

From: Noah Aptekar
To: [CA Broadband Council](#)
Subject: Private citizen Noah Aptekar public comment for CA Broadband Plan
Date: Monday, November 16, 2020 5:34:10 PM
Attachments: [Alternate Models for Addressing the Digital Divide - Noah Aptekar.pdf](#)
[CPUC filing Oct 12-Noah Aptekar R.20-09-001 resubmit.pdf](#)

Hello,

Please find the following two attached writings as part of my public comment for the California Broadband Council, submitted as a private citizen and resident of the state. I answer a range of questions on how best to deliver 21st century ready access to all people in the state under the CPUC filing Oct 12 pdf and I am also including my own analysis of alternative models for addressing the digital divide once and for all.

I believe the the State of California is ideally positioned to leverage the innovative and entrepreneurial spirit of our private sector technology industry with the effectiveness of our statewide bureaucracy, as evidenced by numerous accomplishments of the state's public sector including, but not limited to, the ranking of two of California's public universities in the top 13 universities in the world. We are widely viewed as the home of innovation not just in the US, but in the world, and I believe that a comprehensive solution to the broadband issue will require the kind of creative, disruptive and future-accelerating ideas that earned us that reputation.

I look forward to hearing how I can be of service in helping to bring these ideas to fruition in collaboration with the public, private and social sectors.

Sincerely,
Noah Aptekar

Clarification of Alternate Models for Addressing the Digital Divide

My clarification of alternate models here provides additional detail and explication above and beyond the “CPUC filing Oct 12” PDF I am also submitting. I am expanding on my original comments in response to the discussion with CPUC Commissioner Martha Guzman Aceves during the November 4th Action Plan Working Session around Deployment.

In response to the comments during the November 4th call about how broadband should be “treated like telephone service or electric utilities” and that such a regulatory construct makes sense when over 60% of Californians have little or no choice in internet provider:

I agree, in principle, that there is room to “utilitize” telecom infrastructure, but I have a specific opinion about exactly what parts of the infrastructure to “utilitize” in order to preserve the free market competitiveness where it makes sense and to use public or quasi-public management of network infrastructure to serve as a platform for continued innovation.

Why should the public sector get involved?

The private sector is operating irrationally. Companies in the ICT sector are weighed down by excessive debt loads, which has diminished their appetite to invest in expanding their networks to meet the urgent connectivity needs of citizens as exposed by COVID19. For ISPs, this debt load comes, ironically, from the over-building of fiber, which leaves the vast majority of fiber in the ground being completely unused or dramatically underutilized. There is a serious coordination problem between ISPs who are either unable or unwilling to share infrastructure in any meaningful way. This has led to a massive redundancy in capital investment as networks build their “walled garden” networks, with chronically low utilization rates. In addition, there is an excess of fiber or conduit already installed along the state’s highways, electricity transmission lines and natural gas pipelines. Most of this is completely unused, as well, and also not meaningfully shared. For MNOs, this debt load comes from the same unwillingness to share, and the fact that upgrading networks to 4G, and now to 5G, is less of a technical necessity than a marketing tool that the MNOs use as a defensive tactic to prevent customers from defecting to another carrier. Monthly subscription fees did not increase when networks went from 3G to 4G, but the MNOs took on massive amounts of debt to upgrade their networks--leading to more debt needing to be serviced by the same amount of revenue. Now, the carriers are poised to spend billions of dollars building parallel, redundant 5G networks, which will again increase their debt load without creating any opportunities to increase revenue as the monthly subscription they charge is not elastic. Granted, given the absolutely titanic amount of capital investment required for 5G, some MNOs are starting to talk more seriously about sharing infrastructure around “small cells” and Open RAN models. However, there is also a tens-of-billions-of-dollars-per-year private equity and infrastructure investment community that expects to have 7-10 years of being able to harvest returns on building out this 5G infrastructure, much of which will be redundant. The costs of this duplicate or triplicate 5G upgrade will be passed along, yet again, to consumers, in order to generate the returns required by the investors who finance the build out of this redundant infrastructure. This description of the status quo in the telecom industry constitutes a low-level equilibrium trap, and is likely to lead to inevitable bankruptcies of numerous telecom companies, not just in California, but across the nation. It will also lead to poor returns for the private equity funds and infrastructure funds, who count, as their limited partners, pension funds like California’s own CalPERS. So, there is a reasonable chance that when the telecom bubble pops, the real losers will be retired public employees whose pension

funds were invested in these companies that are taking on too much debt to build out redundant assets.

