California Broadband Council
December 17, 2020
Meeting Minutes

The California Broadband Council (CBC) met on Thursday, December 17, 2020 at 10:01am via virtual conference (per California Executive Order N-25-20).

Agenda Item 1 – Welcome

Council Chair Amy Tong welcomed Council members.

Roll Call

A quorum was established for the meeting.

Member	Designee	Present	Absent
California Department of Technology Director	Amy Tong		X	
California Public Utilities Commission President	Marybel Batjer	Rob Osborn	X	
California Office of Emergency Services Director	Mark Ghilarducci	Patrick Mallon	X	
Superintendent of Public Instruction	Tony Thurmond	Jerry Winkler	X	
Department of General Services Director	Daniel Kim	Brent Jamison	X	
California State Transportation Agency Secretary	David Kim	Lori Pepper	X	
California Emerging Technology Fund President	Sunne Wright McPeak		X	
California Department of Food and Agriculture	Karen Ross	Arturo Barajas	X	
State Librarian	Greg Lucas	Anne Neville-Bonilla	X	
Governor's Office of the Tribal Advisor	Christina Snider*		X	
Member of the Senate	Ben Hueso	Sarah Smith	X	

Member of the Assembly	Mike Gipson	Victor Ibarra	X	

Chair Tong noted that California Department of Technology Deputy Director for Broadband and Digital Literacy Stephanie Tom would provide an update of Action Plan development, then California Department of Technology Chief Strategist Justin Cohan-Shapiro would walk everyone through the updated version of the draft Broadband Action Plan, and then there would be public comments prior to the Council voting to accept or amend the plan.

California Department of Technology Deputy Director for Broadband and Digital Literacy Stephanie Tom recognized the Council members/designees for their contributions to the development of the Action Plan. She noted that public comments were considered in the development of the plan and the most recent draft includes updated data. Ms. Tom emphasized that the Plan provides a foundation for California to close the digital divide.

Agenda Item 2 – Action Plan Working Session

California Department of Technology Chief Strategist Justin Cohan-Shapiro expressed appreciation for all the work and feedback received over the past months and walked the Council through the draft Plan (attached).
- Executive Summary - Broadband For All will take time and require partnerships and resources.
- Why Broadband for All is important – there is an increasing need while portions of the state remain unserved and underserved.
- The California Public Utilities Commission commissioned a model to help estimate costs to provide service to unserved and underserved state populations to illustrate the magnitude of the challenges ahead - Mr. Osborn explained the cost model and answered questions.
- Affordability – affordability is a driver of adoption.
- Devices – how people access the internet is important.
- Digital Skills – digital literacy is an evolving spectrum.
- Data – from a policy perspective data is missing, particularly among availability and adoption – data is needed to inform policies to move to Broadband For All
- The Action Plan is organized around three goals – Actions to ensure all Californians:
  - Have high-performance broadband available at home, schools, libraries, and businesses.
  - Have access to affordable broadband and the devices necessary to access the internet.
  - Can access training and support to enable digital inclusion.

Agenda Item 3 – Public Comment

Chair Tong opened the meeting for public comments.

Verbal public comments were made by:

- Parisa Vinzant
- Eli Cortez
- Kami Peer, Next Gen California
- Danielle Hughes, Tahoe Transportation District
- Tom Mullen
- Leticia Garcia, Riverside County of Education
- Rochelle Swanson, Crowne Castle
- Vivian Martin-Gonzalez
- Abby Ridley-Kerr, Education Trust
- Tom West, North Bay North Coast Consortia

Council members discussed the Action Plan.

A motion was made and seconded to adopt the draft Action Plan presented and discussed with (1) amendments to include references to nonprofits, refine the term responsible parties to key parties, and include references to specific demographic groups and (2) the ability for staff to update the wordsmithing of the plan according to the meeting discussion. The Council voted unanimously to adopt the Action Plan with the noted amendments and ability of staff to update the plan wordsmithing as long as it does not change the intent of the Plan. Mr. Barajas voted for Secretary Ross, who was only able to attend the first portion of the meeting.

A motion was made and seconded to dedicate the Plan to late Assembly Member Gwen Moore. The motion was unanimously approved.

Chair Tong thanked Council members/designees, staff, subject matter experts, and stakeholders for their involvement in developing the plan. She reminded everyone that the plan will be refreshed annually.

The meeting adjourned at 12:07am.

Attachments:
- Zoom meeting comments
- Draft Action Plan Reviewed during the meeting

10:08:00   From Matthew Rantanen : yes, audio is smooth now

10:18:03   From Jules : Here's the link to the report https://broadbandcouncil.ca.gov/wp-content/uploads/sites/68/2020/12/BB4All-Action-Plan-Final-Draft-v26.pdf

10:28:54   From twest : Will there be a workshop on the cost model? I have done a study and come up with double the $6.8 Billion. Tom West

10:29:33   From Tom Mullen : The costs are for only the areas (100% - 96.4%=only 3.6%?) not served or underserved (less than 25/3)?

10:31:09   From stephanie.tom : Thank you for your questions regarding the cost model. We will address shortly during public comment. (Glad we moved this up in the agenda!)

10:31:17   From travisfinch : $6.7 seems unrealistically low if you are talking about extending coverage to 100% of households. There are some rural areas where it could cost $1 million to extended down canyons to reach two households.

10:32:33   From Marina : The CPUC website with the report and support documentation is available here: https://www.cpuc.ca.gov/communications/costmodel/

10:35:30   From elias : Did you get input from the Greenlining institute who is reaching out to the California legislature on closing the Digital Divide? The Greenlining Institute has reported and mapped out the areas which lack Broadband access which match most of the communities which had been impacted by redlining policies of the 1930's. The State has a Disadvantaged mapping and community development program (DAC). Did you include their analysis and programs into you analysis and report?

10:37:33   From Jules : If you are not a Council member, please make sure to mute your audio. Thank you.

10:37:48   From David Griffith, Alpine County : Is there a reference to the observation that Mexico has more expensive broadband access than California. I have an office in Mexico and I have faster service at a lower price than I have in my home here in California.

10:38:42   From stephanie.tom : Hi Elias-We did not receive formal, written public comment from the Greenlining Institute. Since opportunities for public comment are available all year around for future versions of the broadband action plan, please feel free to submit to: CABroadbandCouncil@state.ca.gov

10:40:04   From Anne Neville-Bonilla : Hi David - it's footnoted and from an OECD study. They took several price points across comparison areas.

10:42:12   From travisfinch : 25/3 and 100/20 would render all area that previously benefitted from CASF awards suddenly eligible again. This could result in a lot of overbuilding. 10/1.5 would be more realistic. Also, the 70 mbps average speed across the country is dramatically skewed by high-population areas. Most of our customers state 10-20 mbps is suffificient.

10:43:34   From stephanie.tom : Elias - Clarification: We do cite the Greenlining Digital Divide report as a footnote on page 6, but did not receive formal input directly.

10:43:52   From elias : Due to COVID19, the school districts are overwhelmed by the need for Digital access for their students. The school attendance has dropped and drop out rates have increased which directly impacts the ADA funds for these schools. This is an emergency, which should be included for funding resources immediately via covid!9 funding from the federal government. Does this plan include current and short term urgent COVID19 Internet access needs for education?

10:49:44   From Tom Mullen : Does Library or D of Ed provide broadband infrastructure grants?

10:50:44   From elias : community stakeholders

10:50:55   From Tom Mullen : What about... Responsible: California Broadband Grant Issuers

10:51:52   From Anne Neville-Bonilla : Tom - the State Library provides grants to libraries to help subsidize one-time costs of connecting. Information is available here: https://www.grants.ca.gov/grants/california-state-library-high-speed-broadband-grant/

10:52:24   From Tom Mullen : Thank you

10:53:53   From stephanie.tom : Thank you for the suggestions! We will consider and adjust as appropriate.

10:56:35   From Kelly Stephenson : I need to drop off at 11 for another call. Please consider adding to page 7, an example representing an actual broadband deficiency (underserved) at a tribal health program:

Imagine a tribal health provider trying to update an electronic health patient record, another provider hosting a telehealth visit with a patient, business office staff trying to submit insurance claims, an employee attending an online webinar or training, and other staff checking and answering emails, all over a single T1 at 1.54 Mbps capacity.

10:59:10   From stephanie.tom : Thank you Kelly!

10:59:31   From Parisa Vinzant : Good morning, all. I have public comment.

11:00:33   From Carolyn McIntyre : Does the cost model take into consideration the locations that will be served through the RDOF grants and the recent and soon to be awarded CASF grants?

11:00:40   From Jules : Please wait until the chair indicates it is time for public comment to indicate you would like to make a comment. Thank you.

11:01:19   From Jacqueline Kinney : On page 23, under #9, what is the discussion about surcharges and bill impacts? Is that related to reliability? What are the broadband "licensing requirements" referenced?

11:01:53   From Tom Mullen : Page 17 regarding data challenges,…Data about the costs, gaps, speeds and access to broadband in California is disparate and subjective. This statement is important and needs to be backed up by stronger language in the action section, Improve broadband data and mapping transparency and usability, item 18. Address level data equals the granularity and accuracy needed.

11:02:23   From Parisa Vinzant : Good morning, Jules. I have public comment.

11:02:28   From elias : Due to COVID19 the urgent needs of the state and local education entities there need to be included. this will add a sense of urgency for funding justification.

11:02:37   From elias : eli would like to comment

11:02:39   From kamipeer : I would like to join the queue for public comment.

11:02:44   From Danielle Hughes : Hi Jules, I would like to comment. Thank you!

11:03:06   From Tom Mullen : I would like to comment.

11:03:51   From Asm Kevin McCarty : Leticia Garcia, Riverside County Office Education.

11:05:08   From Gloria Earl : Recommend verbiage to include: Labor Workforce Development Agency and/or California Workforce Development Board Workforce has been tremendously impacted by this long term issue and local workforce board directors are very interested in learning more about what they can do to help address the broadband issues.

