LITTLE HOOVER COMMISSION

Issue Brief: California's Digital Divide

December 2020

Executive Summary

Access to affordable, high-speed internet is more critical now than ever before, yet many California households go without or lack sufficient bandwidth to meet their household's needs. These households are then hindered, among other things, in their ability to access education, contribute to a productive economy, and obtain crucial government services. Due to the cross-cutting and highly-relevant nature of this issue, the Commission is offering this valuable background research on the digital divide and municipal fiber broadband network initiatives in the form of an Issue Brief. In its Brief, the Commission outlines the status of broadband service in both California and the U.S. This research shows that:

- California's broadband coverage, speed, and pricing is **rated 13th in the nation** with strong access to low-cost plans (defined as less than $60/month) but very slow speeds.
- The U.S. ranked **31st out of 36 OECD countries** for their internet access among households. A majority of U.S. cities still pay more for slower internet speeds than their counterparts abroad.
- Experts attribute higher broadband prices and slower speeds to a **lack of competition** among internet service providers.

The Commission also provides background on initiatives from municipalities – in California and across the globe – to start fiber broadband networks as a way to increase competition and potentially make access more affordable for consumers. The Commission discovered that:

- Using public and public-private partnership models respectively, **Chattanooga** and **Stockholm** were able to offer fiber broadband connections to businesses and residents.
- The **South Bay Cities Council of Governments** has developed a ring of fiber with connections to data centers, municipal buildings, and public agencies in the South Bay and anticipates that 15 South Bay cities and additional agencies will be connected to the network by the end of the year.
- **Santa Monica** executed a successful effort to bring fiber broadband connections to the city's business, anchor institutions, and municipal buildings and also provides residential service to some affordable housing units in the city.
- Attempts to create public-private partnerships to build fiber broadband networks in California's more populous cities – **San Francisco** and **Los Angeles** – were unsuccessful.

We hope this research will serve as a resource for policymakers and others as they weigh opportunities to better serve all Californians.

Introduction

Access to affordable, high-speed internet is more critical now than ever before, yet many California households go without or lack sufficient bandwidth to meet their household's needs. These households are then hindered, among other things, in their ability to access education, contribute to a productive economy, and obtain crucial government services. Due to the cross-cutting and highly-relevant nature of this issue, the Commission is offering this valuable background research on the digital divide and municipal fiber broadband network initiatives in the form of an Issue Brief. We hope this research will serve as a resource for policymakers and others as they weigh opportunities to better serve all Californians.

Definitions[1]

Broadband: Reliable, high-speed internet. The U.S. Federal Communications Commission (FCC) defines broadband as having download speeds of 25 megabits per second (Mbps) and upload speeds of 3 Mbps.[2] The FCC's definition of "high-speed" has evolved as technology has improved and internet speeds have increased.

Download speed: How quickly information from the internet travels to your internet-connected device. For example, how long it takes for news content to load on a news app on your phone.

Upload speed: How quickly information from your internet-connected device travels to the internet. For example, how long it would take to attach a document to your email.

Average speed test: The average rate at which a device can send or receive data.

Types of broadband connections:

- **DSL (digital subscriber line):** Connects you to the internet through the same wires as a telephone line, without interrupting your phone use. DSL speeds are typically the slowest, but it is widely available and more affordable when compared to fiber or cable internet services.
- **Cable:** Connects you to the internet through the same cables that your TV likely uses. It can have high-speed capabilities and is widely available. Because it is possible for many households to share the same cables, especially in highly populated areas, households may experience slower speeds during peak times.
- **Fiber:** Relies on fiber-optic cables that are installed underground and are capable of transmitting a lot of information quickly. While fiber offers the fastest internet connection available, it can be higher in price and has limited availability within the United States. Outside of the U.S., fiber is standard in parts of Asia and Europe.[3]
    - **Dark fiber:** Unused fiber cables that have not yet been "lit" with internet service.

Wired broadband: Broadband that has a physical connection to a physical location, such as a home or business. DSL, cable, and fiber are all wired broadband connections.

Wired low-price plans: As defined by BroadbandNow as a wired broadband plan that costs less than $60 per month.

Anchor institutions: Entities such as schools, universities, medical and health care providers, libraries, municipal government buildings that provide broadband to members of the community. The entities can sometimes be connected to fiber when commercial services are not available. Because of this, they can serve as a connection to the internet infrastructure.

Institutional Network (I-Net): The network that a municipal government requires to carry out its duties. I-Net frequently refers to networks that are specifically built for city use by a cable company as part of their franchise agreement with the city.