How should the public sector structure its participation?

I believe that public sector innovation can break the telecom market out of this low-level equilibrium trap. To that end, I believe that the best role for the public sector is to create a connectivity “utility” or public benefit corporation, which manages, operates, maintains and upgrades a single, neutral wholesale (B2B) data network. For the sake of argument, let’s call it California State Telecom (CAST), which would acquire fiber assets, including both long haul and metro networks, from major telecommunications companies operating within the State of California today, and blend them together with the relevant fiber assets of public agencies like the California Department of Transportation, as well as those of the electrical and gas utilities in the state. As pointed out above, the private telecom companies have accumulated towering debt loads to finance fiber infrastructure and network upgrades without material increases in their revenue, which severely threatens to undercut future profitability, if not viability. In addition, there are multiple avenues for CAST to acquire network assets, which should be evaluated based on what is most favorable to the private sector:

- The most familiar private-market-based solution would be to leverage tax-free public debt to finance the acquisition of private fiber assets outright, providing liquidity and economic return to the telecom companies, where assets in remote and rural areas are given a multiplier.
- Allow private sector companies to donate fiber assets to CAST in return for a tax deduction, where assets in remote and rural areas are given a multiplier, increasing their value when donated to CAST. For example, dense, urban assets could be donated at their current, depreciated valuation, whereas sparse, rural assets could be donated at their original, as-built, undepreciated valuation.
- Allow private sector companies to contribute fiber assets to CAST in return for a non-controlling ownership stake in the public benefit corporation, again, where assets in remote and rural areas are given a multiplier, increasing their value when contributed to CAST.
- Finally, any and all of the above could be combined with a new investment tax credit program, where new assets built to connect previously disconnected communities are given a multiplier, further increasing their value to be developed. Private sector companies can continue to be the fiber infrastructure builders, leveraging private market efficiencies, and subsequently can donate, contribute or sell those assets to CAST.

This new structure at the B2B layer, could effectively reset the cost structure of the telecommunications market, staving off bankruptcies, and letting market efficiencies drive decision-making about network development, not individual customer acquisition.

As a neutral, wholesale connectivity provider, CAST would be able to achieve economies of scale at the network level and dramatically reduce operation and maintenance costs while improving network quality for consumers. The term “network effects” comes from the telecom industry. It was first discussed in relation to the rise of a national telephone network and then later popularized as “Metcalf’s Law” leading to the rise of the Internet. Therefore, it should be logical to see that having a single, master data network will be of greater value and utility than a myriad of piecemeal “walled garden” networks. By building a single wholesale network with all the true and intended benefits of network effects, CAST would operate in the interest of the public and the people of the State of California, while also helping to ensure that the business

models of the telecommunications companies remain viable. CAST, as a neutral third party, would lease connectivity back to telecommunications companies at very low wholesale rates and would thus serve as a platform for a competitive statewide retail marketplace for connectivity. Additionally, by centralizing capital allocation it would be possible to finance infrastructure expansion to bridge the digital divide once-and-for-all, while also accelerating the technological promise of 5G, machine learning and AI, and to keep the entire State of California on the front lines of innovation. Finally, CAST could generate excess revenues, which could even be used to reduce the tax burden on the citizens of the State of California.

By partnering with local governments in the delivery and premarketing of the solutions, obligations can run through government, but not be of government, allowing for a local government passthrough of services and tax-exempt financing. And, unlike prior attempts for “community owned fiber” the infrastructure will be sized to the efficient market, not to finance infrastructure into a competitive telecom environment.

What does this mean for private sector telecom companies?