11:05:08   From Rochelle Swanson - Crown Castle : Public comment - Rochelle Swanson, Crown Castle

11:05:29   From Viviana Martin-Gonzalez : Hello, I would like to sign up for public comment. Thank you.

11:09:07   From Abby Ridley-Kerr : Abby Ridley-Kerr with Education Trust - West. We submitted comment and I'd like to sign up for public comment.

11:16:33   From Assemblymember Mike Gipson : Thank you for this presentation very good, must head to another meeting…

11:19:06   From Martha Van Rooijen : How about streamline permitting process on page 22

11:19:11   From Kevin Harbour : Kevin Harbour - BizFed Institute President would like to share the work we're doing representing the LA & Orange County Regional Broadband Consortium on the Digital Divide in SoCal

11:22:57   From David Griffith, Alpine County : No public comment, but I think all of you have done a tremendous job and the action plan is extremely well done and well written.

11:28:00   From Jacqueline Kinney : There are a few questions in the chat. Thanks if you can answer.

11:47:16   From whughe200 : Comcast agrees with Lori and that the Caltrans process is much approved and they have been great partners.

11:47:30   From Christina Snider : In case anyone missed it while we have been discussing this morning--just want to flag the Deb Haaland has been picked for Interior (big win for Indian Country)!!! Semi-relevant for this work.

11:49:13   From stephanie.tom : Congratulations Christina and all!

11:55:11   From Rochelle Swanson - Crown Castle : Congratulations on approving the Action Plan!!

11:55:32   From Matthew Rantanen : "and there was much rejoicing"…

12:00:35   From Carolyn McIntyre : Thank you for all of the work done to develop the Broadband Action Plan.   We look forward to working with you on implementation.

12:05:07   From stephanie.tom : Thank you stakeholders! We truly appreciate your ongoing collaboration and support.

BROADBAND ACTION PLAN

2020

CALIFORNIA BROADBAND FOR ALL

CALIFORNIA
BROADBAND COUNCIL

Executive Summary

Broadband is essential to modern life. It is an engine of economic possibility, educational opportunity, civic engagement, and access to health care. People and communities that lack available broadband and the means to use it are increasingly being left behind.

The rural digital divide means that residents in less populated areas have much less access to broadband services. But lack of broadband is not just a matter of geography; income, education, disability status, age, and race and ethnicity all correlate with lower broadband adoption.

The Covid-19 pandemic has only reinforced our reliance on broadband—and the importance of closing the digital divide. With school, work, and health care increasingly—or completely— available online as a public health imperative, Californians' ability to access and use broadband became the difference between being able to fully engage in life, and being cut off.

In light of these challenges, this California State Broadband Action Plan—prepared in response to Governor Gavin Newson's executive order[1]—reflects the state's belief that broadband is essential to economic and workforce development, public safety, education, and an engaged citizenry.

The California Broadband Council developed this "Broadband for All" Plan in fall 2020 with the understanding that broadband access, adoption, and training are essential components of digital equity. The Council solicited extensive engagement and input from state and local agencies, state legislative leaders, tribal nations, broadband industry leaders, nonprofits, and members of the public. In addition to our own research on national best practices, we reviewed 70 written comments and listened to ideas and concerns raised by many of the 150 organizations and more than 600 attendees that participated in listening sessions, online events, and meetings.[2]

This Plan focuses on achieving three long-term goals:

>**Goal 1:** All Californians have high-performance broadband available at home, schools, libraries, and businesses.

>**Goal 2:** All Californians have access to affordable broadband and the devices necessary to access the internet.

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[1] California Executive Order N-73-20, https://www.gov.ca.gov/wp-content/uploads/2020/08/8.14.20-EO-N-73-20.pdf.

[2] All written public comments, transcripts and recordings of the listening sessions and the California Broadband Council meetings are available on the Council's website (https://broadbandcouncil.ca.gov/action-plan/).

Goal 3: All Californians can access training and support to enable digital inclusion.

To achieve these goals the Council plans to leverage the state's full range of tools, including policy, programs, funding, partnerships, and collaborations with federal, municipal, and tribal governments. This Plan lays out key actions including:

- Modernize broadband speed and performance standards

- Simplify processes and leverage existing assets and construction

- Set reliability standards

- Increase access to affordable broadband services and devices

- Promote affordable broadband services and devices

- Encourage broadband competition

- Strengthen partnerships and coordinate initiatives

- Improve broadband data and mapping transparency and usability

- Develop technical assistance and support

- Enhance partnerships

We recognize that enabling every Californian to access and adopt broadband will require time. Like the rest of the country, we face complex and deep-rooted challenges to delivering Broadband for All. We also are making plans in an ever-changing landscape—such as the potential impacts of federal programs like the Federal Communications Commission's Rural Digital Opportunity Fund—so the actions we propose here are first steps, and will be revised at least annually to reflect new achievements and opportunities.

We also recognize that achieving Broadband for All will require partnerships with and support from the broadband industry and federal, municipal, and tribal governments. We anticipate partnering across agencies and organizations at every level of government and industry on these next steps to ensure all Californians have equal access to affordable high-performance broadband and the devices and skills needed to use it.

Already, we have seen the spirit of collaboration in response to the unprecedented effects of the Covid-19 pandemic and the wildfire season. As Californians struggled to find ways to work, learn, and care for each other from home, California's government, business, philanthropic, and nonprofit communities have helped to blunt the worst effects of the digital divide.

- The Governor's Task Force on Business and Jobs Recovery and the Superintendent of Public Instruction's Digital Divide Task Force helped secure donations of more than 64,000 devices and 100,000 hot spots for students.[3]

- The Governor's Task Force also reached out to internet service providers such as Cox, Charter, and Comcast, which extended low-cost plans to low-income children and families to assist with distance learning. Several other internet service providers expanded their affordable offers and enacted more beneficial policies on service termination, fees, and data caps.

These examples of collaboration and philanthropy helped California address the worst of the short-term impacts of the pandemic, make meaningful headway on devices, and illustrate the importance of the work we have ahead.

We are proud to partner together across our state to ensure all Californians have equal access to affordable, high-performance broadband and the devices and skills needed to use it.

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[3] "State Superintendent Tony Thurmond and Digital Divide Task Force Identify Resources, Partnerships Available to Support Successful Distance Learning in the Fall," California Department of Education, News Release, July 23, 2020, https://www.cde.ca.gov/nr/ne/yr20/yr20rel61.asp.

Why Broadband for All?

Broadband can transform lives—and lack of access or adoption can limit Californians' economic, educational, and health care opportunities.

- ***Imagine* two seniors with medical needs**, struggling to find reliable transportation to get to and from weekly medical appointments—and unable to take advantage of telehealth visits because they do not have access to broadband (and might not know how to use it even if they did).

- ***Imagine* a family of five working and learning from home**. Imagine the kids trying to understand geometry while the video of their teacher pauses and freezes. Imagine the adults taking turns sitting in their car to take work video calls while the other stays inside—unable to connect because the family does not have enough bandwidth to keep from knocking each other offline.

- ***Imagine* a college student, working a full-time minimum-wage job by day and attending online classes at night**. Imagine coming home after a nine-hour day and spending the next five hours trying to stream courses and submit homework through a smartphone.

- ***Imagine* a farmer in the heart of the Central Valley who cannot effectively compete in global markets** because of the lack of broadband access necessary to utilize internet-enabled machinery that other farms use to optimize soil fertility and yield more crops.

Since the beginning of the internet era, California's policymakers have envisioned a California in which all residents can communicate using robust and affordable services, and where they are empowered to leverage these technologies for economic and social benefits.[4] Even as far back as 1993, the state considered at what point internet access would become so essential that the state should make it affordable to everyone.[5]

The Council's pursuit of Broadband for All is rooted in a belief that broadband internet access is a critical service, not a luxury:

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[4] See, for example, AB 1289 (Stats. 1993 Ch. 1143), which made it the policy of the state "to promote economic growth, job creation, and the substantial social benefits that will result from the rapid implementation of advanced information and communications technologies by adequate long-term investment in the necessary infrastructure." And SB 1563 (Stats. 2002, Ch. 674) which made it the policy of California "To assist in bridging the 'digital divide' by encouraging expanded access to a state-of-the-art technologies for rural, inner-city, low-income, and disabled Californians."

[5] California Public Utilities Commission. "Enhancing California's Competitive Strength: A Strategy for Telecommunications Infrastructure (A Report to the Governor)." November 1993, 48.

- Broadband access enables individuals to work, study, communicate, apply for government services, work remotely, operate home-based businesses, receive emergency information, and access health care.

- As a state, broadband powers our most critical systems, from our electrical grid to our water supply systems, and public safety and emergency response networks. It underpins modern life.

- Broadband has helped power California's ability to compete on the world stage for years. Broadband enables communities to build thriving economies by attracting talent and businesses. It powers California's advancement and success in industries from higher education to manufacturing, agriculture, and the service and economy.

Like residents of every other state, however, Californians have uneven access to and adoption of broadband. These challenges existed when Governor Newsom announced in November 2019 that he would bring stakeholders together to develop a Broadband for All plan.[6] A scant four months later, the Covid-19 pandemic upended every aspect of Californians' lives—and broadband, which already was essential to so many activities, became the only point of entry to many critical life needs. Nearly 7 million California K-12 students saw their schools close and started learning from home,[7] employees who were able to telework began working remotely, and Medicare patients began seeing their doctors through telehealth visits at much greater rates.

While in-person activities will resume in a post-pandemic world, the cost in economic opportunity and quality of life will only become greater for those who cannot access or adopt broadband. This is especially true for historically underserved communities, which continue to fall behind their connected peers.

