California Workers: Modernized Telecommuting Policies To Build Equity and Reduce Costs

How a Health Crisis Can Create Jobs and Save Our Environment

A California Center for Jobs & the Economy White Paper

October 2020
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"We are very supportive of schools being virtual, but there isn't consideration for what working parents are going to do. Working parents can't teach and elementary school kids can't be on zoom every day for six hours by themselves."

Jonathan Alloy, father of a 7 and a 9-year-old in San Francisco

Summary

Despite being at the forefront of technological advances and innovation, California’s current policies related to teleworking have remained static. Prior to COVID-19, primarily the higher paid, highly educated Californians had the most access to the benefit of telecommuting. In an analysis of 2019 jobs data, 70 percent of all higher wage jobs (more than $100,000 average annual wage) occupations could do their work entirely from home. This, despite being able to afford to live closer to their places of work and with more income to dedicate to higher gas prices, other expenses related to super-commuting, and the resources to secure quality child and other dependent care.

COVID-19 and corresponding stay-at-home orders forced employers and employees to quickly adapt to telecommuting as the standard mode of working. According to recent federal data, likely more than 40 percent of workers across the nation are maintaining their household incomes through telecommuting. The rapid shift to telecommuting has disproportionately benefitted higher-wage and salaried employees, whose jobs can be done remotely under the state’s existing labor and employment laws. This smooth transition can be seen in the state’s income tax withholding data, which is relatively unchanged since the same time last year. Because of the steeply progressive nature of the state’s income tax, this outcome confirms that higher wage Californians have been able to retain their jobs and household incomes more fully in the current crisis, and they have done so largely through telecommuting.

The current pandemic has created a substantial shift in attitudes toward telework. Not only have employers made significant investments in technologies and protocols to support telecommuting, but employees realize that they can be just as and in most cases more productive working from home. As is discussed later in this report, as many as 40 percent of California workers could do their jobs entirely from home once the COVID-19 pandemic is over. More could so on a less regular schedule, and more could telecommute in future years as technology and the nature of work continue to evolve.

However, absent actions from the state, telecommuting will continue to be a luxury that benefits primarily the higher-wage workers in the state. In fact, only 26 percent of teleworkable jobs in California are in these higher-wage occupations. Another 35 percent are in lower wage jobs (up to $50,000 average wage) that could telecommute, but have not by and large because of restrictions in state law. In order to create equal access to telecommuting now and into the future, the state must modernize its workplace rules in order to give employers and employees flexibility they both want and in the current crisis circumstances need.

1 “While schools within California county watch list eye distance learning, some parents aren't so sure,” ABC 7 News, July 17, 2020 (https://abc7news.com/newsom-schools-counties-in-california-watch-list-county-private/6322515/)
A flexible work environment is even more critical now, as working parents work to balance educating their children while ensuring a stable and secure income from their job. Salaried employees, who are not restricted by meal and rest break requirements, restrictions on work days, and other provisions of the state rules, are better able to create the work/life balance required to be both a full-time employee and full-time educator for their child/children. Lower-wage hourly employees with inflexible work schedules, as mandated by law, will likely be forced to choose between educating their children and receiving full pay (if they can remain employed at all). State workers across all wage levels have access to this work flexibility now; lower wage workers in the private sector should as well.

Beyond the short-term need to address equal access to telecommuting options, the state should promote long-term telecommuting as part of its climate change agenda. Telecommuting can help the state achieve its greenhouse gas and air quality emission goals, across all workers but especially as the housing crisis has created a class of super-commuters who typically spend several hours in the car each day commuting to and from work hubs in Los Angeles and the Bay Area. This option also does not raise costs, which so far have disproportionately affected lower-income Californians.

While the transition to telecommuting has been developing naturally for the past two decades, COVID-19 has accelerated the transition and demonstrated its co-equal benefits for employment and the environment. The only barrier to fully realizing the benefits for Californians of all income level continues to be state law, policies and regulations.

**Key Observations**

**Even Before the Current Crisis, Workers were Choosing to Telecommute.** As a primary commute mode, working at home (telecommuting) grew 602% since 1980, doubling since 2000 alone. Telecommuting first passed public transit use in 2010, and has remained consistently above that mode since 2014. Even before the current crisis, telecommuting was on track to bypass carpooling by 2029, and in the present circumstances clearly already has done so. In 2018, 6.0% of workers in California worked at home as their primary commute mode (vs. 5.3% for the US).

**And Even More Workers Chose to Telecommute Part of the Time.** Federal data shows 19.5% of workers (28.1 million) nationally worked at home for pay at some point in the year, and 14.7% (21.3 million) worked exclusively from home ranging on schedules from less than once a month to 5 or more days a week. Those working exclusively from home did most frequently 1-2 days a week, but 8.1% of all workers worked from home at some frequency within a regular weekly schedule.

**In the Current Crisis, Likely Over 40% of Workers are Maintaining Household Income through Telecommuting.** Recently released federal data indicates that in June, 31% of US workers worked from home as a result of the COVID-19 crisis. Adding in those who telecommuted prior to the crisis, over 40% of the current workforce is now maintaining their jobs and household incomes through this employment arrangement.
**Federal Workers Already Telecommute.** Federal telecommuting policies stem from a 1994 directive from President Clinton ordering this option primarily to expand flexible family-friendly work arrangements. The policy was then expanded greatly under President Obama and became law in 2010. While the Trump Administration subsequently began rolling this policy back, 22% of the federal workforce teleworked at least some portion of their regular work week in 2018.

**State Workers Will Telecommute More.** In spite of its notable absence in the state air and climate change plans, telecommuting became formal state policy through legislation in 1990. In the recent Budget May Revise, Governor Newsom highlighted his intention to expand substantially teleworking by state employees as a means to reduce the amount workers drive, improve worker productivity and jobs satisfaction, reduce turnover, improve the delivery of state services, and reduce office space and energy use and thereby reduce the state’s carbon footprint.

**Post-COVID, 40% of All Workers in California Could Do Their Jobs Entirely at Home.** In the post-COVID economy, the issue will not so much be which jobs can be done from home as it was asked in the past. The question instead will be which workers will want to go back to an office.

California innovation made the current rapid shift to telecommuting possible, providing an economic lifeline here and in countries around the globe. Many jobs previously considered less amenable to this option are now being done at home. The transition was quick, and was greatly facilitated by changes in technology over the past two decades. In post-COVID California, much of this shift can be maintained; an estimated 40% of all wage and salary workers could do their jobs entirely from home. Weighted by wage, about 50% of all wage income could be earned entirely at home—a prime factor in the fact that California income tax withholding has been running at only 0.9% below the 2019 numbers even during the current crisis.

**The Potential Upside is Even Higher.** Continuing changes in technology and applications will make other occupations teleworkable as it expands into a standard work arrangement. The 40% estimate covers only wage and salary workers; the self-employed will be able to expand telecommuting as well as it becomes more of a working norm. The 40% estimate covers only occupations that can be done entirely at home; many others have at least a portion that can be done from home. Meetings, conferences, and contact with customers in the current crisis is now being replaced by phone and video conferencing, and can continue to reduce work related travel as telecommuting expands. The number of super commuters—those with one-way commutes of greater than 50 miles—grew from 10.7% of workers in 2002 to 15.2% in 2017. They will be more likely to telecommute, increasing the potential emissions benefits from a shift to telecommuting.

**Higher Wage Occupations Are More Likely to Telework.** In the past, workers with a higher educational attainment and a higher wage, knowledge-based occupation were more likely to telework. The same results are in the analysis of the 2019 job and wage data—70% of all higher wage (over $100,000 average annual wage) occupations could do their work entirely from home.

**But Three-Fourths of the Potential would Come from Lower- and Middle-Wage Workers.** Higher wage occupations are more amenable to telework, but there are fewer workers in these occupations overall. From the analysis of the 2019 data, higher wage workers represent only 26% of the total workers who could telecommute. Middle wage occupations ($50,000 to $100,000) comprise 39%, and lower wage occupations ($0 to $50,000) 35%. The economic and environmental potential in fact depends on employers being able to offer telecommuting to this lower wage group.
Achieving the Full Benefits from Telecommuting Depends on Giving Access to All Eligible Workers. There are few regulatory barriers to expanding telecommuting to the middle and high wage occupations. Some may become better addressed systematically as telecommuting expands, but these issues can and have been handled through employer policies. The lower wage occupations, however, in essence cover the non-exempt employees under the state’s wage and hour laws, that limit the flexibility required to extend telecommuting fully to these workers. The risk to employers is amplified under the Private Attorney General Act (PAGA), which opens up employers to substantial penalties for even minor or paperwork infractions. In most cases, changes to these laws themselves are not required. Instead, recognizing that in essence teleworkers become their own front-line supervisor for compliance with these rules, additional flexibility could be achieved by: (1) modifying the currently cumbersome notice and voting requirements to adopt flexible schedules for workers who choose to telecommute or (2) allowing employers/employees to adopt flexibility provisions that are already being used for state employees. These issues are particularly important due to the fact that as the minimum wage rises, so will the share of workers subject to these issues.

Telecommuting at This Level Furthers the State’s Climate Change & Air Quality Goals. As the foundation for the state’s climate change program, AB 32 gives the designated agencies broad authority to develop regulations to achieve “. . . the maximum technologically feasible and cost-effective GHG emissions reductions . . .” Efforts to date to reduce the amount Californians drive their cars and trucks contain only costs. After nearly 5 decades of repeated trying, there has been little or no effect on emissions, and in fact emissions from this source continue to grow. With a renewed reliance on land use strategies associated with SB 375 and SB 743 that cannot work given California’s jobs and development patterns and policies, the current program ensures that only more costs will be imposed especially on lower wage workers who are least able to afford them. Telecommuting at the levels above instead have the (scoping level) potential to reduce the amount Californians drive by up to 60.7 billion miles a year (17% of VMT) based on the 2019 numbers, and up to 66.5 billion miles by 2030. The associated GHG reductions range up to 24.1 MMTCO2e (10% of the cumulative gap remaining to reach the state’s 2030 goal) from the 2019 numbers, and up to 26.3 MMTCO2e by 2030. The potential emission benefits are even larger taking into account the upside factors listed above. And these benefits can be achieved at no cost to the public agencies or the public, but instead with substantial cost savings to workers who choose to telecommute.

Telecommuting at This Level Furthers Other Goals as Well. Additional household and state policies goals that can be furthered through sustained, expanded telework include: (1) Allows greater work/personal balance by returning an hour or more a day previously used for commutes and allows balancing of family demands that are especially critical as schools remain closed. (2) Expands dependent care options that instead have become limited as day care slots have shut down in the current crisis, and are likely to remain costly and in short supply as the recovery unfolds. (3) Fosters worker satisfaction by giving them more flexibility over their work process and schedules, resulting in higher productivity, creativity, lower job turnover, and overall job satisfaction. (4) Combats growing income inequality by allowing workers to realize higher effective incomes through immediate savings on commute costs, reducing or foregoing other costs for dependent care and other household needs, and expanding the options to find housing they can afford without having to resort to overcrowding. (5) Opens new economic development paths for lower income communities through a potential network of telecommute centers in these communities throughout the state, using them to accelerate introduction of telecommute jobs until workers can afford to
work out of their own homes, linking with Community Colleges for training in teleworkable occupations, and refocusing employer recruiting outside the coastal urban centers that accounted for the bulk of better-paying jobs growth over the prior decade. (6) Expands economic resiliency through a model that has maintained jobs and incomes for a large portion of the workforce even under the current crisis conditions. (7) Expands public health resiliency through a model that has reduced the spread of COVID-19 and the only strategy that has been deployed with economic benefits rather than substantial costs. (8) Expands fiscal resiliency through a model that has allowed state and local governments to retain a revenue base essential to the current crisis response and other essential public services. (9) Expands a model that will take other provisions in the climate change Scoping Plan that now exist as only modeling benefits and assist them in achieving the emissions reduction potential.
Telecommuting in California

The current public health crisis has seen a rapid and expansive embrace of telecommuting worldwide, and is now being used by an estimated over 40% of all current workers in California. While concentrated within certain occupational groups, telecommuting was quickly adopted in far more instances than previously considered possible, producing broadly distributed benefits whether measured by household income, industry, or demographics.

Telecommuting households have been able to maintain their incomes even during the worst economic crisis since the Great Depression, and in fact have increased their effective incomes through savings on the cost and time for commuting and other household expenses such as dependent care. Parents and other caregivers have secured the flexibility they need as schools have remained closed. Telecommuting has been key in meeting the public health goals through a demonstrable reduction in infection rates, and is the only public health measure that has done so while producing economic benefits rather than only economic costs. And telecommuting incomes have kept essential revenues flowing to state and local agencies at levels that would not have been possible if this type of shutdown had occurred even 20 years ago.

Telecommuting has instilled a high level of resiliency within the economy, public health response, and the public revenue base. Simply put, things are bad, but they would be far worse if not fully out of control without the rapid shift to telecommuting by both the public and private sectors.

An increasing number of employers—including the state—have already announced plans to make telecommuting an expanded and standard employment arrangement in the post-COVID economy. Workers having experienced the flexibility and income benefits from this arrangement by large majorities indicate they prefer to keep working under this mode and in fact would be willing to change jobs in order to telecommute in the future.

The conditions are there to make telecommuting more a standard feature of post-COVID California, retaining the resiliency that was achieved through crisis response, increasing worker job satisfaction and real incomes, and making California employers and government more efficient and competitive in the 21st Century economy. California innovation made the current rapid shift to telecommuting possible, providing an economic lifeline here and in countries around the globe. The state is poised to lead this workplace transformation in the forthcoming recovery period.

Telecommuting Before the Crisis: All Workers

Telecommuting—working at home—has expanded steadily as a worker choice. In the Census Bureau commuting data detailed in a later section, telecommuting grew by 602% between 1980 and 2018, doubling since 2000 alone. Telecommuting has consistently surpassed the number of commuters using public transit—the core focus of the state’s current transportation and environmental policies—since 2014. Workers have not turned to this option because the agencies have tried to mandate it. Workers have embraced this option because it is the only alternative that provides the flexibility they need for both their work and personal lives.
In the most recent 2019 results, the number of telecommuters rose to 1.2 million workers in California and 9.0 million for the US as a whole. The Census data, however, only covers those working at home as the primary commute option. Far more did so on a less regular basis.

The US Bureau of Labor Statistics (BLS) has conducted on ongoing series of surveys that provides more details on workers who use this option as their primary work situation along with workers who telecommute on a less frequent basis. The data is only available for the nation as a whole, with no separate tabulations on the state level.

The data covers only those who work for an employer for wages and salaries and does not include the self-employed. From the American Community Survey, 475,000 of California’s 2.2 million self-employed reported working at home in 2018.

Compared to the commuting data, the most recent results for 2017-18 show a much higher percentage of workers using telecommuting at some point during the work year. The commuting data from the American Community Survey indicates 6.0% of workers in California worked at home as their primary commute mode (vs. 5.3% for the US) in 2018. The BLS data instead shows 19.5% of workers (28.1 million) nationally worked at home for pay at some point in the year, and 14.7% (21.3 million) worked exclusively from home ranging on schedules from less than once a month to 5 or more days a week. The most frequent schedule (Figure 1) for those working exclusively from home was 1-2 days a week, but 8.1% of all workers worked from home at some frequency within a regular weekly schedule. Overall, 28.8% of all workers (41.6 million) had the ability to work from home, with some choosing not to exercise this option or doing so only infrequently.

Unless otherwise noted, the following is based on workers teleworking exclusively from their home at least one day a week:

- Women were somewhat more likely (8.5% of women workers) than men (7.7%) to telecommute.

- Latinos (4.1%) were less likely to telecommute than Asians (8.7%), Whites (8.3%), and African-Americans (7.2%). Note that in the BLS data, Latinos may be of any race, and each of the three race categories may be of any ethnicity, and there is some overlap in the numbers as a result.

- Telecommuting increases with educational attainment: BA or higher at 15.4%, Some College/AA degree at 5.9%, High School graduates at 2.8%, and less than a high school degree at less than 1.3%.

- Having a child under 18 present in the household was a clear motivation for working at home: no child present at 7.4%, parent with at least one child under 13 at 9.1%, and parent with children no younger than 13 to 17 at 11.4%.

- By class of worker, those in the non-profit sector (10.6%) were more likely to telecommute than private for-profit workers (8.2%), with state workers (9.8%) also somewhat higher.
• Other than mining, quarrying, and oil and gas extraction where the results were not statistically valid, all industries reported some level of telecommuting (Figure 2). Extraction, production, and services jobs more often requiring a physical presence had lower rates, while Financial Activities, Information, and Professional & Business Services indicated telecommuting at nearly a third of their workforce. Note that due to data issues, this figure contains the results for all workers regardless of whether they worked a regular weekly schedule at home or more infrequently.

• Consequently, wage levels also showed substantial differences, with workers at the 25\textsuperscript{th} percentile earnings or lower at under 4\%, 25\textsuperscript{th} to 50\textsuperscript{th} percentile at 4.6\%, 50\textsuperscript{th} to 75\textsuperscript{th} percentile at 7.9\%, and the highest wage earners at 18.3\%.

When asked to state the main reason for working at home (Figure 3), nearly half at 46.3\% indicated it was a personal preference or due to a need to coordinate work with personal and family needs. Only 9.3\% cited a transportation-related reason, namely the desire to reduce the cost and time of their commute. These results are for all workers who telecommuted at some point in the year rather than just those who did on a regular weekly schedule. But they indicate the main reasons for the rapid rise in working from home are because this option conforms to the conditions workers face. It is the result of workers on their own finding accommodation between the needs of their work and personal lives. Not the result of agencies seeking to define it by attempting to force behavior change through regulation and increasing the costs of commuting by single occupant vehicle (SOV).