With the quasi-public entity CAST only operating at the wholesale or B2B level, this leaves the B2C or retail connectivity market wide open to private sector competition and innovation. However, for public benefit networks, such as to connect public school students or to cover municipal public spaces, CAST could also be able to design or recommend service delivery solutions that are in the public interest. Finally, while this solution may reduce the absolute revenues for telecom companies, it is also sure to dramatically reduce both their operating expenses and their capital expenditures, so that margins for telecom companies will not only be preserved, but are likely to be enhanced. In the end, I believe this elevates the telecom market to a high-level equilibrium. However, the only way we will get there is through strong public sector leadership and open-minded private-sector participation.

**BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF CALIFORNIA**

*Order Instituting Rulemaking Regarding
Broadband Infrastructure
Deployment and to Support Service
Providers in the State of California*

*Rulemaking 20-09-001 (Filed
10/12/20)*

**OPENING COMMENTS OF PRIVATE CITIZEN NOAH APTEKAR TO ORDER
INSTITUTING RULEMAKING REGARDING BROADBAND INFRASTRUCTURE
DEPLOYMENT AND TO SUPPORT SERVICE PROVIDERS IN THE STATE OF
CALIFORNIA**

Noah Aptekar
Private Citizen

[REDACTED]

October 12, 2020

**BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF CALIFORNIA**

*Order Instituting Rulemaking Regarding
Broadband Infrastructure Deployment and to Support Service
Providers in the State of California* *Rulemaking 20-09-001 (Filed
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I. Introduction

In accordance with Rule 6.2 of the California Public Utilities Commission (“Commission”) Rules of Practice and Procedure (“Rules”), private citizen Noah Aptekar submits comments to the Order Instituting Rulemaking 20-09-001 (“Rulemaking”).

II. About Private Citizen Noah Aptekar

Noah Aptekar, private citizen, has extensive experience in innovation, strategy and driving change agendas both in the public and private sector. Working for SpaceX’s Starlink project, Noah was on the front lines of developing both technologies and business cases for the world’s preeminent satellite-based telecommunications solution. He was responsible for driving the development of the Starlink system’s terrestrial infrastructure ranging from customer premise equipment (CPE) to ground stations for downlinking data from the constellation to negotiating commercial agreements for fiber backhaul to and colocation within PoPs and IXPs in order to connect Starlink customers to the backbone of the internet. Prior to transitioning to focus solely on Starlink, Noah brought financial discipline to SpaceX’s 2,300-person production division and

was responsible for financial planning, cost analysis and budget management activities for the division's >\$400M annual operating and capital spend. Working for the Governor of Colorado, he led change agendas for diverse industries including manufacturing, telecommunications and aerospace. Noah served as an in-house consultant to Governor Hickenlooper's cabinet to draft and implement the Colorado Blueprint 1.0, the first statewide bottom-up economic development strategy. Ten years later, the same framework is being used by Governor Polis as Colorado Blueprint 3.0. Noah also drafted the legislation for and co-created the \$150M+ Advanced Industries fund, which makes co-investments to leverage private investments into high-tech businesses, and he established and managed the implementation of a rigorous yet business-friendly application and award process.

Since leaving SpaceX pre-COVID in March 2020, Noah has been singularly focused on taking a comprehensive approach to bridging the digital divide globally by leveraging innovations in policy and business models as well as technology. His primary focus is on emerging markets, where he is actively exploring opportunities to engage as an investor, entrepreneur, advisor and consultant to accelerate the development of telecommunications infrastructure in countries across sub-Saharan Africa. In the last seven months, Noah has uncovered novel policy frameworks and private sector business models in other countries that have been proven to align economic incentives between public and private sector actors to promote infrastructure development and drive down the cost of connectivity. Noah firmly believes that there are valuable lessons that the State of California, in general, and the California Public Utilities Commission, in particular, can learn from frontier and emerging markets. In this country, the resources and, in many cases, the infrastructure, already exists to achieve the goal of bridging the digital divide once and for all. However, what has been lacking is the appropriate policy framework to align economic incentives. Technology is continuously reshaping our world across geopolitics, the global economy and public health. Institutions must recognize how the ecosystems they operate within are evolving and must actively reimagine how to achieve their goals and fulfill their missions using new tools, new policy frameworks, new business models, new organizational structures and new ways of building partnerships across sectors and across borders. This rulemaking is an opportunity for the California Public Utilities Commission to

adapt and evolve and to lay the foundation for the digital infrastructure that will support global competitiveness and also the economic dignity of communities and citizens across California for decades to come.

