

## **PANDEMIC RECOVERY AND BEYOND**

# **Building Broadband Access for Stronger Communities**



In today's world, broadband access is critical to strengthening a community's resilience against COVID impacts, and creating post-pandemic prosperity. It is not, however, fully developed nor equally available and affordable to everybody. Residents in rural areas, for example, are less likely than their urban counterparts to have access to sufficient Internet service providers, Internet-accessible devices, and online services and functions for government, banking, education, healthcare and transportation.

Even in tech-pioneering California, the digital divide persists for both rural communities and low-income neighborhoods. Less than one-half (47%) of the state's rural population has the same Internet access as urban areas, according to a California Public Utilities Commission report. Moreover, while about 83% of Californians use broadband, only 52% have access to broadband that operates at the benchmark speed of 100 Mbps. Almost one-half of rural households and over 28% of tribal households lack broadband that meets that benchmark.

More than 618,800 households were estimated to be unserved or underserved (connected to the Internet at home only with a smartphone) statewide. These "underconnected" residents don't have access to the full range of digital technologies and therefore have fewer opportunities to benefit from California's economic prosperity.

The pandemic has made even more clear that the need for reliable, fast and affordable Internet connectivity is crucial for a community's ability to provide education, business, health and governmental services.

***Approximately 19 million Americans – 6% of the population – still lack access to fixed broadband services at threshold speeds.***

***In rural areas, nearly 1/4th of the population – 14.5 million people – lack access to this service.***

*See FCC's Broadband Deployment Report for more data on broadband services nationally*

*Click for more info about California's broadband demographics*



## Broadband for All Action Plan Highlights

The California Broadband Action Plan 2020, from the California Broadband Council, outlines a 12-month action plan to help ensure all Californians have high-performance broadband available at home, schools, libraries and businesses. Some highlights:

- ▶ Develop state funding criteria for local and tribal government involvement that aligns federal broadband funding.
- ▶ Prioritize funding open-access, middle-mile infrastructure, including connections to anchor institutions.
- ▶ Identify alternative financing opportunities with government and philanthropic partners to maximize infrastructure funding.
- ▶ Implement a Dig Smart policy to install conduit as part of state-funded transportation projects in strategic corridors.
- ▶ Continue improving encroachment permitting and rights-of-way to speed up broadband deployment for under-connected areas.
- ▶ Develop framework, standards and metrics to define essential, affordable broadband service.
- ▶ Leverage existing state 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 new housing.
- ▶ Support broadband cost savings and efficient purchasing by local governments.
- ▶ Provide guidance to local governments and partner with tribal governments to develop broadband strategies and explore options for increasing competition in their communities.
- ▶ Explore methods to promote competition within multi-dwelling units to enable tenants in apartment buildings to choose between multiple Internet service providers (like San Francisco's Article 52).
- ▶ Build out digital-skills training programs for core digital literacy and technical training linked to specific jobs and career pathways.
- ▶ Establish a Broadband for All portal to enable easy access to broadband tools and information.

*Plan cover and more about background and recommendations >*

## Pandemic Impacts Focuses Attention on Deficiencies and Opportunities in Broadband Infrastructure

During the pandemic, businesses, schools and health organizations significantly changed their operations, including implementing remote learning and telework policies at an unprecedented scale.

Consider the challenges of online learning and teleworking without Internet access. Families without affordable quality broadband service struggled to accommodate remote student learning as schools instituted online classes. Some parents without broadband access went so far as to travel to local school campuses, libraries and community centers to use the Internet connections available at those facilities.

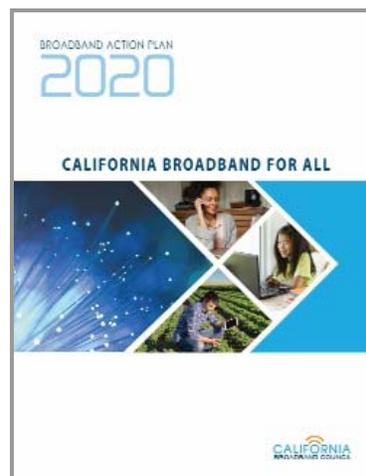
Businesses and industries in areas with sufficient Internet connectivity were better able to transition to remote work and retain their workers to keep operations going. However, employers with workers in positions not suited to remote work, or who did not have reliable Internet access at home, suffered job losses – which means broadband-infrastructure improvements for business activities and residents in unserved and underserved communities are a necessity.