Understanding Broadband Speeds

DSL vs Cable vs Fiber Speeds[4]

Technology	Download Speed Range	Upload Speed Range
 DSL	5 to 35 Mbps	1 to 10 Mbps
 CABLE	10 to 500 Mbps	5 to 50 Mbps
 FIBER	250 to 1,000 Mbps	250 to 1,000 Mbps

Internet Speed Capabilities[5]

0–5 Mbps	5–40 Mbps	40–100 Mbps	100-500 Mbps	500–1,000+ Mbps
▪ Checking email ▪ Streaming music on one device ▪ Searching on Google	▪ Streaming video on one device ▪ Video calling with Skype or FaceTime ▪ Online gaming for one player	▪ Streaming HD video on a few devices ▪ Multiplayer online gaming ▪ Downloading large files	▪ Streaming video in UHD on multiple screens ▪ Downloading files quickly ▪ Gaming online for multiple players	▪ Doing a lot of almost anything

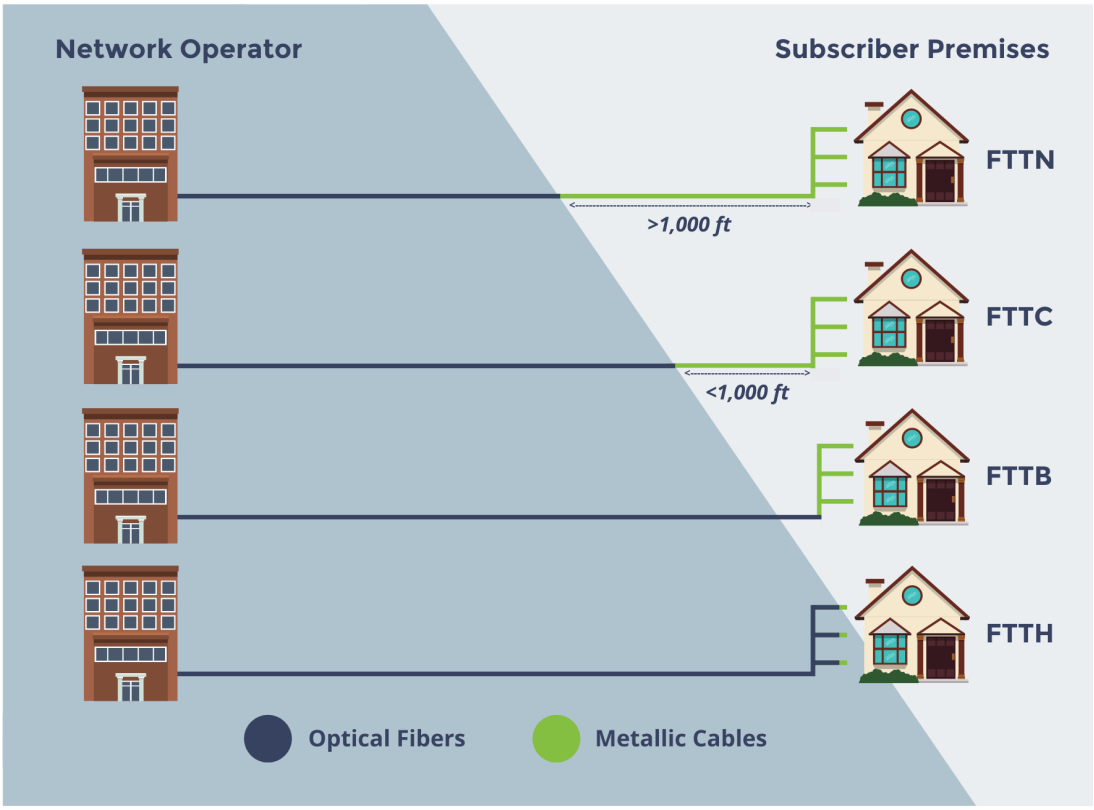
Understanding Fiber Broadband Network Architecture

Question: Does fiber need to go to your home?

Yes and no. There are multiple types of fiber broadband network architecture:[6]

- **Fiber to the home, business or premises (FTTH or FTTB or FTTP):** Fiber cables are laid underground and go directly to the customer's home/business/premises through the installation of a node[7] (such as a box on the outside wall of a home), providing faster connection speeds. However, this process can be expensive and if the customer's house is not "fiber ready" the provider might need to install fiber lines through the customer's property.
- **Fiber to the node or neighborhood (FTTN):** Providers run fiber to a central node, and then from there through existing copper or coaxial cables to the customers. These cables (think DSL cables) cannot carry the same capacity that fiber lines offer. Because cables are used, FTTN can be more susceptible to problems common with cable internet, such as the potential slowness of a shared connection. Nodes can also potentially be miles away, and the farther away a customer is from a node, the slower speeds they will receive.
- **Fiber to the curb or cabinet (FTTC):** The fiber goes to the cabinet, which can be found on a nearby pole or utility box – not an actual curb. FTTC is similar to FTTN, but the cabinet is closer to the customer's premises – typically within 1,000 feet.

Types of Fiber Broadband Network Architecture[8]



Defining the Digital Divide

When looking at the digital divide and broadband more broadly, there are discrepancies in how individuals are defined as "connected." The U.S. Federal Communications Commission (FCC) makes and enforces the rules and regulations regarding radio, television, wire, satellite and cable. In 2015, the FCC defined its "broadband" benchmark speeds for internet service at 25 megabits per second (Mbps) downstream and 3 Mbps upstream.[9] The FCC estimates that 21.3 million Americans lack a connection to internet that meets this benchmark.[10] However, due to the methodology used by the FCC to count access, this estimate is considered to be an underestimate of the extent of the problem. The FCC looks by census block to find if there is a single subscriber within the block. If there is, it assumes that there is subscription throughout. This inaccuracy has real-world funding implications as the FCC gives out billions of dollars a year to extend service based on this information.[11]

Conducting their own analysis, BroadbandNow manually checked availability of over 11,000 addresses using FCC data and estimates that 42 million Americans lack access to broadband, roughly 2.3 million of whom are residents of California.[12] Looking closer at California as a whole, BroadbandNow estimates that 94.1 percent of Californians have access to broadband coverage or wired low-price plans (70 percent) with an average speed test of 92.6 Mbps. When taking into account these three factors (internet coverage, speed, and price access), California is ranked 13th in the nation by BroadbandNow. New Jersey was ranked highest overall with 98.1 percent wired broadband access and 78.4 percent low-price plan availability. Alaska was ranked lowest overall, with 60.8 percent wired and fixed broadband access and no low-priced wired plan availability.[13] On page 6, find a chart detailing how each state ranked on each of the three factors independently.