III. Comments

A. Infrastructure Deployment Models and Strategies.

1. Implementing E.O. N-73-20, OP #8. What business models could the California energy Investor-Owned Utilities (IOUs) employ to make their existing and future fiber infrastructure more available in rural, urban and Tribal areas? What are the critical requirements and incentives for these models to be effective?

When the National Highway Program was launched in the 1950s, there was no way to understand how many cars and trucks would drive on it, what companies would make those cars and trucks, what fuels they would run on, and where they would be driving to and from. The nation's highways are agnostic to the vehicle that drives upon their pavement, but by the very virtue of being open, and by interconnecting all corners of the nation, they have been the foundation for economic opportunity, improved delivery of public and private services and countless other efficiencies. A fiber network can and should be understood in the same way. It does not make sense for "walled garden" networks to persist. Imagine if Walmart owned its own highways and roads that only Walmart customers and suppliers could drive on? And if Target had to build its own highways and roads only open to its own customers and suppliers in order to compete? That would be viewed as completely illogical, inefficient and wasteful. However, this is effectively the exact situation we find ourselves in when fiber networks are not open access.

With this context, there is only one business model that the California energy Investor-Owned Utilities (IOUs) should employ to make their existing and future fiber infrastructure more available in rural, urban and Tribal areas: a neutral, wholesale, open-access network, which can, itself, be operated as a utility. A neutral wholesale network provides a platform both for

competitive delivery of services (“push”) to individuals, businesses, communities and devices connected to the network, as well as a platform for novel business models that create value from the acquisition of data (“pull”) from individuals, businesses, communities and devices connected to the network. The network should be viewed as a foundation for multiple connectivity use cases, including those based on pushing services as well as those based on pulling data and information. Networks are often erroneously viewed only as cost-centers that are necessary to push services. However, modern networks are also rich sources of data and information, which can generate significant monetary value and nonmonetary value.

The connectivity use-cases that are most familiar can be classified as “push” use-cases: traditional internet service providers (ISPs), mobile network operators (MNOs) and Over-The-Top (OTT) services like voice, messaging, streaming, television and cloud services. However, one can imagine nearly endless “pull” use-cases ranging from the familiar to the more imaginative: consumer behavior data acquisition to inform display advertising, security cameras, traffic sensors, smart-grid sensors, real-time transmission line temperature sensors, real-time air quality sensors, sensors that generate pre-warning for earthquakes. Novel “push/pull” use-cases can be contemplated as well, such as secure, dedicated school-based networks that allow students to access school information and collaborate with classmates in other homes while operating within a secure, dedicated private network specific to the school district.

The largest technology companies in the world view their apps and websites as data acquisition portals. These savvy companies use the information collected from the applications running on the devices that their customers use, which are effectively functioning as multi-purpose sensors, to derive insights that can be used to either improve their products or generate revenue or both. These companies have demonstrated the immense value of telecommunications networks as sources of value that can be pulled out in the form of data and insights.

Networks should be open platforms for innovation and be understood for their value both in pushing services and in pulling in data and information. When viewed holistically in this way, it

is obvious that there is fundamental value to connecting every individual, business, community and device across the state.

With regards to the critical requirements and incentives for these models to be effective:

- Access to all infrastructure should be made open and available to all for the same, transparent, fair price for connectivity.
- A revenue-share-type model should be used to align economic incentives between the infrastructure owner-operator and all connectivity use-cases.

2. What strategies, incentives or standards can improve open access in deploying fiber and wireless infrastructure to be utilized by multiple carriers, particularly in rural and Tribal areas? Specifically, how can communication providers better share their assets and build planning (e.g. points of presence, carrier hotels, trenches, conduit, towers, poles, etc.)?