**Telecommuting Before the Crisis: Federal Workers**

While the American Community Survey and BLS data provide information on telecommuting as it has evolved through worker choice, data on Federal workers provides lessons on deliberate policies to promote this work option.

Telecommuting as a formal policy within federal workplaces began at least in 1994 with a directive from President Clinton to the agencies to create a “family-friendly workplace” through:

\begin{quote}
... expansion of flexible family-friendly work arrangements, including: job sharing; career part-time employment; alternative work schedules; telecommuting and satellite work locations. \end{quote}

Legislative requirements began with the Transportation and Related Agencies Appropriations Act of 2001 (PL 106-346) formally establishing telecommuting for federal employees in law.

The Obama Administration placed an increased emphasis on telecommuting, including through passage of the Telework Enhancement Act of 2010 which expanded the policy and required annual reports on the issue. While previously languishing without action in Congress, impetus for this legislation came from crisis conditions, in this case the “Snowmageddon” that shut down federal agencies for 4 days in February 2010.

Prior to the current crisis, the Trump Administration, however, had been scaling the program back:

\begin{quote}
The federal government, though, is calling its employees back to the office. \end{quote}
After a big push toward telecommuting in the Obama administration, President Trump’s government is scaling it back at multiple agencies on the theory that a fanny in the seat prevents the kind of slacking off that can happen when no one’s watching.

The about-face began at the Agriculture Department in 2018, after Secretary Sonny Perdue was angry to discover that an employee he needed to meet with was working from home, according to three administration officials. In response, he slashed by half a robust program used by tens of thousands of employees.3

The annual data on this program provides useful information on how a more broadly applied telecommuting policy could work in practice:4

- The policies apply to a substantial portion of the workforce. In 2018, 42% of federal employees were eligible for telework.

- The share of workers participating in this option has grown steadily from 29% of eligible workers in 2012 to 51% in 2018. The share of all employees participating in telecommuting has leveled off in the last three years to about 22% of the total federal workforce.

- 34% of participating workers routinely telecommute for 3 or more days a week; 26% do so for 1-2 days.

As indicated, not all workers who could chose to telecommute under the conditions existing prior to the current crisis, but a great many did so even if for only a portion of the week. Contact within the workplace appears to still have been a priority. These results, however, still are for a pre-COVID world. Outcomes are likely to vary in the years ahead as telecommuting becomes more the norm.

Telecommuting During the Crisis

In the current public health crisis, telecommuting has been one of the primary strategies to keep as many workers employed as possible, businesses operating, and the flow of revenues to critical public services largely sustained even in the face of a continuing cycle of business closures, openings, and reclosings along with the other social distancing directives. In the most recent results,5 total state personal income tax withholding since the shutdowns began in March was 2.4% above the comparable period in 2019. Because the state tax has such a steeply progressive rate structure, these results are a clear indication that the workers earning the higher wages subject to tax have been substantially less affected by the current public health measures, and by and large this outcome is the result of a massive shift to telecommuting. During the trough of the prior recession in 2009 when layoffs more strongly affected all wage levels and when telecommuting was not an option given the widespread effects of that downturn, weekly withholding was instead running from 5% to close to 10% below the prior year. Telecommuting has been one of the few if not the only elements providing resiliency to household incomes, jobs, and public revenues. Telecommuting has helped ensure state government has had the resources it needs to cope with the crisis.

Telecommuting also has contributed heavily to current efforts to slow the spread of the COVID-19 virus. In a major study of such prevention measures in six countries,6 the US results indicate
working from home had nearly the same effect (reduced the infection daily growth rate by 4.59%) as did the expansive business closures (reduced by 5.35%) but without the attendant economic effects.

Recent data demonstrates the extent to how far telecommuting has expanded, allowing a number of workers to maintain their jobs and household incomes by working at home and thereby ensure that the substantial economic and public revenue impacts have not grown more than they have. Beginning in May, the US Bureau of Labor Statistics and Census Bureau included a new question on this issue in the monthly Current Population Survey. The data was recently published for the US; the public use microdata that would allow estimates for California is not yet available. From the national results for June:

- In June, the share of workers who telecommute because of the current pandemic (31%) was down somewhat from May (35%) as businesses in many states reopened. Because the survey is done each month during the week containing the 12th, these reopenings included California. These numbers do not include persons who were already telecommuting prior to the current crisis, as detailed above. Incorporating the crisis-driven numbers with the number of workers who already telecommuted in the prior period, telecommuting likely now covers over 40% of the total workforce—an indication of its future potential as a standard work arrangement for a broader range of workers.

- Women (36% of all women workers) were more likely to telecommute than men (27%), and made up 54% of all teleworkers in June.

- Asians were the most likely to telecommute (48% of all Asian workers), followed by Whites (31%), African-Americans (26%), and Latinos (21%).

- Educational attainment (age 25 and older) and Occupation were core factors behind this pattern. Telecommuting was used by workers with an advanced degree at 63% of all workers at this level, BA at 48%, some college or AA at 22%, High School graduates at 13%, and less than high school at 5%. By Occupation, 74% of all teleworkers were in management, professional, and related occupations, followed by 20% in sales and office occupations.

- Telecommuting was also affected by which industries were able to stay in business. The rate was high in industries that were able to keep operating—Educational Services (private schools that quickly shifted to remote learning) at 66%, Professional & Technical Services at 60%—while much lower for those who largely had to shut their doors—Accommodation & Food Services at 7%. Still all industries showed some level in the current crisis.

- Government workers were more likely to telecommute (50% of all government workers) than private wage and salary workers (29%) and self-employed (23%).

Other data also demonstrates that telecommuting has saved jobs and household incomes. In an analysis of the April 2020 labor force data, workers nationwide in occupations not able to telecommute saw a 21.2% drop in employment between February and April and a 14.3 percentage point rise in their unemployment rate. Occupations able to telecommute still saw layoffs but at
much lower rates—a 7.7% drop in employment and only a 6.2 percentage point rise in their unemployment rate.
Telecommuting Potential in Post-COVID California

Telecommuting is expected to expand in the post-COVID economy. Early results from the Survey of Business Expectations in mid-May indicate that nationwide employers were poised to triple the number of workers able to telework, going from 5.5% of all working days pre-COVID to 16.6% after the current crisis has eased.

Even prior to the current crisis, workers professed a strong preference for work flexibility. Gallup surveys on benefits and perks indicated that 51% of employees would switch to a job that allows them flexible schedules, and 37% would switch to a job that allows them to work remotely at least part of the time. More recent Gallup polling indicates that the share of employed adults working from home due to concerns over COVID rose from 31% in mid-March at the beginning of the crisis to 63% by the end of April.

Rapid expansion under crisis conditions indicates telecommuting has considerable potential to expand further as a standard employment option. Many jobs previously considered less amenable to this work arrangement are now being done at home. The transition was quick, and was greatly facilitated by changes in technology and its availability over the past two decades, much of which was developed in this state.

Not all jobs are amenable to telework. Those requiring face-to-face customer contact such as in food service and portions of health care and those requiring the specific use of equipment or resources such as in manufacturing, lab, or other production jobs typically have to be done at the place of work.

This division is not static. As technology has changed the nature of some work, occupations previously not considered as telecommuting candidates have now become part of the potential universe. Teachers are a clear example in the current environment. Previously tagged as tied to a classroom setting in prior studies, the experience of the current crisis has caused a complete shift in the possibilities. Technology has already altered many jobs to where they are now telecommuting candidates. Future changes will continue to shift this picture as well.

In addition, components of jobs are capable of being done at home even if the job overall is linked to a specific place. Administrative and other paperwork duties do not have to be done at work. They can be done anywhere with access to a computer and the internet.

The definition of “telework” can also differ. One of the few instances of trying to incorporate this measure into a regulation by the South Coast Air Quality Management District became bogged down in part on this issue. In general, however, telecommuting categories often break down into how often it is done (one to five days a week or on an irregular schedule), when it can be done (a regular 9 to 5 schedule or flexible hours to accommodate other personal and family demands), and whether it is done out of home or at some nearby center with desk space, internet access, and other basic support services established specifically for this purpose.
Estimates of how many jobs can shift to this employment option consequently have changed over time. These estimates are also highly sensitive to underlying judgments by the researchers on what can and cannot be done remotely as well as expectations over future occupational trends.

One of the most recent and detailed analyses of the telecommuting potential estimates up to 37% of all jobs in the US can be performed entirely at home. Weighted by wage, the number is higher at 46% of all US wages. While this difference reflects that higher wage jobs in general are more amenable to telework, it is also a key outcome that emphasizes how critical telecommuting has been to preventing public revenues—especially state revenues and their outsized reliance on personal income tax—from sinking more dramatically under the current circumstances.

In subsequent calculations accessible through Github, the comparable figures for California are similar to but somewhat higher than the national results at 38% of all jobs and 50% when weighted by wage.

Also as accessible through Github, telecommuting potential differs substantially across industries (US data in Figure 4). With the exception of the highest potential lying in Educational Services, this distribution largely reflects the pattern of pre-COVID working at home as shown in the BLS data.

The potential also varies across regions in the state (California MSAs in Figure 5) but to a far lesser degree. Most MSAs have a potential around 30% (unweighted jobs), while traffic-heavy Los Angeles, San Diego, Sacramento, and San Francisco-Oakland are higher at around 40%, leading up to San Jose at just over 50%. Telecommuting viewed as an air quality measure consequently has the potential to do the most good largely where it is needed the most.

But while the telecommuting potential is generally associated more with the higher wage industries, the wage distribution among occupations is different. Using the Dingel-Neiman results applied to the California occupational data (May 2019) produces the results in Figure 6. In this exercise, occupations are categorized within three wage levels:

- **Lower wage occupations** are those earning less than the highest wage generally subject to the state’s overtime rules for non-exempt workers in accordance with Industrial Welfare Commission Order 14. Generally under this administrative exemption, nonexempt employees are those working at wage rates of up to twice the state minimum wage, which in 2019 was $12 an hour for employers having more than 25 employees. Using this higher employer rate and Order 14 provisions covers most of the occupations that are amenable to telecommuting at these wage levels. The resulting income band is for occupations earning an average of up to just under $50,000 a year gross in 2019.

- **Middle wage occupations** are those earning an average of $50,000 to $100,000 a year gross. For context, the average wage in the occupational data for California is $61,290.

- **Higher wage occupations** are those earning an average of over $100,000 a year gross.
Note that the total results from these calculations are slightly higher for the state as a whole (41% vs. 38% as stated above) due to using the results rather than the source code, but any resulting differences across the distributions are small.

As indicated in the results, higher wage occupations have a higher potential for shifting to telework—70% compared to 56% for middle wage jobs and 26% for the lower wage jobs. However, there are far fewer jobs at this wage level. Applying the Dingel-Neiman results to the California occupational employment numbers shows the potential telecommute expansion from lower wage jobs (35% of jobs that can be done entirely from home) is nearly as great as the potential coming from middle wage jobs (39%). While the higher wage jobs as a whole are typically more amenable to telework, their actual potential covers only 26% of the total. The fact that far fewer workers at the lower wage levels have telecommuted in the past has more to do with regulations as any other factor, as will be discussed further below.

It is important to recognize that these results are lower range estimates of the full telecommuting potential in the state. The results cover only occupations that can be done entirely at home. They do not incorporate jobs where a portion can be done at home—the BLS and the federal agency data showed few of those working at home prior to the current crisis did so regularly 5 days a week. In addition, the results only cover wage and salary employees. The major classification not covered in these numbers is the self-employed, many but not all of whom already work at home at least a portion of the time.
Telecommuting Co-Benefits

The immediate benefits of telecommuting, and consequently its sustained rise over the past four decades as technology has made more telework feasible, accrue immediately to the workers who chose this work alternative. Workers get more flexibility in their lives and the ability to balance work and family demands. This flexibility is greatly enhanced by getting an hour and in increasing cases more than one hour back in each day to use as they see fit. Costs of living fall, directly in the case of commute costs and additionally through flexibility in dependent care and other expenses. Most workers also report increased productivity because of fewer workday interruptions, and most report greater job satisfaction because their time is now to a greater extent their own. A sustained shift of a large portion of the workforce to telecommuting has additional benefits in other areas as well.

Allows Greater Work/Personal Balance

The BLS data indicates that prior to the crisis, nearly half of workers said they turned to telecommuting to accommodate other personal or family needs. While the state policies specifically require state workers to arrange for other dependent care during telecommuting hours, telecommuting has become critical to many households—especially single parent and two working parent households—as the schools remain closed. The ability of many telecommuting situations to accommodate—or more appropriately, juggle—work and dependent care responsibilities in particular under a flexible hours schedule is precisely the reason why many households were turning to this option in the first place before the current crisis.

Expands Dependent Care Options

This aspect will become even more important in the post-COVID recovery. Schools are uncertain about when and how they will reopen. Nationally, recent studies have indicated that many childcare providers already have been forced to permanently close, with a potential permanent loss expected of as many as 4.5 million childcare slots, 420,000 alone in California. Even prior to the current crisis, the cost and availability of child care was a growing crisis. Caseload and consequently costs were rising under state-funded programs. As their own costs continued to grow, total employment in private Child Day Care Services was only up 2.4% in 2019 to 77,500. By June of this year, it had plunged to 50,400. In San Francisco, 40% of the providers had closed by July, and the remaining were operating at less than half capacity due to social distancing requirements. Telework, particularly if expanded to the lower wage occupations, provides an immediate, no-cost solution to many workers to what was already becoming an impending crisis. The solution is not found solely in massive federal bailouts or large increases in state spending. Much of this issue can be handled by increasing workplace and household flexibility through telework.

Fosters Worker Satisfaction

Desks in US offices already are empty an average of 40 – 50% of the time as workers spend the rest of their days in conference rooms, client offices, snack and lunch spots, in airports, in their cars, and even at home as they check up on emails. Most workers consequently already spend a great portion
of their time engaged in screen connections, both at their desks and in these other venues. Telecommuters generally achieve greater control over their schedules and work process and products. As a result, those choosing this option also generally report higher productivity, creativity, lower job turnover, and overall job satisfaction.

**Combats Growing Income Inequality**

If expanded to its potential among the lower wage occupations, telecommuting provides an immediate counter-push to income inequality and the growing costs of living in the state. Telecommuting provides an immediate boost in real household incomes: (1) eliminates or reduces commuting costs, (2) allows households to reduce or forego other costs through flexibility applied to dependent care and other household needs, and (3) enables these households to consider a greater range of housing they can afford. In the pre-COVID circumstances, lower wage and increasingly middle wage households were faced with two equally costly choices: (1) increase their commute and consequently the percentage of their income spent on commuting, or (2) share housing with other family and friends. As a consequence, California commutes have grown, and the state continues to have the highest overcrowding rate in the country—at 8.3% of households in 2019 compared to the US average of only 2.8%. The regulatory flexibility required to expand telecommuting to the lower wage occupations has the potential to produce the highest income effects.

A key driver of income inequality in the state, however, was the pattern of jobs development in the state following the recession in 2008. Many traditional, higher income blue collar jobs such as in manufacturing were permanently lost. Higher wage jobs overall, in particular in the information and tech industries, were concentrated to a very high extent in the Bay Area and to a lesser degree in the other coastal urban centers. Large swaths of the state—including Los Angeles County and many inland regions—instead expanded jobs in the lower wage, population-serving services such as retail, food service, and other services and in tourism related employment.

In the years prior to this crisis, wage and consequently income growth lagged in those regions, especially for workers having to contend with the ceaseless rise in living costs for housing, energy, transportation, and other necessities driven by the state’s policies. In the current crisis, this jobs development pattern also means those regions are among some of the hardest hit economically in the state and in the country because these are the jobs that cannot telework.

The consequences are now being seen in the labor force data. In June 2020, Los Angeles-Long Beach-Anaheim MSA had the 9th worst unemployment rate among the 389 MSAs in the country. Only one other area in California—Imperial County with perennially one of the worst rates in the country—made the Worst 10 list that month. By September 2020, Los Angeles had sunk to the 6th worst.

**Opens New Economic Development Paths for Lower Income Communities**

Telecommuting offers another path from the two-tier jobs structure experienced over the last several years. Telecommuting can be anywhere. It doesn’t have to be done in the Bay Area where job growth over the past decade was largely concentrated, and where lower wage occupations were put at a disadvantage by housing they cannot afford and commutes that required driving for an hour.
or more. Adding flexibility to the regulations to expand telecommuting more widely among non-exempt occupations can also expand the geographic distribution of jobs growth more widely.

Economic development proposals for long-overlooked regions of the state, in particular the Central Valley, have a history as long or longer as the one discussed later for the traffic-related regulations championed by the state. They also have a record of unachieved expectations that is close to being the same. Telecommuting offers an opportunity to bring jobs to where workers live. Under SB 375, substantial public funds are being spent on studies, planning, and travel options that have little hope of producing change or any measurable benefit. Current trends in vehicle use will not change. Any promise of jobs will end once the studies are done and the bike and walking paths are built.

These funds instead would have far larger results—to environmental goals and to jobs and to low income communities—if a substantial portion was reallocated to create telecommuting centers in those communities. Use of centers accelerates the introduction of telecommuting into lower income communities, and allows them to grow their incomes to the point workers can telecommute out of their homes. Use of this approach also allows centers to be linked with the Community Colleges as a training conduit—including through remote learning—for skills required for the teleworkable occupations. Such centers can also provide a focus for recruiting by California’s employers.