BroadbandNow manually checked availability of over 11,000 addresses using FCC data and estimates that 42 million Americans lack access to broadband, roughly 2.3 million of whom are residents of California.

When looking on the national level, the United States was ranked 31st out of 36 countries[14] for their internet access[15] among households by the Organization for Economic Co-operation and Development (OECD). The New America Foundation's Open Technology Institute published a report comparing the cost and speed of internet in 24 U.S. cities and abroad. In their analysis, they found that the majority of U.S. cities (included in the report) pay more for slower internet speeds than their counterparts abroad. When comparing the estimated speeds that a customer could expect for $50, they found U.S. cities fell between 25 and 45 Mbps; with California cities Los Angeles and San Francisco at around 35 and 60 Mbps respectively. When looking internationally, that $50 allowed for dramatically higher internet speeds with Hong Kong and Seoul around 300 Mbps, and Tokyo and Paris around 200 Mbps.[16]

BroadbandNow United States Broadband Internet Rankings[17]

State Rankings

Ranking	State
1	**New Jersey**
2	New York
3	Maryland
4	Rhode Island
5	Florida
6	Illinois
7	DC
8	Texas
9	Massachusetts
10	Connecticut
11	Pennsylvania
12	Georgia
13	**California**
14	Delaware
15	Virginia
16	Washington
17	Tennessee
18	North Carolina
19	Michigan
20	Minnesota
21	Indiana
22	North Dakota
23	New Hampshire
24	Ohio
25	Colorado
26	Oklahoma
27	Hawaii
28	Kansas
29	Utah
30	Wisconsin
31	South Carolina
32	Missouri
33	Louisiana
34	Oregon
35	Nevada
36	Arizona
37	South Dakota
38	Alabama
39	Idaho
40	Kentucky
41	Arkansas
42	Mississippi
43	Maine
44	West Virginia
45	Iowa
46	Wyoming
47	Vermont
48	Nebraska
49	New Mexico
50	Montana
51	**Alaska**

How Each State Ranked Based on Individual Factors Considered

State	Broadband Access:
CT	98.3%
NJ	**98.1%**
NY	96.8%
RI	96.2%
MA	95.9%
DC	95.7%
MD	95.2%
DE	94.8%
WA	94.6%
CA	**94.1%**
FL	92.4%
HI	92.3%
PA	90.5%
MN	89.6%
NH	89.6%
NC	89.5%
IL	89.3%
OH	89.3%
UT	88.4%
ND	86.8%
ME	86.6%
CO	85.9%
NV	85.3%
TX	85.3%
GA	84.9%
OR	84.5%
MI	84.0%
VA	83.4%
WI	82.6%
TN	82.4%
KS	82.1%
KY	81.8%
IA	81.3%
IN	79.8%
SC	79.7%
VT	79.0%
SD	78.2%
MO	77.3%
LA	75.0%
NE	74.5%
AZ	73.8%
MT	72.4%
AL	72.1%
ID	70.3%
WV	69.2%
NM	66.5%
WY	62.1%
AK	**60.8%**
MS	58.7%
OK	57.8%
AR	54.3%

State	Wired Low-Priced Plan Access:
RI	88.5%
NJ	**78.4%**
ND	77.7%
DC	74.7%
NY	70.0%
CA	**70.0%**
TX	67.3%
MD	65.4%
SD	63.2%
ID	62.3%
IL	62.2%
FL	59.8%
TN	59.5%
GA	57.4%
DE	57.1%
MS	56.8%
LA	56.4%
MI	56.0%
MO	55.2%
IN	53.4%
AR	52.7%
OK	52.5%
SC	52.4%
PA	51.9%
HI	51.3%
VA	51.3%
KS	51.3%
OH	47.7%
NC	46.8%
AL	44.4%
WI	44.0%
MA	43.3%
KY	39.3%
WV	39.3%
NH	36.4%
CT	30.9%
UT	26.3%
OR	24.5%
WY	19.6%
IA	18.5%
WA	15.4%
MN	15.1%
NV	13.6%
NM	12.5%
NE	10.8%
AZ	8.7%
ME	4.5%
CO	3.0%
VT	1.1%
MT	0.7%
AK	**0.0%**