The first strategy focuses on price transparency and profitability. To ensure that the free market determines pricing a policy should have the following tenets:

- Infrastructure companies can only negotiate pricing with other infrastructure companies
- Service provider companies can only negotiate pricing with other service provider companies
- Any price given by any infrastructure company by any service provider company, must be open and transparent and available to everyone else in the market
- Any price given by any service company by any infrastructure company, must be open and transparent and available to everyone else in the market.
- All entities--both infrastructure companies and service provider companies--must be pricing their products such that they remain profitable.

This prevents following two sub-optimal situations, which would otherwise be common:

- Selling low: the infrastructure arm of a company sells B2B connectivity at a massive loss to its own service provider arm, which drives all other infrastructure companies out of the

market. The service provider arm then generates sufficient B2C profit to offset the losses of the infrastructure company.

- Selling high: the infrastructure arm of a company sells B2B connectivity at a prohibitively high price to its own service arm, which drives all service provider companies out of the market. The service provider arm then generates significant B2C losses, which are offset by the profits of the infrastructure company.

When telecommunications operate in both the infrastructure and service provider sides of the market, the only way to firmly prevent such anti-competitive behavior is to require complete price transparency and also to require profitability. This prohibits race-to-the-bottom type strategies that lead to monopolistic outcomes.

The second strategy is to create forced barter agreements, as one of the primary ways that infrastructure companies should be encouraged to partner is through barter and infrastructure swaps. To ensure that every individual, business, community and device is connected, a policy should have the following tenets:

- Fiber built to rural/Tribal areas can be bartered at a significant multiple for miles of fiber in the city/urban/suburban areas. For example, building one mile of fiber to connect all the homes in a rural town can be bartered for five miles of fiber in the city. This will reduce repetitive and redundant construction in urban areas, which generate costly traffic delays, as urban miles are less “valuable” to build.
- The right to barter goes to the first-mover that builds a certain route or in a certain community. This will, appropriately, create a frenzy of activity where companies compete to build fiber to connect rural and Tribal areas in order to bank valuable miles with a high multiple, which can be used to barter for capacity in cities.

Of note, this barter strategy was effectively deployed in Germany in the mid-1990s, with a particularly striking result in East Germany, which had been less connected from their time as part of the Soviet Union. Within a matter of years, rural communities across East Germany were

better connected by fiber and continue to have better telecom infrastructure than many parts of West Germany. Illustrating the durability of the advantage, a [2009 article in The Atlantic](#) noted the following:

[J]ust as America’s massive fiber-optic network has become the backbone of the Web 2.0 economy, so is eastern Germany’s robust infrastructure now a vital selling point for overseas investors. “You have the situation where the infrastructure in the east is more state-of-the-art than in the west,” says [Thomas] Fabian, [an economist with Germany Trade and Invest, a Berlin-based trade group]. Most recently, DHL switched its European hub from Brussels to the newly refurbished Leipzig-Halle Airport, in part because the eastern German facility offers 24-hour service.

(Note: Additional details on the unification of telecommunications infrastructure between East Germany and West Germany can be found [here](#).)

Beyond Germany, similar approaches have been taken by the following companies and countries in sub-Saharan Africa:

- Kenya Data Networks, now [Liquid Telecom](#), which operates in more than a dozen countries in Eastern Africa and Southern Africa.
- [CSquared](#), joint venture with Mitsui & Co (Japan), Convergence Partners (South Africa) and the International Finance Corporation (IFC, World Bank Group), which has operations in Ghana, Uganda, Kenya and, most recently, Liberia.

Such policies can create an ultra-competitive marketplace that strongly incentivizes building infrastructure into rural, Tribal and underserved urban areas.

3. How can the Commission use its licensing, permitting and CEQA responsibilities to further the goals of this OIR? Are there areas of the CEQA process which can be streamlined while still meeting the statutory requirements?

