

# Expanding Access to Sustainable Transportation in California



PRODUCED BY

**Next 10**

F. Noel Perry  
Colleen Kredell  
Marcia E. Perry  
Stephanie Leonard

PREPARED BY

**Beacon Economics**

Uday Ram  
Hoyu Chong

DESIGN BY

**José Fernandez**

ONLINE AT

[www.next10.org](http://www.next10.org)

NEXT 10 is an independent nonpartisan organization that educates, engages and empowers Californians to improve the state's future.

Next 10 is focused on innovation and the intersection between the economy, the environment, and quality of life issues for all Californians. We provide critical data to help inform the state's efforts to grow the economy and reduce greenhouse gas emissions. Next 10 was founded in 2003 by businessman and philanthropist F. Noel Perry.

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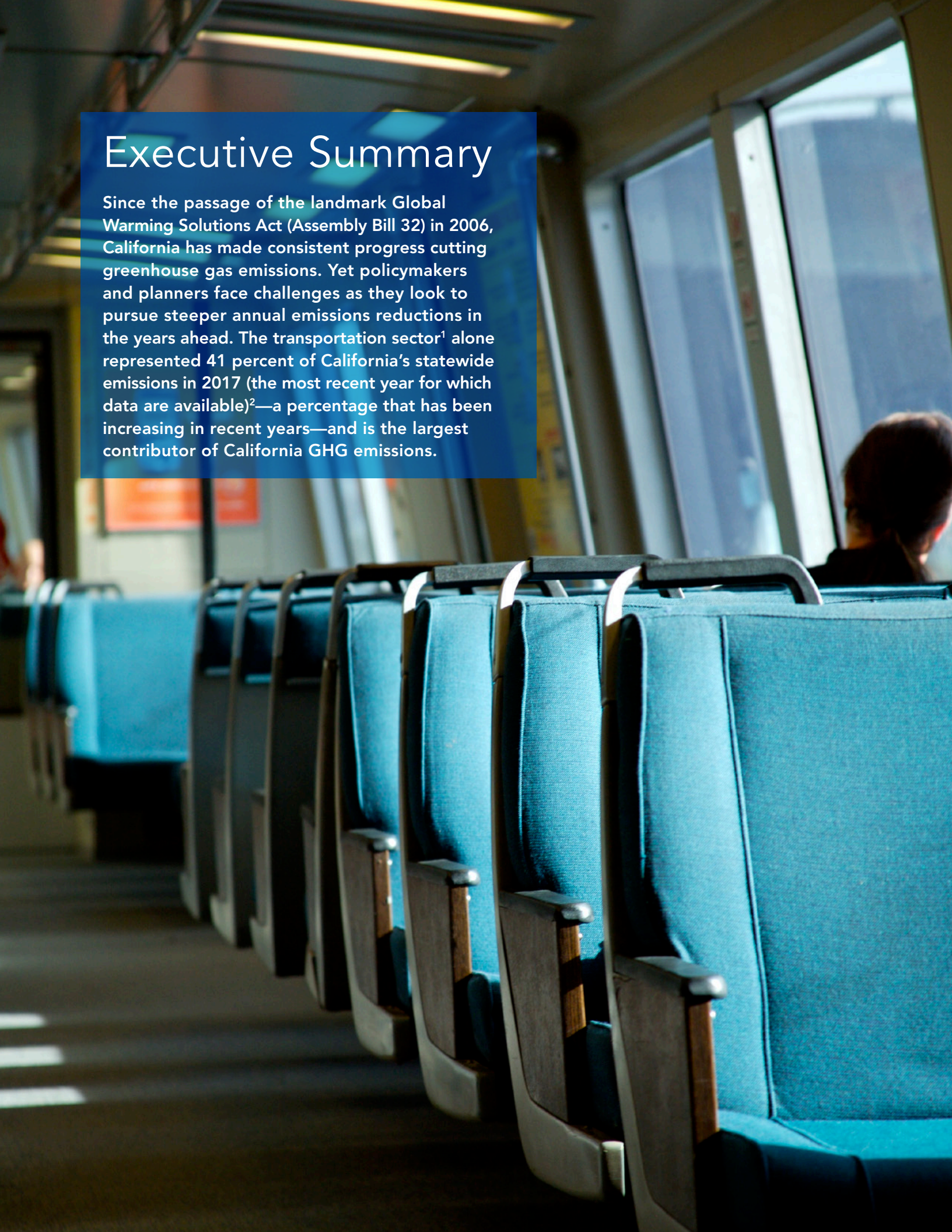
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# Executive Summary

