

**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 09/03/21)

**COMMENTS OF THE ELECTRONIC FRONTIER FOUNDATION IN RESPONSE TO
THE ASSIGNED COMMISSIONER RULING SEEKING COMMENTS ON MIDDLE
MILE DEPLOYMENT POLICY ISSUED AUGUST 6, 2021**

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I. INTRODUCTION

In accordance with Rule 6.2 of the California Public Utilities Commission’s (“Commission”) Rules of Practice and Procedure (“Rules”), the Electronic Frontier Foundation (EFF) submit these comments in response to the Assigned Commissioner’s Ruling, dated August 6, 2021, regarding middle mile network policy and to the questions therein. The Electronic Frontier Foundation is already a party to the “proceeding”.

II. ABOUT THE PARTY

The Electronic Frontier Foundation (EFF) is the leading nonprofit organization defending civil liberties in the digital world. Founded in 1990, EFF champions user privacy, free expression, and innovation through impact litigation, policy analysis, grassroots activism, and technology development. With over 30,000 dues-paying members (with several thousand California members) and well over 1 million followers on social networks, we focus on promoting policies that benefit both creators and users of technology. EFF has been at the forefront of studying the future of broadband access in the high-speed market and has conducted

in-depth research and produced both legal and technical publications on the issue. EFF's goal in broadband access is the deployment of universally available, affordable, and competitive high-speed networks. EFF focuses on fiber because it is the only data transmission medium capable of low latency and speed upgrades for generations to come that far exceed alternative last-mile options and a necessary component for ubiquitous 5G coverage.

III. DISCUSSION

A. In the context of these comments, what is sufficient capacity and affordable rates?

In analyzing whether a community has sufficient capacity, the Commission should look at not only available capacity today, but also whether its existing capacity can be scaled upwards well into the future. Internet consumption grows at an average of 21% every year,¹ and the proper infrastructure must be able to anticipate and exceed that demand curve for several decades. The other metric the government should consider, beyond just bandwidth capacity, is latency and consistency of connectivity. Higher bandwidth has little usefulness if it comes with significant delay or persistent interference due to environmental challenges, such as the ones faced by low earth orbit satellites.² The Federal Communications Commission (FCC) already studies³ latencies and projects fiber to consistently reach “10 ms to 12 ms,” which is essentially what the state proposes to deliver with its open-access fiber network.

¹ Doug Dawson, *Why Fiber?*, POTs and PANs (Feb. 1, 2021), available at <https://potsandpansbyccg.com/2021/02/01/why-fiber>.

² Nilay Patel, *Starlink Review: Broadband Dreams Fall to Earth* (May 13, 2021), available at <https://www.theverge.com/22435030/starlink-satellite-internet-spacex-review>.

³ FEDERAL COMMUNICATIONS COMMISSION, *Measuring Fixed Broadband – Tenth Report* (Jan. 4, 2021), available at <https://www.fcc.gov/reports-research/reports/measuring-broadband-america/measuring-fixed-broadband-tenth-report>.

In terms of assessing whether rates are affordable, the Commission will need an understanding of what rates are being charged in various parts of the state of California for middle-mile access; it also likely needs to assess national and global trends for context and comparative purposes. In California regions where the Commission believes sufficient competition is present, the rates charged in those regions should represent the lowest, best-possible price charged due to competitive pressures. With an understanding of what kind of range constitutes a market competitive charge for capacity, the Commission could then use that as a benchmark to determine which areas lack affordable access—even if capacity is present.

B. For routes that are identified as being open access, with sufficient capacity, and at affordable rates, how should the Commission verify these claims (e.g., should Communications Division send a data request for service term sheets, rates, approximate dark fiber, lit fiber, and conduit capacity, etc.)? Are there any other criteria that should be used to verify these claims?