State	Average Speed Test:
MD	196.2 Mbps
VA	193.1 Mbps
NY	190.5 Mbps
MA	188.2 Mbps
NJ	**174.3 Mbps**
CT	172.0 Mbps
IL	171.3 Mbps
OK	168.8 Mbps
CO	168.5 Mbps
FL	167.8 Mbps
DC	167.2 Mbps
TX	163.7 Mbps
RI	163.1 Mbps
MN	161.4 Mbps
GA	150.6 Mbps
AZ	149.1 Mbps
WA	149.0 Mbps
PA	144.7 Mbps
NH	144.3 Mbps
DE	139.9 Mbps
KS	135.9 Mbps
IN	134.1 Mbps
TN	132.7 Mbps
UT	127.5 Mbps
WI	126.0 Mbps
SC	125.0 Mbps
OR	122.5 Mbps
NC	115.5 Mbps
MI	113.3 Mbps
NV	112.1 Mbps
AL	111.8 Mbps
LA	109.4 Mbps
MO	108.4 Mbps
WY	108.2 Mbps
AR	104.1 Mbps
HI	102.6 Mbps
OH	102.1 Mbps
WV	101.2 Mbps
VT	98.6 Mbps
KY	95.7 Mbps
NM	93.1 Mbps
CA	**92.6 Mbps**
ND	90.5 Mbps
NE	90.3 Mbps
ID	88.9 Mbps
MS	84.5 Mbps
ME	82.8 Mbps
MT	81.4 Mbps
IA	78.9 Mbps
SD	74.5 Mbps
AK	**58.6 Mbps**

Global Comparison: Percentage of Households with Internet Access (2019, or latest available)[18]

Rank	Country	Percent
1	Korea	99.7%
2	Netherlands	98.4%
3	Norway	98.4%
4	Iceland	97.7%
5	Sweden	96.1%
6	United Kingdom	95.9%
7	Switzerland	95.5%
8	Denmark	95.4%
9	Luxembourg	95.2%
10	Germany	94.8%
11	Finland	94.4%
12	Spain	91.4%
13	Ireland	90.6%
14	Estonia	90.4%
15	France	90.2%
16	Austria	89.9%
17	Belgium	89.7%
18	Slovenia	89.0%
19	Turkey	88.3%
20	Chile	87.5%
21	Czech Republic	87.0%
22	Poland	86.8%
23	Costa Rica	86.3%
24	Spain	91.4%
25	Australia	86.1%
26	Latvia	85.5%
27	Italy	85.2%
28	Slovak Republic	82.2%
29	Lithuania	81.5%
30	Portugal	80.9%
31	**United States**	**79.9%**
32	Greece	78.5%
33	Israel	74.1%
34	Brazil	71.4%
35	Mexico	56.4%
36	Colombia	52.7%

Addressing the Digital Divide

The Center for Public Integrity mapped the service areas of broadband providers in five U.S. cities and found that providers will "carve up" territory, avoiding competition with each other. The Center's analysis found that the lack of competition has resulted in higher broadband prices.[19] This is also true in California, which is primarily served by several large national or regional providers.[20] Analysis from USC Annenberg of Los Angeles County found that nearly two-thirds of Angelenos live in areas served by a single internet provider that offers speeds that meet the FCC's definition of "broadband." Additionally, researchers found that the speeds offered in areas served by monopolies are 35 percent lower than those offered in areas with three or more competitors.[21] By looking both domestically and abroad, there are models from other cities that can offer some suggestions on how California can further address this challenge.

Municipally-Owned Fiber Networks

One idea to address the digital divide is to allow municipalities – such as cities or towns – to start their own fiber networks. Fiber networks, a type of broadband connection, allow for much faster internet speeds than DSL and cable (see chart: *DSL vs Cable vs Fiber Speeds* on page 3). Fiber networks are also very expensive to install, with the majority of costs coming from having

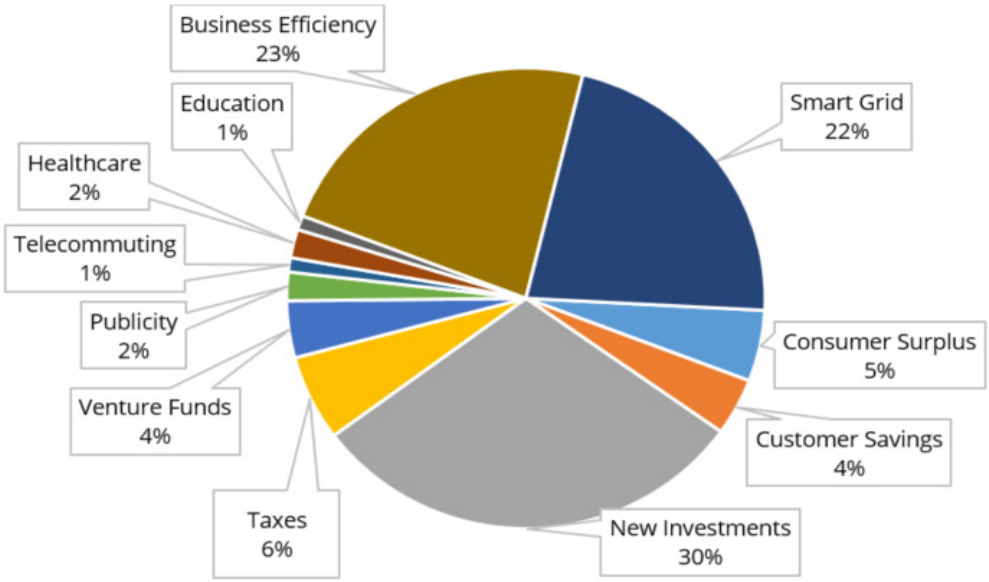
to physically dig underground to lay the fiber. According to Harvard Law School Professor Susan Crawford, internet service providers have received a lack of pressure from regulators and competitors to upgrade to fiber.[22] As a result, across the world, municipalities are taking it upon themselves to install fiber networks and provide their own service, or develop public-private partnerships to lease the service to privately-owned companies, to increase competition as well as internet speeds. A study from Harvard researchers found that community-owned fiber-to-home networks in the U.S. generally do not charge as much for broadband services when compared to their private counterparts. The study also found that they do not make their pricing structure as complex.[23]