Broadband for All also represents new opportunities, however—not just a way to keep up, but a way to get ahead. The Covid-19 pandemic compelled many employers, employees, and entrepreneurs to quickly pivot to working in new places. That same type of innovation could be harnessed to encourage new regional economic development efforts after the pandemic—building on the governor's Regions Rise Together initiative.[8]

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[6] "In Fresno at the California Economic Summit, Governor Newsom Highlights New Investments in Higher Education, Actions to Strengthen California's Workforce & His Administration's Focus on Regional Growth Strategies," Office of Governor Gavin Newsom, News Release, November 8, 2019, https://www.gov.ca.gov/2019/11/08/in-fresno-at-the-california-economic-summit-governor-newsom-highlights-new-investments-in-higher-education-actions-to-strengthen-californias-workforce-his-administrations-focus-on-regiona/.

[7] Council staff calculation: https://www.cde.ca.gov/ds/sd/cb/ceffingertipfacts.asp.

[8] "Regions Rise Together," State of California, https://www.arcgis.com/apps/Cascade/index.html?appid=d056b93e3116413cbd1ad25cc4245221.

The Current State of Broadband in California

Delivering broadband to a state as large and diverse as California is complicated. This is especially so when regions and even local communities vary by level of competition, historic investment, and the need for subsidies to incentivize infrastructure deployment and broadband adoption.

While broadband infrastructure and increasing levels of adoption have helped power California's fiscal health and well-being for decades, data showing where broadband is unavailable and who has been unable to adopt demonstrates how uneven access to this essential service remains.[9] Indeed, according to the most recent figures, 23 percent of California housing units—home to 8.4 million residents—do not have broadband subscriptions.[10]

At the end of 2018, broadband services that advertised download speeds of 100 Mbps or greater were available to nearly 95 percent of California households. This achievement reflects widespread cable and fiber deployment in urban population centers. Nevertheless, many homes in urban areas remain unserved or do not have access to the same broadband infrastructure (especially fiber) that is available to wealthier neighbors.[11] In addition, in rural California, less than half of households (46.5 percent) can adopt broadband at this speed. Even in urban areas, some communities lack availability. Approximately 674,000 households in the state lack this high-

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[9] In this report we refer to broadband "availability" when the infrastructure is available such that a household could access it. We refer to broadband "adoption" when a household subscribes to an available service. We refer to the "digital divide" to describe either lack of availability or lack of adoption (the latter of which might be caused by issues related to lack of affordability, devices or digital skills).

[10] Council staff calculation. California's population was approximately 39.5M in 2019, assuming average household size of 3.05, and 22 percent of households did not subscribe to broadband at home through a computing device. See 2019 California Emerging Technology Fund survey for figures on non-smartphone broadband subscriptions: https://www.cetfund.org/action-and-results/statewide-surveys/2019-statewide-surveys/

[11] See the below resources on lack of access (particularly to fiber) in urban communities:
"Who gets access to Fast Broadband? Evidence from Los Angeles County 2014-2017," Hernan Galperin et. al, October 2019, https://arnicusc.org/publications/who-gets-access-to-fast-broadband-evidence-from-los-angeles-county-2014-17/
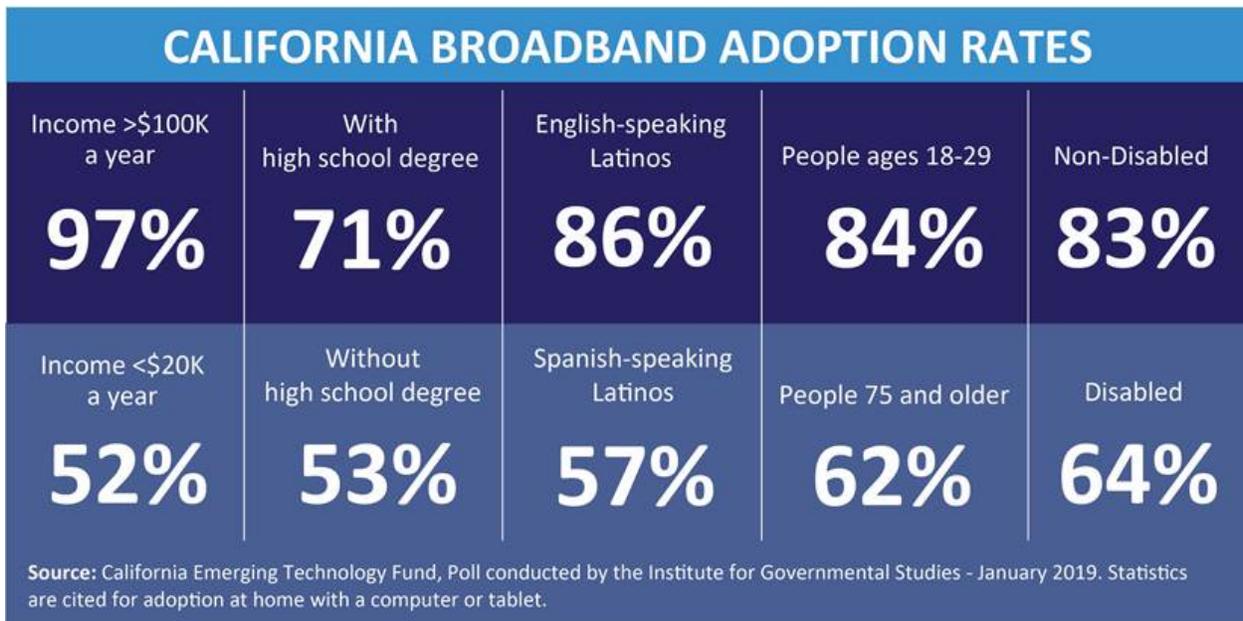"On the Wrong Side of the Digital Divide," Greenlining Institute, June 2020, https://greenlining.org/publications/online-resources/2020/on-the-wrong-side-of-the-digital-divide/
"AT&T's Digital Redlining: Leaving Communities Behind for Profit," National Digital Inclusion Alliance and Communication Workers of America, October 2020, https://www.digitalinclusion.org/wp-content/uploads/dlm_uploads/2020/10/ATTs-Digital-Redlining-Leaving-Communities-Behind-for-Profit.pdf

capacity broadband, with about 305,000 located in urban areas and 369,000 located in rural areas.[12]

To frame the magnitude of this challenge, consider that urban California covers about 8,200 square miles and contains just under 95 percent of the population, while rural California is home to 5 percent of the population spread across more than 147,000 square miles—a geography larger than the combined land areas of Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, Rhode Island, South Carolina, Vermont, and West Virginia.[13]

The scope of California's challenge, however, is not limited to geography. In fact, many Californians face roadblocks to accessing broadband, even when it is physically available.[14] Income, education, disability status, age, and race and ethnicity all correlate with lower adoption, as the following data illustrates.[15]

CALIFORNIA BROADBAND ADOPTION RATES

Income >$100K a year	With high school degree	English-speaking Latinos	People ages 18-29	Non-Disabled
97%	**71%**	**86%**	**84%**	**83%**
Income <$20K a year	Without high school degree	Spanish-speaking Latinos	People 75 and older	Disabled
52%	**53%**	**57%**	**62%**	**64%**

Source: California Emerging Technology Fund, Poll conducted by the Institute for Governmental Studies - January 2019. Statistics are cited for adoption at home with a computer or tablet.

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[12] "California Advanced Services Fund: 2019 Annual Report," April 2020, p. 11, https://www.cpuc.ca.gov/General.aspx?id=9226.

[13] Council staff calculation. "United States Summary: 2010," U.S. Census, https://www.census.gov/prod/cen2010/cph-2-1.pdf.

[14] "Statewide Survey 2019," California Emerging Technology Fund, https://www.cetfund.org/action-and-results/statewide-surveys/2019-statewide-surveys/.

[15] The California Public Utilities Commission concluded income was the most significant factor contributing to low adoption rates: "Broadband Adoption Gap Analysis," CPUC, June 2019, https://www.cpuc.ca.gov/uploadedFiles/CPUCWebsite/Content/UtilitiesIndustries/Communications/Reports_and_Presentations/CDVideoBB/BAGapAnalysis.pdf.

Challenges to Achieving Broadband for All

State, local, and tribal governments, the private sector, nonprofits, and philanthropies have all made investments to address these challenges over the past 20 years. While California has made significant progress toward digital equity, the evolving complexity and scope of the challenges means there is still much work to be done.

The Council identified five core roadblocks preventing Californians from accessing or adopting broadband: availability (speed and reliability), affordability, access to devices, digital skills, and data.

Challenge 1: Availability (speed and reliability)

Californians' need for high-performance broadband continues to increase

In 1996, the Federal Communications Commission (FCC) defined broadband internet as a 200 kbps speed service—fast enough to send and receive email. Bandwidth needs clearly have increased since then, but speed benchmarks lag behind those needs.

The FCC last updated its definition of broadband to a minimum of 25 Mbps download and 3 Mbps upload (25/3 Mbps) in 2015.[16] That benchmark was intended to be sufficient for people engaging in "light use" (email, browsing, basic video, VoIP, internet radio) or moderate use (basic functions plus one high-demand application such as videoconferencing, online gaming or streaming HD video) for up to three devices at a time.[17]

California's current standard is slower than the FCC's definition. California defines broadband service in its core broadband subsidy program, the California Advanced Services Fund (CASF), as 6/1 Mbps or higher, and subsidizes build out at 10/1 Mbps or higher. This makes California one of 32 states that define service below the FCC's benchmark.[18] (It also does so without any latency standards, which are critical for applications like video and emerging Internet of Things and Smart Cities applications.)

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[16] "2015 Broadband Progress Report and Notice of Inquiry on Immediate Action to Accelerate Deployment," Federal Communications Commission, February 4, 2015, https://docs.fcc.gov/public/attachments/FCC-15-10A1.pdf.

[17] "Household Broadband Guide," Federal Communications Commission, February 5, 2020, https://www.fcc.gov/consumers/guides/household-broadband-guide.

[18] "State Broadband Policy Explorer," Pew, July 31, 2019, https://www.pewtrusts.org/en/research-and-analysis/data-visualizations/2019/state-broadband-policy-explorer.

There is little chance that Californians will need less broadband in the future. Americans already are outgrowing today's federal 25/3 Mbps standard. For example, the Federal Communications Commission's 2018 "Measuring Broadband America" report found that among participating home internet service providers, the median download speed experienced by users was approximately 72 Mbps, nearly triple the current federal standard.