Since the passage of the landmark Global Warming Solutions Act (Assembly Bill 32) in 2006, California has made consistent progress cutting greenhouse gas emissions. Yet policymakers and planners face challenges as they look to pursue steeper annual emissions reductions in the years ahead. The transportation sector<sup>1</sup> alone represented 41 percent of California's statewide emissions in 2017 (the most recent year for which data are available)<sup>2</sup>—a percentage that has been increasing in recent years—and is the largest contributor of California GHG emissions.



In the first few months of the COVID-19 crisis in California, amid the shuttered storefronts and shelter-in-place orders, many observed the inadvertent tradeoff between a sudden shutdown in economic activity and nearly instantaneous improvement in air quality. Nowhere has the cause-and-effect been more noticeable than in the case of drastically reduced traffic volumes across the state. This is not to suggest that COVID-19 should be celebrated for reducing vehicle-borne emissions, but it does grant policymakers, planners, and residents alike an opportunity to reflect on the outcomes should California successfully pursue strategies and policies resulting in a cleaner and more sustainable transportation sector.

Within the transportation sector, emissions from on-road passenger vehicles made up over two-thirds of the entire transportation sector's GHG emissions in 2017, representing 28 percent of the state's total GHG emissions. While California has made progress in decarbonizing its higher-emitting sectors and transitioning to cleaner vehicles, at its current trajectory, it is unlikely that the state will achieve its goal of reducing GHG emissions 40 percent below 1990 levels by 2030 without significant movement towards a more sustainable transportation sector.

One pathway to achieving emissions cuts in the transportation sector—while providing the added benefits of improved air quality and economic savings—is by improving options and access to cleaner transportation alternatives. The state has passed a number of policies and programs to advance cleaner fuels, transportation alternatives, and encourage development that can allow for lower vehicle miles traveled (VMT), but there remain opportunities and challenges for advancing sustainable transportation options across the state. Local conditions vary greatly throughout California, making some options more viable than others and allowing for a wider range of alternatives in one region compared to another. Yet while the solutions for sustainable transportation may differ, there is potential for all communities to reap the benefits.

## Purpose and Methodology

The degree to which a county can contribute to state-wide climate goals and improve regional air quality conditions rests largely in its ability to reduce its population's dependence on fossil fuel modes of transportation. Yet

one size does not fit all, and different regions will have different options available to them based local context.

**This paper analyzes four categories related to sustainable transportation in an effort to inform how counties and regions can best support clean transportation alternatives in their areas to not only achieve GHG reductions and air quality improvement, but to promote economic growth and equitable outcomes.** These results are also analyzed with respect to equity, to determine the extent to which clean transportation alternatives are being accessed and used by all income levels and all racial groups across the state. The goal of this analysis is to identify the successes of areas that have been able to increase the equitable use of sustainable transportation modes—as well as opportunities for improvement.

The COVID-19 pandemic has created a temporary “new normal” that will impact how people move, and via what means, throughout the state for some time. At the same time, the pandemic has brought to light some of the environmental and economic challenges that have been exacerbated by inequality during the state's extended shelter-in-place. In order to reduce the inequitable health effects experienced as a result of concentrated air pollution and to achieve the state's long-term climate goals, it is critical that the state, regions, and counties work to improve access to and increase usage of clean transportation alternatives. Through the use of 12 indicators across four categories, this study provides counties and regional planning organizations with several lenses through which they can measure progress on sustainable transportation planning.

In addition to these indicators, the transportation sustainability assessment framework also considers equity issues and population density.

- **Equity:** Low-income communities—especially low-income communities of color—are chronically underserved with respect to accessible, efficient, and effective transit infrastructure. Effective reductions in the transportation sector's GHG emissions can be achieved only if everyone is involved and everyone benefits, regardless of income level, race or ethnicity. To shed light on these concerns, this paper looks at whether or not sustainable transportation alternatives are being equitably accessed and utilized across all income levels and all racial groups through the state.