**Expands Economic Resiliency**

Diversification manages risk, and this point is clearly defined in the ability of California as with other states to stem the economic damage to the extent they have from the current cycle of closures and other social distancing measures. In particular due to its overreliance on personal income tax revenues, California just closed out its fiscal year with an initial $1 billion above previous estimates. Telecommuting kept state revenues from dropping even lower because the workers that pay state income tax continued earning income through telework. These are public funds required to maintain essential public services. The more workers can be kept working during a crisis through telework, the less that has to be spent on income supports and—when short-term unemployment turns into long-term decay of skills and earning power—retraining in later years in the hopes of restoring better paying jobs. The current crisis is notable for being the deepest, but it is not the only crisis the state has faced. Job and household disruptions can and have come from fires, earthquakes, floods, and other disasters throughout California’s history. Resiliency through telecommuting can help ensure the state has more tools to manage the consequences of these risks in the future.

**Expands Health Resiliency**

The emerging public health research indicates use of public transit was a primary vector for the spread of the COVID-19 virus. Workers locked into a single transit mode as they would have been in the transit-dependent vision the agencies have pushed for the state present few options during any future health or natural emergency. Telecommuting provides resiliency in how workers and families are able to cope with a crisis and maintains the resources they need to do so.

**Expands Fiscal Resiliency**

In the current crisis, telecommuting has kept government revenues from dropping further than they have, ensuring a continuing flow of funds for dealing with the crisis and other essential services.
And as high as workload has spiked in the various assistance programs, keeping workers employed has stemmed the extent to which these costs can rise. Expanding the telecommuting users expands the sustainable portion of the public revenue base.

Moreover, as detailed in the later sections, telecommuting has actual, quantifiable results to the state’s transportation, air quality, and climate change goals. The billions now spent on other regulations and programs have no comparable results to show. In a cost effectiveness sense, they are all costs with no effectiveness to show for them. Telecommuting instead offers substantial progress towards these goals at no cost to public agencies or the public, but with cost savings to the workers who use it.

### Reduces Road & Other Maintenance Costs

Telecommuting capable of reaching the levels estimated in the previous sections will have an effect on funds available for roads as workers use less taxable fuel for commuting. Funding for public transit operations provided through the diesel fuel tax will not be affected, but some level of reduction in the SB 1 rates allocated to capital improvements will decline. Counterbalancing this effect, overall road use could decline by up to 17% or more, substantially lengthening the cycle for routine maintenance, reducing the need for major maintenance, and overall reducing congestion—by less frequent traffic disruption for maintenance and reduced traffic overall—to a degree never achieved by any other measure. All these effects would be magnified by the fact that travel reductions from telecommuting reduce traffic during what are now peak traffic hours.

### Promotes Other Climate Change Program Goals

The success of both the state air quality and climate change programs are heavily dependent on consumer acceptance of electric or other zero emission vehicles (ZEVs). Progress in meeting the state’s ZEV goals, however, has lagged, with what progress that has been achieved not coming from a broad change of the vehicle market but instead largely from the production of a single company—Tesla. Commuting is the longest daily trip for almost all households. Consequently, many ZEV owners use that vehicle for secondary trips, and rely on combustion vehicles for commutes due to lingering concerns over range, potential delays that drain batteries, and access to recharging facilities. These concerns are likely to remain a factor in the coming years as consumers become more risk-adverse in their purchases as a result of their experiences during the current crisis. In April, ZEV sales crashed 27% in China and gasoline-vehicle sales rose 6% as consumers prized experience and certainty even over mandates pushing them to buy another way. These concerns are less likely, however, if ZEVs are used for secondary trips—the potential “rebound” trips that lead some researchers to discount the potential benefits from telecommuting. In any event, the extent to which these “rebound” trips are done with a secondary, ZEV vehicle, the potential for use of these vehicles expands and does so in a way that improves the potential emissions effects coming from telecommuting. This use level is already assumed in the state air and climate change plans. Telecommuting helps make it go from a modeling assumption to more of a reality.
Barriers to Telecommuting

The current circumstances are a forced experiment in how quickly and how expansive telecommuting can be applied to the economy. The core difference under the current circumstances is the changing nature of work that has made more occupations potential candidates for telecommuting, along with technology and applications such as teleconferencing that allowed that potential to be quickly realized.

There are relatively few barriers to expansion of telecommuting among the middle and higher wage occupations. While there are issues that have to be addressed by employers, many workers at these wage levels were already moving to telecommuting in the pre-COVID economy. The weekly personal income tax withholding trends and recent federal data indicate they have embraced it to a far greater extent under the current crisis.

Most of the following issues—which apply to all wage levels—are those that have to be addressed in employer telecommuting policies, but they can be and have been addressed under existing government rules. Broader expansion of telecommuting as a more prevalent work arrangement may however raise the need to address them more on a systematic basis. These issues include:

- **Workplace Liability.** Potential employer liability issues may arise due to unsafe work conditions within the home workspace or injuries that occur while moving around the house or using vehicles during the telecommuting hours. Home injuries may also become subject to Workers Compensation claims.

- **ADA and Other Workplace Standards.** Related to the above, the home as a workplace may become subject to these provisions as well.

- **Equipment.** Most but not all teleworkers do so through their own computers, printers, desks, and other office equipment, supplies, and furniture. Expanded telecommuting may raise the issue of these items as a reimbursable expense along with potential employer liabilities associated with their use and issues arising in case of damage, theft, maintenance and repair, and return of employer property as a result of separations.

- **Workplace Utilities.** Teleworkers generally continue to be responsible for electricity, heating and cooling, and internet access during telecommuting hours. These generally are the normal costs of being within a home, but as with the previous item carry the potential of disputes over reimbursable expenses as telecommuting expands. Any such costs as with those under the previous item, however, are more than balanced by the substantial savings from foregone commutes and personal valuation of the time saved and used for other personal purposes.

- **Information Security.** Telecommuting employers require that workplace materials and products remain the property of the employer along with confidentiality provisions related to use of trade secret or other proprietary information. Telecommuting agreements
generally lay out procedures for ensuring this treatment, but issues are raised when physical
documents or other items have to be transported to and from worker homes. Issues are
further complicated by the growing proliferation of state and federal privacy requirements
that are more amenable to compliance monitoring in a central workplace and less so in a
dispersed work structure, but generally are handled through standard procedures and
software controls on access to the relevant information.

• **Zoning.** Local zoning or other ordinances may restrict certain telecommuting activities or
require a permit or license for persons working from home. Responsibility for these
provisions has to be clearly delineated.

The issues become more complicated when dealing with non-exempt workers, which in California
are generally although not completely determined as workers earning up to two times the applicable
minimum wage. The issues primarily relate to California’s differing wage and hour laws for this class
of workers, but just as critically the substantial financial risks California employers face for even
minor or paper infractions of these rules. Rule compliance is more amenable to a central workplace
setting, and becomes diffused and less assured when in essence a telecommuter becomes their own
front-line supervisor for these purposes.

• The general federal standard as in almost all other states is that overtime is paid after
working 40 hours in a week. California is one of only 3 states—along with Alaska and
Nevada—where overtime must be paid after 8 hours of work in a day. For workers at
home, the 40-hour standard is more easily monitored pursuant to agreed flexible work
schedules. In California, the monitoring obligations along with the risk of violations become
a daily issue.

• Compounding this first issue, a general rule under the federal Fair Labor Standards Act is
that non-exempt employees must be paid for all hours worked even for work that is not
requested by the employer. This activity is easily monitored in a central workplace. In a
telecommuting situation, employers may become liable if a teleworker chooses to check
business emails, finish a document, catch up on work-related reading, or otherwise conduct
an activity after normal telecommuting hours that could be deemed related to their work,
and this risk becomes much higher under an 8-hour rule. As an example, US Department of
Labor in 2015 proposed to expand the wage range subject to overtime closer to California’s,
making many salaried white-collar workers subject to overtime as well. Many firms reacted
by restricting access to emails and other business systems for these workers outside of
normal working hours in order to ensure that they would not become inadvertently liable for
overtime and any associated penalties. A similar response in the case of telecommuting
would severely reduce its flexibility potential for these workers. And as in many other
instances, California’s rules for “hours worked” are stricter than the federal standards.

• Other provisions of California labor law are unique to the state including timing and other
specifications for meal and rest periods, requirements for final pay, and sick leave. Not all of
these are directly transferable to a telecommuting situation with the employee in essence
becoming their own front-line supervisor.
• In general, non-exempt employees working from home more than 50% of the time are considered to have their home as their primary office location. Employers consequently are required to pay for any hours spent going back and forth between from their homes to the employer’s location when not working at home. This issue, however, can generally be handled by scheduling in order to manage any resulting effects.

• An overriding consideration in California is the potential and substantial financial risks to an employer under the Private Attorney General Act (PAGA). The bounty hunter provisions of this statute put employers at risk for substantial and ongoing damages even when wage and hour violations are minor or unintentional. These risks combined with an increased potential of accidental or otherwise inadvertent infractions of California’s expanding rules have limited the extent to which telecommuting has been extended to the lower wage occupations in the past. Intentional violations should be prosecuted, but as it has operated in the past, PAGA can restrict the ability of the state and workers at all wage levels to secure the full economic and, as discussed later, environmental potential of teleworking going forward.

From the estimates above, these regulatory issues could limit expansion of telecommuting for up to 35% of the telework-eligible workers in the state based on the 2019 factors. However, the state minimum wage is set to grow in the coming years, and an increasing share of workers will be subject to these limits, reducing the number of workers able to increase their flexibility and real incomes through telecommuting and reducing the economic and environmental benefits that can be achieved through this policy.

If the 2019 occupation numbers are instead evaluated based on a cut-off point of $30 an hour ($15 minimum wage), the share of potential teleworkers represented by non-exempt workers jumps from 35% to 40%. With the $15 set to continue rising in subsequent years by being indexed to inflation, the minimum wage laws will automatically continue to shrink the potential of telecommuting unless flexibility is applied to ensure expansion of this option to these wage levels as well.

Except for reforms to PAGA, changes to these underlying statutes are not needed to provide the necessary flexibility in every case. Laws written for 20th Century working conditions likely at some point should be reviewed and revised to reflect an economy where telecommuting is far more prevalent. But in the current circumstances, flexibility in many cases can instead be provided by eliminating the currently cumbersome notice and voting requirements and allow individual agreements under a defined telecommuting policy. State employees currently have this flexibility; private sector workers should as well.

Flexibility provisions for telecommuting agreements could be specified in statute, or alternatively, private employers should be permitted to apply for telecommuting purposes any flexibility provisions adopted by the state agencies for their employees. In this way, workers not choosing to telecommute will still be subject to the state’s current wage and hour rules. Workers instead choosing the telecommuting option will have flexibility as already approved for state workers, but will receive substantial compensation in return in the form of significant time and cost reductions from commuting, cost savings from dependent care and other household expenses, and greater flexibility for personal and family needs.
Telecommuting in State Policy

Promotion of telecommuting has been formal state policy since 1990. As stated by the Department of General Services:

Appropriately planned and managed, telecommuting is a viable work option that can benefit managers, employees, and customers of the state of California. Telework, which is called "telecommuting" in statute, is an important means by which the state can help reduce air pollution, traffic and parking congestion, and demand for office space.

... It is the policy of the state of California to encourage the use of teleworking as a management work option. Chapter 1389 Statutes of 1990 (AB 2963 – Klehs), adding Sections 14200-14203 to the California Government Code, authorized state agencies, boards, and commissions (agencies) to establish telecommuting programs as an element of transportation management programs. As practiced today, appropriately planned and managed telecommuting is a viable work option that can benefit managers, employees, and customers of the state of California.

Amendments to AB 2963 to strengthen telecommuting by state workers (Chapter 1209, Statutes of 1994) further adopted findings to indicate that this action was being taken specifically as an environmental measure (reduce traffic congestion) that achieves air quality benefits, cost savings to workers, increased worker productivity, and a means to provide workers with greater flexibility in their personal lives. In Government Code 14200.1:

(a) The Legislature finds and declares the following:

(1) Telecommuting can be an important means to reduce air pollution and traffic congestion and to reduce the high costs of highway commuting.

(2) Telecommuting stimulates employee productivity while giving workers more flexibility and control over their lives.

(b) It is the intent of the Legislature to encourage state agencies to adopt policies that encourage telecommuting by state employees.

In the current crisis, after an initial reluctance by the agencies to do so on their own, rapid expansion of state worker telecommuting through actions by the Administration enabled the public agencies to maintain public services and ensure continued income for public workers. Governor Newsom has already indicated he intends to build off this experience and make telecommuting more broadly available to state workers in the post-COVID period. As highlighted in his May Revise announcement:

The COVID-19 pandemic has required an unprecedented shift to telecommuting for state government that has allowed state managers, led by the Government Operations Agency, to rethink their business processes. This transformation will result in expanded long-term telecommuting strategies, reconfigured office space, reduced leased space, and flexible work schedules for employees when possible. The Administration also continues working with
state departments in delivering more government services online – including expansion of the Department of Motor Vehicles’ virtual office visits pilot to other departments and agencies with more face-to-face interactions with Californians.23

In addition to provisions such as a proposed hold on the Natural Resources Agency moving into its new building until an evaluation of telecommuting opportunities is completed, the May Revise also proposed a far broader consideration of telecommuting for state employees in an effort to reduce the state’s carbon footprint:

Transforming state government will include lessons learned from the state’s real time experiment with a statewide telecommuting program. The state’s response has shown that teleworking on a large scale is possible, and the ability to optimize a telecommuting approach can reduce the state's carbon footprint and leased office space, while increasing the state's digital presence for the benefit of both California's employees and the people they serve.

. . . Increased telecommuting could reduce statewide absenteeism, increase employee retention, promote inclusion, and move the state toward being an “employer of choice.” Telecommuting is also environmentally favorable, as it reduces vehicle miles traveled and improves air quality.24

One approach to how the barriers discussed above can be addressed is contained in the established state policies regarding telework. Through Department of General Services, the state in conjunction with the bargaining units has developed a model telecommuting program for modification if required and adoption by the individual agencies. The model applies to both home-based and telecenter-based options, and allows workers at their option if eligible to telecommute on either a temporary/episodic or regular basis. The model telecommuting agreement is included in the Appendix: Model State Telecommuting Agreement. Various provisions addressing the issues above for state workers include:

- State workers already have access to flexible work schedules that minimize the potential issues between exempt and non-exempt workers.

- Telecommuting hours are specified in the agreement, and the teleworker is required to work or otherwise be available by phone in those hours.

- Under normal conditions, teleworkers are expected to work in their main office at least one day a week for worker continuity purposes, unless otherwise specified in the agreement.

- Teleworkers are not to use this option for dependent care purposes. Teleworkers are required to make dependent care arrangements for the telecommuting hours.

- Office supplies are provided by the state. All purchases including any for equipment as below are to conform to state procurement requirements.

- Equipment may be provided by the state or by the worker, at the determination of the state. A teleworker agrees that any equipment provided by the state is to be used solely for work purposes. They are responsible for maintenance and repair of their own equipment, and for
keeping state-provided equipment in a safe and working manner. Repair or replacement of state equipment is to be done through the standard procurement procedures.

- The state covers any expenses identified in individual agreements, and may approve expense claims for home dedicated voice or data lines and other expenses at the supervisor’s discretion. Utility costs and commute costs to the main office on non-telecommute days are not eligible for reimbursement.

- Teleworkers are required to complete various checklists (office safety, ergonomic standards) and agree to maintain a safe work environment in accordance with these requirements. Teleworkers consequently self-certify to various workplace rules. Workers’ compensation applies during the telecommuting hours, but is subject to these self-certifications.

- Teleworkers agree to abide by specified information security requirements, and ensure any equipment connecting to state systems conforms to the state IT standards.
Telecommuting & the Environmental Goals

Current Regulatory Focus: Reduce How Much People Drive

The air quality programs have long focused on measures to reduce vehicle miles traveled (VMT). As stationary sources such as factories and power plants were subject to stricter controls, mobile sources including most notably passenger cars and trucks became a larger component of the overall emissions inventory subject to regulation. And even though vehicles have become far cleaner since the air programs began in this state in the 1950s, the growing number of vehicles and the amount they are driven have countered these gains.

The same trends are seen in the state’s Climate Change program. While this program and the air quality programs both rely heavily on the eventual transformation of the state’s fleet to zero emission vehicles, progress has been slow, and Californians continue to drive further as their commutes lengthen and as they have been forced to expand their search for housing they can afford. As shown in Figure 7, both total and transportation GHG emissions dropped rapidly as the economy contracted during the previous recession that began in early 2008. Total emissions have since continued to decline except in the most recent results for 2018, but transportation in particular passenger vehicle emissions have grown. Passenger vehicle emissions were 26.6% of the total inventory in 2000, 28.3% in 2019, and remain on course to continue growing in the coming years.

Traffic reduction measures adopted in the 1970s and 1980s were—as they are today—regulation and fee measures intended to get people out of their cars. These included attempts such as indirect source regulation that sought to make large destination-developments such as shopping malls and office parks responsible for mitigation of emissions associated with the related traffic. Other regulations covered a series of measures similar to the current efforts such as expanded public transit, parking management, congestion pricing, carpooling, bike use, and walking incentives that were largely begun in California and subsequently grouped together under the label transportation control measures (TCMs) in the Clean Air Act along with conformity provisions requiring consistency between the air quality and regional transportation plans. This rules-based approach was carried to an extreme in the 1994 Federal Implementation Plan proposed but quickly withdrawn by US Environmental Protection Agency, with measures that went beyond trying to influence motorist behavior to directly controlling it including proposed no-drive days for motorists in the Sacramento region and provisions that would have limited out-of-state trucks to only one stop within the affected areas of California.