## Equitable Access as Path to Social Justice

Ensuring that all residents have high-quality Internet access is a matter of social equity. Expanding broadband into homes, schools and businesses in underserved and unserved communities will help close gaps in access to digital technologies, as well as gaps in access to other basics like education, healthy foods, transportation, quality healthcare, good jobs and banking services.

Today, education – a critical step toward individual and community prosperity – requires basic digital literacy and access to technology tools.

Broadband-infrastructure improvements that address access, speed and reliability keep businesses, employees, families and students successful and thriving in their communities. Equal access to 21st-century pathways for success is imperative in all these aspects of our lives.



**Read more:**

[Broadband Action Plan 2020](#)

# Economic and Environmental Benefits

Investments in broadband infrastructure and digital-access initiatives are fundamental to California's sustainable economic growth and global competitiveness.

Research indicates communities that improve their broadband service increase their jobs base and the number of businesses, generating hundreds of thousands of new jobs and billions of dollars for the California economy.

While better broadband access benefits all communities, it is especially critical for a changing educational structure, governmental and business services, and the agricultural economy.



**Telework Benefits.** Other environmental benefits of expanded and improved broadband access include reducing the number of vehicle miles traveled (VMT) with changes to workers' daily work commute and travel patterns. Adoption of online learning and telework measures has economic, equity and environmental benefits for employees, organizations and local governments.

Expanding broadband access is showing to be good for public health and the environment, with modern approaches to e-government, telehealth, telecommuting, smart buildings and smart grids that help California communities reduce their carbon footprint.

Telework policies help fulfill a range of local-government goals, from infrastructure and climate-change impacts to improved health outcomes.

Decentralized labor and reduced commutes associated with telework – which take considerable VMT wear-and-tear off the road – in turn reduce the strain on public infrastructure. Between December 1, 2019, and March 31, 2020, VMT in the Bay Area and Los Angeles/Ventura counties dropped by 30–40%, according to Institute of Transportation Engineers data.

Investments in broadband infrastructure also have the potential to prevent nearly 95,000 traffic-related injuries and deaths annually and save more than \$11 billion a year in related costs by shifting the 50 million Americans with compatible jobs and a desire to work from home at least part of the time to half-time telework.

A recent Global Workplace Analytics survey found 77% of office-based workers are now working from home five days a week, compared to only 9% before the start of the pandemic. Nearly 75 million U.S. employees (56% of the workforce) could work from home, up from 5 million (3.6%) who worked from home at least half-time in 2018.

**Agriculture Efficiencies.** Broadband infrastructure allows farmers to use water, fertilizer and fuel more efficiently through remote sensing and monitoring technologies. The result is increased yields, better monitoring for food safety and security, and expanded access to market and distribution networks. Emerging agriculture and production-driven technologies depend on the wireless transmission of data for economic growth and sustainability.

**Climate mitigation.** Along with this economic shift, increased telework has also been instrumental in the fight against climate change. Although not all VMT avoided during this period are directly tied to telecommuting policies, researchers at the UC Davis Road Ecology Center found that, after California's statewide stay-at-home order in March and mid-April 2020, total VMT fell by 75%, with a corresponding drop in pollution levels.

U.N. data shows there has also been a 5.5% to 5.7% fall in CO<sub>2</sub> emissions due to the pandemic. Continuing VMT-reducing telework policies would also help maintain the reductions in greenhouse gas emissions and harmful pollutants (SO<sub>2</sub>, O<sub>3</sub>, NO<sub>2</sub>, CO and PM 10) seen during the pandemic.