1 The transportation sector consists of the following sub-sectors: On-Road Passenger Vehicles, Heavy-Duty Trucks, Ships and Commercial Boats, Aviation, Rail, and Off-Road Transportation. This white paper focuses on the climate effects of On-Road Passenger Vehicles.  
 2 2019 California Green Innovation Index. Next 10. October 8, 2019. Available at: <https://www.next10.org/publications/2019-gii>

- Population Density:** Whether a county is primarily rural or urban has significant implications for the availability of feasible and effective transportation options; what works in one region of the state may not necessarily work or be appropriate in another. For example, recreating the Bay Area Rapid Transit system in Alpine County makes little sense, nor should residents in Butte be expected to reduce VMT per capita to the same extent as Los Angeles residents aspire. This study acknowledges such differences exist and addresses rural and urban considerations separately

### Key Findings

Results from this analysis are highlighted below for both urban and rural counties. Detailed findings for all indicators, along with assessments of three of the state’s largest regions can be found in the full brief. While many counties may have a mix of both urban and rural communities, for the purpose of this brief, counties that are included as “rural” are those that are identified as such by the Rural County Representatives of California.<sup>3</sup>

#### Vehicle Miles Traveled

##### Urban County Findings

- The San Francisco Bay Area performs best with respect to VMT.** Among the top 10 ranking urban counties in terms of lowest VMT per capita, 3 were located in the Bay Area.
- Eleven of the 17 counties that either experienced a decline in VMT per capita or saw no change between 2013 and 2018 were located in urban areas.** Of those, San Francisco saw the greatest decline (-5.1%) while Santa Cruz followed closely behind (-4.9%). While the Bay Area did perform best overall in terms of VMT, the decline of San Francisco’s VMTs was tempered by an increase in VMT from its neighbor to the north, Marin County (+12.3%). Given that San Francisco has the highest population density and lowest VMT per capita per day statewide, this difference exemplifies a divide even among counties in close proximity to each other that have different community preferences, land use policies, and transportation needs.
- An increase in the share of commuters using cars**

**TABLE ES.1 Sustainable Transportation Indicators**

Vehicle Miles Traveled (VMT)	VMT per capita VMT improvement over time Percentage of commutes by driving Change in percentage of commutes by driving
Alternative Fuel Vehicle Adoption	Battery electric vehicle (BEV) adoption Plug-in hybrid electric vehicle (PHEV) adoption Other alternative (hybrid-electric and natural gas) vehicle adoption
Active Transportation	Percentage of commutes by active transportation Percentage of commutes by active transportation improvement over time
Public Transit	Percentage of commutes by public transit Percentage of commutes by public transit improvement over time Public transit ridership per capita

**does not necessarily mean that VMT per capita (or VMT overall) is moving in the same direction, as evidenced in Southern California.** Although the share of commuters by car increased in five of the largest Southern California counties from 2013 to 2018—Los Angeles (+2%), Orange (+1.3%), Riverside (+1%), San Bernardino (+1.5%), and San Diego (+0.3%)—VMT per capita actually declined by one to two percent in some cases (San Bernardino and Orange) or stayed roughly the same (Los Angeles).

##### Rural County Findings

- Of the top ten ranking rural counties in terms of lowest VMT per capita, three counties saw 2018 VMT levels fall below the statewide average of 23.8 miles/person/day:** Napa (22.9), Butte (22), Tulare (22.9).
- Six rural counties (Calaveras, Merced, Napa, Nevada, Placer, and Plumas) saw a reduction in VMT per capita between 2013 and 2018.** Of those, Nevada County saw the sharpest decline (-6.0%), which may be in part attributed to an increase in teleworking (even before COVID-19) and rising interest in active and public transportation modes among residents.<sup>4</sup> In Calaveras, the share of commuters who