In addition to trying to reduce emissions directly by reducing the number of vehicles doing the emitting, many of the traffic measures adopted during this period were also pursued largely for the purposes of congestion management. Following Governor Jerry Brown’s decision to end new highways in the 1970s, state transportation funding began a shift to carpool lanes, public transit, other alternative modes, and efforts to manage traffic levels in order to move people away from single occupant vehicles (SOVs). With intermittent shifts along the way, this policy framework continues with the current embrace of road diets within the transportation, air quality, climate change, and land use arenas of state and local governments.
In large part, the policy choice of road diets comes from a large body of literature that shows that as highway capacity is increased, overall traffic and congestion likely will increase as people are able to move to greater distances from their jobs to find preferable housing and as the networks draw in traffic from larger regions both on any new roads and, as capacity is freed up, on existing roads as well. From these studies, the current policy focus then assumes the corollary must also be true—that if you stop expanding roads, eventually people will turn to some other mode of transportation and reduce traffic overall. As discussed below, the nearly 50 years of experience with these measures in California only shows how wrong this assumption has been.

Current State of Regulation

While conformity and TCMs remain a part of the state and regional air quality plans, the Climate Change program relies on two key pieces of legislation for direct regulation of how much people drive.

SB 375 (Chapter 728, Statutes of 2008)

This legislation requires the 18 Metropolitan Planning Organizations (MPOs) to incorporate Sustainable Communities Strategies plans (SCS) into their long-range transportation plans. Each SCS must contain strategies to reduce GHG emissions from light-duty vehicles (cars and trucks) based on targets set by Air Resources Board for each MPO to reach by 2020 and 2035. As the program has been shaped by the Air Resources Board, the primary focus is land use based, seeking ways to mandate denser development patterns in the state. The primary strategies being used in these plans consequently are trying to reduce how much people travel by SOV through a shift of funds to public transit, walking, and bike projects. Most projects—both planning and infrastructure—are primarily funded through the state’s cap-and-trade auction revenues. In 2018-19, $1.442 billion was allocated for these strategies.

In a recent review, Legislative Analysts’ Office (LAO) concluded the program has had no significant effect on statewide traffic levels. In fact, per capita VMT was declining in the years prior to this program, and began rising again as it was being put into effect:

Based on our review of available information, it appears that SB 375 likely has not had a major impact on VMT (and, consequently, GHG emissions). In a November 2018 legislatively required report on progress toward meeting SB 375’s goals, CARB found that VMT per capita statewide decreased by nearly 10 percent from 2005 through 2010, before CARB’s initial adoption of GHG emission reduction targets for each MPO. In subsequent years since 2010, as MPOs began developing their SCS plans, VMT per capita increased to a few percentage points higher in 2016 than it had been in 2005. Though much of the increase likely was fueled by factors outside the control of MPOs (such as an improving economy), the overall trajectory suggests that SB 375 did little to blunt the general trend. Moreover, CARB found little evidence in other performance indicators that large-scale transportation and land use changes were underway in California. For example, the percentage of commuters driving alone either increased or stayed level in most regions.

A separate independent analysis of 10 years of experience with this program concluded the primary changes were to the internal bureaucratic aspects of the planning process. Planning bureaucrats
learned how to talk with each other more. As far as its intended purpose, however, the program itself was “unlikely to noticeably shift development patterns,” a result that is essential to its ability to produce measurable traffic, air quality, and GHG results:

**SB 375 represents a solid move towards integrating the planning processes for transportation and housing in California. In our interviews, we found consensus that the process of working on the SCS and RHNA together led to new and ongoing collaborations between professionals in the transportation and housing fields, between the private, non-profit, and public sectors, and between planning agencies at the local, regional, and state levels. We also found that after SB 375, the RHNAs seem to be better-aligned with the goal of reducing vehicle miles traveled. Still, these advances in the planning process and increased collaboration are unlikely to noticeably shift development patterns in the face of barriers to redevelopment in urban areas (including the high and rising cost of construction and local opposition to building new housing), and with only limited incentives.**

In spite of using 24 different “data-supported indicators” in their effort to measure success, the Air Resources Board’s conclusion on the ineffectiveness of the SB 375 program was more succinct:

**A key finding of this report is that California is not on track to meet the greenhouse gas reductions expected under SB 375 for 2020, with emissions from statewide passenger vehicle travel per capita increasing and going in the wrong direction . . .**

These results are all the more striking given Air Resources Board’s low expectations for SB 375 even before it was begun:

**In terms of climate policy, SB 375 is expected to achieve only modest benefits, accounting for 8 percent of all GHG emission reductions in the transportation sector by 2020 and approximately 3 percent of all emission reductions economy-wide (California Air Resources Board 2008).**

A more recent review by Air Resources Board continues to couch the SB 375 potential benefits as theoretical (i.e., “if successfully implemented”) but in any event, insufficient to achieve the traffic reductions deemed necessary to reach the climate change goals:

**Currently adopted SCSs would achieve, in aggregate, a nearly 18 percent reduction in statewide per capita on-road light-duty transportation-related GHG emissions relative to 2005 by 2035, if those SCSs were successfully implemented. However, the full reduction needed to meet our climate goals is an approximately 25 percent reduction in statewide per capita on-road light-duty transportation-related GHG emissions by 2035 relative to 2005. CARB explored setting the updated 2018 SB 375 targets at the level necessary to attain state climate goals, and determined that those targets would be infeasible for MPOs to achieve with currently available resources.**

The market for denser housing such as what is attempting to be mandated through SB 375 exists. But these and similar densification strategies have been pursued in California and elsewhere for quite some time, and the commuting data discussed below still sees the overall trends for those using modes other than driving alone either staying level or getting worse depending on the region. Studies on the issue have postulated that rather than changing behavior, this type of development instead appeals to those who already were amenable to or actually using biking, walking, and public transit in the first place. The commuting data discussed below indicates the numbers on
transportation modes have not changed or more often not changed in the agency-desired direction. The people using them have simply been moved around and consequently were able to shift from one mode such as carpooling to the other SB 375-compliant modes.

In spite of these failures, the agencies continue to focus solely on land use strategies and active transportation alternatives. In 2014, the Air Resources Board issued a VMT Impact Tool in an effort to assist local governments with “estimating vehicle miles traveled (VMT) that are unique to their community and mix of neighborhood types.” The model only allows inputs for land use factors and commuters using transit, biking, and walking—all traffic strategies that as discussed in this paper have not produced the desired results on traffic levels—while ignoring the primary strategy, telework, that has reduced the amount people drive consistently over time.

**SB 743 (Chapter 386, Statutes of 2013)**

CEQA analysis for development projects historically has assessed transportation impacts based on significant changes in Level of Service (LOS) for affected roads, in other words, generally the effect of the project on traffic congestion and road maintenance. Among other things including a CEQA exemption for yet another pro-sports team stadium, SB 743 directed Office of Planning & Research (OPR) to revise the CEQA guidelines to require impact analysis through a different metric aligned with the state’s GHG emission reduction goals. Under the final revisions that went into effect on July 1, OPR chose VMT as the new metric. At their essence, the OPR regulations are yet another try at the failed indirect source control measures from the 1980s.

Under this new approach, a project’s significant effects are no longer measured by the resulting impacts on the natural or physical environment—in this case the local road and other transportation systems. Instead, significant increases in traffic—people going to and from their homes, shoppers, parents picking up their kids from school, employees going to a place of work—are deemed to have an effect on the environment and are subject to mitigation. Suggested mitigation measures included in OPR’s advisory documents cover the same list of measures embraced in regulations since the 1970s, including access to transit, pedestrian and bike facilities, parking control, parking cash-outs, congestion pricing, car and van pooling, transit passes, transportation coordinators, and on-site facilities for those using transportation modes other than SOV. The only standouts are “incorporate neighborhood electric vehicle network” which does nothing for VMT, and much further down the list “providing telecommuting options” which as indicated previously is likely the only measure worthy of consideration. Instead, the VMT Mitigation and Alternatives section further encourages the imposition of fees in addition to the specific measures in order to fund regional programs such as public transit.

Few development projects of consequence are likely to escape a significant impact conclusion without inclusion of these additional measures and fees up front. And while agencies are still able to approve a project with significant impacts under a statement of overriding considerations, few do or see their decision sequentially overridden in the inevitable lawsuits.

The result, therefore, will be that new housing beyond limited infill and any new business development providing more than a few jobs will automatically be subject to the higher costs from these measures and fees. The actual cost will vary by how much of VMT must be addressed. For example, a recent civil rights lawsuit filed by The Two Hundred estimates that the cost of a new
home in San Bernardino County will increase by $40,000 to $400,000 depending on whether 15% or 100% of the associated VMT is offset.\textsuperscript{38}

Regardless, new housing, new jobs, or even new public facilities will increase traffic. People live there. People work there. And somehow they will need to get back and forth. The core result from SB 743 will be to increase the cost of solving California’s housing crisis. SB 743 will also increase the cost of jobs development during what both the Department of Finance\textsuperscript{39} and LAO\textsuperscript{40} expect to be a multi-year period to recover to previous job and employment levels, now likely not to be until 2026.

Viewed from this perspective, SB 743 as being implemented is little more than yet another attempt to increase funding for the regulatory measures that over the nearly 50 years of being tried have failed to produce their intended results. The choice of CEQA as the funding mechanism means these costs will be imposed inconsistently across regions, jurisdictions, and projects and will be done through bureaucratic fiat with none of the accountability that would be required if done directly through the imposition and appropriation of tax revenues.

The shift to CEQA as a primary funding mechanism not only means these costs will continue to rise, but also that they largely will do so outside of public accountability for continued and increased funding of policies that do not work. At some point in the process, even public transit is held to the standard of: if fewer riders are using transit, how much more of scarce public funds should be spent on it? By moving the issue to CEQA and other regulatory costs and fees, the current trend from the agencies is to ensure these questions are never asked.

Has Regulation Been Effective?

The persistence of traffic measures that do not work over the past 50 years largely extends from the nature of California’s regulatory structure. Under the Clean Air Act, an approvable regulation must include: (1) complete description of the measure and its estimated emissions reductions, (2) evidence the measure was properly adopted by an agency able to implement the measure, (3) evidence of funding, (4) necessary approvals from all applicable agencies, (5) implementation and enforcement schedule, and (6) monitoring program to determine effectiveness. As administered by the Air Resources Board, this regulatory framework has migrated to the Climate Change program as well.

The traditional traffic measures by their nature conform readily to criteria (1) – (5). They are easy to define, and as paper regulations are easy to enforce based on whether that paper is in place or not. Not that they work, but that they have been properly adopted as rules.

Effectiveness is less an issue. Effectiveness historically has focused on the emission estimates determined from models at the beginning under (1), with far less if anything done on evaluating measures individually as they have worked in the real world. Monitoring instead has been substituted more on a system-wide basis, including air quality monitoring in the affected basins, estimates of overall and per capita VMT, and the GHG emissions inventory estimates for transportation sources. The precise contribution of each measure has rarely been measured, and if the system-wide metrics are not producing as expected, more of the individual measures are simply
assumed to be needed. Measures instead are assumed to be working because the modeling required up front said they would.

This point was made explicitly by LAO in a review of the effectiveness of the state’s HOV (high occupant vehicle) policies, a traffic reduction focus beginning in the 1970s but continuing today even as commuter use of carpooling has plunged:

Although generally believed to be beneficial, the impact of HOV lanes on air quality is unclear. While the mobile source reduction potential of HOV facilities must be documented as part of the State (air quality) Implementation Plan (SIP), this documentation is based entirely on models and projections, rather than actual emission data. This is due generally to an inability to measure emissions from specific vehicles driven in actual traffic conditions. Moreover, many of the variables critical to such models, such as the percentage of vehicles that shifted from SOVs to HOVs, are estimated based on very limited data.

. . . In addition, our review found that HOV lanes do appear to have a positive impact on carpooling, although the statewide impact is unknown due to a lack of data. Finally, we found that the exact impact of HOV lanes on air quality, though widely believed to be positive, is unknown due to lack of actual emission data.41

What measure-specific evaluations that have been done indicate few if any traffic-related and consequently GHG-related benefits. One literature review prepared for the Air Resources Board on existing employer trip reduction mandates found regional traffic reductions of only 1.33% to 1.6%.42 More broadly, LAO in their review of the Climate Change program transportation strategies found little evidence these measures actually work:

In 2010 and 2014, researchers from UC Davis reviewed the academic literature on the relative effectiveness of various strategies to reduce VMT. Though they found evidence suggesting that many strategies are associated with lower VMT, the effects varied somewhat and, in a few cases, were nonexistent. For example, the researchers found that increasing residential density, employment density, and land use mix by 1 percent is associated with a decrease in VMT of up to 0.2 percent, but they were unable to find evidence that increased transit service or bicycling infrastructure is associated with lower VMT. The researchers also identified several uncertainties and caveats. For example, they noted that the effectiveness of a strategy might vary by context (such as in urban versus rural areas). 43

Moreover, studies that have found an effect for specific measures often did so through correlation analysis rather than evaluating the results of the measures directly:

Additionally, they noted that the existing research generally focused on correlations between strategies and VMT, not causal relationships. For instance, rather than mixed use, compact developments causing residents to drive less, it could be that these developments only attract residents whose preference is to drive less regardless of where they live.44

There are, however, a number of system-wide measures can be used to illustrate the ineffectiveness of the combined traffic measures over time.
The Amount People Drive has Continued to Grow

First, as shown in Figure 8, the amount Californians drive has continued to grow regardless of the intensity with which the agencies have pursued the various reduction measures. The only periods when traffic declined or leveled out were during economic downturns (national contraction periods shown in red on the figure; California has varied somewhat in the beginning and end of these periods). VMT measures have not caused VMT to drop. Lack of jobs and economic activity has.

Worker Commutes have Shifted Away from the Regulatory Alternatives

Second, the US Census Bureau has tracked the different modes of transportation used to commute to work. The core data used in this analysis is from the Means of Transportation for worker commutes information obtained by the Census Bureau in its various surveys, both the Decennial Censuses and since 2000 from the American Community Survey (ACS). While some of the ACS results are available in the published tables, the figures and results cited below come from an analysis of the Public Use Microdata Sample (PUMS) through PUMS USA, University of Minnesota, www.ipums.org. There are consequently some insignificant differences in the exact numbers, but this approach was used to retain consistency in the analysis across the different issues. For the purposes of the analyses, motorcycle use as an emission source was included in the “Drive Alone” numbers. This treatment has little effect on the overall results due to the low numbers involved (52,344 workers in 2018).

As shown in this data:

- For California as a whole (Figure 9), the share of commuters using the regulatory VMT alternatives promoted over the past five decades by regulation, redirection of capital spending, fees, and various incentives has declined, both compared to the beginning of this period and more pronounced in recent years. Commuters have shown a preference for only two commute alternatives: working at home (telecommuting) and the “other” category, which in recent years covered increased use of the rideshare services now under regulatory attack as a result of last year’s AB 5. Telecommuting first surpassed public transit (all forms) in 2010, and has remained consistently above that mode since 2014. While some of these gains came from the self-employed, the bulk of the growth has come from wage and salary workers. At the trendlines shown in this figure, telecommuting would have surpassed carpooling by 2029 as well, but under the current crisis conditions clearly already has.

- Looking at the actual number of users (Figure 10), the regulatory VMT alternatives (public transit, carpooling, bikes, walking) show little change between 1990 and 2018, growing by only 2% (73,714) in this 28-year period.

The primary result of the various traffic measures consequently was to provide further options to those workers who already were able or had to use a mode other than a personal vehicle. In spite of increasing regulation from the agencies and accelerated funding from state, federal, local, and fee sources, the traffic measures promoted by the agencies had little effect on the amount Californians drive or on GHG emissions.
The primary shift was from workers who previously carpooled to use of public transit as new lines were opened, including bus, rail, and other modes. In contrast, Driving Alone grew by 37%, accounting for 81% of the total increase in commuting. Working at Home grew by 147%. The result has been a continued rise in worker reliance on SOV, with the regulatory alternatives steadily losing ground even as public spending and regulatory mandates have increased (Figure 13).

- This result—traffic measures simply expanding the choices for workers already able or having to use SOV alternatives—is also shown in the regional numbers. Even in the transit-dense Bay Area, gains in public transit have largely come from workers who previously carpooled (Figure 11). This is one of the regions where use of the regulatory alternatives had been growing slightly, but took a dip in the 2018 numbers (Figure 14). Still, public transit use in this region grew by 63% since 1990, but total regulatory alternatives by 28% compared to Drive Alone at 21% as SOV carried half the total increase in commuters. Work at Home grew by 134%.

Southern California—the region which saw the greatest acceleration in VMT alternatives investment—also saw use of these options drop, both in relative terms (Figure 12 and Figure 15) and in total numbers. Between 1990 and 2018, the number of commuters using the regulatory alternatives dropped 10%, while Drive Alone grew by 38% (covering 88% of the growth in commuters) and Work at Home by 150%.

As the State and Local Agencies Invest More, Public Transit Use Keeps Dropping

A third effectiveness measure comes from looking at the results achieved by shifting state transportation priorities to public transit. While the regulations have always considered modes such as increased use of bikes and walking, these two options contain considerably far lower potential and real world results to make significant reductions in the amount people drive. Policies since the 1970s instead have placed their hopes on expanded use of public transit, encouraged if not mandated through strategies such as public and fee-supported funding of system expansions, transit oriented housing and jobs development, and various incentive programs imposed on employers or encouraged through public campaigns and subsidies.

Shortly before BART began its first service in September 1972, the state Transportation Development Act of 1971 (SB 325) provided, among other purposes, funding to local governments for public transit under the State Transit Assistance (STA) fund. California’s statewide shift to public transit continued with the 1973 creation of the Public Transit Account (PTA) within the State Highway Account. Funding for transit subsequently came from a variety of sources including allocations from the existing revenues base and in the earlier years, general fund appropriations; shortly after the creation of fuel sales taxes in 1972, dedication of the diesel sales tax to local transit operations; increasing allocations within state transportation bonds for public transit; expenditures from the state’s cap-and-trade auction proceeds; and voter approval of local sales tax add-ons for transit purposes. Enactment of SB 1 (Chapter 5, Statutes of 2017) carried this shift to its current status, with only a small fraction of the new revenues (about 6%) allocated for road capacity and the remainder for road repairs and maintenance, public transit, and the other regulatory VMT alternatives. In the 2018-19 budget following SB 1, about one-sixth of state transportation revenues
other than bond funds was allocated to public transit, supplemented by both dedicated federal and local funds (Figure 16).