# Strategies for Improving Broadband Access

## Emerging Technology Fund Recommendations

For Californians, the California Emerging Technology Fund's "Getting Connected for Economic Prosperity and Quality of Life: A Resource Guide for Local and Regional Government Leaders to Promote Broadband Deployment and Adoption" highlights a number of steps that communities can take to increase broadband access by upgrading existing infrastructure and investing in next-generation technologies, including:

### Land Use and Smart Infrastructure

- ▶ Provide broadband infrastructure in all public buildings and other infrastructure projects.
- ▶ Require new or renovated residential and commercial development projects to provide broadband connectivity. Require broadband connectivity and periodic upgrades in conditional use permits.
- ▶ Identify local public rights-of-way and public facilities for broadband, and streamline the approval of easement encroachment permits.
- ▶ Submit notification and information about all major infrastructure and construction projects to a shared web-based database (such as the prototype developed by Caltrans) so that broadband and other utility providers can coordinate infrastructure in shared trenches, conduit, poles and towers to reduce costs, save time, and minimize duplicative construction.

### Public Services and Digital Inclusion

- ▶ Prepare and implement a Technology Plan that uses state-of-art broadband so that local governments can operate in the most cost-efficient manner possible. Provide all vital public information and critical services online.
- ▶ Promote the use of public buildings — libraries, parks and meeting centers — as broadband hot spots to give residents affordable (or free) high-speed Internet access.

### Smart Housing

- ▶ Require all new residential subdivisions to be served with state-of-art broadband infrastructure with sufficient transmission rates.
- ▶ Require all publicly subsidized housing development to provide an independent and more affordable "advanced communications



network" — aggregating high-speed Internet access service throughout the property rather than unit-by-unit — to significantly reduce the cost of Internet access for lower-income residents.

- ▶ Establish housing-authority policies that promote and support smart, affordable housing with advanced communications networks whenever public funds are used to subsidize the construction of affordable housing.

### Interagency Cooperation

- ▶ Outline a process for ensuring inter-agency and inter-jurisdictional cooperation: Share this policy with other jurisdictions in the region; meet to explore common needs for infrastructure; identify opportunities to collaborate on broadband applications (such as telehealth) or regional projects, such as library networks; and notify neighboring jurisdictions about major infrastructure projects, such as transportation improvements along shared corridors.
- ▶ Work with other public and private entities — schools, special districts, utilities, and private health and medical providers — to cooperate and joint-venture on broadband projects and programs.
- ▶ Closing the digital divide will require much greater investment from local, state and federal partners to support private-public partnerships, streamline permitting requirements for broadband infrastructure, provide rights-of-way for broadband deployers, and develop "dig once" policies for broadband infrastructure that can reduce costs and environmental impacts.

# Dig Once Policies

Local governments can significantly reduce the capital costs of installing broadband infrastructure by adopting policies and ordinances that encourage broadband investment. “Dig once” (or “shadow conduit”) policies encourage public and private excavators to place extra conduit or fiber-optic cable when a trench is open, which eliminates much of the cost: 60% to 80% of a broadband network’s capital costs arise from digging that will house fiber-optic cable. The incremental cost to install shadow conduit is \$2–\$7 per foot, while the cost to install new, stand-alone conduit is \$25–\$35 per foot. Typically, shadow conduit represents less than 2% of a road improvement’s total budget.

A dig-once policy fosters coordination of street cuts and excavations to maximize opportunities to install broadband conduit and minimize the cost, community disruption and damage to existing infrastructure. By coordinating with other city, county or state capital projects, additional conduit can be placed within an open trench when other work – such as sidewalk improvements, street-light and trails construction and maintenance, road construction and road-widening projects, and any underground utility project – is being performed in the right of way.

**Excavation Requirements.** In California, the Cities of Santa Cruz, San Francisco and Gonzales, for example, have implemented dig-once policies that provide for improved communication with potential stakeholders and mandatory installation requirements for excavators. Santa Cruz works with construction contractors to create cost-effective upgrades in the public right of way, and suspends stand-alone construction in those locations. Gonzales requires all excavators in the public right of way to install telecommunications conduit, and has established common engineering specifications for these projects.

Santa Cruz County requires conduit installation during all underground and repaving construction, while San Benito County roadway-construction projects that involve more than surface-pavement work must include underground utility conduit.

**Re-Dig Moratoriums.** San Francisco requires City-owned fiber-network infrastructure be installed in excavation projects when technically and financially feasible. Their ordinance establishes a five-year moratorium on road excavation after the project is completed, and is estimated to significantly reduce the cost of conduit installed per street mile from the first installation (including excavation of the trench) to the second.