THE PUBLICLY-OWNED MODEL IN CHATTANOOGA, HAMILTON COUNTY, TENNESSEE

One example of a successful municipal network within the U.S. can be found in Chattanooga, Hamilton County, Tennessee. In 2009, the city's electric company (EPB) used an effort to modernize its electrical grid to limit outages as an opportunity to install fiber-optic cables throughout the city.[24] To help fund the project, Chattanooga used a $111 million grant from the Department of Energy. After working past a series of lawsuits from Comcast and local cable operators, Chattanooga became the first city in the United States to offer gigabit internet speeds (1,000 Mbps) to all of its residents through their fiber network in 2010.[25] As of 2019, the city's electric company serves more than 100,000 homes and businesses (nearly two-thirds of the homes and businesses in the community).[26]

According to a study from the University of Tennessee, the network created between 2,800 and 5,200 new jobs and generated incremental economic and social benefits between $865.3 million and $1.3 billion in Hamilton County between 2011 and 2015. About 75 percent of the benefits accrued have come from new investments, business efficiencies and advantages of the smart grid.

Contribution to Value (average of range)[27]



Researchers did not provide a sector breakdown of the new jobs created. They did identify a few companies that either relocated or expanded in Chattanooga because of the city's fiber-optic investment. These include HomeServe USA, an emergency home repair company, and Claris Networks, a cloud computing company. Researchers also identified firms that invested in the city; including Volkswagen AG, Alstom Power Inc., and Amazon, but due to lack of direct evidence from the firms, researchers acknowledged that it was less clear whether the jobs and investments could be attributed to the fiber investment. However, researchers argue that evidence suggests that high-speed internet access and cost-efficient energy availability play a key role in what sites firms select to expand or relocate to.[28] Although it is worth noting that researchers in a separate study from the Advanced Communications Law and Policy Institute at New York Law School, suggest alternative factors, such as tax incentives, played a role in at least Amazon and Volkswagen's decisions to expand and invest in the city.[29]

With the installation of the fiber network, the city also went through a technological transformation and created what researchers dub a "unique entrepreneur ecosystem." Chattanooga has become home to multiple start-up accelerators and a handful of new venture capital funds – with some focused specifically on its fiber network. Including GigTank, a 14-week entrepreneur accelerator program launched by CO.LAB (Company Lab), which focused on utilizing Chattanooga's one gigabit per second internet grid. Gigtank itself has launched several notable startups.

In addition to direct economic benefits (such as job creation), researchers also identified the value added from more indirect social benefits such as those stemming from telemedicine, telecommuting, e-business, and e-government.[30]

THE PUBLIC-PRIVATE PARTNERSHIP MODEL IN STOCKHOLM, SWEDEN

In 1994, Stockholm's city leaders were looking for a neutral player to provide basic IT infrastructure to the city in the wake of the Swedish government's decision to allow a former monopoly company to own both the telecommunications infrastructure and sell its services.[31] With the goal of stimulating the telecom market and information and communications technology (ICT) in the Stockholm region, the city set up its own passive fiber infrastructure provider, Stokab.[32] The municipally-owned provider would be responsible for building, operating, and maintaining the fiber networks; however, it would not be responsible for selling active services but rather it would be required to lease out those connections, to any purchaser on equal terms.[33] Using loans backed by the city, Stokab purchased existing duct network and deployed dark fiber[34] (unused fiber cables that only work once someone, such as an internet service provider, lights it). At its start, Stokab's network mainly connected public institutions and universities but soon started leasing circuits to private businesses, allowing the network to expand quickly. Today, over 100 operators and service providers operate on Stokab's network[35] which has provided 100 percent of businesses and over 95 percent of households with the possibility of signing up for a fiber-based connection, at prices ranging from $15 to $35 per month.[36] Due to Stokab's success, other parts of Sweden have since continued this model and there are now over 200 municipal networks throughout the country.[37]

Fiber Broadband Network Efforts in California

As of 2018, California is one of 28 states that does not have any substantive roadblocks to establishing municipal broadband networks for its residents.[38] California's final roadblock was removed in 2018 with the passage of AB 1999 (Chau), which expands the authority for municipal and public utility districts to develop public broadband services and requires those entities to adhere to "net neutrality rules" when providing services. Additionally, the bill removes the requirement for Community Service Districts (a form of local government created by a community

Municipalities with Broadband Networks in California[39]