It would be logical and informative for the Commission to send a data request for basic information on what is available in a proposed region and to determine if the offerings are speculative or real—as, undoubtedly, providers that enjoy monopoly status in an area will attempt to thwart the state from building competitive, affordable capacity. The Commission should also consider ways to publish its findings for an area that will receive new network infrastructure to provide the public with an understanding of what is available to them, as well as to inform the legislature. Cloudflare, for example, provided the public a generalized understanding of the cost of transit around the world⁴ by using a benchmark and then applying the various charges around the world in relation to that benchmark. The Commission could adapt this and rely on an established benchmark of what is an affordable competitive rate that delivers

⁴ Nitin Rao, *Bandwidth Costs Around the World*, THE CLOUDFLARE BLOG (Aug. 17, 2016), available at <https://blog.cloudflare.com/bandwidth-costs-around-the-world> (Cloudflare opting to use “units” to represent costs without explicitly revealing business information on actual prices charged but providing comparative data on price ranges and identifying regions that were far above average costs).

sufficient capacity, then simply compare that established rate by a percentage basis. For example, an area that is more expensive than an affordable, competitive rate can be referred to by its percentage deviation from that competitive rate—i.e., 150% or 300% above competitive rates.

C. Is it reasonable to assume counties with a disproportionately high number of unserved households (e.g., 50% or more unserved at 100 Mbps download) are areas with insufficient middle-mile network access?

It would be a fair assumption to conclude that areas that lack a set of offerings on both mbps and latency lack the physical means of obtaining those offerings due to a lack of middle mile fiber infrastructure. However, the Commission must be careful not to set the metric too low. Doing so would allow the delivery of basic broadband access via microwave or satellite to prevent the delivery of fiber optics, which EFF has determined plays a central role in *any* attempt to deliver 21st-century capacity at the last mile. EFF's own technical analysis, which we have included in past submissions, confirms that fiber optics, as a transmission medium, is a vastly superior choice and has orders of magnitude greater spectrum capacity than all the alternatives.⁵ This is not mere speculation, but rather baked into the physics. Its availability can be objectively measured by the government. Some obvious criteria include the availability of symmetrical services exceeding 100/100 mbps and the availability of symmetrical gigabit residential services and symmetrical multi-gigabit business class services.

⁵ Bennett Cyphers, *The Case for Fiber to the Home, Today: Why Fiber is a Superior Medium for 21st Century Broadband*, ELECTRONIC FRONTIER FOUNDATION (Oct 11, 2019), available at https://www.eff.org/files/2019/10/15/why_fiber_is_a_superior_medium_for_21st_century_broadband.pdf.

D. What other indicators, if any, should the Commission use to identify priority statewide open-access middle-mile broadband network locations (i.e., built expeditiously, areas with no known middle-mile network access, regions underserved by middle-mile networks, regions without sufficient capacity to meet future middle-mile needs)?

The availability or scarcity of 5G wireless services is another indicator of nearby fiber capacity. Industry has widely acknowledged that 5G is inextricably linked with fiber,⁶ which means its absence is a clear signal that fiber is not present. Furthermore, if only one 5G provider is present but others are not, the Commission could consider that a signal that fiber capacity is nearby but might be withheld from other providers for anti-competitive reasons. In those instances, the Commission should remedy the problem through interconnection and open-access type regulations rather than through building redundant fiber, as the priority is to deploy affordable fiber where none is present.

E. Is it reasonable for the costs of these services to change depending on the location where the service is provided (i.e., rural vs urban)?