A number of recommendations for the Commission to use its licensing, permitting and CEQA responsibilities to further the goals of this OIR:

- Issue a preferred list of materials such as the HDPE for conduits that are pre-approved for deployments. Essentially, if the bill of materials for an infrastructure build only contains materials that have been tested and pre-approved, those builds will receive automatic and blanket approvals for construction.
- Identify and pre-approve corridors or zones for fiber builds, which avoid known sensitive areas like swamps and wetlands. As long as an infrastructure build is within the approved corridor or zone, it gets automatically approved.
- Issue a moratorium of three years for all permitting costs, so that construction can be completed and assets can be in service before fees need to be paid. This generates an incentive to deploy faster to generate revenue to be able to cover fees before they come due.
- Articulate standards for repeater stations, or in-line-amplifier huts, which mandate or strongly incentivize the use of renewable energy resources like solar panels, lithium ion batteries, etc. As an additional incentive, companies could be offered low-cost or no-cost land-leases on public lands for these repeater stations, only if they meet the State's stringent environmental requirements.
- Subsidize planting of trees on top of fiber along the fiber routes, which will serve the function of both clearly marking fiber routes when maintenance is needed, and also mitigating the likelihood of accidental fiber cuts, which drive costs and loss of business to network operators and service providers. The trees also provide a carbon offset.

B. Economic Vitality and Recovery Strategies.

1. What requirements, if any, should the Commission impose on communications service providers and IOUs to facilitate the construction of fiber when restoring facilities after a disaster such as a fire?

We recommend the following requirements be imposed on communications service providers and IOUs to facilitate the construction of fiber when restoring facilities after a disaster such as a fire:

- Any rebuild must be at the same level of technology and quality as the latest and greatest deployments. The communications service providers and IOUs cannot rebuild with anything below the highest standard in their network.
- If this is mandated and required by the state, insurance companies will have to comply
- The first-mover barter equation will be reset, so that the first company or entity to rebuild infrastructure into a rural or Tribal area post-disaster will be entitled to the same multiple of fiber miles, for example 5:1, where they can barter for 5 fiber miles of capacity in urban areas in return for each one mile of fiber they rebuild in a rural or Tribal area. This will incentive fast rebuilds and the highest deployed standards.
- Reset the moratorium on fees for permits and licenses for three years after the end of the fire, which will again incentivize fast rebuilds at the highest deployed standards.

2. How can the Commission partner with other state agencies to effectively address the infrastructure and affordability gap for communications services in California? How can the Commission assist in the implementation of E.O. N-73-20, OP #7?

The commission should create a round table among state agencies to provide a forum to discuss and share all the business and use cases for connectivity that they can and do come up with. It is impossible to foresee all the connectivity use cases, which may emerge as the result of technological innovation or changing environmental or economic demands.

Planning should be additionally facilitated at the county level and the wishlist and ideas should be actively shared and cross-pollinated between counties. This will generate a huge catalogue of valuable applications and use cases, which can be sources of inspiration for entrepreneurs, hackathons and government acquisition.

The Commission should serve as the data warehouse for all these ideas and to provide a venue for

sharing promising practices and lessons learned between agencies as well as between counties.

3. How should the Commission address access to existing infrastructure for those communities where there is infrastructure going through a community but they are not served by it?

Two very simple economic incentives can resolve the situation where infrastructure is going through a community but they are not served by it:

- Any right-of-way fees are waived for corridors where the community is also served by the infrastructure.
- If a community is not served by the infrastructure, the community is entitled to a material percentage of the revenue generated by the infrastructure going through the community.

Between these two incentives, it should be made cost-prohibitive to leave any community out.

In order to balance the equation, in return for connecting the community, the community could be required to provide no-cost access to space to house, connect or store equipment. For example, rather than needing to build or maintain a detached repeater station or network gear cabinets, space could be provided on the grounds of a school, police station, or even in traffic light switching cabinets to house such gear and equipment.

4. How should the Commission consider the role of communications in serving all households in a community and concerns about digital redlining?

In order to address concerns about digital redlining, the Commission should adopt a policy that no new home or new housing development shall be approved without a plan to connect fiber just like sewer. The utility has the obligation to provide the connection, which should be funded by property taxes at a standard number of mils. The technology level should be standardized to the same “highest quality in the network” just like any rebuild after a fire or other disaster. Higher property taxes in richer neighborhoods can cross-subsidize the cost of installation in poor

neighborhoods. There should be any attempts to provide two-tiered infrastructure should be prohibited and actively dismissed.