Capital investments to expand public transit options consequently have expanded considerably, accelerating from $0.7 billion in 1992 to $4.2 billion in 2018, and totaling $57.2 billion in this period. California, which is about 12% of the nation, accounted for an average of 21% of all capital expenditures for public transit nationally during the 5-year period 2014 – 2018.

Public transit, unlike roads, has a cost structure with a much larger annual operations component. In the most recent accounting from the National Transit Database and Federal Highway Administration, total California expenditures other than debt service on highways were a total of $14.13 billion in 2017:

<table>
<thead>
<tr>
<th>California Highway Expenditures ($b.)</th>
<th>2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capital Expenditures</td>
<td></td>
</tr>
<tr>
<td>State administered highways</td>
<td>$4.53</td>
</tr>
<tr>
<td>Locally administered roads</td>
<td>3.83</td>
</tr>
<tr>
<td>Federal roads and unclassified</td>
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</tr>
<tr>
<td>Total, Capital Expenditures</td>
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</tr>
<tr>
<td>Maintenance &amp; Services</td>
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</tr>
<tr>
<td>Administration &amp; Miscellaneous</td>
<td>0.87</td>
</tr>
<tr>
<td>Total Expenditures</td>
<td>$14.13</td>
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</tbody>
</table>

Adding in Highway Law Enforcement & Safety brings the total to $17.50 billion.

Without accounting for a share of the above that applies to the non-rail components, public transit in 2017 required comparable costs of $11.22 billion, or 79% of the figure above (64% if CHP costs are included) to carry—as measured by the number of commuters—about only 6% as much traffic.

<table>
<thead>
<tr>
<th>California Public Transit Expenditures ($b)</th>
<th>2017</th>
<th>2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capital Expenditures</td>
<td>$4.13</td>
<td>$4.23</td>
</tr>
<tr>
<td>Total Operating Expenses</td>
<td>7.09</td>
<td>7.40</td>
</tr>
<tr>
<td>Total Expenditures</td>
<td>$11.22</td>
<td>$11.63</td>
</tr>
<tr>
<td>Total Fare Revenue</td>
<td>$1.84</td>
<td>$1.82</td>
</tr>
<tr>
<td>Operating Expense Subsidies</td>
<td>$5.25</td>
<td>$5.58</td>
</tr>
<tr>
<td>Fare Ratio</td>
<td>25.9%</td>
<td>24.6%</td>
</tr>
</tbody>
</table>

Moreover, public transit is dependent on increasing amounts of public and fee funding to remain solvent. As shown above, fare revenues declined in 2018 while operating costs continued to grow. The fare ratio consequently went from covering 25.9% of operating expenses to 24.6%.

Public transit ridership has dropped even as state and local governments have invested more in expanding the number of lines and their coverage in the state. As shown in Figure 17, public transit use measured by unlinked passenger trips (UPT) has dropped nationwide since 2014. The decline has been more pronounced in California, with total ridership in 2019 being 16% below the peak in 2008, and even 6% below the totals in 2002. Combining the previous capital expenditure data
(Figure 18), the more state and local governments in California have expanded public transit options, the deeper ridership has declined.

Passenger Miles Traveled (PMT) similarly has been dropping, with a sustained decline since 2015 (Figure 19). Only full reporting systems cover this data, but these include the primary systems in the state along with those providing rail service—the primary focus of public transit spending since 1973. Compared to VMT, PMT carried only 7.9% as much traffic in 2018.

Public Transit in the COVID Economy

Although trending down even before the current public health emergency, transit ridership has collapsed in recent months. In the most recent May data (Figure 20), California ridership was down 72% from the average monthly results for 2019. The California collapse was also far deeper than the severe drops seen in the rest of the country, which were down by 22%.

Part of these contractions is due to fewer workers engaged in a commute, either because they have been laid off or because they have been able to maintain their household incomes through telecommuting and other flexible work options that have slashed commutes. The sharp differences between California and the rest of the country, however, clearly indicate that other considerations have come into play.

A number of research papers have begun to look at the role played by public transit in facilitating the spread of COVID-19.\textsuperscript{47}

- One of the earlier working papers\textsuperscript{48} from MIT identified subways as the primary vector for the substantially higher infection rates suffered by New York City:

  \textit{New York City’s multipronged subway system was a major disseminator – if not the principal transmission vehicle – of coronavirus infection during the initial takeoff of the massive epidemic that became evident throughout the city during March 2020.}

  This study further concluded that early decisions by the Metropolitan Transit Authority to conserve financial resources by cutting back service and converting express lines into locals likely accelerated the spread of the virus by maintaining passenger densities while distributing them over a broader area. The decisions of the Authority have to be considered in the context of the longer-term viability of an essential infrastructure system through what is now an extended crisis. But the public health consequences are the result of longer-term public policies that left commuters with little choice but to put their health at risk by using transit.

- Another MIT working paper\textsuperscript{49} assessed correlations between a number of socio-economic variables, county-level health variables, modes of commuting, and climate and pollution patterns. The analysis did not attempt to determine a cause-and-effect relationship, but by looking at correlations that could control for a large range of factors, narrow down the specific instances contributing to death rates for further study as to why they were having this effect. African-Americans were found to have significantly higher rates even after for controlling for various income, health such as obesity rates, and other factors. The highest effect, however, was associated with the use of public transit:
A striking and robust relationship is found between death rates and public transit use. We find higher rates of commuting via public transportation is associated with higher death rates compared to all other modes of commuting, including not working, whether we control for state fixed effects or not. This correlation is statistically significant when comparing with telecommuting. Counties with a higher share of workers driving and walking, relative to telecommuting, also have statistically significantly higher death rates. Taken together, these results suggest that counties with high levels of telecommuters have lower death rates.

- In another paper also looking at racial disparities in death rates, higher rates found for Latinos and Asians were more associated with underlying factors such as occupation, education, and commuting patterns rather than ethnicity/race itself. The higher rates for African-Americans and First Nations were significant even after controlling for these factors. The most significant factor in the differences between these groups, however, was the relative use of public transit:

This note seeks the socioeconomic roots of racial disparities in COVID-19 mortality, using county-level mortality, economic, and demographic data from 3,140 counties. For all minorities, the minority's population share is strongly correlated with total COVID-19 deaths. For Hispanic/Latino and Asian minorities those correlations are fragile, and largely disappear when we control for education, occupation, and commuting patterns. For African Americans and First Nations populations, the correlations are very robust. Surprisingly, for these two groups the racial disparity does not seem to be due to differences in income, poverty rates, education, occupational mix, or even access to healthcare insurance. A significant portion of the disparity can, however, be sourced to the use of public transit.

- An analysis of early measures to limit the virus spread in China assessed the effectiveness of the various distancing measures:

Cities that implemented control measures preemptively reported fewer cases on average (13.0) in the first week of their outbreaks compared with cities that started control later (20.6). Suspending intracity public transport, closing entertainment venues, and banning public gatherings were associated with reductions in case incidence. The national emergency response appears to have delayed the growth and limited the size of the COVID-19 epidemic in China, averting hundreds of thousands of cases by 19 February (day 50).

In the analysis, suspension of public transport (coefficient of -3.50) was found to have a larger effect than closure of entertainment venues (-2.28).

Public transit in the nation in the whole and more particularly in California was in decline even before the current crisis. As the crisis extends, the willingness of workers to return to this mode will continue to be undermined by lingering concerns over health risks and the personal economic risks of depending on this mode in the future. Even in the state’s most transit-dense city, San Francisco, the local transit agency has already indicated it intends to abandon 40 of its 68 bus lines.

**Why Transit Does Not and Will Not Work as a Traffic Solution**

The effectiveness of public transit largely depends on jobs density, with systems funneling workers into areas of high-density job clusters just as streetcars used to be an efficient means to move
workers when jobs were centralized in downtowns and adjacent factory zones rather than distributed more broadly as they are now.

But red flags abound, potentially limiting California’s ability to reduce VMT. Employment density (the number of jobs per square mile) is low and declining, and employment density matters more than residential density for encouraging transit use as an alternative to driving. Furthermore, major transit investments since the early 1990s have not produced an overall reduction in VMT, and densities around new stations have not increased. The vast majority of commuters still drive to work, even if they live or work near a transit station. And planners are skeptical about pricing policies—a key component of integrated strategies—especially in localities with higher-income households, which tend to be less sensitive to changes in the cost of driving and parking.\textsuperscript{53}

Consequently, current transit systems have managed to pull ridership in areas such as New York City and San Francisco with high densities of generally higher-wage white collar jobs within centralized areas.

The data indicates that travelers from higher income households comprise a larger share of travelers on rail modes. This is indicative of numerous factors including the prevalence of higher incomes in some of the larger Metropolitan areas that provide rail services and reflects the fact that these services typically offer higher speed travel and often cater to destinations such as central business districts and airports that are frequent destinations for higher income individuals.\textsuperscript{54}

For the vast majority of workers, however, access to jobs and in particular to a choice of jobs to diversify their income opportunities requires a single occupant vehicle.

This situation is illustrated in the access data calculated by the Center for Transportation Studies at the University of Minnesota from the American Community Survey data. As indicated in the latest numbers for 2018 (Figure 21), even in the state’s most transit-dense area (San Francisco-Oakland), workers commuting 30 minutes can access 8 times as many jobs by car as they can by public transit. In Los Angeles-Orange Counties, the number is 32 times as many jobs, in San Jose 42 times, in Sacramento 51 times, in San Diego 53 times, and in the Inland Empire 91 times. The ratio improves slightly for workers willing to commute 60 minutes, but still ranges from 4 times as many in San Francisco-Oakland to 43 times in the Inland Empire. Comparable numbers calculated for biking and walking show substantially wider spreads.

Widening job options is a critical wage and income strategy. Even in normal economic times, changing jobs is the primary strategy used by workers to improve their wages, working conditions, benefits, and overall household income.\textsuperscript{55} Increasing the range of accessible, potential jobs is a way for workers to expand their opportunities for wage and income growth by diversifying their options, and historically has been the key individual response workers can take on their own to combat trends towards income inequality. And workers change jobs. Workers in the latter part of the Baby Boom (born 1957–64) held on average 12.3 jobs from age 18 to 52,\textsuperscript{56} and job tenure overall has changed little since the 1960s.\textsuperscript{57} Most workers need access to job options in order to pursue upward economic mobility.

Public transit locks workers into a limited set of job options. Using personal vehicles expands the choices by orders of magnitude throughout the state, an outcome even more critical as workers must...
broaden their search areas for housing they can afford. There are far fewer income implications when the limited set of options via public transit involves the choice between a coding/design job at Facebook or Salesforce. The disposable income effects are much higher for restaurant and other lower wage workers who now have to commute 60 minutes or more and would prefer to find something closer to their families.

Job access is important in normal economic times. It will be critical in the upcoming recovery period from the current economic downturn. Experience from the last several recessions indicates that the trend in economic recoveries has become more shallow and taken longer to return to prior job and employment levels, particularly in California following the recessions in 1990 and 2008 (Figure 22). Extrapolating the economic projections done by Department of Finance for the Budget May Revise, recovery from the current downturn is likely to take nearly as long as the recovery from 2008. In order to survive, maintain the marketability of their skills, and further progress in the upcoming economic climate, workers more than ever will require the flexibility that can only be obtained by using their vehicles for work. Except for the higher income workers, over-reliance on public transit in this upcoming, extended recovery period will otherwise be a factor contributing to a worsening of income inequality.

The Missing Element is Housing

Even when densification strategies such as those mandated under SB 375 are pursued, their potential to meaningfully affect both traffic and GHG emissions is limited. A 2009 National Research Council analysis concluded that even policies that would mandate compact development for up to 75% of all new and replacement housing (nationally, 57 million new units by 2030 and 62 to 105 million units by 2050) would result in only less than 1% to 11% reductions in baseline VMT, CO2, and energy use. The Research Committee was also unable to reach a conclusion on whether policies capable of achieving more than the 1% level were even plausible:

Thus, the committee believes that reductions in VMT, energy use, and CO2 emissions resulting from compact, mixed-use development would be in the range of less than 1 percent to 11 percent by 2050, although the committee disagreed about whether the changes in development patterns and public policies necessary to achieve the high end of these findings are plausible.

More critically, policies reliant on densification even if they only achieve the 1% reduction assume that something will get built, in particular new, denser housing. The trend in California as in most coastal urban areas, however, has been in the opposite direction. New housing denser or not has been severely limited as a result of restrictive local ordinances and zoning, neighborhood opposition, and in California regulations such as CEQA, inclusionary requirements, and the expanding climate change provisions such as in SB 375 and SB 743 that substantially increase the final price of any new market-rate housing that does manage to get built.

As a result, other than coming close in 2003 – 2005, permit data from California Homebuilding Foundation shows California has failed to allow the new housing required to keep pace with population growth since 1990. In 2019, only 111,184 new units were permitted, well below the 180,000 annual total required even before taking account the number of units destroyed by fires or otherwise demolished. In the 1990s, an average of 111,000 new units were permitted annually; in the 2000s, 146,000; and in the 2010s, only 86,000 or less than half of the annual need.
The State has made some tentative housing reforms in recent years, but they are focused primarily on rental units and low income affordable housing, or contain narrowing criteria and counterbalancing cost increases that have severely limited their effect on overall supplies. In particular, far less has been done to facilitate the construction of new units for sale, particularly at price points that would restore housing as the core element of wealth creation for lower and middle income households.

Under these conditions, traffic regulation as currently pursued under both SB 375 and SB 743 has only one possible outcome: further increase the construction cost and consequently the price of what limited housing is being built. The number of affordable units that can be built under existing financing sources will be reduced. The price of new market rate housing will be pushed even higher. While producing only limited new funding for traffic measures that have failed repeatedly in the past, the paradoxical outcome will be to push the working poor and even middle class income households further out in their search for housing they can afford, and thereby ensuring the amount Californians drive will remain on its current uphill trend.

The current regulations as implemented under SB 375 and SB 743 are simply a tax raising the cost of living for those least able to afford it, with minimal to no compensating public benefits for either air quality or the state’s climate change program.

**Who Uses the Travel Alternatives?**

The overall use of the various commuting modes differs only slightly when viewed by income or by ethnicity/race.

Considering income as measured by household poverty status (Figure 23), the dependence on using personal vehicles is not substantially different across the different levels. Commuters in households under 200% of the poverty level are slightly less likely to drive alone, while the two lowest income groups are more likely to carpool.

The absolute differences are small across all the travel alternative modes. In Southern California, commuters from households under 200% show a relatively higher reliance on public transit, but in the Bay Area, the greater use of transit is by both the highest and lowest income levels.

For the state as a whole, telecommuting is more likely in the highest income households, but the share using this mode exceeds all the other travel alternatives except for Public Transit at the lowest income level.

These same patterns are also generally seen by ethnicity/race (Figure 24). Reliance on SOV differs only slightly both for the state as a whole and within each of the two regions shown. Carpooling is relatively higher among Latinos and Asian commuters, while lower for African-Americans and Whites.

While the absolute differences are small, Asian and African-American workers are more likely to use Public Transit, while use by White commuters is relatively less. In the Bay Area, Latinos are the
least likely to use Public Transit, while African-Americans show the highest use. The differences in Southern California are smaller and at far lower absolute levels.

While telecommuting differs little across the state, White commuters do so at a higher rate, and Latinos at the lowest. Most of these differences, however, come from the underlying occupational and industry of employment profiles. As these continue to change and in particular as educational attainment continues to improve, use among Latinos is likely to expand as well.

These numbers, however, have changed substantially over the past two decades. The next several figures indicate the demographic composition of the change in commuting mode (the cumulative increase or decline since 2001 in the number of commuters using each mode) in order to assess the ongoing effectiveness of the traffic policies in this period to influence changes in worker behavior. In considering these figures, however, the composition of the commuting population changed in each year as well. Figure 34 shows the effects of the last two recessions on commuters by household income (ratio of income to poverty level), with the initial job loss stages showing the cumulative change in commuters coming primarily from the lower two income bands, and a turnaround in the recovery portions as jobs and wages were restored.

Figure 35 shows the shifting ethnic/racial composition of workers, with the number of non-Latino White workers declining, Latinos comprising the largest share of the absolute change in the number of workers, and Asian/Pacific Islanders showing the overall largest growth rate in this period.

Reflecting the previous discussions, overall (Figure 25) the increase in workers (3.7 million workers) during this period came primarily from workers driving alone or working at home. Partial recovery from the early drops in use of the regulatory VMT alternatives (public transit, carpooling, biking, and walking) occurred in the period prior to 2010, the year the state’s climate change program started its activities with the implementation of the AB 32 Early Action Items, but then stopped growing immediately this program began. Partial recovery in the regulatory alternatives started again in 2012, but has been trending downwards in the last two years.

By household income:

- The lowest income group (commuters from households earning 0 – 199% of poverty income) shown in Figure 26 shows increases only for driving alone, working at home, and to a far lesser extent using “other” modes (including taxicabs and rideshare services). Use of the VMT regulatory alternatives increased only during the recessionary years, and went negative in the last three years as worker incomes rose and as these workers depend increasingly on SOV to access a broader range of job options.

- Workers in the next highest income level (200 – 399% of poverty, Figure 27) show the same pattern, but with somewhat higher use of other modes. Use of the regulatory VMT options rather than declining now remains at the 2001 levels.