Provider	Network Type	Services Offered
Beverly Hills Fiber	Fiber	Residential Fiber-to-the-Home, Enterprise. (Network under development.)
Burbank Water and Power	Enterprise Services, Dark Fiber	Enterprise, Anchor institutions and municipal buildings.
City of Anaheim	Fiber, Dark Fiber	Anchor institutions and municipal buildings.
City of Shafter, California	Fiber	Enterprise, Anchor institutions and municipal buildings.
Connect Anza	Fiber	Residential Fiber-to-the-Home, Enterprise, Anchor institutions and municipal buildings.
Culver Connect	Fiber	Enterprise, Anchor institutions and municipal buildings.
Glendale	Dark Fiber	Anchor institutions and municipal buildings.
Loma Linda Connected Community	Fiber	Residential Fiber-to-the-Home, Enterprise, Anchor institutions and municipal buildings.
Long Beach	Dark Fiber	Anchor institutions and municipal buildings.
Palo Alto Fiber	Fiber, Dark Fiber	Enterprise, Anchor institutions and municipal buildings.
Pasadena	Fiber, Dark Fiber	Enterprise, Anchor institutions and municipal buildings.
Plumas-Sierra Telecommunications	Fiber, Wireless	Residential, Enterprise.
Riverside Dark Fiber Network	Dark Fiber	Enterprise, Anchor institutions and municipal buildings.
San Bruno Municipal Cable TV	Cable, Fiber	Residential, Enterprise.
Santa Clara	Dark Fiber	Enterprise.
Santa Monica CityNet	Fiber, Dark Fiber	Residential Fiber-to-the-Home, Enterprise, Anchor institutions and municipal buildings.
Stockton Fiber	Fiber	Residential Fiber-to-the-Home. (Network under development.)
Truckee Donner Public Utility	Fiber	Residential, Anchor institutions and municipal buildings.
Vernon Light & Power	Fiber, Dark Fiber	Enterprise, Anchor institutions and municipal buildings.

to meet a specific need or needs[40]) to first try to identify a private company to deploy service, before entering the broadband market and to sell or lease their broadband infrastructure and service to a company that enters the market at a later time.[41]

ConnectCalifornia.org (also cross-checked with similar information provided by BroadbandNow) found that California has 17 active municipal broadband providers – and an additional two networks that are under development and pending launch – as of June 2020 (see *Municipalities with Broadband Networks in California* on page 10). The Commission also identified an additional fiber broadband network from the South Bay Cities Council of Governments, which is outlined in more detail below.

California Case Studies

SOUTH BAY CITIES COUNCIL OF GOVERNMENTS (SBCCOG) – SOUTH BAY FIBER NETWORK (SBFN)

The South Bay Cities Council of Governments, comprised of 16 city councils in Los Angeles County, set out to create a "ring of dark fiber" around the South Bay that would connect all member cities with high-capacity, high-speed internet access.[42] In 2017, the South Bay Workforce Investment Board and the South Bay Council of Governments commissioned a feasibility study by Magellan Advisors[43] and a request for proposals (RFP) was issued in June 2018.[44] During the feasibility study, Magellan advisors found that the South Bay's digital infrastructure network was extensive, but also inconsistent and fragmented. Looking at costs they found a range – with the city of Redondo Beach paying $6,300 per month for just 100 Mbps upload/download speed while the monthly cost for Rancho Palos Verdes was $275 for 150 Mbps upload/download speed. As a whole, the South Bay Cities were paying about $43 per Mbps download and $63 per Mbps upload per month.[45]

Broadband Costs in South Bay Cities (May 2017)[46]

	Contracted Mbps		Actual Mbps		Monthly cost	Monthly cost per Mbps	
City	Down	Up	Down	Up		Down	Up
Carson	100	100	100	100	$1,500	$15.00	$15.00
El Segundo	100	10	75	7	$531	$7.08	$75.86
Gardena	200	200	200	200	$2,600	$13.00	$13.00
Hawthorne	50	50	42	19	$3,700[47]	$88.09	$194.70
Manhattan Beach	100	100	93	42	$7,800[48]	$83.87	$185.71
Inglewood	1,000	1,000	850	750	$6,000	$7.06	$8.00
Rancho Palos Verdes	150	150	149	152	$275	$1.85	$1.81
Redondo Beach	100	100	40	38	$6,300	$157.50	$165.79
Rolling Hills Estates	50	50	49	46	NA	NA	NA
Torrance	308	317	54	54	$3,933	$72.39	$72.84
				Averages	$3,627	$49.54	$81.41
				Total	$32,639		

To fund the project, the South Bay Cities submitted a funding request for $4.4 billion in Measure M (transportation tax) funds in September 2019. Because officials were asking for transportation funding, the project leaders needed to establish a transportation component. South Bay officials and the Metro (Transportation Authority) agreed to connect the fiber-optic ring to traffic collection centers and traffic monitoring programs operated by the Metro, Los Angeles County, Manhattan Beach, and Torrance.[49] The cities later received an additional $2.5 million[50] in additional Measure M funding, as well as $1.2 million[51] from the state.