It is reasonable for the costs of services to be different depending on geography from a *private market* perspective, due to the need to deliver returns on investment and profits. However, the state should re-emphasize the spirit of universal service by delivering *equivalent* access between urban and rural markets. Given that this will be a public network that is not dependent on profits, the state is given more flexibility to offer service at prices that are consistent across its network. The state simply needs to provide access at rates that sustain the network over the decades, which should allow it the ability to offer the lowest costs feasible in rural communities. Doing so will allow those rural communities to develop last-mile options equivalent to urban communities. Private providers that object to this regularly seek government

⁶ Kristen Beckman, *Fiber: Inextricably linked with 5G Connectivity*, WIRELESS INFRASTRUCTURE ASSOCIATION (Aug. 19, 2020), available at <https://wia.org/blog/fiber-inextricably-linked-with-5g-connectivity>.

subsidies to achieve the same goals—but without offering a better solution. Lastly, the legislature unanimously made it clear with the passage of the new infrastructure law that it is time for the state government to directly deliver affordable capacity to all communities.

F. If there is existing open access communications infrastructure with sufficient capacity to meet the state’s needs, should the state purchase IRUs from that network? Is there any value in the state purchasing an IRU from the network if capacity is already available?

The state should avoid redundant *open-access fiber* construction if open-access fiber infrastructure is already available at an affordable price and with sufficient capacity. Often industry will lament “overbuilding” but gloss over the fact that fiber infrastructure does not overbuild legacy wire or wireless connectivity. It is instead replacing these older technologies with 21st century, future-ready connectivity. However, in areas where future-proof connectivity is available, the state should lease capacity to reinforce the existing network. This would improve the network for all related services, extend the reach of each dollar spent by the state, and lower prices by improving the financials of the existing network.

A challenge for fiber infrastructure is that it carries a high cost one-time investment to build it out. If the state were to engage in building a second open-access fiber network in an area, it would suppress available revenues for *both* networks—potentially causing both to become unsustainable. This would be particularly problematic in rural areas where the available revenue is already limited.

G. If the state relies on IRUs for the development of the statewide network, will the generational investment that this funding provides be diminished when the IRU leases end 20 to 30 years later? Will existing networks run out of spare capacity?

It is difficult to predict exactly how much capacity any one community will need—other than to safely assume it will be more in the future. As EFF mentioned earlier, estimating an

increase of at least 21% every year⁷ seems appropriate—although recent data analyzing the change in work life and education during the pandemic has showed the drive for greater uploads far exceeds the annual trend⁸ and some future services will need symmetrical download/upload delivery.⁹ This reinforces the importance of fiber infrastructure and the ability to deliver symmetrical gigabit (and beyond) services. If an existing network is expected to run out of capacity in less than 30 years—which is likely to be rare given that fiber infrastructure will improve on capacity through advances in hardware¹⁰ without needing new fiber strands—the state should consider offering the existing provider a chance to jointly expand the current network with the state. This would finance the addition of new fiber strands that will be publicly owned, but jointly available as capacity needs grow.

H. At what points should the statewide network interconnect (e.g., to other networks, servers, etc.)? Are additional exchange points necessary or strategic, and if so, where?

The development and deployment of exchange points will be central to whether the state's open access middle-mile fiber network successfully brings down the cost of broadband and expands access. EFF considers three types of last-mile providers to be of particular importance in helping the state determine where to build its exchange points: 5G providers, loan-loss reserve applicants, and last-mile providers explicitly focused on providing high-speed access to low-income communities. Each have different needs that can be met by the state's network

⁷ Doug Dawson, *Why Fiber?*, POTs and PANs (Feb. 1, 2021), available at <https://potsandpansbyccg.com/2021/02/01/why-fiber>.

⁸ Dan O'Shea, *Pandemic Drove Upstream Broadband Traffic Boom: OpenVault*, FIERCE TELECOM (Apr. 1, 2021), available at <https://www.fiercetelecom.com/telecom/pandemic-drove-upstream-broadband-traffic-boom-openvault>.

⁹ GSMA, *Could AR/VR Whitepaper* (Apr. 26, 2019), available at <https://www.gsma.com/futurenetworks/wiki/cloud-ar-vr-whitepaper>.

¹⁰ Steven Harris, *10 Gbps Symmetrical with XGS-PON*, BROADBAND LIBRARY (May 25, 2019), available at <https://broadbandlibrary.com/10-gbps-symmetrical-with-xgs-pon>.

through various approaches. Given that the network will have to be built out in phases over the years, the state government can facilitate processes to create these opportunities and coordinate with these classes of providers.