In addition, the FCC found that from 2016 and 2017, between 2 and 50 percent of DSL subscribers, 4 and 100 percent of cable subscribers, and 14 and 80 percent of fiber subscribers moved to higher-speed tiers—either because the subscriber changed their broadband plan, or because the subscriber's service provider upgraded their plan.[19]

The number of internet-connected devices also is growing. In 2019 there were approximately 10 billion Internet of Things devices connected worldwide, and that number is predicted to jump to 30.9 billion by 2025, with growth driven significantly by personal and home devices.[20]

Rural, tribal and some urban communities lack high-performance broadband, network resiliency, and redundancy

A large portion of California's population now has access to broadband. At the end of 2018, 96.3 percent of Californian households had residential access to broadband at speeds of 25/3 or greater, and nearly 95 percent had access to download speeds of 100 Mbps or greater.[21] The areas of the state in which these speeds are not available are disproportionately rural. Less than 47 percent of rural households have broadband access at 100 Mbps and just over two-thirds have access at 25/3.[22]

Having low-quality or no broadband creates not only missed economic or quality of life opportunities, but also threats to people's lives and homes. As the Governor's Wildfires and Climate Change Strike Force report noted in 2019, "the lack of broadband in rural communities and access to cell services makes it difficult to communicate clear emergency evacuation orders to residents or to locate residents when they are in trouble."[23] Moreover, progressively worse fire seasons have shone a spotlight on the limited capacity of the current infrastructure absent substantively more investment in redundancy and infrastructure hardening. Given the changing

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[19] "Eighth Measuring Broadband America Fixed Broadband Report," Federal Communications Commission, December 14, 2018, https://www.fcc.gov/reports-research/reports/measuring-broadband-america/measuring-fixed-broadband-eighth-report.

[20] "State of the IoT 2020: 12 billion IoT connections, surpassing non-IoT for the first time," IoT Analytics, November 19, 2020, https://iot-analytics.com/state-of-the-iot-2020-12-billion-iot-connections-surpassing-non-iot-for-the-first-time/.

[21] "California Advanced Services Fund: 2019 Annual Report," p. 11.

[22] "California Advanced Services Fund: 2019 Annual Report," p. 11.

[23] "Wildfires and Climate Change: California's Energy Future," A Report from Governor Newsom's Strike Force, April 12, 2020; p 12.

climate, there is a risk that broadband services may fail due to public safety power shutoffs or damage done to fragile infrastructure.

Tribal lands, which are largely rural, also remain consistently underserved by broadband. While FCC data report that over 98 percent of non-tribal areas in California have access to a fixed broadband provider, nearly a quarter of tribal lands lack access to such service.[24] Tribal lands in California are largely unserved.[25] Rural tribal communities often have less robust services available than their urban counterparts. According to the FCC's Native Nations Task Force November 2019 Report, challenges include "statutory obstacles, regulatory and economic barriers, geographic and economic barriers, mapping challenges, Tribal consultation and engagement issues, accessibility, and adoption and demand issues."[26] The result is a pattern of underinvestment and an exacerbation of existing inequalities.

Patterns of underinvestment in rural and tribal communities are largely due to the economics of infrastructure deployment, precisely the issue that programs like CASF are designed to address. There is a higher cost to build network infrastructure in less densely populated rural areas.[27] One possible result is that the private sector will choose to not offer services in low-density areas, especially without a subsidy.[28] If a provider does offer service, it is under no obligation to continue providing internet access, even if it is the only provider in a community. Competition among providers is also more difficult in these communities because they offer thinner profit margins and require large capital investments.

As a result, prospective internet service providers in these areas of California require concerted help to overcome the challenges of building new infrastructure. Public intervention, particularly in the form of capital subsidies like those offered through the CASF program and various federal

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[24] "Fixed Broadband Deployment: California," Federal Communications Commission, https://broadbandmap.fcc.gov/#/area-summary?version=dec2019&type=state&geoid=06&tech=acfow&speed=25_3&vlat=37.41896076143145&vlon=-119.30660699999999&vzoom=3.9361444836050796

[25] Analysis showing the reservation and trust lands (excluding tribal communities not on these lands) that 15 of California's federally recognized tribes have no broadband and 30 have less than 25 Mbps download. See Order Instituting Rulemaking into the Review of the California High Cost Fund-A Program (Rulemaking 11-11-007), Opening Comments of the Public Advocates Office on the Assigned Commissioner's Fifth Amended Scoping Memo and Ruling (Feb. 29, 2020) at pate 10, https://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M336/K533/336533984.PDF. See also Brian Howard, Traci Morris, Tribal Technical Assessment: The State of Internet Service on Tribal Lands (American Indian Policy Institute 2019), https://aipi.asu.edu/sites/default/files/tribal_tech_assessment_compressed.pdf

[26] Native Nations Task Communications Task Force, Improving and increasing Broadband Deployment on Tribal Lands, Nov 5, 2019.

[27] "Rural Broadband Economics: A Review of Rural Subsidies," CostQuest Associates, 2018, page 10, https://www.ustelecom.org/wp-content/uploads/2018/11/Rural-Broadband-Economics-A-Review-of-Rural-Subsidies-final-paper-1.pdf.

[28] "Rural Broadband Economics: A Review of Rural Subsidies," page 13.

programs, is necessary in many cases to incentivize providers to deliver equivalent service to poor and rural communities.

The difficulty in building out in many parts of the state points to the need for collaboration and consideration of new models and strategies to lower the barriers to entry, such as making public infrastructure available for lease, barring anti-competitive agreements in multiple dwelling units like apartments, and streamlining permitting processes. The Council heard from providers about the challenges associated with permitting and building across jurisdictions, for example. This is an area that warrants continued focus and innovation,[29] especially when it comes to communities that are unserved and underserved.

Delivering Gigabit Service to unserved and underserved Californians will require at least $6.8[30] billion in new private, federal and state investments.

Broadband infrastructure is a long-term capital investment, and as the state takes strategic action to prepare for success in a digital world for all of its residents, it is imperative that public resources continue to be put toward infrastructure that will serve Californians for decades to come.

Several last-mile technologies can deliver these speeds to Californians. Fiber, whether to the home, community or somewhere in between, will always be a critical component—for last-mile service and also advanced wireless services.[31] It is a critical backhaul for next-generation wireless technologies, such as 5G.[32] And a home's proximity to fiber improves service quality dramatically.[33] There are parts of the state where the economics of building fiber do not make sense from a private or a public policy perspective, and alternative solutions will be required.[34] It will likely take a long, phased approach—as well as considerable investment from the state and the federal government—to make fiber connectivity a reality across California.

The California Public Utilities Commission (CPUC) contracted with experts for a cost model to determine the network investment required to build fiber networks that can provide broadband and voice services to California homes and businesses, including the middle-mile for use by

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[29] See, for example: "Public Infrastructure/Private Service: A Shared-Risk Partnership Model for 21st Century Broadband Infrastructure," published by the Benton Institute for Broadband and Society, 2020, https://www.benton.org/publications/public-infrastructureprivate-service.

[30] See California Broadband Cost Model, https://www.cpuc.ca.gov/communications/costmodel/.

[31] "The Case for Fiber to the Home, Today: Why Fiber is a Superior Medium for 21st Century Broadband," Electronic Frontier Foundation, 2019, page 22, https://www.eff.org/document/case-fiber-home-today-why-fiber-superior-medium-21st-century-broadband.

[32] "5G Deployment: FCC Needs Comprehensive Strategic Planning to Guide Its Efforts," U.S. Government Accountability Office, June 2020, page 19, https://www.gao.gov/assets/710/707530.pdf.

[33] "Issue Brief: California's Digital Divide," Little Hoover Commission, December 2020, page 4, https://lhc.ca.gov/sites/lhc.ca.gov/files/Reports/253/IssueBrief1.pdf.

[34] For example, each year California schools and libraries solicit bids from providers for broadband access. In some cases, rural schools and libraries receive no bid for fiber or they receive a single bid, usually for fixed wireless.

multiple service providers. The model estimates the cost for a network to serve currently unserved locations with three tiers of broadband: 25 Mbps download and 3 Mbps upload, 100 Mbps download and 10 Mbps upload, and 100 Mbps download with no upload considered. It includes investment in "extremely high-cost" areas that are supported by monthly FCC subsidies. The estimates are for a passive fiber optical network delivering broadband and voice service to residences and businesses. Comparing the estimated costs for middle-mile and last-mile for three speed tiers illuminates details about how the model considers each part of the network, as described below.

Middle-mile is a critical component to providing service because it provides a transport platform that multiple service providers can use between last-mile nodes, unlike wireless backhaul which is usually built for a single provider. Although middle-mile fiber is already present in many locations, in many cases it is not available for use by all service providers due to price, bandwidth or the policies of the owner. The estimated cost to build a statewide middle-mile dark fiber network along highways from scratch is $2.2 billion. (Operators' electronics would be priced separately.)

For the last-mile or access network, the model estimated three tiers of service, all of which include the middle-mile costs. Each estimate is standalone, meaning that each speed tier provides for a complete network in unserved areas at that speed tier. Unserved areas are the places where a network which provides this speed does not currently exist. Unlike the middle mile estimate, the last mile model network considers if the infrastructure of existing service providers can be used. Existing facilities costs factored into the model include pole attachments, conduit/duct and manholes.

For last-mile network speeds of 25 Mbps download and 3 Mbps upload, the estimated cost for the California network build, including middle-mile, is $5.6 billion. For last-mile network speeds of 100 Mbps download and 10 Mbps upload, the estimated cost for the California network build, including middle-mile, is $6.8 billion. For last-mile network speeds of 100 Mbps download without estimating an upload speed, the estimated cost for the California network build, including middle-mile, is $6.7 billion. The difference between these two model estimates is the cost of network electronics.

The CPUC's cost modeling tool will help the state target subsidized funding and deployment—and, with enhancements, can provide the state with better tools to measure progress.