Initially, the service will cost $1,000 a month for one gigabit (equal to 1,000 Mbps) with the goal for it to lower in price once more services are connected to the system. For higher rates, service is also available at two, five, and 10 gigabits.[52]

The project has continued amid the COVID-19 pandemic and the network's "core ring," also known as the middle-mile network architecture, became operational at the end of August 2020. Construction to connect municipal facilities and public agencies' sites to the ring is still underway. As of November 2020, the South Bay Cities has been able to complete 22 lateral connections to the core ring to include two data centers in the South Bay, 10 South Bay municipalities (some with multiple sites), and four public agencies (some with multiple sites). The South Bay Cities anticipates that all 15 South Bay cities (in the SBCCOG's service territory) as well as a diverse set of agencies – such as the Metro, Beach Cities Health District, Los Angeles County Department of Public Works – will be connected to the network by the end of 2020.[53]

SANTA MONICA – SANTA MONICA CITYNET

Santa Monica recognized the potential value in providing broadband back in 1998[54] when the city released its Telecommunications Master Plan.[55] The Telecommunications Working Group tasked with developing the plan, engaged in workshops; interviewed city departments, key businesses, and individuals; and conducted surveys to businesses, residents, and existing telecommunications providers.[56] The plan was meant to serve as a "strategic road map for telecommunications development in the City over the next five years" and called on the city to construct and operate a municipal fiber network.[57]

In 2002, Santa Monica negotiated with a local cable company that was renewing its lease. The city agreed to lease an institutional fiber network (an internet network that connects municipal buildings but is not open for commercial use) from the company. The Institutional Network connected 43 city buildings, as well as schools and college facilities. Santa Monica paid for the $530,000 in construction costs but shared the ongoing operations and maintenance costs with the school districts and colleges.

By operating its own network, the city, school district and college initially reduced their combined telecommunications costs by $400,000 each year (from $1.1 million to $700,000). Within a few years, these savings grew to $500,000 annually. The city then re-invested these savings to help build its own 10 Gbps municipal fiber-optic network.[58] Santa Monica was able to slowly expand its network, and reduce costs, by installing the fiber infrastructure underground while the city worked on projects like street renovations and sewer-main installations.[59] By adopting a "dig

once" policy, Santa Monica was able to reduce the installation costs by up to 90 percent.[60]

Starting in 2006, CityNet focused on leasing dark fiber to large businesses (with over 2,000 employees) but in 2009 the city started to provide internet to smaller businesses - that were not inclined to light their own dark fiber and/or could not justify the price for speeds they did not necessarily need. To provide this service, the city leased a connection to One Wilshire, a carrier hotel (a building that houses multiple networks from multiple providers, like a grand central station) in downtown Los Angeles. Hundreds of service providers interconnect at One Wilshire and connections are offered at rates roughly 70 percent lower than prices charged in Santa Monica. By connecting to One Wilshire, CityNet was able to offer more services to local businesses.[61] According to Gary Carter, community broadband manager for CityNet, soon businesses started to pay a third of what they had been previously paying private providers for 10 times the speed.[62]

In 2015, with $175,000 in seed funding as part of the City Council's Strategic Initiatives, Santa Monica launched a Digital Inclusion Pilot to provide internet to 10 affordable housing buildings in the city. Working with the U.S. Department of Housing and Urban Development, the city was able to later use a $1.85 million of Community Development Block Grant funding to expand to an additional 29 buildings. With this expansion, over 900 low-income housing families were given the option to use the free gigabit broadband in their community rooms, purchase their own internet for $48 per month (for 1 Gbps), or partake in free technology workshops available onsite.[63]

CityNet has also been able to expand to offer a multitude of benefits to the public. As of 2014, the network supports 550 video cameras for public safety, 55 video cameras for traffic management and synchronizes 80 percent of the traffic signals.[64] As of 2016, it has 34 no-cost Wi-Fi hots spots around the city at most of their public spaces and commercial and transit corridors.[65] And last year, they started offering free Wi-Fi on select Santa Monica buses.[66]

As of 2014, the latest revenue details available, CityNet had 110 customers and generated $1.6 million annually in revenue. CityNet costs $1 million annually to operate and also has an additional $500,000 revolving fund. The fund is used to pay the upfront costs of fiber installation for commercial entities, which they will later reimburse the city for.[67] Essentially, companies are paying for their own fiber installation.

Unsuccessful Efforts in California

SAN FRANCISCO

San Francisco leaders, including Mayor Ed Lee and Supervisor Mark Farrell, looked at building a municipal fiber broadband network to close the digital divide for the approximately 100,000 San Franciscans (12 percent of San Francisco residents[68]) without internet access at home.[69] In 2016, Supervisor Farrell requested the city's Budget and Legislative Analyst Office (the Office) conduct a financial analysis of constructing, owning, and operating a citywide municipal fiber network that would provide internet access to all residential, commercial, and industrial properties in San Francisco at speeds of at least one Gbps. The Office evaluated the costs and risks of three different approaches to financing and operating the fiber network:

- **Public development and ownership.** Would pose the most risk to the city and potentially a higher cost (but could be equal to or less than the cost of the public-private partnership, depending on the build-out approach taken).
- **Private development and ownership.** Would provide the least cost and risk to the city, but would also be the least effective at tackling the digital divide.
- **Public-private partnership development and ownership.** Would reduce the costs and risks associated with San Francisco creating and operating a new utility, while also bringing the benefit of competition to the public as more providers would be allowed to use the fiber-optic network.[70]

Upon release of the study, Supervisor Farrell issued a press release touting that the report concluded that the public-private partnership model was the best model.[71]

In March 2017, Supervisor Farrell formed the San Francisco Municipal Fiber Blue Ribbon Panel, co-chaired by Harvard Law Professor Susan Crawford and composed of internet access, business, and privacy experts. The panel was charged with making recommendations on how to bring fast and affordable internet to San Francisco.[72] In June 2017, the panel released a report recommending that San Francisco build out a fiber-optic network citywide.[73]