It could even be cross-subsidized by some of the property taxes that fund schools, as connectivity can be viewed as a critical resource for every home to be connected in order to access the education system, which has likely permanently migrated at least partially online. Some of the funding for bussing could be diverted to providing home broadband, which is not just a “push” service use case for students to watch classes on Zoom, but can enable “push/pull” use-cases like a private school network for students to collaborate in groups within their class or their neighborhood, or “pull” use cases where students are generating content or collecting sensor data (like a home weather station) to share with their teachers and classmates.

The Commission should actively incentivize and promote a “build once” policy so that every time sewer, road or electrical construction is done, fiber conduit is installed at the same time.

C. Strategies to Support Specific Communities and Uses.

1. What further strategies, if any, should the Commission utilize to facilitate broadband internet access service for low-income, high fire threat, and/or low adoption communities, primary school students and institutions, libraries, and public safety communications?

The most effective policy tool is to implement forced barter agreements with barter multipliers available to the first-mover that connects rural or underserved areas.

Additionally, building codes could be updated to standardize requirements for telecommunications equipment rooms, which need to be built into public buildings like schools, libraries, universities, etc, which will make it cheaper and easier for communications infrastructure to be connected.

2. How should the Commission use the roughly \$1 million in the Digital Divide Account to help schools and students?

The best way to leverage the \$1 million in the Digital Divide Account would be to hire a boutique telecommunications consultancy with global experience in the countries and regions referenced here, Germany and sub-Saharan Africa, to advise the Commission on the implementation of the policy recommendations shared herein. The amount of money is not going to make a material impact on the digital divide unless it is used to reset the policy landscape to align incentives between private and public sector actors to serve the urgent needs of the everyday citizen of the State of California.

3. What are the strategies and models that Tribes can pursue for communications infrastructure and what are the means through which the Commission can support them?

First of all, if any infrastructure traverses Tribal lands, they should be immediately and retroactively compensated with a percentage of the revenue generated by the infrastructure that traversed their lands since it was first installed.

The issue of connecting Tribal areas and communities should not be viewed solely through the lens of how to “push” digital infrastructure and services, but also what value can be “pulled” from digital infrastructure once it is installed. One specific example of how to shift the perspective on Tribal areas from areas of scarcity to areas of bounty would be to consider the potential of Tribal lands to house data centers. Tribal lands are typically large land areas, which could be used both for data centers as well as renewable energy installations of solar and/or wind power infrastructure. In that way, Tribal lands could be the ideal locations for carbon-neutral data center installation. Similar to how casinos have been promoted as a source of income and employment on Tribal lands, data centers could be promoted and incentivized as a source of income and employment on Tribal lands. Building data centers would provide construction jobs,

and could also serve as a platform for STEM education and STEM career development. If Tribal lands become the best place in the state to build and expand data centers, there will be no Tribal lands that do not have the best digital infrastructure in the world.

In addition, under the forced barter agreements, the multipliers for connecting Tribal lands could be even more generous than for connecting rural areas, for example valued at 10:1 for the first mover to connect Tribal land.

4. What are the strategies and models that public entities can pursue for communications infrastructure and what are the means through which the Commission can support them?

The Commission should serve to convene and facilitate community stakeholders to identify, discuss and prioritize connectivity use cases. Lobbying should be done on behalf of use cases for connectivity, not on behalf of business interests. Today, corporate lobbyists push use cases that are most profitable for them onto consumers, and stifle innovation and a free market of ideas at the same time. In the future, the Commission should oversee open, neutral, wholesale connectivity networks that facilitate both the delivery of service via “push” models and the acquisition of value in the form of data and information via “pull” models. All “walled garden” networks, at the physical level, should be effectively eliminated through forced barter and markets for capacity swaps between urban, rural and Tribal areas.

Executed *October 12, 2020* in Santa Monica, California.

Noah Aptekar

10/13/2020

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