Challenge 2: Affordability

Price matters. When we consider what broadband costs a Californian, we have to account for all of its price tags. The service cost is just one component; there are also taxes, surcharges, rental

charges for modems and routers, and the cost of devices used for getting online—such as laptops and tablets. There are also additional unexpected costs of contractual penalties if a family falls behind and has to catch up, cancel, or switch plans. Each of these is a mandatory cost—and barrier—to getting online.

Compared to many other countries, broadband in the United States is expensive. Across the Organisation for Economic Co-operation and Development (OECD) countries, only Mexico has higher broadband prices than the United States.[35] For a family with a tight budget, it is easy to see how paying for food, electricity, rent, and other necessities would takes precedence over purchasing internet services.

That is one reason cellular phone subscriptions are the core communications service purchased by many Californians. However, smartphones provide only limited broadband access, and have a limited ability to share service with others—a spouse, children, or an elderly parent—in the household.

More than half of California non-adopters simply cannot afford market prices or do not own a computer.[36] Many believe they could pay total monthly bills of $10 to $15 per month.[37] While some affordable broadband programs offered by providers are within this price range, programs are limited to people living just above the poverty line, making them more limited in scope than even the federal Lifeline subsidy program, which most broadband providers do not participate in. These affordable broadband programs do not offer broadband at particularly high speeds, only at least 15/2. In a pre-pandemic survey, more than 70 percent of California non-adopters were unaware that these programs even existed.[38] The state's LifeLine program does not offer standalone broadband.[39] Moreover, there are no broadband programs to support families at risk of losing their service similar to programs like the Low Income Home Energy Assistance program.

Competition, which can drive down prices in an open, lightly regulated market, is more difficult to find for a service with such high capital costs. In its 2018 report on the state of competition among retail communications services in the state, the PUC found that regional fixed broadband markets are highly concentrated, and that competition is weaker at higher speed thresholds.[40]

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[35] "Broadband Portal," OECD, http://www.oecd.org/sti/broadband/broadband-statistics/. See fixed broadband basket, high user.

[36] "Statewide Survey 2019," California Emerging Technology Fund.

[37] Jonathan Sallet, "Broadband for America's Future: A Vision for the 2020s," Benton Institute for Broadband & Society, October 2019, pages 65–66, https://www.benton.org/publications/broadband-policy2020s.

[38] "Statewide Survey 2019," California Emerging Technology Fund.

[39] California LifeLine, https://www.californialifeline.com/en.

[40] "Retail Communications Services in California," California Public Utilities Commission, December 2018, https://www.cpuc.ca.gov/uploadedFiles/CPUCWebsite/Content/UtilitiesIndustries/Communications/Reports_and_Presentations/CD_Mgmt/re/CompetitionReportFinal%20Jan2019.pdf.

Using 100/10 Mbps as a minimum baseline broadband speed, FCC data show that 4 percent of households have no access, 28 percent have only one choice, 45 percent have a duopoly, and only 23 percent were able to choose between three or more providers.[41] While this dataset does not contain demographic data, in general wealthier communities are two to three times more likely to have more than two choices than are communities with households that have lower-than-average income.[42] This results in even greater inequities because consumers benefit when companies compete for customers, and research shows that broadband competition reduces prices, and improves service.[43]

Challenge 3: Devices

As we focus on creating digital equity, we must look not only at what is available and affordable, but also how Californians access the internet. In 2019, only about 82 percent of California households had a desktop or laptop at home.[44] For those that are not yet connected to the internet, a device can be a barrier. For example, 51 percent of non-adopters stated that broadband was too expensive or they did not have a computer at home.[45] Several hundred dollars is a significant investment for a lower-income household. And if that household lacks good credit, the true cost can be much higher.

Households that only access the internet through a smartphone are unable to fully participate in modern digital life. In 2019, 78 percent of California households with home internet had a home desktop, laptop or tablet computer, but 10 percent of those households only accessed broadband through their smartphone.[46] Smartphone-only users are often limited to consumer applications, finding it challenging to use such basic tools as word processors and spreadsheets. In addition, those that are smartphone-only must contend with plans that have usage limits, resulting in a

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[41] "Fixed Broadband Deployment," Federal Communications Commission, December 2019 map data, https://broadbandmap.fcc.gov/#/.

[42] Jonathan Sallet, "Broadband for America's Future: A Vision for the 2020s," Benton Institute for Broadband & Society, October 2019, https://www.benton.org/sites/default/files/BBA_full_F5_10.30.pdf.

[43] Jonathan Sallet, "Broadband for America's Future: A Vision for the 2020s."

[44] "Types of Computer and Internet Subscriptions," U.S. Census Bureau, American Community Survey 2019 (Table S2801), https://data.census.gov/cedsci/t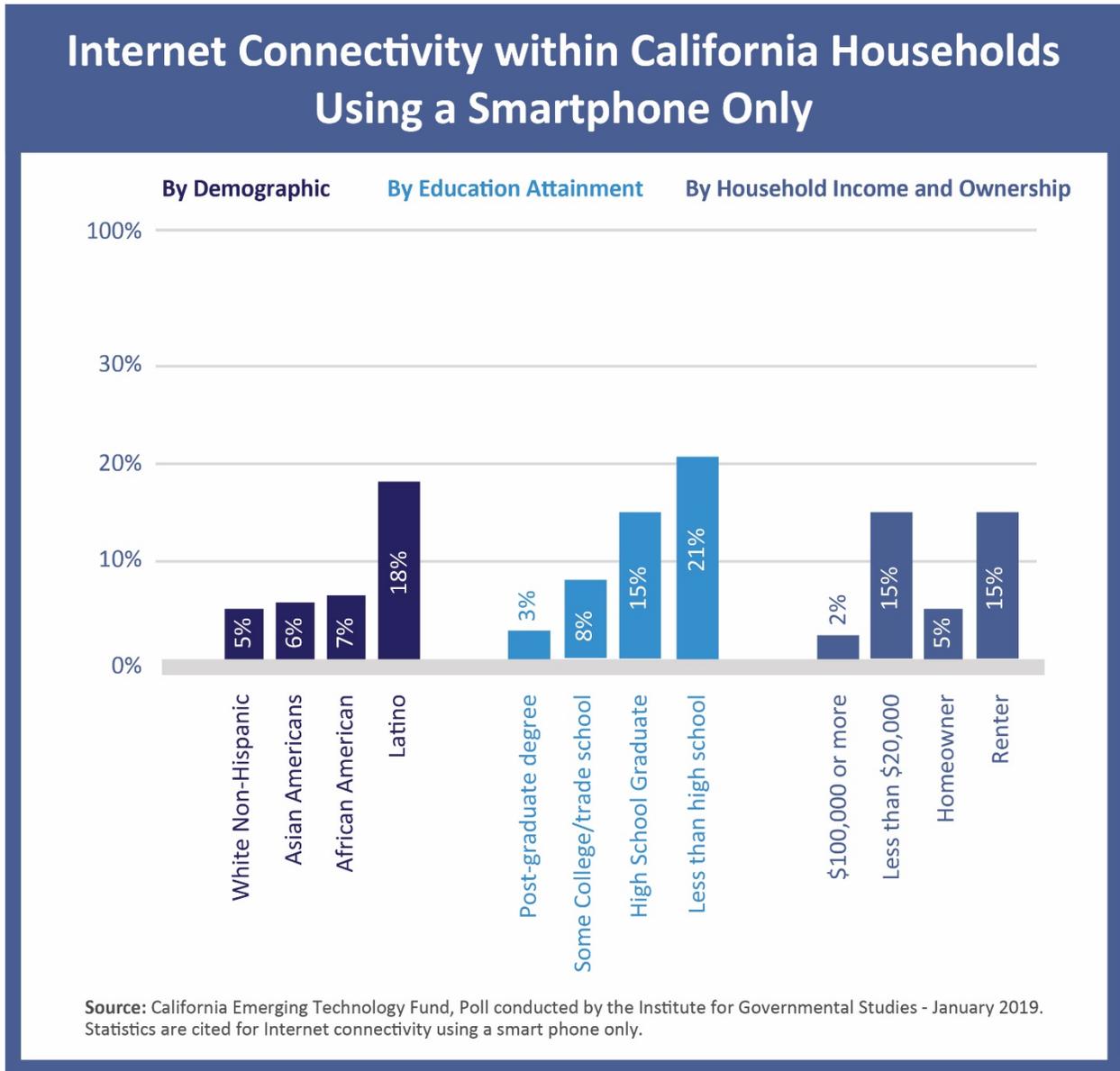able?q=computer%20ownership&g=0400000US06&tid=ACSST1Y2019.S2801&hidePreview=true. An additional 0.6 percent have a tablet, but no other computing device.

[45] "Internet Connectivity and the 'Digital Divide' in California - 2019," California Emerging Technology Fund, page 12.

[46] "Internet Connectivity and the 'Digital Divide' in California - 2019," California Emerging Technology Fund, page 5.

kind of "workaround ecosystem" using free Wi-Fi hotspots—exactly the kind of workaround the 2020 pandemic has disabled.[47]

Vulnerable populations are often the most likely to be smartphone dependent, as the following data illustrates.

Internet Connectivity within California Households Using a Smartphone Only

By Demographic   **By Education Attainment**   **By Household Income and Ownership**

By Demographic:
- White Non-Hispanic: 5%
- Asian Americans: 6%
- African American: 7%
- Latino: 18%

By Education Attainment:
- Post-graduate degree: 3%
- Some College/trade school: 8%
- High School Graduate: 15%
- Less than high school: 21%

By Household Income and Ownership:
- $100,000 or more: 2%
- Less than $20,000: 15%
- Homeowner: 5%
- Renter: 15%

Source: California Emerging Technology Fund, Poll conducted by the Institute for Governmental Studies - January 2019. Statistics are cited for Internet connectivity using a smart phone only.