Wireless providers that want to deliver 5G services, particularly in rural areas, need access to fiber and already share tower infrastructure in many cases. While some major wireless providers opposed the passage of California's infrastructure law, all of them would be eager to leverage existing fiber capacity to extend their own networks in certain areas where they had no intention of deploying their own fiber. Hopefully, this proceeding can provide some initial locations that are of high interest to rural wireless providers to aid the state in determining where its infrastructure can meet demand. If not, the Commission should consider directly soliciting small and regional wireless providers about where they would be willing to lease capacity if made available and, more importantly, subscribe to the network in advance of its construction for a set number of years to affirm their commitment and guarantee revenue for the state network. This would be akin to how most "dig once" proposals suggest making efficient uses of rights of way public works projects.

Loan-loss reserve applicants, which, by default, are public, non-profit, or tribal in nature under the new California law, are especially important to coordinate middle-mile infrastructure with on exchange points. Well-placed, affordable capacity will make their projects feasible in even the most difficult to serve areas. Loan-loss reserve applicants will approach their last-mile infrastructure with long-term debt repayment plans. Having steady, consistent, reasonable pricing for capacity will have a direct effect on both the prices they can charge and the sustainability of their models. When the Commission opens the loan-loss reserve program to applicants, it should assess incoming applicants as demand points that indicate where the middle-

mile exchange points could be best-leveraged. It is worth noting though that local communities recently eligible to leverage this first-in-the-nation opportunity to deploy last-mile fiber infrastructure with long term financing will need some additional time to develop their plans, while others are ready to go as soon as possible. Therefore, the Commission will need to assess interest at various stages (such as assessing local needs, preparing feasibility studies, and eventually applying for funding) to better inform the deployment strategy in phases.

Lastly, providers focused on low-income needs—particularly for urban markets where broadband access is concentrated in low-income neighborhoods—need to keep the costs as low as possible to deliver access to provide high quality high-speed access. The potential passage of a new federal infrastructure program that will include a 5-year, \$30 per month benefit for low-income people 200% above the poverty line¹¹ could usher in a variety of solutions including free high-speed access from public and non-profit models. For example, a few well-placed public hand-off points in a high-poverty area in major cities such as Los Angeles, San Francisco, Oakland or other cities could be quickly leveraged with WiFi 6 by a non-profit; this organization could also apply for a loan with philanthropic backing to provide free broadband access to these communities at \$30 per month, per user, which would be paid entirely by the subsidy proposed by Congress. The Commission should consider a means of soliciting interest in engaging in last-mile deployment specifically for low-income areas in urban markets to establish priority targets for the initial stage of middle-mile construction. Should a county government or local city commit to leveraging the state’s capacity as an anchor tenant, that should be sufficient for the

¹¹ H.R. 3684, 2021. [online] Available at: https://www.epw.senate.gov/public/_cache/files/e/a/ea1eb2e4-56bd-45f1-a260-9d6ee951bc96/F8A7C77D69BE09151F210EB4DFE872CD.edw21a09.pdf [Accessed 3 September 2021] (otherwise known as the Senate bipartisan infrastructure package).

state to identify a public exchange point in that city or county and solicit nearby providers interest in leveraging the infrastructure with the loan-loss reserve applicant as a local partner.

IV. CONCLUSION

The State of California has an enormous opportunity on its hands under its new infrastructure law and the middle mile program should be used as a tool to empower local public and private providers as well as facilitate the creation of new ones. Local public entities will be motivated to serve their entire community and are given a first-in-the-nation opportunity to demonstrate the value of public model broadband access. With the full backing of the state, EFF remains confident that enormous progress will be made towards universal fiber access to all Californians.

Dated: September 3, 2021

Respectfully submitted,

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