as these educational agencies are called upon to provide real-time information to households and service as emergency shelters and coordination sites;
  - Including support for students so that their education and ability to complete homework is not hindered by a lack of broadband access
  - Including support for economic development in many hard to reach communities;
  - Including support for access to essential services by low income and rural areas;
  - Including support for adequate services and bandwidth for modern educational teaching and testing methods
- Therefore, beneficiaries and projects should be defined and designed broadly but programs should accomplish specific and clear articulated goals and funding conditions must be clear and enforced.
- While these efforts have traditionally relied on significant public/private partnerships, and will continue to do so, there is also a strong leadership role for the Commission to ensure transparency, fairness and prioritization
  - The Commission has the authority and expertise to review communication networks and to identify where there is a need for redundancy and other improvements
- For the Commission to ensure transparency, fairness, and prioritization, however, input and involvement at the local level and by community representatives is critical
- When funding these projects, including providing discounts for services, be clear and transparent about the goal of the program and design accordingly. How much funding for household access vs. school access vs. community access;
- Broadband capability should be "leading edge" when factoring in needs of the community, potential for growth, and operational barriers to high speed deployment

- Calls for more data gathering and "post-mortem" analysis of public purpose program funding, like CASF, to determine proper process and results

Economic Development
- The Commission should take a leadership role here to look at "resource adequacy" for communications as they do for energy and water
  - When asked "whether California can expect economic development from broadband without government?" every panelist answered "no."
  - When looking at infrastructure funding and support, determine if an area has sufficient broadband speeds, capacity and backhaul ubiquitously throughout the community to accommodate future developments and needs
  - Rural and tribal areas will not have a wireless future until a fiber backbone is deployed
  - Telehealth applications also need strong leadership from the Commission and other state agencies to ensure deployment and coverage that will support rural community needs
  - Infrastructure deployments should be "future proof"
  - Recognize where market-based solutions will not materialize due to unique circumstances of the geographic or economic characteristics of the community
- There is a market imbalance and potential lack of accountability when local governments negotiate agreements for services, access and infrastructure. Most of these communities, even large and sophisticated communities do not have time or expertise; the Commission can play a role in facilitating local government work with utilities, especially in rural and underserved areas
- TURN does not agree with the focus of some panelists that urged the Commission and other state agencies to provide funding and programs to support economic development but then to move aside, reduce barriers, streamline processes and generally "get out of the way" of future development; instead, TURN supports the comments of other panelists and Commissioners that acknowledge the role of the Commission and other agencies to provide the economic support where possible, but within a framework or structure that would allow the Commission to ensure transparency and accountability for the funding to these entities.
- While the Commission's role here may be fact-specific and depend on the needs of the community, the Commissioners expressed their concerns about accountability and structure to these benefits.
- TURN disagrees with some panelists' advocacy of a "trickle down" theory to economic development. They argue that unstructured and unfettered funding to local agencies and/or carriers, will, by definition, benefit end users. However, in many instances, these funding programs are necessary because there would be no motivation or market drive to otherwise serve these end users. Therefore, agencies must impose specific conditions on the funding to ensure that end user customers do benefit.

Cybersecurity
- A government-wide approach, and coordination across state and federal agencies, is needed to reduce cybersecurity threats to the entire state.
- There is no market incentive for cyber security for many Internet of Things devices. Many folks "gamble" with cyber security because of the costs, leaving many consumers vulnerable.
    - Hard to get an attacker off a network, easier to prevent the attacker in the first place
    - Constant testing is the key to hardening networks against potential attacks
- Technology needs to be "future proof" in that it is "crypto-agile" and able to identify and protect against continuously evolving potential attacks.
    - There is a need to protect privacy

As an experienced and knowledgeable intervenor, with strong connections to many organizations throughout the state, TURN looks forward to working with the Commission on a path forward from this discussion. We trust that through a collaborative, transparent and structured process, the Commission will take the lead to protect California consumers and ensure reliable, affordable and high-quality essential communications services.

Sincerely,
Mark Toney, PhD.
Executive Director

Peter Hayes, AT&T
ph3693@att.com

Mr. Osborn,

AT&T shares the Commission's interest in the future of California's communications network, and recognizes the complex and important considerations involved require a fulsome understanding of the current facts and future opportunities. The Communications Division's May 20 En Banc touched on areas of interest to Californians, including affordability and availability of service, emergency preparedness and response, education, and security. The day's panels, however, fall far short of the full discussion the Commission needs to chart its course for the future. The issues discussed at the En Banc are relevant to all stakeholders and the conversation must be in the context of the dynamically changing communications ecosystem, which at its center includes the providers of communications services, whose expert opinions are essential to inform the Commission's actions and policies. In the spirit of collaboration, AT&T makes these short comments and recommends that the Commission hold additional en bancs on the same issues to hear from AT&T and other service providers on the issues discussed at the May 20 En Banc.