**Coordinated Schedules.** Santa Monica used a dig-once policy to build its municipal fiber network, with fiber installations coordinated with the water and power utilities’ transportation-project schedules (using shared



documentation software). Key locations for fiber were identified, and over time the incremental process coordinated multiple capital projects that laid extra fiber for future use. Ongoing savings are \$700,000 per year.

**Public-Private Partnerships.** The City of Brentwood adopted a conduit policy in 1999, beginning with installations in new-home developments and since expanding across the city. In 2015, the City began offering gigabit services in partnership with Sonic to install fiber throughout City conduit. In addition to providing the City with lease revenue, Sonic also supplies gigabit services to the City at no charge, saving around \$15,000 annually. Local schools (in neighborhoods with subscription rates over 30%) also receive free gigabit Internet service.

The State of California enacted a dig-once policy for the State Department of Transportation in 2016. AB 1549 requires the department to notify companies working on broadband deployment of department-led highway-construction projects and authorizes them to coordinate with the department on conduit installation.

## Policies Compatible with Dig Once

The California State Transportation Agency (CalSTA) recommends a number of practices that reinforce dig-once policies:

- ▶ Resource-sharing through agreements with service providers for the exchange of the use of rights-of-way or existing infrastructure (conduit) for the use of broadband services.
- ▶ Subsurface Utility Engineering, which uses 3D modeling to collect subsurface information on utilities that can be integrated into highway projects.
- ▶ Joint-trench agreements that require broadband-service providers (in some cases, utilities) to install their infrastructure at the same time, in the same trench or conduit, and share installation costs.
- ▶ Moratoriums on street excavation to preserve new roadway construction.
- ▶ Use of trenchless technologies, such as horizontal directional drilling and micro-trenching (digging a small trench along the curb line just below the surface to install fiber optic lines).

# Future Benefits of an Improved Broadband Infrastructure

## A New Era of Delivering Services

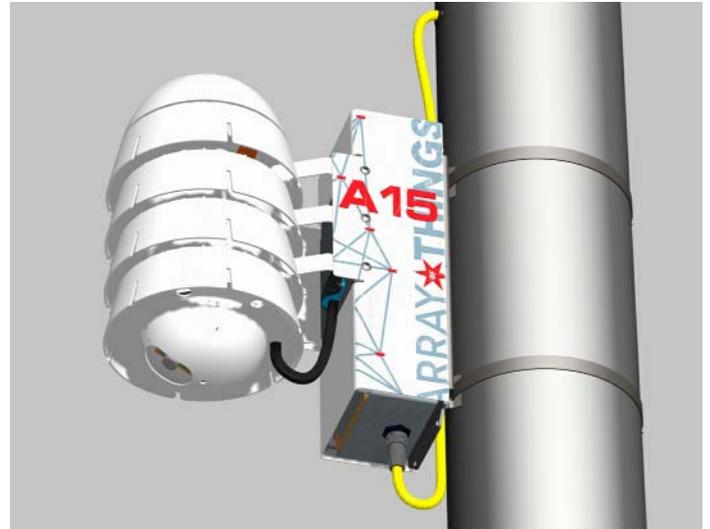
Growing population and increasing stress to infrastructure are causing communities to rethink how they provide services. Emerging technology used in a responsible way (that protects privacy and data) can play a critical role to increase a community's ability to achieve environmental goals, maintain and increase community's quality of life, and advance local economic competitiveness.

Local leaders should consider ways that they can use new technology to improve the coordination and delivery of city services.

Government officials and business leaders are beginning to embrace the ability of advanced technology to create opportunities to dramatically rethink the way communities manage their resources. Cities large and small are at the center of this paradigm shift.

A 2016 report on "Cities and the Future of Technology" from the President's Council of Advisors on Science and Technology maintains that the nation and its cities should use technology not only to upgrade and transform aging infrastructure, but to fundamentally reshape the way cities operate. Doing so, the report explains, will save energy, reduce traffic and congestion, create more sustainable and competitive cities, and bolster American innovation and competitiveness more broadly.

"Smart cities" are communities that are building an infrastructure to continuously improve the collection, aggregation and use of data to improve the life of their residents – by harnessing the growing data revolution, low-cost sensors and research collaborations, and doing so securely to protect public safety and individual privacy.