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[47] Monica Anderson and John B. Horrigan, "Smartphones help those without broadband get online, but don't necessarily bridge the digital divide," Pew, October 3, 2016, https://www.pewresearch.org/fact-tank/2016/10/03/smartphones-help-those-without-broadband-get-online-but-dont-necessarily-bridge-the-digital-divide/.

With this in mind, it is notable that often our most vulnerable populations are those that are relegated to accessing the internet via a smartphone.[48] Mobile service is an important tool, but it cannot fully bridge the digital divide—and we cannot consider those that access the internet only through a smartphone as being able to fully capitalize on the benefits of high-speed broadband.

Not everyone will have access to a desktop or laptop at home. This is one reason why computer labs at libraries and nonprofits, as well as programs in which students can bring a laptop home from schools, continue to be critical. While discount or refurbishing programs may help some afford devices, others may continue to struggle to do so for a variety of reasons ranging from housing insecurity to concerns about privacy. In these cases, libraries and nonprofits fill a gap by providing computer and internet access to all. In fact, across the nearly 1,200 library branches in California, community members used public computers nearly 24 million times in fiscal year 2018–2019.[49] While this is not a substitute for home adoption, it is an important backstop for the most vulnerable Californians.

Challenge 4: Digital skills

Broadband adoption requires not just service (availability and affordability) and a device, but digital skills, as well. Indeed, the skills to get online, and the comfort to do so, are an essential requirement for ensuring Broadband for All.

Like other forms of literacy, digital literacy is a spectrum, from basic computing, job search, privacy and internet search skills to computer science. And like other forms of literacy, the need for digital literacy increases and evolves over time. The skills a young child needs are far different than those needed by someone searching for a job, seeing a doctor for a telehealth visit, or engaging in civic life. In other words, digital skills need to be addressed across a lifecycle from early childhood to school, career, and older ages.

For new broadband adopters, creating equity starts with ensuring access to introductory skills. For example, a study of users of Comcast's program for low-income subscribers, Internet Essentials, found that significantly more of these households felt they would need help setting up a new device (69 percent) compared to the control group (50 percent).[50]

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[48] "Internet Connectivity and the 'Digital Divide' in California - 2019," California Emerging Technology Fund. See "underconnected" users.

[49] 2018–2019 California State Library Annual Survey. Results available at https://www.countingopinions.com/pireports/report.php?7ee907072fa6bbb008b6b06b39cad413&live.

[50] John Horrigan, PhD, "Reaching the Unconnected: Benefits for kids and schoolwork drive broadband subscriptions, but digital skills training opens doors to household internet use for jobs and learning," Technology

For households where broadband is available, but has not been adopted, research has demonstrated that a low price is not the only barrier.[51] Concerns by people about their capacity to effectively use the internet, as we see in the large share of new adopters who feel uncomfortable in simply setting up a device, mean that a key component to creating a digitally inclusive California will be supporting and strengthening local programs run by cities, community colleges, libraries, schools and nonprofit organizations.

It is important to note that in the same Comcast Internet Essentials study, those users who engaged in basic training increased the likelihood that they would "use the internet for learning, job search, and improving job skills."[52] This lends further credence to the notion that digital skills training is important because it impacts the type of activities a person will undertake online.

Often, digital literacy takes the form of reaching late adopters, who have missed out on broadband use, experience, and training, and who will fall further behind as the lack of digital literacy compounds existing disadvantages and excludes them from opportunities. For example, a lack of digital literacy skills excludes potential students from opportunities to build skills online.

Challenge 5: Data

Imagine trying to solve a problem when you do not know exactly who has it, or where it occurs, or how much it will cost to fix it. That is the work of creating broadband policies that solve California's digital divide today. Data about the costs, gaps, speeds and access to broadband in California is disparate and subjective.

One data problem is granularity and accuracy.[53] Data about broadband availability is provided at the census block level. Blocks in urban areas might be an actual city block, but in rural areas, they might span miles. In remote/frontier areas, blocks may encompass several hundred square miles.[54] Additionally, concerns over the accuracy of California and FCC availability data remain, and can affect communities directly by making them eligible or ineligible for state and federal funds.

A second part of the problem is opacity. Some data that would help significantly in evaluating the quality of availability and adoption data is unavailable. For example, for the affordable broadband programs, what is the take-up rate? How quickly do customers cycle off? How many people that

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Policy Institute, August 2019, p. 23, https://techpolicyinstitute.org/wp-content/uploads/2019/08/Horrigan_Reaching-the-Unconnected.pdf.

[51] Horrigan, "Reaching the Unconnected," pages 3 – 4.

[52] Horrigan, "Reaching the Unconnected," page 26.

[53] Ryan Johnston, "FCC's annual broadband report criticized for 'inconsistent' methodology," StateScoop, May 30, 2019, https://statescoop.com/fccs-annual-broadband-report-criticized-for-inconsistent-methodology/.

[54] "Glossary: Blocks (Census Blocks)," U.S. Census Bureau, https://www.census.gov/programs-surveys/geography/about/glossary.html.

apply are turned away? What are the prices for the same kind of service in different parts of the state?

Finally, broadband subscription data is critical to understanding where people actually have and subscribe to internet service, as opposed to where providers advertise service. Subscription data by address provides granularity to accurately map broadband affordability and adoption.

High-quality data is not an end to itself. But without accurate, transparent and updated data, we cannot formulate good policies to solve real problems. And there are models for better data from other critical sectors. As one example, the U.S. Energy Information Administration (EIA) collects, maps, and makes publicly available information from the industry about the location of energy infrastructure throughout the country. EIA also collects cost and pricing data from the industry and from consumers—and publishes data at the state level. These robust data sets provide policymakers the tools needed to deftly respond to supply and pricing challenges, particularly for low-income consumers.

From Obstacles to Opportunity: California's Broadband Goals

To achieve a future in which all Californians have access to affordable broadband and the means to use it, we'll need to meet three goals:

Goal 1: All Californians have high-performance broadband available at home, schools, libraries and businesses.

Broadband is neither ubiquitous nor resilient in all corners of the state, especially in rural communities, tribal lands and some urban areas. As importantly, Californians need access to the broadband speeds that reflect the growing demand and reliance for access to education, government, public safety, economic prosperity and health care via high-speed access to the Internet. We must work toward a future in which broadband is everywhere a Californian lives, including all low-income neighborhoods. For the homeless or those without broadband at home, we will continue to support anchor institutions, such as schools, libraries and community-based organizations, so they can provide broadband to meet people where they are.

Goal 2: All Californians have access to affordable broadband and the devices necessary to access the internet.

Even when Californians have access, broadband service is still unaffordable for too many Californians today. The upfront cost of a computer or tablet, especially for lower-income families or those with little credit, makes subscribing to broadband that much harder. Affordable broadband services and devices must be available to all Californians, regardless of geographic location or household income.

Goal 3: All Californians can access training and support to enable digital inclusion.

Availability and affordability of service and devices are key requirements for broadband adoption—but digital inclusion also requires digital literacy. Californians must have access to digital skills training for job opportunities to thrive in a digital world.

Action Plan

Delivering tangible and measurable results to meet our goals will require innovation across many sectors and levels of government. This action must be grounded in strong partnerships among federal, state, tribal, and local governments, and with the private sector, nonprofits, and philanthropy organizations.

Key opportunities for progress are reflected in the Action Plan items below. Our Council and partners will begin working on these items in 2021, recognizing that some may require legislative action, and will evaluate priorities and results over the next year in order to update the plan in 2022.

Actions to ensure all Californians have high-performance broadband available at home, schools, libraries, and businesses

Key steps in ensuring that all Californians have access to high-performance broadband include modernizing state broadband definitions, optimizing the state's financial toolkit, developing partnerships to smooth deployment and leverage existing assets, and setting reliability standards for critical infrastructure. Universal access to high-performance broadband for all Californians will take time, and it is critical that a strong foundation is built to ensure meaningful and efficient investment.

Modernize broadband speed and performance standards

1. Recommend, and when possible, adopt shared standards among all state grant-funding and related broadband programs:

   a. Define "broadband" with dual definitions: (1) a baseline definition to match the FCC standard of 25/3 Mbps and (2) a goal of 100/20 Mbps that reflects the Governor's Executive Order of a minimum of 100 Mbps download, and growing demand for higher upload speeds. These dual definitions both bring the state in alignment with current federal standards[55] and adopt a forward looking speed as bandwidth needs continue to grow and federal funding benchmarks are likely updated accordingly in the coming years.

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[55] Federal Communications Commission, "FCC Launches $20 Billion Rural Digital Opportunity Fund To Expand Rural Broadband Deployment," https://docs.fcc.gov/public/attachments/FCC-20-5A1.pdf. See above baseline performance tier.

b. To mitigate the problems with federal data, California should move to evaluate broadband at the serviceable location level because this method will bring greater accuracy and granularity.

At the same time, definitions of "unserved" and "underserved" should be evaluated with each state funding opportunity to ensure that awardees are best positioned to leverage state funding to pursue competitive federal funding opportunities. Projects eligible for funding should deliver at least 25/3 Mbps to align with national and international standards, and 100/20 Mbps ideally to align with the Governor's Executive Order.

Broadband funding speed targets for infrastructure subsidies or grants should be reviewed annually in light of national and international trends to ensure California remains competitive. Standards should also be reviewed in light of federal funding requirements and scoring criteria to ensure that California applicants are able to leverage state funding to unlock federal grant and other funding opportunities.

c. Develop criteria for state funding around demonstrated local and tribal government involvement that align with such criteria for federal broadband funding, specifically the Department of Agriculture's ReConnect and Community Connect programs. Requiring robust demonstrated support will help to make state-funded projects even more competitive to receive funding from federal programs that require significant community support.

d. Prioritize funding open access, middle-mile infrastructure, including connections to anchor institutions.

Responsible: California Public Utilities Commission, California Department of Education, California State Library, California Department of Housing and Community Development and any other agency that makes broadband-eligible infrastructure grants.

2. Identify alternative financing opportunities with government and philanthropic partners to maximize funding for new infrastructure. The State should work with local governments to explore opportunities for public financing, including but not limited to bond instruments. The State should also engage with active philanthropy organizations to identify areas of shared interest and potential sources of funding to support new broadband deployments in unserved and underserved areas.