Two issues raised at the En Banc in which AT&T is actively engaged are emergency preparedness and response and rural broadband. AT&T looks forward to discussing its extensive investment in network resiliency and disaster response. On rural broadband, AT&T agrees with many of the day's panelists that we must continue to focus on bringing broadband to California's hard to reach rural communities. Significant progress has been made in the past two years as 15 companies, including AT&T, are leveraging $749M of federal Connect America Fund II (CAF II) support to bring high‑speed internet access to over 296,000 locations here in California. AT&T has met its CAF II build‑out commitments for both 2017 and 2018, with over 84,000 locations in parts of 40 California counties now having access to high‑speed internet service. Programs like CAF II are changing the broadband map of California and must be well‑understood as California creates strategies for rural broadband deployment.

AT&T looks forward to an opportunity to offer its views and what it is doing in all of the areas discussed at the En Banc. Having robust and collaborative discussions will lead to the effective policy outcomes that Californians expect.

Sincerely,
Peter Hayes
Assistant Vice President ‑ Regulatory

Charlie Born, Frontier
charlie.born@ftr.com

Dear Mr. Osborn:

Frontier Communications Inc. (U-1002-C) hereby submits the following informal comments and observations on the Communications Division En Banc: "The Future of California's Communications Grid" which was held on May 20th in Sacramento.

1. The communications providers and ISPs should have been invited to participate in the panels to be a part of the conversation and work in coordination to achieve goals. The panel representatives and Commissioners stated many times that all parties needed to work together in order to achieve meaningful results in closing the Digital Divide, however, no providers were granted a seat at the table.

2. The timeline of two business days for providers to submit feedback on the En Banc does not reflect very genuine effort to cooperate.

3. Frontier agrees that working together with stakeholders and communities at the local level creates synergy and better results. Frontier has exercised this tactic when handling Wi-Fi hotspots, California Advanced Services Fund (CASF) grants, Connect American Fund events that raise awareness of low-income products, and working with diverse suppliers; Frontier plans to remain a committed partner in these efforts.

4. It is discouraging that the Commission and panelists failed to recognize the providers that are working hard to participate in the CASF program. President Picker asked a question about why no one is participating in the program, and unfortunately, no one mentioned that Frontier is the only ILEC to file grants or that that we have been a consistent long-time participant. It should be noted that many of the providers made comments in workshops, formal comments and panels during the CASF rulemaking that addressed complications with the program and possible methods that would help remove barriers to participation. We feel this feedback was largely disregarded as the Decision hardly waivered from the proposal that originally released by staff months earlier. It should come as no surprise that the lack of consideration for providers' feedback ultimately resulted in new rules that added even more unworkable hurdles to an already complicated program.

5. In the Economic Growth and Prosperity panel it was stated multiple times by many panelists that in order to promote education, economic development and growth prosperity, we must focus on connecting anchor institutions in local municipalities. While Frontier understands that the CASF program is intended to connect households, connecting anchor institutions – and therefore communities - should be a factor that is taken into consideration when assessing funding levels. Frontier has been consistent in sharing this belief as reflected in our

comments in the Rulemaking, and in comments for the Lytle Creek and Desert Shores CASF Resolutions.

6. It was stated that it is important to provide statewide robust broadband support and that perhaps we need a new paradigm on how this is approached. Frontier's answer is not more regulation or to consider broadband a basic service but to consider making broadband a public priority and establish a statewide support program that addresses infrastructure and broadband that is supported like 911. This would not be a grant system but rather a funding mechanism to insure the state is taking necessary steps for safety and connectivity.

Please contact me with any questions at charlie.born@ftr.com or 916-686-3570.

Respectfully submitted,
Charlie Born Director – Government & External Affairs

David Espinoza, Northeastern California Connect Consortium and Upstate California Connect Consortium

despinozaaguilar@csuchico.edu

The Northeastern California Connect Consortium and Upstate California Connect Consortium (NECCC & UCCC) work on improving broadband availability and performance in the rural Northern California region and accomplish this goal through supporting broadband infrastructure expansion and project proposals, developing strategic partnerships, promoting information sharing, assessing current broadband service performance, and supporting development and implementation of local policies and broadband plans. The NECCC & UCCC consist of counties, cities, non-governmental organizations, anchor institutions and internet service providers (ISPs), among other local public and private partners, and serve ten rural counties: Butte, Colusa, Glenn, Lake, Lassen, Modoc, Shasta, Siskiyou, Plumas, and Tehama.

We are grateful to have an opportunity to offer comments to the California Public Utilities Commission Communications Division En Banc The Future of California's Communications Grid. Please find below the aggregated comments of multiple NECCC & UCCC partners.