In October 2017, San Francisco commissioned a report from an outside consultant, CTC Technology & Energy, to explore costs associated with building out a fiber network and potential business models. CTC found that a public-private partnership would be the easiest and cheapest option[74] for the city to build out a fiber network - estimating that it would cost $1.9 billion.[75] This drew controversy to the project as internet service providers and other city leaders questioned whether spending money on internet access was as important as other priorities, such as providing affordable housing.[76]

San Francisco continued to move forward with the project using the public-private partnership model. The citywide fiber network would have been owned by San Francisco but built and managed by a private company under a 15-year contract.[77] The network would offer at-cost gigabit-speed internet to all homes and businesses, while the cost would be subsidized for qualifying low-income households.[78]

In January 2018, the city issued a request for qualifications (RFQ) to find qualified teams (comprised of private companies) to build out the network. After identifying three teams, the city planned to issue a request for proposals (RFP) in which the teams would compete for the final bid to build out the network.[79] However, after the teams were selected, the project was put on hold indefinitely in June 2018. One of the next steps in the project was to put a measure on the November 2018 ballot to generate funding. The tax measure would have raised $1.7 billion over 25 years to cover the costs of the project, but a poll indicated that it was shy of the two-thirds of votes needed to pass. Ultimately, Supervisor-turned-Interim Mayor Farrell – who took over the role in January 2018 following the death of Mayor Ed Lee in December 2017 – was leaving office in July and opted to let the deadline pass without submitting a tax proposal for the ballot.[80]

According to a letter from the Office of Contract Administration to the three bid teams obtained by the San Francisco Examiner, San Francisco wanted to continue to "reduce uncertainties" and "... research a number of factors, including how market conditions and the construction environment would affect the project" over the coming months.[81] In July 2018, London Breed was sworn in as mayor but has not taken further action on this project specifically. However, Mayor Breed launched the Fiber to Housing program in 2018 – a collaboration between the Department of Technology, the Mayor's Office of Housing and Community Development, and the local internet service provider, Monkeybrains – which works to reduce the digital divide by leveraging existing municipal fiber resources to bring free high-speed internet to residents in affordable housing.[82] Monkeybrains is on call to fix any problems that arise and also offers onsite digital literacy training to those who do not know how to use the internet once they have access.[83] As of August 2019, the program has provided 1,500 low-income families with access to free, high-speed internet with a plan to serve an additional 1,600 families in the next year.[84]

Prior to the 2018 effort, San Francisco also made a push for citywide internet in 2007. The city commissioned a report recommending a fiber network,[85] but according to Harvard Law Professor Susan Crawford, plans did not move forward due to a "lack of leadership and the absence of a concrete plan."[86]

LOS ANGELES

Over the past decade the city has explored ways to provide free internet access to every resident, including conducting a study of the city's broadband capabilities. In 2009, the LA WiFi Working Group – composed of representatives from multiple city departments including the Information Technology Agency, Department of Water and Power, and Office of the Mayor – and the consulting firm Civitium released a feasibility study of developing of a citywide wireless network. However, the study concluded that the construction of a citywide network was not feasible, at that present time, due to a variety of technical and financial reasons.[87]

Then in 2013, Mayor Eric Garcetti and City Councilmember Bob Blumenfield launched CityLinkLA, an initiative to ensure that every Los Angeles resident has access to high-speed, high-quality internet.

As part of this effort, in April 2014, the Los Angeles City Council issued a Request for Information to gather feedback from potential bidders and the public to provide needed information to create a viable request to build a citywide network.[88]

In June 2015, the Los Angeles City Council approved a Request for Participants to find one or more providers to commit to deploying wireline and wireless networks that could provide one-gigabit broadband speed or more internet to homes and businesses. The City Council also asked entities to provide a free level of service, at slower speeds (of at least five Mbps), to members of the public – to try and prevent low-income residences from being left without internet access. Due to the size of the city, Los Angeles was divided into four quadrants and the Council asked proposers to serve one or more of the service areas.[89] In exchange for serving the city, service providers would be offered discounts and the ability to lease city-owned infrastructure and a streamlined permitting process.[90]

Los Angeles expected that it would cost $3 to $5 billion to build out the fiber infrastructure, but the cost would be borne by the vender(s). Steve Reneker, Los Angeles Information Technology Agency's General Manager, told Ars Technica that the winning bidder should make out well as it would gain a lot of new residential, business, and government customers.[91] Ultimately, the city never received any workable proposals to build out the network and the project died.[92]

In March 2018, Los Angeles City Councilmember Paul Krekorian proposed a motion for a study into the creation of a new city department that would oversee an effort to improve the city's broadband capabilities.[93] Within the motion, Councilmember Krekorian referenced the city's extensive network of city-owned fiber optic cables, which, in combination with the city's control of power poles, light poles, and significant plans for street reconstruction and maintenance could, "create a unique opportunity for the voters of the City of Los Angeles to consider the creation of a city-operated broadband utility."[94] After the motion was referred to the City Council's Information, Technology, and General Services Committee it did not move further within the Council's process.[95]

Conclusion

Lack in universal access to affordable, high-speed internet is leaving many households behind. These inequities are impacting many Californians' to ability to access to the necessities and advantages that internet access provides: from the ability to access education and employment opportunities to obtaining critical government services. More information about the Commission and our work is available at www.lhc.ca.gov.

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