Responsible: Governor's Office of Business and Economic Development, and California Public Utilities Commission

3. Modernize California's universal service programs to effectively support the deployment and ongoing maintenance of broadband networks.

   Responsible: California Public Utilities Commission

   Additional areas worth consideration:

   ● Increase financial resources allocated to expanding broadband availability statewide.

   ● Establish obligations for existing Internet Service Providers to serve all customers.

Simplify processes and leverage existing assets and construction

4. Implement a Dig Smart policy to install conduit as part of any appropriate and feasible state-funded transportation project in strategic corridors, as an incentive for service build-outs to un- and under-connected communities. Dig Smart policies present an opportunity to lower the capital cost of infrastructure deployment and minimize disruptions caused by ongoing or duplicitous construction, both incentivizing and expediting new investment.

   Responsible: California State Transportation Agency

5. Continue improving state encroachment permitting processes and rights-of-way management to accelerate broadband deployment projects that will serve un- and under-connected communities.

   Responsible: California State Transportation Agency, California Public Utilities Commission

6. Explore various actions to enhance permitting processes at all levels of government through meaningful partnerships. Convene semi-annual meetings with broadband providers and local governments to enhance permitting processes that support the construction of broadband infrastructure and the needs of local governments. In addition, the office should launch a formal partnership with federal agencies to support prioritization of permits for broadband construction through federal land and when permit holders are experiencing delays.

   Responsible: California Department of Technology

7. Identify state property for possible use for broadband infrastructure, based on specific criteria identified by the CPUC, Caltrans and other relevant agencies, to accelerate broadband deployment.

   Responsible: California Public Utilities Commission, Department of General Services, California State Transportation Agency, California Department of Technology

8. Regularly coordinate and convene with jurisdictions implementing next-generation 9-1-1 to expand broadband infrastructure to enhance public safety and disaster preparedness, response, recovery and mitigation capabilities.

> *Responsible:* California Office of Emergency Services

Set reliability standards

9. Establish standards for middle mile and backhaul resilience and reliability. Recent experiences responding to wildfires throughout the state can be leveraged to identify shortcomings in network resilience and reliability. Analysis of demonstrated gaps can be used to set standards and a timeline for bringing networks throughout the state in line with such goals.

> *Responsible:* California Public Utilities Commission in consultation with the Governor's Office of Emergency Services .Establish clear standards of consumer protection and provisioning of equitable service by providers. Evaluate the surcharge collection and overall bill impacts, including other, non-public charges, to minimize total customer bill impacts. Examine whether broadband service in underserved and unserved communities is consistent with current licensing requirements.

> *Responsible:* California Public Utilities Commission

Additional areas worth consideration:

- Explore framework to ensure broadband resilience and reliability standards are met.

Actions to ensure all Californians have access to affordable broadband and the devices necessary to access the internet

The Council recognizes that broadband affordability remains an obstacle for many Californians. Partnerships with anchor institutions such as libraries, schools and community organizations, as well as with philanthropies and private industry, will continue to be critical in ensuring access to internet-enabled devices and ultimately encouraging broadband adoption. In addition, the Council believes that significant progress can be made in helping Californians to enroll in existing affordable internet programs.

Increase access to affordable broadband services and devices

10. Within the scope of the California Public Utilities Commission's current proceeding, "Order Instituting Rulemaking to Establish a Framework and Processes for Assessing the Affordability of Utility Service," develop a framework to define essential broadband service affordability

standards, evaluate those standards relative to other essential service costs, and develop a range of metrics to provide a comprehensive assessment of households' ability to afford essential broadband service.

Responsible: California Public Utilities Commission

11. Improve the California LifeLine Program by including stand-alone broadband service, and work in partnership with internet service providers to encourage participation in the program.

Responsible: California Public Utilities Commission

12. Leverage existing California Department of Housing and Community Development programs, such as the Infill Infrastructure Grant Program and the Affordable Housing and Sustainable Communities Program, to provide free broadband service for tenants in newly built housing. Funding programs could incorporate opportunities for awardees to provide 100/20 Mbps broadband service for free of charge to all tenants in publicly subsidized units.

Responsible: Department of Housing and Community Development

13. Promote existing state contractual vehicles with internet service providers and equipment vendors to support cost savings and efficient purchasing of broadband services and equipment by local public entities such as school and library districts. Leveraging existing contracts is a resource-efficient strategy to help other public entities acquire affordable broadband services, especially in bulk.

Responsible: Department of General Services, California Department of Technology, California Department of Education and California State Library

14. Analyze the needs of people ages 60 and older for access to affordable, reliable, high-speed broadband, and identify programmatic and partnership opportunities to meet these needs.

Responsible: California Department of Aging, California Department of Technology, California Public Utilities Commission

Additional areas worth consideration:

- Ensure all affordable broadband offers meet minimum state standards for broadband

Promote affordable broadband services and devices

15. Partner with internet service providers to promote, track and publicly report the progress of adoption of affordable internet services and devices throughout the.

a. Request providers to develop multi-language marketing materials for distribution to under-adopting communities and support dissemination by leveraging existing public programs and campaigns, such as: CalFresh, Department of Motor Vehicles (DMV), CalWorks, Covered California, public libraries, public housing, and the National School Lunch Program (NSLP), investor-owned utility CARES and Energy Savings Assistance (ESA) programs.

b. Develop tools for low-income individuals and service organizations to easily identify and subscribe to affordable broadband plans.

c. Continue promoting affordable broadband and device offers to:

    i. Recipients of the National School Lunch program

    ii. Public library patrons

Responsible: California Department of Technology, California Public Utilities Commission, California Emerging Technology Fund and California State Library with support from all departments listed above, providers, manufacturers and local government

Encourage broadband competition

16. Provide guidance to local governments and partner with tribal governments to develop broadband strategies and explore options for increasing competition in their communities. Specifically, provide resources for guidelines for communities to inventory local infrastructure assets, publish template lease agreements, and make assets available on an open-access basis.

Responsible: California Public Utilities Commission

Additional areas worth consideration:

● Identify if there are new incentives to encourage competitive leasing of privately-owned infrastructure to encourage competition.

● Explore methods of promoting competition within multi-dwelling units, for example, through statewide adoption of San Francisco's Article 52, to enable tenants in apartment buildings to choose between multiple internet service providers.

Actions to ensure all Californians can access training and support to enable digital inclusion

Digital skills and literacy training are essential to ensuring that individuals with access to broadband are able to fully leverage the opportunities enabled by the internet. Nearly a quarter of Californians who do not subscribe to broadband today say that they are uncomfortable using a computer or going online.[56] The California Broadband Council thinks that by better aligning skills training with infrastructure build-outs, identifying existing grant funds that can support digital skills training, and supporting the organizations leading the way today—local governments, libraries, nonprofits, schools and other stakeholders—we can make headway on this issue.

Strengthen partnerships and coordinate initiatives

17. Develop and manage a multi-layer network of digital inclusion stakeholders to discuss ongoing needs, share resources, and coordinate initiatives. First, leverage California Broadband Council meetings and the GO-Biz broadband funding identification initiative to strengthen partnerships among anchor organizations such as schools, libraries, workforce development boards, and county social service departments. In addition, convene local government broadband coordinators and managers quarterly to identify barriers to local programming, new actions undertaken, and tools developed at the local level. Also, regularly convene private and nonprofit sector companies in an effort to understand and predict current and future demand for broadband. Finally, convene broadband adoption practitioners, including libraries, nonprofit organizations and others semi-annually to share best practices and ongoing community needs in regard to , innovate and create new digital literacy tools, and develop curriculum and training programs to meet the needs of the workforce, community and students.

    Responsible: Office of Broadband and Digital Literacy, Governor's Office of Business and Economic Development, California Public Utilities Commission , Department of General Services, state agencies that work with the local agencies listed above, California Emerging Technology Fund, private and nonprofit sector broadband providers, and local partners.

    Additional areas worth consideration:

    • Build out digital skills training programs that include core digital literacy as well as more advanced technical training that is linked specific jobs and career pathways.

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[56] "Internet Connectivity and the 'Digital Divide' in California - 2019," California Emerging Technology Fund, table 6.

Actions to support all goals

Full realization of the goals presented in this action plan requires cross-cutting interventions focused on three key areas: data transparency, technical assistance, and partnerships. First, lack of access to accurate, granular data is a core challenge to developing targeted solutions for broadband availability and adoption. In addition, improved technical assistance for local and tribal governments and their key partners, as well as tight coordination among executive branch agencies, will help to equip stakeholders with the tools needed to meet the state's broadband goals. Finally, strong partnerships among local, state and federal governments, as well as, with industry providers will ensure all resources are being leveraged to the fullest extent possible.

Improve broadband data and mapping transparency and usability

18. Collect more granular and more accurate broadband data and leverage this information to further build out the public California Interactive Broadband Map. Collecting and mapping granular broadband availability data will provide internet service providers and local and tribal governments the tools needed to competitively pursue state and federal funding opportunities, and to proactively advocate for their eligibility to participate in such programs, by being able to demonstrate a lack of broadband access. This will also incorporate the following data in the California Interactive Broadband Map: Existing public broadband assets, geographic boundaries, roads, anchor institutions, public rights-of-way, and fairgrounds.

    Responsible: California Public Utilities Commission in partnership with other departments/agencies including the California Department of Food and Agriculture and the Governor's Office of Emergency Services.

19. Leverage the California Public Utilities Commission's cost model to inform broadband planning and investments, project broadband availability based on existing resources, and inform statewide discussions of additional resources required to achieve our broadband goals.