1. Affordability and Access - Questions: What issues may arise as network speeds increase and devices proliferate, and how will communications services continue to be affordable?

"In addition to access and affordability, reliability and quality of the service should be included in the delivery of broadband services to all California. In March 2018, in a CPUC public forum held by the commission in the City of Oroville, several residents and local institution representatives expressed complaints about broadband service that was unreliable or presented outages under mild weather conditions, such as fog (mist) and light rain during Fall and Winter seasons. Residents of this area acknowledge that strong or severe weather conditions might in some cases impact performance of broadband service and produce temporary disruptions (for either wireline or wireless), however, just fog and light rain disrupting broadband network performance strongly indicate lack of maintenance, an aging network infrastructure or actual lack of adequate service. Then adding reliability and quality of service to determine adequate broadband service will ensure availability of service in a consistent manner."

"Plumas County is underserved with affordable, reliable, and high speed Internet services. This is affecting the county's ability to conduct retail business, advance in education, and healthcare, and attract people who can work from home."

"As broadband services expand in California, the reported service provided by internet service providers (ISPs) should be validated using CPUC's approved measurement tools (i.e., using CalSPEED

or similar professional tools). Measurements should be carried out during high peak broadband traffic hours in order to reflect actual speeds that customers will have available. Otherwise, broadband speed measurements during low peak traffic hours will not reflect actual speeds that customers will have available during popular times when users access to the Internet. In some cases, during high peak broadband traffic hours, broadband speeds reduce to just a fraction of the contracted nominal broadband speed. Measured broadband parameters should include speed (download and upload), jitter, latency, quality and reliability, among others."

2. Emergency Preparedness and Response - Questions: how will the needs of first responders and victims of natural disasters likely evolve over time?

"More disasters are expected with wildfire, flooding, heavy snowfall expected in the mountains. We need more advanced communications to reach people when these events happen and for the first responders."

"PSPS has a major affect on ILECs in that PG&E has been poor in letting the telcos know exactly when and where they are going to do the outages. I need to know as an ILEC so that I can make sure my portable generators are ready to kick in to charge the batteries back up for my remotes (broadband loop carriers) to ensure that my subscribers have access to 911 and other telecommunication services. It sure would be nice if PG&E coordinated with other utilities before they do it so we can make sure we are covering critical infrastructure."

"Priority area focus for upgrades and expansion of broadband services in rural California should include vulnerable geographic areas which have been recently, or in recent years, impacted by disaster or emergency events, for example, wildfires affecting both urban and rural areas across California resulting in tragic losses of lives and devastation of property. These vulnerable areas should be part of the focus for broadband expansion or upgrade projects, including last-mile and resilient and redundant middle-mile infrastructure which can ensure availability of emergency communication services during disaster events, and also enable fast recovery of these services after the event."

3. Libraries and Education - Questions: What challenges do libraries and schools face in the coming years with regards to the communications grid?

"To keep up with the urban areas, libraries and schools need more advanced technology in the rural areas."

4. Economic Growth and Prosperity - Questions: What are the challenges to economic growth and prosperity created by the lack of access to the communications grid?

"I kind of disagree with the statement. I am an ILEC and I have spent a lot of money building a resilient network and upgrading my network to provide quality broadband. What we need is to make sure that small telcos who provide the necessary broadband services continue to receive the support from the CPUC that we need. This means allowing small telcos to continue to have access to CHCF-A so that we can put fiber into the ground for the farmers. We will also work with CASF to edge out from our existing infrastructure to provide additional broadband to farmers."

"Slow Internet connections hurt business retail sales when the transaction is slow or stops in the middle of the process. It happens here in Plumas County. We want to attract young families here to keep our town going, high speed Internet is crucial to achieve that."

"Our rural healthcare facilities have to close many times due to unreliable broadband service which prevent us from accessing patient records. This is a big challenge for rural healthcare providers which struggle to serve our rural communities"

5. Cybersecurity and Communications - Questions: how will cybersecurity likely to evolve? "With all the hacking, scams, and stolen identity problems, cybersecurity will be of the upmost importance!"

Finally, we recommend that the CPUC Communications Division continue receiving comments on these topics for many more weeks and months to come. It might be helpful to make available an online link for comments. Many NECCC & UCCC partners were not able to submit comments within the required deadline by May 23rd, 2019. It might require a longer period for rural partners to learn about this opportunity to submit comments. Thank you again and we are grateful to have this opportunity to offer aggregated comments of multiple NECCC & UCCC partners.

Sincerely, David Espinoza, PhD.
NECCC & UCCC Manager
35 Main Street, Ste. 132
Chico, CA 95928
despinozaaguilar@csuchico.edu
530 898-3945 office