- Workers in the two highest income groups (400 – 499% of poverty in Figure 28 and workers from households earning 500% or more in Figure 29) are the only income groups showing
an increased use of the regulatory VMT alternatives. Workers reliant on these modes, however, saw the sharpest drops in employment during the recession that began in 2008. Increased working at home likely through self-employment was a stronger income-resiliency measure for these groups during this period. A slight return to the regulatory VMT alternatives is then seen in recent years, with the strongest use gains in the highest income commuters—an outcome that reflects that these workers are far more likely to be those able to afford any new, SB 375- and SB 743-compliant housing where the regulatory alternatives are more available. This outcome also reflects the earlier conclusion that workers commuting to clusters of high-wage jobs are also far more likely to use the new public transit systems, which in the prior decades have focused on expanding the state’s rail lines. Use, however, remains low and bracketed by the increase in SOV and telecommuting.

By ethnicity/race:

- The expansion of Latino workers within the economy has been almost solely by those reliant on SOV (Figure 30), with a relatively smaller but steady share of those telecommuting. This outcome pushed use of the regulatory VMT alternatives below the 2001 level.

- African-American workers (Figure 31) show a similar outcome but with a stronger use of telecommuting and “other” modes. VMT regulatory alternative use overall has declined. Workers reliant on these modes comprised the biggest share of employment drops during the 2008 recession, with working at home an income-resiliency response as it was for the higher-income groups.

- Asian-Pacific Island workers (Figure 32) are the only demographic showing increased use of the regulatory VMT alternatives, although the use eased slightly in the most recent data and overall is likely explained as much by the much stronger growth rate for this population group overall during the period shown. Telecommuting is above the rate for Latinos, and reliance on SOV still covers 75% of the increased number of workers.

- Non-Latino White workers (Figure 33) show a markedly different pattern. Telecommuting was the dominant trend both before the 2008 recession as an income-resiliency strategy as it began. Telecommuting comprises almost all of the counterbalancing positive shifts as the number of workers have declined among those previously driving alone and using the regulatory VMT alternatives.

The commuting data provides additional backing for some of the conceptual results discussed previously. Although increasing somewhat for Asian/Pacific Islander workers, the regulatory VMT alternatives pushed by state policies over the past five decades have had minimal if not negative results among Latino, African-American, and White workers in the past two of those decades. The same conclusions come out when looking at workers by household income, with only the highest income workers showing increased benefits from these policies. Lower-income workers instead faced with the need to travel further to find housing they can afford and a range of job options to provide the income to do so rely to a much higher extent on driving alone.
This outcome is in the nature of the current environment for housing and jobs in the state. Housing costs continue to rise because housing supply continues to fall further behind overall population growth. The state has evolved into a two-tier economy, with the higher wage job clusters capable of promoting use of public transit heavily concentrated in the Bay Area over the past decade, other regions instead dominated by much more geographically diffuse lower wage service jobs, and few centers of meaningful middle class wage growth outside the Inland Empire.

The regulatory policies consequently have only served to increase income inequality in the state—benefiting those few able to afford the rising costs of SB 375- and SB 743-compliant housing and those with the skills and educational attainment in demand in the coastal centers with concentrations of high wage jobs. Making these policies work for a broader range of California workers and households would require a willingness to reconsider the other state and local policies that have produced the jobs and housing framework the state has today. There are no signs that willingness exists.

Outside the policy-driven choices, the data also shows the embrace of telecommuting across all income and ethnic/racial groups, both as an income-resiliency response during prior recessions and as an ongoing income option in the current jobs and housing framework. This option has been embraced to greater extent by certain demographic groups, with Latino workers being the lowest to date, but the commuting data illustrates its importance even within the lower income groups.
Telecommuting Potential to Further the Climate Change & Air Quality Goals

The existing regulatory structure attempts to reduce the GHG and air quality emissions associated with the growing levels of traffic by trying to change behavior—making use of the vehicles that workers and in particular lower and middle income workers rely on more costly or by restricting land use, force them into housing where other travel modes eventually become more acceptable. Telecommuting, however, requires no such changes. Instead, substantial emission reductions are possible by simply embracing the fact that this is what workers by large majorities would prefer.

Reducing Traffic through Telecommuting

While there are a substantial number of studies previously estimating the traffic reduction potential from teelwork, many are older beginning in the 1970s and consist of projection modeling as a Transportation Demand Management (TDM) tool rather than measurements, and similar modeling estimates as employers began including this component into their mandated trip reduction programs. Additional work surrounded the 1999 National Air Quality and Telecommuting Act, which created 5 pilot programs designed to develop market-based air quality credit programs to encourage telecommuting. Many of these previous studies consequently addressed telecommuting potential under the technology systems, development, and overall commuting patterns at those times. None incorporate the lessons that can be learned from the recent accelerated and widespread adoption of this option under the current crisis conditions, nor do they reflect the current development and commuting patterns within the state.

A more recent research effort prepared for the Air Resources Board reviewed the available literature to arrive at a more current estimate of telecommuting’s potential. This work concluded that through telework, individual commute mileage could be reduced by up to 90.3% and total daily personal mileage by 53.4% to 76.5% on telecommuting days. Center-based telecommuting was somewhat lower, with individual commute reductions ranging from 62.0% to 77.2%. In each case, commuting mileage was not eliminated entirely due to the fact that some workers made trips to work on days they primarily worked from home.

These study conclusions along with those from comparable reviews of other traffic measures were then incorporated into various materials presented at workshops evaluating potential strategies to include into the State’s climate change program. While an immediate comparison is not readily apparent in the summary tables of these documents—measurements vary from individual reductions possible through strategies such as telecommuting and carpooling, to primarily elasticities in all the other cases—telecommuting shows by far the single largest effect at 48 – 90.3% decrease per telecommuter per telecommuter day.

Telecommute estimates, especially any associated air or GHG emission reductions, also vary according to assumptions about worker behaviors in these circumstances. Earlier studies done for the Air Resources Board for comparable measures such as a compressed work week (4 days/40
hours) found significantly less work travel but no measurable increase in nonwork travel. More recent studies, especially those relying on sources such as travel diary data, make adjustments in an attempt to capture the net effect of all possible travel behavior by workers using this option. These studies consequently adjust the potential benefits to account for workers using their vehicles during telecommuting hours for such purposes as household errands, food, and childcare. However, workers also do these activities now during lunch and other breaks, and more frequently to and from work during peak congestion times. The overall net effects, especially considering that teleworkers spread these activities out during a weekday rather than everyone trying to do the same things on weekends, are even more uncertain under circumstances where telecommuting would be more prevalent and these responsibilities more generally redistributed among teleworkers and other household members.

For the purposes of this white paper, the estimates developed below are general estimates of the traffic reduction potential based on the results from the various data sources discussed above. As such, they are scoping level estimates that would be subject to refinement depending on the specifics in any policy changes that embraced these potential reductions more fully. The primary assumptions for these estimates are as follows:

- The total jobs base is the average 2019 wage and salary employment for California, to represent a pre-COVID “normal” level of the potential universe. However, as indicated in Figure 22, extrapolating the current Department of Finance projections indicates full recovery to that level is not likely until early 2026, and the estimates shown below would ramp up to that level in this period and presumably keep growing in future years. The estimates cover only wage and salary employees and do not cover the other worker classifications, predominantly the self-employed who could contribute to these reductions even further as telecommuting becomes more a standard operating model and as technology continues to develop in response to this change.

- Total share of telecommuting eligible workers is as calculated from the Dingel-Neiman estimates above, distributed by wage level as in Figure 6.

- Using the most recent data, calculations from the Census Bureau’s Longitudinal Employer-Household Dynamics show wage and salary workers in California had an average one-way commute of 19.8 miles in 2017 (Figure 36). This figure is up from 17.2 miles in 2002 as commutes have lengthened, but has been relatively stable since 2013. The distances calculated through this data are based on the distance between the census block containing each worker’s residence and the block containing their place of work. Consequently, the data does not precisely measure actual travel paths, but incorporates a full accounting rather than an estimate from a sample or survey.

This data source also shows that the importance of “super commuters”—those with one-way commutes of greater than 50 miles—has been growing in this time, going from 10.7% of workers in 2002 to 15.2% in 2017. While the estimates below use the commuting average, the greater likelihood of these super commuter workers wanting to telecommute and to do it more days of the week means the potential traffic reductions are likely to be higher.
It is also important to note that for workers, travel distance does not always translate on a linear basis into time spent due to traffic congestion and for those using public transit, the need to shift and wait between the different transit lines. In the 2018 American Community Survey data, 7.8 million workers (45% of all workers) in California spent an hour a day or more on their commutes; 2.3 million (13%) of them spent two hours or more a day. Those spending more than an hour a day had an overall average commute total of 1.6 hours. That portion commuting more than two hours on average had 2.6 hours of their day consumed by travel.

Working at home is a way to give many California workers back this time to spend on other pursuits, including taking care of children and other family members, education or training—much of which can now be done from home as well—to improve their skills and long-term wage growth, or other home chores and errands that due to the lack of time must now be crammed into the weekend days. This last factor alone means many regions of the state face weekend congestion and associated air impacts that now equal or exceed those during the weekly commute hours. The BLS data indicates telecommuters prior to the current crisis chose to do so primarily from the need to balance work with personal and family needs rather than from a commitment to air and climate change goals. The opportunity for many to get these hours back and at this level adds another source of underestimation to the numbers below.

- Three cases are given. The Low Case is based on workers going back to pre-COVID telecommuting patterns as described by the BLS and federal worker data. The assumed take-up rate is the two-thirds from BLS. Occasional teleworkers (0.5 day a week average) are at 39%, 1-2 days a week at 34%, and 3 days or more at 26%. The Low Case consequently is one where workers will decide whether to work from their homes or not. The Mid and High cases assume that the post-COVID period instead will be more one where the decision is whether to go back to the workplace or not. The Mid Case assumes an overall average of teleworkers spending 2 days a week working at home. The High Case assumes an average of 4 days a week. No specific adjustments are made to incorporate a subset of center-based telework, but instead is assumed to be embraced by the use of these averages.

- No adjustments are made to the commute length for side trips made while working at home or for similar trips made at a workplace or in conjunction with a regular commute.

- Similarly, no adjustments are made for reductions in work-related travel. In an economy where telecommuting becomes more the norm, teleconferences and video calls have the potential to replace a substantial share of work-related travel done in the past, similar to much of what is happening in the work environment during the current crisis.

- The results are also limited to telecommuting opportunities for occupations that can be done entirely at home. As previously discussed, many other occupations that otherwise are linked to a workplace have at least a portion of their duties that can be done through telework. Adding in this component would increase the potential traffic reduction numbers even more.
The numbers are not adjusted for current telecommuting levels, both as they existed prior to the current crisis and as they are now. All indications are that neither the regional nor the state air and climate change plans specifically account for these existing reductions.

The resulting potential traffic reductions from a sustained expansion of telecommuting is shown below. To estimate the percentage reduction, 2019 VMT was assumed to grow at the previous 5-year average rate.

<table>
<thead>
<tr>
<th>VMT Reduced (billion miles)</th>
<th>Percentage VMT Reduction</th>
<th>Teleworkers (million)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low Case: BLS/Federal Experience</td>
<td>-17.9</td>
<td>5%</td>
</tr>
<tr>
<td>Mid Case: Average of Two Days a Week</td>
<td>-30.4</td>
<td>9%</td>
</tr>
<tr>
<td>High Case: Average of Four Days a Week</td>
<td>-60.7</td>
<td>17%</td>
</tr>
</tbody>
</table>

To put these numbers into context, total Passenger Miles Traveled (PMT) on public transit in California in 2018 was 7.9 billion miles, achieved through the expenditure of $11.6 billion in public and rider funds. Even if the Low Case telecommuting numbers were achieved in the post-COVID period—or more appropriately, retained given the current substantially higher levels of telework—the result would be 2.3 times the level of traffic reduction at no cost to government but with substantial cost savings to the participating workers. In the high case, the potential is 7.7 times the level of previous PMT.

The numbers above are based on the job numbers and occupational mix in 2019. Assuming the economy recovers back to this level and assuming it then continues growing at the prior 3-year average growth rate, traffic reduction by 2030 would be about 10% greater, at 66.5 billion miles replaced by telework.

In the case of the lower wage workers who comprise just over a third of the potential beneficiaries from such a policy, the result would be a substantial and real increase in disposable household income. As contained in the Center’s Affordability Index, the average cost of transportation in 2018 for homeowners in California was $7,000 (commute and personal but not including the cost of vehicles). For the average renter, it was $6,600. In general, about half these current expenses are for daily commutes.

This point is underscored in a separate analysis of the cost effectiveness of the various regulatory measures. This 2013 study for San Diego concluded that telecommuting produced a savings of $1,715 per metric ton of GHG abated, while mass transit had costs of $2,607 a ton and a bicycle strategy $37,811. To put these numbers in context, Air Resources Board reports that the weighted average auction settlement prices for Cap and Trade credits in 2019 were only $16.78 (current allowances) and $16.76 (advance allowances). In other words, by achieving reductions through a substantial cost savings, telecommuting is far more cost-effective than the most cost-effective measure currently embraced in the climate change Scoping Plan.

Telecommuting has already proven to be the only traffic measure that has worked in the past 5 decades. The experiences from the current crisis conditions and the potential as indicated above demonstrates clearly it can do much more.
The ability to reach these levels, however, is dependent on telecommuting becoming available across all wage levels. Applying the previous share of telecommuting distribution calculated above, the potential traffic reductions by worker wage level are shown below.

<table>
<thead>
<tr>
<th>VMT Reduced (billion miles)</th>
<th>Lower Wage</th>
<th>Middle Wage</th>
<th>Higher Wage</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low Case: BLS/Federal Experience</td>
<td>-6.2</td>
<td>-7.1</td>
<td>-4.6</td>
<td>-17.9</td>
</tr>
<tr>
<td>Mid Case: Average of Two Days a Week</td>
<td>-10.6</td>
<td>-12.0</td>
<td>-7.8</td>
<td>-30.4</td>
</tr>
<tr>
<td>High Case: Average of Four Days a Week</td>
<td>-21.1</td>
<td>-23.9</td>
<td>-15.7</td>
<td>-60.7</td>
</tr>
</tbody>
</table>

Previous analyses largely dismiss telecommuting as something only used by and therefore benefiting higher wage workers. Application of the Dingel-Neiman results instead indicates that policies that expand this work option to lower wage workers are essential in order for it to achieve its full environmental and—through its effect on disposable household incomes—economic potential.

In practical terms, even when they were able to work from home, many workers chose not to do so in the pre-COVID economy. Interactions with co-workers is a factor for some leading to higher productivity and job satisfaction. Other workers may have felt their chances at advancement were greater if they were seen more often at their desk.

But part of the reasons behind lower uptake rates in the pre-COVID economy—including those who teleworked occasionally rather than on a regular schedule—came from the fact that telecommuting was the exception, not the normal operations model. As telecommuting expands, technology to facilitate it will as well, leading to greater acceptance of this work arrangement both by workers and their employers. Many workers having experienced telecommuting now indicate strongly that would prefer to keep working under this arrangement. The post-COVID economy situation faced on an individual worker level is likely to be a personal struggle between wanting the social and professional interactions of a workplace vs. the conveniences that they experienced while working at home vs. a realization that due to the effects of the closures combined with other steps taken by California during the crisis, dependent care slots will be far less available and far more costly. The High Case or more is certainly within reach through state and employer policies that promote this option.

In addition, the estimates cover only wage and salary workers who can do their job entirely from home. Others can do a portion of their jobs at home. As telecommuting technology expands, other occupations may be able to do more at home as well as more of the self-employed. Work related travel will also decline as the video meetings and teleconferences that have replaced it in the current crisis remain in use in the period after. In the latest Survey of Business Uncertainty, employers nationally expect to slash their travel budgets by 30% after the current crisis subsides; use of virtual meetings is expected to go from 16% of all meetings pre-COVID to 50% post-COVID. There is considerable upside from these sources to the numbers shown above.

**Reducing GHG Emissions through Telecommuting**

As with the 2008 recession (Figure 7), the current economic downturn is having a substantial effect on the state’s progress in meeting its climate change goals. One recent study estimates that between the first week of March and the second week of April, daily traffic dropped 75% in California. If traffic remained at this level for a year, those reductions would “allow California to meet half of
its 2050 climate change target." While the 2008 recession produced a permanent drop in GHG emissions as sources were restructured out of the state, the current downturn still has the potential to have less lasting effects. As discussed above, much of the effects of the current traffic decline instead can be captured and maintained in a much more positive manner through aggressive adoption of telecommuting as a permanent work arrangement.

Less work, however, has been done on attempting to quantify the associated air and GHG emission reductions from both the prior and a substantially expanded use of telework.

An early assessment of air emissions completed for the Air Resources Board found that reductions were largely proportional to the net reduction in miles traveled after taking into account differences in driving on both pre-telecommuting commutes and telecommuting days. Potential air emission reductions consequently are sensitive to assumptions in any study on any potential rebound effects (i.e., additional vehicle driving while working at home compared to this kind of travel while commuting or at a workplace). Some slight differences were identified stemming from the tendency to drive at lower speeds on telecommuting days and the higher portion of those trips being driven in cold start and hot start modes.

Other early studies indicated that any rebound trips associated with telecommuting would instead increase the air quality benefits by shifting trips overall from the early morning and late evening hours to later in the daytime.

A more recent study by the Mineta Institute of potential expansion of telecommuting in the South Bay area of Los Angeles estimated that annual emissions per 1,000 telecommuters would see ROG reduced by 7.7 tons, NOx by 15.5 tons, PM2.5 by 3.5 tons, and CO by 90.3 tons.