    Responsible: California Public Utilities Commission in partnership with the Governor's Office of Business and Economic Development and the California Department of Technology

20. Establish a Broadband for All portal to enable easy access to broadband information and tools and serve as a central repository, including:

    a. A page for the public to submit data to validate or dispute broadband mapping data related to broadband speeds and availability.

    b. Resources and toolkits for specific to broadband planning and implementation.

c. Digital inclusion plans, initiatives, and best practices developed by local governments, nonprofits, anchor institutions, and community partners. When possible, entities should include resources that can be replicated or built upon by other entities.

d. Digital skills training tools, such as curricula, fact sheets, promotion collateral, and more.

e. Information on affordable internet offers and devices, including cost, eligibility, customer service contact information, and instructions on how to sign up.

f. State and federal broadband funding opportunities using the grants.ca.gov site, including program status, eligibility requirements, and ability to be leveraged as match for other programs.

Responsible: California Department of Technology

Develop technical assistance and support

21. Identify additional opportunities to provide technical assistance to local governments, Tribes, nonprofits, and their partners to best leverage local, state, federal, and private funding opportunities. This may include supporting the creation of special districts or cooperatives to deploy networks, and providing support in navigating the technical, regulatory, and financial hurdles to deployment.

Responsible: California Public Utilities Commission, California Department of Technology

Additional areas worth consideration:

- Building out a technical assistance program that could include feasibility studies for potential infrastructure build outs.

- Explore mechanisms for private entities to share asset availability with local governments on a project-by-project basis to enable efficient investment.

Enhance partnerships

22. Form a planning group of all state agencies that oversee any potential infrastructure or broadband adoption funding to meet quarterly to ensure alignment in funding goals and implementation, and to further identify existing and new programs that can support Broadband for All. The planning group will:

a. Allow various agencies to coordinate funding priorities to ensure maximum impact of state funds, maximization of new and existing federal funding opportunities,[57] and that various programs complement one another in meeting the state's broadband goals.

b. Explore setting shared standards among state grant programs to prioritize joint infrastructure and adoption projects.

c. Explore opportunities to use programs under their jurisdiction to accelerate broadband deployment and to leverage utility infrastructure to increase access to existing fiber and cost-effectively deploy new fiber.

d. Identify and facilitate new broadband projects that support precision agriculture and food systems in rural communities.

e. Identify ways to increase free or low-cost broadband· connectivity at all publicly subsidized housing communities for residential units.

f. Include updates from the California Department of Education as it continues leading statewide efforts to ensure that students have the computing devices and connectivity necessary for distance learning and online instruction.

g. Identify additional opportunities for cross-department partnerships that bring new funding sources together, such as the current initiative by the Labor and Workforce Development Agency and the California State Library that supports access to online training and digital literacy.

h. Support issuing guidance on how state agencies and local partners can support digital inclusion via existing federal programs, such as has already happened across departments.[58]

Responsible: Governor's Office Business and Economic Development, California Public Utilities Commission, California Department of Food and Agriculture, California Department of Education, California State Library, California Department of Housing and Community Development, California Department of Water Resources, California Labor and Workforce Development Agency, California Department of Social Services, California

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[57] Existing funding opportunities include broadband-specific programs, but also those programs for which broadband access and adoption are an eligible use of funds (e.g., CARES Act, TANF, SNAP, U.S. Department of Labor funds)

[58] See, for example, recent guidance from the California Department of Social Services to County Welfare Departments, which includes adoption and training options for program recipients: https://cdss.ca.gov/Portals/9/Additional-Resources/Letters-and-Notices/ACINs/2020/I-76_20.pdf?ver=2020-11-05-094747-987.

Department of Aging, Governor's Office of Planning and Research, and any other agency with broadband infrastructure and adoption eligible programs.

23. Request that executive branch entities and constitutional agencies incorporate broadband into their strategic plans, and provide broadband priorities to the California Broadband Council annually to ensure effective interagency collaboration.

Responsible: All executive branch state entities (agencies, departments, commissions, etc.), and if they agree, constitutional agencies.

What's Next

This Broadband Action Plan will be a live, iterative document. The California Broadband Council will update the Plan on an annual or more frequent basis through 2025 as directed by Governor Newsom's broadband executive order N-73-20.[59]

The California Broadband Council in partnership with key state, local, and Tribal government agencies; internet service providers; nonprofits; and other broadband stakeholders will continue to collaborate to identify critical actions items.

Lead agencies or organizations will regularly report on their ongoing progress and provide assessments of each assigned action to the California Broadband Council—and the Council will convene quarterly meetings to discuss and determine next steps.

The Council appreciates the public input it has received during the preparation of this Plan. Public comments on the Broadband Action Plan may be submitted via email (CABroadbandCouncil@state.ca.gov) or during public comment periods at the California Broadband Council meetings.

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[59] California Executive Order N-73-20, https://www.gov.ca.gov/wp-content/uploads/2020/08/8.14.20-EO-N-73-20.pdf.

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The collective support of the Council, staff, stakeholders, and experts, yielded unprecedented feedback from over 650 individuals through the following channels:

- 8 Council meetings with an average of 70 attendees.
- 6 listening sessions with an average of 60 participants.
- 2 tribal consultants with a total of 15 participants.
- 8 public working sessions with an average of 20 participants.
- 12 individual one on one meetings with California Broadband Council staff.
- 77 submitted written public comments.

Special recognition goes to Anne Neville-Bonilla, Director of the California Research Bureau, whose significant contributions to the writing and editing of this report were invaluable.

The Council thanks all of these contributors for the skill, energy, and dedication they brought to creating this Plan.

Appendix A: Summary of 12-Month Action Plan

(Chart to be inserted)

Appendix B: CPUC Cost Model

Excerpt from the California Broadband Cost Model CBCM Report (December 2020). Available at https://www.cpuc.ca.gov/communications/costmodel/.

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EXECUTIVE SUMMARY

INTRODUCTION

Chico State University, on behalf of California Public Utilities Commission (CPUC), engaged CostQuest Associates, Inc. (CQA) to provide a statewide cost model for broadband and voice services using methods consistent with the adopted FCC Connect America Cost Model (CACM) as modified by the approach requested by the CPUC. The CACM is used under multiple FCC funding mechanisms, including the Rural Digital Opportunity Fund (RDOF) program[1]. It must be noted here however that the California State Broadband Cost Model (CBCM) is not the CACM. The CBCM has as its purpose the estimation of investment to build broadband network infrastructure to given locations on a one-time capital cost basis.

The cost elements comprising CBCM are based on network design and engineering methods, to model, as closely as possible, estimated network deployment costs of a fiber to the premises network capable of meeting current and future consumer bandwidth demand requirements. The model's inputs are flexible, so that information about cost factors specific to areas of California may be adjusted going forward, at the option of the CPUC.

The purpose of the CBCM is to provide the CPUC and state Policy Makers with cost estimates for broadband across the state. To that end, and to support the various needs the CPUC seeks to address, the CBCM is provided as an iterative process. This model provides Middle Mile and Access Network investment with aggregate build out costs for Fiber to the Premises (FTTP) for the access networks and service tiers as described in the Scope section of this report. FTTP networks are capable of providing services with bandwidth up to 1000 Mbps. Investment is categorized above and below a threshold. The threshold value is intended to help identify areas which may be too costly for economically viable FTTP.

Future iterations of the model may be expanded to include additional network tech types, tiers of service, and geographies. We note, for example, a majority of California housing units are served with broadband services provided by cable companies. At the request of CPUC staff, the model may be adjusted to evaluate areas served by cable companies.

SUMMARY FINDINGS

The cost models provide estimates for a Fiber to the Premises (FTTP) network. The Fiber to the Premises network is constructed for all unserved locations. Unserved locations *over* an investment threshold are served with the same network as those *under* the threshold.

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[1] The FCC RDOF Program information is available at: https://www.fcc.gov/auction/904. RDOF mapped locations in California are available via CPUC mapping at: https://www.broadbandmap.ca.gov/federalfunding/. The CPUC's support mechanisms for in-state RDOF bidders and federal program updates are available at: https://www.cpuc.ca.gov/broadbandfederalfunding/.

CQA

The estimated investments to provide voice and broadband[2] were calculated for areas not served by the following speed standards:

1. 25 Mbps download / 3 Mbps upload
2. 100 Mbps download / no specified upload
3. 100 Mbps download / 10Mbps upload

Results are presented in Tables 1-4, below. The access network values allocate 100% of the middle mile structure to the voice and broadband network. Associated state maps for each speed standard table can be found in a separate document; see appendix D for detail.

Table 1: Estimated Investments - Statewide Comparative Summary, by Speed Tier[3]

Tier 1 (25/3) Total Network Investment	Category	Structure Count (Demand Locations)	Passed Access Investment	Service Turnup Based Investment	Total Investment
	Unserved Network Subtotal	513,700	$3,034,255,049	$350,898,450	$3,385,153,499
	Statewide Middle Mile Network Subtotal	na	na	na	$2,167,280,701
See: Table 2	Total Investment	na	na	na	$5,552,434,200

Tier 2 (100 Down) Total Network Investment	Category	Structure Count (Demand Locations)	Passed Access Investment	Service Turnup Based Investment	Total Investment
	Unserved Network Subtotal	760,053	$4,058,476,496	$507,437,479	$4,565,913,975
	Statewide Middle Mile Network Subtotal	na	na	na	$2,167,280,701
See: Table 3	Total Investment	na	na	na	$6,733,194,676

Tier 3 (100/10) Total Network Investment	Category	Structure Count (Demand Locations)	Passed Access Investment	Service Turnup Based Investment	Total Investment
	Unserved Network Subtotal	779,065	$4,114,007,951	$518,715,826	$4,632,723,777
	Statewide Middle Mile Network Subtotal	na	na	na	$2,167,280,701
See: Table 4	Total Investment	na	na	na	$6,800,004,478

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[2] The Service Turnup investment (ONT and Drop) is not sensitive to the service speed deployed, up to 1 Gb of best-efforts service. The access network investment, while fairly static, is sensitive to the delivered speeds mainly with respect to splitter ratios and core electronics. Those sensitivities will be driven by bandwidth consumption assumptions for the end user, services consumed, and the number of supported end users connected to the network in an area.

[3] The Statewide Middle Mile Network Subtotal is based on a full state greenfield analysis.