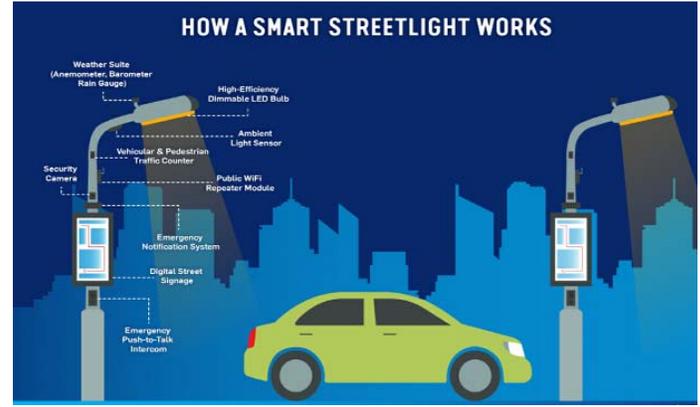
A cornerstone of smart cities is the growing prevalence of low-cost sensors and wifi-enabled "smart" devices (from electricity meters to street lights and garbage bins to home appliances), otherwise known as the "Internet of things" or "array of things." Connecting these devices over the Internet and letting them talk to people, applications and other devices can provide local leaders with much better data about needs within the community and present transformational new solutions to addressing those needs.

## Smart and Adaptive Street Lights

The Los Angeles Bureau of Street Lighting has been upgrading the city's street lights to LED bulbs for years, and is also now attaching mobile sensors to the devices, enabling them to know what bulbs have burned out. In time, officials will also have the ability to brighten, dim and blink the lights, and gather environmental information on an area.

CNN Money reported that Los Angeles has saved \$8 million a year thanks to the new LED bulbs, cutting energy use by 60%. Without having to rely on reports from residents, staff are also able to replace burned-out lights at a faster rate, providing safety and quality-of-life benefits.

Street-light projects that are networked typically pay for themselves two years faster than those that are not. Lastly, by using adaptive lighting, the utility company can brighten the lights when it needs to for safety purposes and dim them at other times.



## Smarter Maintenance

Thanks to sensors, cities could turn to preventative maintenance management, saving the community a lot of money in unnecessary maintenance. Apart from residents who can report damages on urban elements via smart phones, the infrastructure itself (from street lights to full waste receptacles) could inform the community that attention is needed.

The sensor-enabled trash receptacles measure waste levels in public bins and compact trash to reduce overflow. The bins share the data with local authorities, allowing them to enhance efficiency by planning collection routes where and when pickup is needed. The City of Los Angeles has added more than 330 high-tech garbage cans to its arsenal.



## Transportation Management

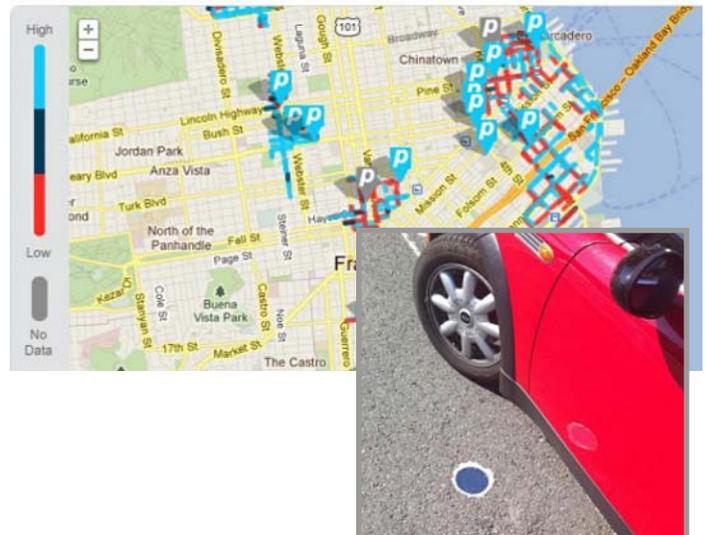
Smart-traffic management will enable car drivers to face less traffic jams, and real-time data will tell them which areas are busy. Traffic lights could automatically adjust to reduce congestion. Monitoring of vehicles and pedestrian levels can optimize driving and walking routes. Smart-parking sensors could automatically alert drivers about available parking spaces, and street lights could only be turned on if someone is approaching, saving a lot of energy.