Estimates of the GHG reduction in recent studies have attempted to do so on a net basis, comparing the reductions from lower vehicle use to possible increased energy use at homes for equipment use, heating, and air conditioning. An IEA analysis concluded that globally, the potential vehicle emission reductions are still four times as large as those associated with any increased residential use. For California, the ratio is likely substantially larger as much of this activity would be taking place during the peak production cycle for solar and wind, and in recent years, the state’s generators have had to dump some of this emission-free energy rather than putting it to beneficial use. The net offsets would be further reduced by substantially lower workplace energy use as the telecommuting potentials estimated above along with associated reductions in work-related travel. As reflected in the Budget May Revise, state government anticipates being able to reduce workplace energy use substantially through a shift to more telework. The private sector will be able to do so as well.

As a scoping level estimate of the GHG reduction potential, the following is based on factors used by US Environmental Protection Agency and Department of Transportation in their formal rulemakings in accordance with IPCC standards. No diesel vehicles are assumed, and the numbers are adjusted for existing levels of electric vehicles. Estimates coming from this approach are similar to one that instead is based on the current GHG inventory numbers for light duty vehicles.
Consequently based on the 2019 base numbers, telecommuting as a traffic reduction option has the potential to account for from 3% to 10% of the cumulative gap remaining to reach the state’s 2030 target, as identified in the 2017 update to the state’s Scoping Plan. Assuming traffic reductions continue growing as above in the previous section, telecommuting would account for up to over 11% of the gap. The potential is likely larger given that control measures pursued earlier under the air quality programs and now under climate change have not succeeded in reversing the continued rise in the amount Californians drive, and the cumulative gap will rise as these adopted measures continue failing to perform as the models predict. Traffic reductions instead will have to come from other sources, but could be more than covered by telecommuting.

The numbers above are gross estimates of the GHG reduction potential and do not account for any of the potentially offsetting increases previously discussed. However, they also are not adjusted to account for the fact that telecommuting takes place primarily during the peak solar/wind generation hours, does not account for workplace and work-related travel reductions, and does not address the upside potential from the additional telecommuting users or the other factors also previously discussed that may increase the benefits from this work arrangement. In addition, the current Scoping Plan assumes a high degree of electric vehicles. These vehicles now are more generally used as a secondary vehicle rather than as the primary commute vehicle in households that have one. To the extent there are any rebound trips associated with telework, the Scoping Plan already assumes they will be done in vehicles that increasingly will be largely emission free.

Consequently, as a general estimate, these numbers are useful as a scoping level assessment of the potential significance to the state’s climate change program compared to the far less effective measures on which it now relies.

In spite of this potential, however, the 2017 Scoping Plan update contains no mention of teleworking or telecommuting. In fact, the background document evaluating the required traffic reductions specifically rejects measures like this that have produced meaningful reductions in the past. The additional GHG reductions are instead to be attained through additional land use planning measures, specifically the SB 375 provisions that even—as discussed previously—the Air Resources Board admits have produced no meaningful change:

This document first provides background on how VMT and associated GHG emissions relate to state climate goals and why additional GHG emissions reductions through land use decisions are important beyond the GHG emissions reduction targets adopted under SB 375 (Chapter 728, Stats. 2008).

Even Appendix H to the Scoping Plan listing the existing climate change program authorities and that goes so far as to include regulations for individual appliances contains no mention of long-established state policies promoting telecommuting. Only a single mention is given in Appendix C (Potential VMT Measures) to “Explore . . . Promoting teleworking and alternative work schedules.”
In other words, the agencies in the Scoping Plan update committed only to “exploring” the one traffic reduction measure that has continued to show results over the past 5 decades. The one measure that they, as state workers, have long been able to use to provide flexibility in their own lives. The only measure producing accelerating results at no cost to government or the public but with substantial cost and time savings to the households that use it.

Telecommuting is a cost-free alternative that can be used to achieve the goals of the Scoping Plan. The agencies’ continued insistence on these failed strategies ensures there will be emission gaps in meeting the 2030 and subsequent 2050 goals. Under the terms of the Scoping Plan, these gaps instead will have to be made up by California’s employers under Cap-and-Trade, further adding to the core costs of living that will in turn be passed on to consumers and households.

**Steps to Make Telecommuting Work**

Replacing the current ineffective strategies with telecommuting policies is not only cost-effective, they in fact produce substantial savings for workers that use it. The sustained growth in telecommuting prior to the current crisis came on its own. It was not mandated or even encouraged by the regulations. No public funding was required, and workers instead saw their effective incomes rise as they saved on the cost and time of commuting, regained an hour and often much more of their day back for other purposes, and saved in many instances on other costs such as dependent care. These income effects have been the strongest for the lower income workers able to use this option. The data shows telecommuting grew because workers welcomed the flexibility for personal and family needs.

Expansion of telecommuting in particular for lower wage occupations could include the following actions:

- Develop a model telecommuting agreement based on the state’s model agreement—except for the provisions related to dependent care—either through a private stakeholder group or in state law.

- Effectiveness of these policies for the purposes of the state air quality and climate change plans should be determined through monitoring of actual results rather than modeling. Employers should be able to use a simplified reporting module, or by working with the federal agencies, through addition of a code to unemployment insurance tax tracking that would enable the monitoring to be done through the Census Bureau’s evolving LEHD transportation database. The current state and federal economic data systems that have developed around establishment-based employment will likely require adjustment as work locations more geographically dispersed. Adjustments for environmental monitoring purposes can be accommodated within these changes.

- Enact flexibility provisions within the applicable wage and hour laws that either: (1) reform the currently cumbersome notice and voting requirements or (2) allow an employer and employee(s) to agree to adopt any flexibility provisions applied to state workers.
• Repeal the authority of the agencies to continue requiring the regulations that have not been effective in the past. Require adoption of any new regulations in this space to meet specified cost-effectiveness standards as monitored by a third-party agency such as the Department of Finance.

• Through the Little Hoover Commission or LAO, conduct a review of current public transit spending and use levels and develop recommendations for better targeting including improved bus service that is more flexible in meeting the needs of low income communities.

• To ensure that telecommuting not only opens opportunities for all wage levels of workers but that the opportunities are spread geographically as well, redirect a portion of the Cap and Trade revenues to create a network of telecommuting centers in low income communities. These especially should be located in the interior regions of the state that have not experienced the same prior level of job and income growth previously experienced by the coastal urban centers. These centers should be used to introduce telecommuting into low income communities, allow workers to grow their incomes to where they can telecommuting from home, be linked with Community Colleges as a training conduit for skills required for teleworkable occupations, and provide a focus for recruiting by California’s employers.
Appendix: Data

Figure 1

Share of US Workers Teleworking by Schedule
Source: US Bureau of Labor Statistics; working exclusively at home at least one day a week

Figure 2

Share of US Workers Teleworking by Industry
Source: US Bureau of Labor Statistics; all working exclusively at home regardless of frequency
Figure 3

Main Reason for Working at Home

Source: BLS; all workers who worked from home

Figure 4

Share of US Jobs that Can Be Done Entirely from Home

Source: Ong et al. & Forrest (2020); occupations accessed through O*NET

Figure 5

Share of Jobs that Can Be Done Entirely from Home by MSA

Source: Ong et al. & Forrest (2020); occupations accessed through O*NET
**Figure 6**

<table>
<thead>
<tr>
<th>Occupational Employment (million)</th>
<th>Work at Home Potential (million)</th>
<th>Share of Employment</th>
<th>Share of Telework Potential</th>
</tr>
</thead>
<tbody>
<tr>
<td>Higher Wage Occupations</td>
<td>2.6</td>
<td>1.9</td>
<td>70%</td>
</tr>
<tr>
<td>Middle Wage Occupations</td>
<td>5.1</td>
<td>2.8</td>
<td>56%</td>
</tr>
<tr>
<td>Lower Wage Occupations</td>
<td>9.7</td>
<td>2.5</td>
<td>26%</td>
</tr>
<tr>
<td>Total</td>
<td>17.4</td>
<td>7.2</td>
<td>41%</td>
</tr>
</tbody>
</table>

**Share of Jobs that Can Be Done Entirely from Home, California by Wage Level**

Source: see text for calculations

**Figure 7**

**California GHG Emissions, 2000 = 100**

Source: Air Resources Board, 2019 GHG Inventory

**Figure 8**

**California VMT (billion miles)**

Source: Federal Highway Administration, Office of Highway Policy Information
Use of Commute Mode, All Workers

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Drive Alone (SOV)</td>
<td>6,870,667</td>
<td>10,057,339</td>
<td>13,766,096, 3,708,757</td>
</tr>
<tr>
<td>Public Transit</td>
<td>568,785</td>
<td>678,788</td>
<td>917,793, 239,005</td>
</tr>
<tr>
<td>Carpooling</td>
<td>1,669,364</td>
<td>2,036,025</td>
<td>1,837,746, -198,279</td>
</tr>
<tr>
<td>Bikes</td>
<td>114,610</td>
<td>130,706</td>
<td>161,140, 30,434</td>
</tr>
<tr>
<td>Walking</td>
<td>437,241</td>
<td>469,867</td>
<td>472,421, 2,554</td>
</tr>
<tr>
<td>Sub-Total</td>
<td>2,790,000</td>
<td>3,315,386</td>
<td>3,389,100, 73,714</td>
</tr>
<tr>
<td>Work at Home</td>
<td>185,308</td>
<td>452,867</td>
<td>1,116,391, 663,524</td>
</tr>
<tr>
<td>Other</td>
<td>88,061</td>
<td>114,658</td>
<td>270,313, 155,655</td>
</tr>
<tr>
<td>Total</td>
<td>9,934,036</td>
<td>13,940,250</td>
<td>18,541,900, 4,601,650</td>
</tr>
</tbody>
</table>

Source: American Community Survey Public Use Microdata, Analyzed through PUMS USA, University of Minnesota, www.ipums.org.
Figure 19

California PMT (billion miles)
Source: Federal Transit Database

Figure 20

Public Transit Ridership (UPT), 2019 Average = 100
Source: US Department of Transportation

100
80
60
40
20
0

US less CA
California

Use of Commute Mode by Household Poverty Status, 2018

<table>
<thead>
<tr>
<th></th>
<th>Drive Alone</th>
<th>Carpool</th>
<th>Public Transit</th>
<th>Work at Home</th>
<th>Walk</th>
<th>Bike</th>
<th>Other</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>California</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0 - 199% of Poverty</td>
<td>67.5%</td>
<td>12.2%</td>
<td>6.3%</td>
<td>5.6%</td>
<td>5.2%</td>
<td>1.1%</td>
<td>2.1%</td>
<td>100.0%</td>
</tr>
<tr>
<td>200 - 399% of Poverty</td>
<td>75.1%</td>
<td>11.3%</td>
<td>4.3%</td>
<td>4.6%</td>
<td>2.3%</td>
<td>0.7%</td>
<td>1.6%</td>
<td>100.0%</td>
</tr>
<tr>
<td>400 - 499% of Poverty</td>
<td>77.2%</td>
<td>9.9%</td>
<td>3.7%</td>
<td>5.3%</td>
<td>1.9%</td>
<td>0.8%</td>
<td>1.3%</td>
<td>100.0%</td>
</tr>
<tr>
<td>500% and Over</td>
<td>76.0%</td>
<td>7.9%</td>
<td>5.1%</td>
<td>7.3%</td>
<td>1.7%</td>
<td>0.9%</td>
<td>1.1%</td>
<td>100.0%</td>
</tr>
<tr>
<td><strong>Total, California</strong></td>
<td>74.2%</td>
<td>9.9%</td>
<td>4.9%</td>
<td>6.0%</td>
<td>2.5%</td>
<td>0.9%</td>
<td>1.5%</td>
<td>100.0%</td>
</tr>
<tr>
<td><strong>Bay Area</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0 - 199% of Poverty</td>
<td>58.0%</td>
<td>11.2%</td>
<td>12.2%</td>
<td>6.1%</td>
<td>8.6%</td>
<td>1.6%</td>
<td>2.3%</td>
<td>100.0%</td>
</tr>
<tr>
<td>200 - 399% of Poverty</td>
<td>63.4%</td>
<td>12.8%</td>
<td>10.5%</td>
<td>4.9%</td>
<td>4.0%</td>
<td>1.7%</td>
<td>2.6%</td>
<td>100.0%</td>
</tr>
<tr>
<td>400 - 499% of Poverty</td>
<td>68.1%</td>
<td>10.1%</td>
<td>10.3%</td>
<td>5.2%</td>
<td>3.2%</td>
<td>1.5%</td>
<td>1.5%</td>
<td>100.0%</td>
</tr>
<tr>
<td>500% and Over</td>
<td>66.0%</td>
<td>8.6%</td>
<td>12.7%</td>
<td>7.0%</td>
<td>2.7%</td>
<td>1.7%</td>
<td>1.5%</td>
<td>100.0%</td>
</tr>
<tr>
<td><strong>Total, Bay Area</strong></td>
<td>64.8%</td>
<td>9.8%</td>
<td>12.0%</td>
<td>6.3%</td>
<td>3.7%</td>
<td>1.7%</td>
<td>1.8%</td>
<td>100.0%</td>
</tr>
<tr>
<td><strong>Southern California</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
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<td>0 - 199% of Poverty</td>
<td>68.0%</td>
<td>11.5%</td>
<td>7.1%</td>
<td>5.6%</td>
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<td>0.7%</td>
<td>2.0%</td>
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</tr>
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<td>200 - 399% of Poverty</td>
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<td>4.3%</td>
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</tr>
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<td>79.0%</td>
<td>10.1%</td>
<td>2.5%</td>
<td>5.1%</td>
<td>1.5%</td>
<td>0.5%</td>
<td>1.3%</td>
<td>100.0%</td>
</tr>
<tr>
<td>500% and Over</td>
<td>80.4%</td>
<td>7.5%</td>
<td>2.0%</td>
<td>7.4%</td>
<td>1.2%</td>
<td>0.5%</td>
<td>1.0%</td>
<td>100.0%</td>
</tr>
<tr>
<td><strong>Total, Southern California</strong></td>
<td>76.5%</td>
<td>9.7%</td>
<td>3.7%</td>
<td>5.9%</td>
<td>2.3%</td>
<td>0.5%</td>
<td>1.4%</td>
<td>100.0%</td>
</tr>
</tbody>
</table>
## Use of Commute Mode by Ethnicity/Race, California 2018

Source: American Community Survey Public Use Microdata, Analyzed through PUMS USA, University of Minnesota, www.ipums.org.

<table>
<thead>
<tr>
<th>Mode</th>
<th>Drive Alone</th>
<th>Carpool</th>
<th>Public Transit</th>
<th>Work at Home</th>
<th>Walk</th>
<th>Bike</th>
<th>Other</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>California</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Latino</td>
<td>74.9%</td>
<td>12.5%</td>
<td>4.6%</td>
<td>3.4%</td>
<td>2.3%</td>
<td>0.6%</td>
<td>1.7%</td>
<td>100.0%</td>
</tr>
<tr>
<td>White</td>
<td>75.2%</td>
<td>6.8%</td>
<td>3.8%</td>
<td>9.1%</td>
<td>2.7%</td>
<td>1.2%</td>
<td>1.1%</td>
<td>100.0%</td>
</tr>
<tr>
<td>Asian/Pacific Islander</td>
<td>71.2%</td>
<td>11.8%</td>
<td>7.3%</td>
<td>5.1%</td>
<td>2.6%</td>
<td>0.7%</td>
<td>1.4%</td>
<td>100.0%</td>
</tr>
<tr>
<td>African-American</td>
<td>73.8%</td>
<td>7.7%</td>
<td>8.5%</td>
<td>5.0%</td>
<td>2.2%</td>
<td>0.6%</td>
<td>2.2%</td>
<td>100.0%</td>
</tr>
<tr>
<td>Other</td>
<td>71.0%</td>
<td>10.0%</td>
<td>5.9%</td>
<td>6.6%</td>
<td>3.7%</td>
<td>1.1%</td>
<td>1.6%</td>
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</tr>
<tr>
<td>Total, California</td>
<td>74.2%</td>
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<td>3.8%</td>
<td>1.0%</td>
<td>1.7%</td>
<td>100.0%</td>
</tr>
<tr>
<td>African-American</td>
<td>62.2%</td>
<td>9.7%</td>
<td>17.6%</td>
<td>4.6%</td>
<td>1.8%</td>
<td>0.7%</td>
<td>3.3%</td>
<td>100.0%</td>
</tr>
<tr>
<td>Other</td>
<td>61.7%</td>
<td>10.3%</td>
<td>13.9%</td>
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</tr>
<tr>
<td><strong>Southern California</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
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<td>5.0%</td>
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<td>0.5%</td>
<td>1.4%</td>
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</tr>
<tr>
<td>White</td>
<td>78.0%</td>
<td>6.5%</td>
<td>1.8%</td>
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<td>2.5%</td>
<td>0.6%</td>
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<td>0.4%</td>
<td>1.2%</td>
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<td>7.2%</td>
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<td>5.2%</td>
<td>2.4%</td>
<td>0.5%</td>
<td>2.2%</td>
<td>100.0%</td>
</tr>
<tr>
<td>Other</td>
<td>73.7%</td>
<td>10.1%</td>
<td>3.1%</td>
<td>7.2%</td>
<td>3.6%</td>
<td>0.7%</td>
<td>1.7%</td>
<td>100.0%</td>
</tr>
<tr>
<td>Total, Southern California</td>
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<td>3.7%</td>
<td>5.9%</td>
<td>2.3%</td>
<td>0.5%</td>
<td>1.4%</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

## Cumulative Change in Commuters by Mode: All

Figure 29

Cumulative Change in Commuters by Mode: 500%+ of Poverty

Source: American Community Survey, Analyzed through PUMS-USA, University of Minnesota, www.ipums.org

Figure 30

Cumulative Change in Commuters by Mode: Latinos

Source: American Community Survey, Analyzed through PUMS-USA, University of Minnesota, www.ipums.org

Figure 31

Cumulative Change in Commuters by Mode: African-Americans

Source: American Community Survey, Analyzed through PUMS-USA, University of Minnesota, www.ipums.org
Figure 35

Cumulative Change in Commuters by Ethnicity/Race
Source: American Community Survey, Analyzed through PUMELUSA, University of Minnesota, www.ipums.org

Figure 36

Average One-Way Commute, California
Source: US Census Bureau, Longitudinal Employer-Household Dynamics

67
Appendix: Model State Telecommuting Agreement
**ATTACHMENT A – TELECOMMUTING ARRANGEMENT**

<table>
<thead>
<tr>
<th>Teleworker Name:</th>
<th>Teleworker Name:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Telecommuting Location:</td>
<td>Main Office Location:</td>
</tr>
<tr>
<td>Street Address:</td>
<td>Street Address:</td>
</tr>
<tr>
<td>City:</td>
<td>City:</td>
</tr>
<tr>
<td>Telephone:</td>
<td>Supervisor/Manager Name:</td>
</tr>
<tr>
<td>Email:</td>
<td>Supervisor/Manager Telephone:</td>
</tr>
</tbody>
</table>

☐ This is my residence  
☐ This is a State telecommuting center or satellite office  
☐ Other location (identify): ____________________________  

<table>
<thead>
<tr>
<th>Telecommuting Schedule: (Check one)</th>
<th>☐ Casual</th>
<th>☐ Regular</th>
</tr>
</thead>
<tbody>
<tr>
<td>☐ Weekly basis</td>
<td>☐ Monthly Basis</td>
<td></td>
</tr>
</tbody>
</table>

|-----------|-------|--------|-------|---------|-------|

Start Time:  
Finish Time:  

Indicate work dates and hours here if not covered in table:

<table>
<thead>
<tr>
<th>State Assets to be Used at Remote Work Site:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
</tr>
<tr>
<td>-------------</td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>State Information Systems to be accessed from remote work location (if any):</th>
</tr>
</thead>
</table>

I have read, understand, and acknowledge the [Entity Acronym] Telecommuting Program Policy and Procedure and state Telecommuting and Remote Access Security Standard. I also understand that my use of any state and/or personal computing equipment for [Entity Acronym] Telecommuting may result in a lack of privacy relating to those items. I have completed and certified the Safety Checklist/Acknowledgement. I have met with my supervisor and discussed my role in, the conditions under which I remain, and the termination process of teleworking at [Entity Acronym].

**Signatures:**  
Teleworker: ____________________________ Date: ______________  
Manager/Supervisor: ____________________________ Date: ______________  
Office Chief: ____________________________ Date: ______________
Both the manager/supervisor and teleworker understand that telecommuting is a bilateral voluntary arrangement that can be discontinued at either party’s request with no adverse repercussions.

- Supervisors must approve in advance the use of, vacation, time off, or other leave credits, as well as any overtime work.
- A teleworker must forgo telecommuting when their physical presence is required in the office on regularly scheduled telecommuting day. Managers and/or supervisors should provide reasonable notice whenever possible. If required, the employee may be required to report to the office without advance notice.

The [Entity Acronym] may reimburse teleworkers for business expenses necessary for performing work assignments.

- Supervisors must pre-approve in writing all such reimbursements.
- The [Entity Acronym] will not be liable for telecommuting expenses not identified in the telecommuting arrangement.
- Teleworkers must return state owned equipment to [Entity Acronym] for maintenance and repair.
- Teleworkers should submit a Travel Expense Claim along with receipts, bills or other verification of expenses pursuant to travel expense claim procedures.

The [Entity Acronym] will not pay for the following expenses:

- Maintenance or repairs of privately owned equipment.
- Utility costs associated with the use of the computer or occupation of the home.
- Equipment supplies (these should be requisitioned through the main office).
- Travel expenses associated with commuting to the main office, other than authorized transit subsidies.

Additionally:

- Teleworkers must be available by phone or e-mail during their designated work hours.
- Telecommuting is not a substitute for dependent care, and teleworkers must make regular dependent care arrangements.
- The teleworker has read and understands the [Entity Acronym] Telecommuting Program Policy and agrees to abide by this policy.
- The teleworker will carry out the steps required for information security, and has familiarized him/herself with [Entity Acronym] information security requirements and procedures and the state Telecommuting and Remote Access Security Standard. The teleworker agrees to consult with his/her supervisor when security matters are an issue.

This arrangement expires in one year and must be renewed to continue participation in the [Entity Acronym] Telecommuting Program.

Initials:  Teleworker  ______  (Date)  ______  Manager/Supervisor  ______  (Date)  ______
The following checklist must be completed for any in-home telecommuting site and reviewed annually. All items must be evaluated by the employee as being satisfactory, and shall be installed and maintained in accordance with guidelines in “Setting Up An In-home Office,” Attachment C.

### I. Electrical

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. All electrical outlets in the work area are permanent in nature and properly grounded.</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>B. There are an adequate number of electrical outlets to support equipment in the work area.</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>C. Electrical cords are not frayed or otherwise damaged.</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>D. Extension cords are not being used as a permanent source of electricity.</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>E. Electrical equipment and tools are properly maintained.</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>F. Computers, peripheral equipment, and fax machines are connected to surge protectors to guard against damage from power surges.</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>

### II. Fire Protection

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
</table>
| A. Smoke Detector  
1. There is a smoke detector placed in a location near the work area and any equipment used to support teleworking. | ☐ | ☐ |

  2. Underwriter’s Laboratory (UL) and/or the State Fire Marshall approve the smoke detector, and it has a function test mechanism. | ☐ | ☐ |

  3. Smoke detector(s) have been tested at the time of installation and will continue to be tested on a monthly basis. | ☐ | ☐ |

B. Fire Extinguisher  
1. A 2A10BC fire extinguisher is required. | ☐ | ☐ |

  2. The fire extinguisher is fully charged. | ☐ | ☐ |

  3. The fire extinguisher is within 10 feet of the electronic teleworking equipment and easily accessible to the teleworker. | ☐ | ☐ |

### III. Emergency Procedures

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. There is an evacuation plan.</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>B. There is more than one way out of the work area (e.g., doors/ windows).</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>C. A first aid kit is on site.</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>

### IV. Environment

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. The work area is free of tripping hazards and is uncluttered.</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>B. All equipment is adequately supported and free from the danger of falling.</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>C. The work area has adequate lighting.</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>D. Potentially hazardous chemicals are not stored in, or around, the work area.</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>
### V. Work Station Arrangement

(Check here □ if you will NOT be using computer equipment and skip to Section VI.)

#### A. Positioning When Seated

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Are your forearms and wrists parallel to the floor and upper arms resting at your sides when positioned at the keyboard or work surface?</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>2. Are your thighs parallel to the floor?</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>3. Are your feet supported?</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>4. Is there at least 2 inches of clearance between your thighs and the working surface?</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>5. Is there space, approximately the size of a fist, between the edge of the seatpan and the back of your knees?</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>6. Is the top of the monitor at a comfortable height <em>(i.e. no tilting of the head back or downward)</em>?</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>7. Is the monitor screen at a comfortable distance from your eyes when in use <em>(i.e. you don't have to lean forward or backward to see the text on the screen)</em>?</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>8. Does your head and neck rest in a neutral position <em>(i.e. facing forward, chin slightly down, shoulders relaxed)</em>?</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>

#### B. Chair Adjustment

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Is the height of the chair adjusted to allow you to sit in a neutral position <em>(see your safety officer for a definition of this position)</em>?</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>2. Is the backrest of your chair supporting the curve of your lower back so that your spine is slightly arched?</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>

#### C. Foot Support

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Are your feet comfortably on the floor or a footrest?</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>2. If a footrest is used, does it allow you to sit in a correct neutral position at your work station? <em>(skip to D if a footrest is not used)</em></td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>3. Is the footrest non-restrictive to allow for leg movement and easily removable?</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>

#### D. Video Display Terminal (VDT) Screen/ Monitor

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Is your monitor placed to avoid glare caused by light sources?</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>2. Is your screen angle and/or brightness and contrast controls adjusted to reduce glare?</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>3. Is your screen clean and free from dust and smudges?</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>4. Is your screen adjusted for good image contrast and brightness?</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>
### V. Work Station Arrangement (Continued)

#### E. Workspace Arrangement

<table>
<thead>
<tr>
<th>Question</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Are materials and equipment accessed and/or used frequently typically positioned/placed within 16” of reach (comfort zone)?</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>2. Are materials and equipment accessed and/or used less frequently typically positioned/placed within 16” to 24” of reach (secondary zone)?</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>3. Are frequently used materials/equipment positioned so harmful postures and motions are eliminated?</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>4. Are documents placed in the same visual plane as the screen face to reduce back and forth neck motions?</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>5. Is the telephone placed within proper reach on side opposite from the writing hand (i.e., on the left side if right handed)?</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>6. Are most of your reaching motions below shoulder height and/or above knee height?</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>

**Caution:** “No” responses to any questions may indicate a potential problem with your in-home workspace arrangement. Management may deny or rescind telecommuting based on home safety or suspected hazards.

#### VI. Acknowledgement

Since the State is ultimately responsible for insuring that employees have a safe work environment under Cal-OSHA (C.L.C. Section 6401.7(a)2), [State Entity NAME] may require a safety inspection by a qualified health and safety inspector of a teleworker’s home office space. If warranted, [Entity Acronym] will provide 48-hour notice to the employee except in the case of an emergency.

Home office safety re-certification will be required on an annual basis.

I, ____________________________________________ (print name) certify that my home office meets all the above requirements in the Safety Checklist/Acknowledgement.

<table>
<thead>
<tr>
<th>Employee’s Signature</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Supervisor's Signature</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
In setting up a home office, select a location that is safe, efficient, and comfortable. Observe “travel patterns” in and around the work area and avoid high traffic areas.

**The main considerations in designing an in-home office are:**

<table>
<thead>
<tr>
<th><strong>Desk</strong></th>
<th>Your desk should be sturdy and able to handle the weight of any peripheral equipment (computers, printers, fax machines and/or telephones).</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• Conventional desks are typically 29” high.</td>
</tr>
<tr>
<td></td>
<td>• Computing surfaces are usually 26” high.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Chair</strong></th>
<th>Your seat should be adjustable, including the headrest.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• Height of top of seat to floor should be between 15 and 25 inches.</td>
</tr>
<tr>
<td></td>
<td>• Back tilt on chair/lumbar support should be 15 degrees.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Lighting</strong></th>
<th>Your work lighting should be directed toward the side or behind the line of vision.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>▪ Bright light sources can bounce off working surfaces and diminish the sense of contrast.</td>
</tr>
<tr>
<td></td>
<td>▪ Northern daylight is optimal for both the office and operating a computer.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Electricity</strong></th>
<th>You should have enough electrical outlets in the room to avoid overloading any circuits. If necessary, consult your local power utility.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1. To avoid tripping hazard, cover interconnecting cables or place them out of the way.</td>
</tr>
<tr>
<td></td>
<td>2. Use a surge protector/master switch to connect electronic equipment, such as computers, monitors, printers and fax machines.</td>
</tr>
<tr>
<td></td>
<td>3. Position equipment close to electrical outlets.</td>
</tr>
<tr>
<td></td>
<td>4. Make sure electrical outlets are grounded.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Noise</strong></th>
<th>You should avoid or keep distracting sounds to a minimum, such as the television or outside traffic or lawn mower sounds</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• Diffuse unavoidable noise by shutting a door or using a room divider.</td>
</tr>
<tr>
<td></td>
<td>• Use soft background music to keep productivity up and reduce boredom.</td>
</tr>
<tr>
<td></td>
<td>• Note: no noise can be just as stressful as too much noise.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Protecting Data and Equipment</strong></th>
<th>You must prevent costly computer breakdowns and the loss of crucial data by following these computer safeguards:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1. Position Equipment away from direct sunlight or heat sources.</td>
</tr>
<tr>
<td></td>
<td>2. Place equipment on well-ventilated surfaces and provide for sufficient air space around them.</td>
</tr>
<tr>
<td></td>
<td>3. Dust office space regularly.</td>
</tr>
<tr>
<td></td>
<td>4. Do not eat or drink near valuable equipment.</td>
</tr>
<tr>
<td></td>
<td>5. Never place food or beverages on your computer equipment, even temporarily.</td>
</tr>
<tr>
<td></td>
<td>6. Do not touch unprotected floppy diskette or compact disk (CD) surfaces, set heavy objects on them, or expose them to heat, dirt, smoke or moisture.</td>
</tr>
<tr>
<td></td>
<td>7. Keep all magnets, telephones, fluorescent lamps and electric motors away from computer equipment, floppy diskettes, and portable storage devices.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Safety</strong></th>
<th>Review the “Safety Checklist/Acknowledgement,” Attachment B.</th>
</tr>
</thead>
</table>
ATTACHMENT D – Supervisor’s Checklist

Teleworker Name: ____________________________  Office/Branch: ________________

Date: __________________

Teleworker’s Telephone at Telecommuting site: __________________________________

Teleworker’s Schedule: ☐ Casual  ☐ Regular

All of the following items must be checked off as completed before the employee begins teleworking:

☐ Employee and supervisor have read and agree to abide by the provisions of the Telecommuting Program Policy and Procedures.

☐ Employee and Supervisor have read and agree to the state Telecommuting and Remote Access Security Standard.

☐ The employee has read and signed the Telecommuting Arrangement Form prior to participation in the program.

☐ You have documented [Entity Acronym] issued telecommuting equipment. The employee has received and clearly understand the requirements for care of [Entity Acronym] equipment.

☐ The employee is familiar with requirements pertaining to the security and confidentiality of data and information.

☐ Performance expectations have been discussed and are clearly understood.

☐ Phone contact procedures have been clearly defined.

☐ Any necessary remote access forms have been completed and approved.

Print Supervisor’s Name: __________________________________

Supervisor’s Signature: ____________________________  Date ______________

___________________________
ATTACHMENT E – Considerations for Selecting Teleworkers

Many [Entity Acronym] jobs contain tasks suitable for teleworking. Tasks that can be successfully managed in telecommuting programs are those where the employee works independently handling information, including writing, reading, analyzing, telephoning, computer work and data entry.

The following considerations should be explored:

☐ Does the employee have the necessary knowledge to perform the required job tasks away from the office, or require input from others in the main office?

☐ What portion of the employee’s job is devoted to face-to-face contact with other agencies, the public or internal staff? Are there alternatives to needing this contact? Can this contact be structured to allow for communication via phone or computer, and if not, can it be redirected to the employee’s planned non-telecommuting days?

☐ What portion of the employee’s job requires the use of reference materials or resources located in the main office? Are these resources portable and able to be temporarily removed without interfering with the job performance of co-workers? Or are these resources available off-site through other means such as the Internet or a local library?

☐ Will the employee’s computer resources and software meet [Entity Acronym] IT standards and allow for required productivity? Are there remote access hardware limitations? Does the Office have available resources to supply the employee with computing equipment?

☐ What portion of the employee’s job relies on access to photocopiers, fax capabilities or other specialized equipment? Can access needs be met on non-telecommuting days or can these needs be serviced by a facility near the employee’s telecommuting office?

☐ What portion of the employee’s job uses confidential information? Can this information be secured in accordance with information security policies if taken or accessed off-site?

☐ Can a variety of tasks, that do not require information or equipment from the main office, be grouped and scheduled as telework? Can staff meetings and conferences be grouped and scheduled for non-telecommuting days or accommodated with teleconferencing?

☐ Does the employees’ job involve fieldwork? Can trips begin or end at the employee’s telecommuting office rather than at the main office? Can associated paperwork be done away from the main office?

☐ Is the employee reliable, responsible, self-directed and able to work independently in performing his or her work duties? Has the employee demonstrated the ability to establish priorities and manage his or her time? Does the employee require close supervision?
**Main Office**: the [Entity Acronym] location to which an employee is assigned.

**Telecenter** – An office near the employees’ homes to which they regularly or casually report to work. The building is usually owned or leased by one or more agencies.

**Dependent Care**: care giving for infants, toddlers, preschoolers, school-aged children, adults and elderly adults who require constant supervision. Prohibited in [Entity Acronym] Telework.

**Gross Negligence**: the deliberate inattention and failure to exercise the care that a prudent person usually exercises and the reckless disregard of the consequences affecting the life or property of another.

**Home Office**: an area designated within the employee’s home for the purpose of performing [Entity Acronym] work.

**Information Assets**: All categories of information (confidential, personal, sensitive, or public), all forms of information assets (paper or electronic), information technology facilities, equipment and software owned or leased by state agencies. (See SAM Section 4989.1, Definitions; Condensed)

**Remote Access**: the connection of an information asset (computing equipment, etc.) from an off-site location to an information asset on state IT infrastructure.

**Telecommute**: see Telework

**Teleconferencing**: holding a conference among people remote from one another by means of telecommunication devices (e.g. telephones or computer terminals).

**Telework**: An arrangement in which an employee regularly performs officially assigned duties at home or other work sites geographically convenient to the residence of the employee.

**Telecommuting Schedules**:  
- **Casual**: a casual or limited telecommuting arrangement to accommodate: 1) convalescence from an injury or illness, 2) a recovering family member in need of limited in-home assistance, 3) the last weeks of pregnancy, and/or following childbirth, 4) an inaccessible main office, 5) blocked commute routes (i.e., major road construction, storm, or a disaster) 6) special project work requiring an extended period of non-interruptible time.

- **Regular**: an established telecommuting schedule of days per week or month that centers on the needs of [Entity Acronym].

**Teleworker**: an employee that teleworks.
End Notes


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