## Congestion Relief in Los Angeles

The City of Los Angeles uses data from an array of magnetic road sensors and hundreds of cameras fed through a centralized computer system to control 4,500 traffic signals citywide to help keep traffic moving. Completed in 2013, the \$400-million system is credited with increasing travel speeds around Los Angeles by 16%, and shortening delays at major intersections by 12%.

## Smart Parking in San Francisco

To determine the right price to charge for parking to meet parking-space availability targets, SFpark used wireless sensors to detect occupancy in metered spaces. Installed in 8,200 on-street spaces in the pilot areas, the wireless sensors detected parking availability in real time. Sensors were also placed in three control neighborhoods to provide baseline data for evaluation purposes. These variable-pricing incentives allow drivers to pay lower rates in underused areas or at less popular times, encouraging them to change where and when they park.





## The Need for Speed, Urgent Change Accelerates

Now more than ever, upgrading our broadband infrastructure as rapidly as possible is critical to provide high-quality and high-speed Internet service to underserved and unserved areas in both rural and urban communities.

In the wake of the pandemic, the average U.S. home now has 25 connected devices, including laptops, smartphones, streaming devices, smart TVs, headphones and gaming consoles, according to a Deloitte report.

“The onset of the pandemic was like a time machine that suddenly propelled us tens of years into the future,” said Deloitte vice chair Paul Silverglate.

Infrastructure upgrades must prioritize building out the core “middle mile” of our broadband network to dramatically improve affordable access and choice to 15.4 million Californians who now live in broadband-monopoly areas, while also completing the “last mile” of our networks to reach those who have not been adequately served by existing providers.

Doing so will provide Internet to the 2.3 million Californians who have no access today, and improve broadband quality and speed to millions more who are underserved.

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## New State Investment Targets Rural Access

In his American Jobs Plan, President Biden has called broadband “the new electricity,” and compared the need for expanded access to that of putting electricity in homes through the landmark Rural Electrification Act of 1936.

The 2021-22 State Budget includes \$4 billion to help provide universal, affordable access to high-speed broadband service by targeting “middle-mile,” high-speed infrastructure for unserved and underserved communities in rural areas and another \$2 billion for “last-mile” projects.

That will in turn help individual communities lower the cost to develop their own “last-mile” plans. Local governments and tribes will be able to secure funds to build new fiber networks through low-cost, long-term loans from a new \$500 million Loan Loss Reserve Account; and \$500 million would be available to telephone service providers in rural areas to expand their services to include broadband.

## State Certifications Bolster Public-Private Efforts

Broadband certification programs can help build partnerships between communities and providers to connect investments in infrastructure and communitywide service.

Wisconsin, for example, helps rural communities benefit from the state’s broadband-infrastructure investments by creating certifications to help those areas foster greater connectivity. Created in 2016, its Broadband Forward! program gives communities – more than 60 counties and local municipalities so far – a way to demonstrate their commitment to expanding broadband and their willingness to work with providers to remove barriers to deployment.

The Wisconsin Broadband Office certifies communities as Broadband Forward! if they pass an ordinance that allows permit applications to be submitted electronically, sets a predictable timetable for application review, and limits permitting fees for broadband infrastructure.

Certification signals to the private sector that the community will be a willing partner for streamlined broadband deployment.

## Resources on Expanding Broadband Access

From the national level down to the local, here are some of the efforts to expand broadband services and improve the infrastructure.

### ■ Federal

“How the Biden Administration Can Expand Rural Broadband,”  
The New Yorker

Federal Communications Commission: “Bridging the Digital Divide for All Americans”

### ■ State

California Broadband Council

National Governors Association: “Governor Strategies to Expand Affordable Broadband Access”

The PEW Trust: “How States Are Expanding Broadband Access”

National Conference of State Legislatures: Broadband 2020 Legislation

### ■ Local

ICMA: “Advancing Local Broadband”

Institute for Local Self-Reliance: “What Your City Can Do to Close Digital Divides during COVID”

National Resource Network: “Access and Inclusion in the Digital Age: A Resource Guide for Local Governments”

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