3 Counties. Rural County Representatives of California. Available at: <https://www.rcrcnet.org/counties>

4 Nevada County Regional Transportation Plan: 2015-2035. Nevada County Transportation Commission. January 2018. Available at: [https://www.nctc.ca.gov/documents/RTP/Final%20Nevada%20Co%20RTP%2017\\_18.pdf](https://www.nctc.ca.gov/documents/RTP/Final%20Nevada%20Co%20RTP%2017_18.pdf)

travel by car declined from 85.8 percent to 81.5 percent over the period. This progress may to some extent be due to the county's efforts to expand active transportation, which includes 50 allocated projects in the main population center of Angel's Camp to minimize traffic volumes, among other plans.<sup>5</sup>

- **Rural counties on average have higher average VMT per capita than urban counties, though there is a high degree of variation from one county to another.** Alpine County had far and away the highest VMT/person/day at 149.1 miles/person/day in 2018 (or an increase from 59.4 to 73.2 percent of all commuters between 2013 and 2018).<sup>6</sup> At the other end of the spectrum, Butte County's average VMT per capita was only 22 miles/person/day—nearly two miles less than the statewide average of 23.8 in 2018—while the share of commuters by car increased one percent.

### Alternative Fuel Vehicle (AFV) Adoption

Alternative fuel vehicles include battery electric vehicles (BEV), plug-in hybrid electric vehicles (PHEV), and other alternative vehicles (including hybrid-electric and natural gas). While many of California's state-level policies are targeted at increasing BEV and PHEV adoption, all alternative fuel vehicles can provide cleaner alternatives than existing gas-powered internal combustion engine vehicles.

### Urban County Findings

- **Rates of AFV adoption are higher in urban areas.** Not surprisingly, concentrations of wealth and a more robust charging infrastructure due to increased levels of demand are key drivers. Indeed, the top five cities in the country that boast the greatest electric vehicle market share are all located in California: San Jose, San Francisco, San Diego, Los Angeles, and Sacramento.<sup>7</sup> Statewide, the top ten counties in terms of highest AFV adoption are all in urban counties.
- **Even though urban areas generally have higher rates of AFV adoption compared to rural areas, variation exists.** The combined battery electric vehicle (BEV) and plug-in hybrid vehicle (PHEV) adoption rates in the urban counties in the Bay Area—especially in Marin (2.4%) and San Francisco (3.1%)—compare favorably against Southern California, where BEVs and PHEVs represented an less than two percent of all vehicles in 2018, with the exception of Orange County (which is slightly higher at 2.2% of total vehicles).

### Rural County Findings

- **Income is a currently a stronger predictor of alternative fuel vehicle adoptions rates than rurality.** Sonoma County, whose median annual household income is over \$81,000, outpaced adoption rates in many urban areas and ranked 9th, 5th, and 8th among all counties in terms adoption of battery electric vehicles (BEVs), plug-in hybrid electric vehicles (PHEVs), and other alternative fuel vehicles (hydrogen and natural gas), respectively, in 2018.
- **Counties that prioritize charging infrastructure are driving adoption.** At a population of 220,000 residents, Yolo County boasts an AFV adoption rate of nearly six percent. The Institute for Local Government ranks the County highly in terms of its current deployment of electric vehicle charging and hydrogen fuel stations,<sup>8</sup>

5 2017 Calaveras Regional Transportation Plan. Calaveras Council of Governments. October 4, 2017. Available at: <https://calacog.org/wp-content/uploads/2020/06/2017-Regional-Transportation-Plan-RTP-Update.pdf>

6 Alpine's extremely low density and population - 96 percent of the County sits on public lands - coupled with a lack of major employment centers nearby are major determining factors. Per the county's regional transportation plan, Alpine is primarily automobile-oriented due to the rural nature of the local communities, low development densities, and limited options for using alternative modes of travel with regional traffic fluctuations as a result of outdoor tourism.

7 *The surge of electric vehicles in United States cities.* The International Council on Clean Transportation. June 2019. Available at: [https://theicct.org/sites/default/files/publications/ICCT\\_EV\\_surge\\_US\\_cities\\_20190610.pdf](https://theicct.org/sites/default/files/publications/ICCT_EV_surge_US_cities_20190610.pdf)

8 "County of Yolo: Sustainability Best Practice Activities." Institute for Local Government. Available at: [https://www.ca-ilg.org/sites/main/files/file-attachments/yolo\\_county\\_bp\\_final.pdf?1569020423](https://www.ca-ilg.org/sites/main/files/file-attachments/yolo_county_bp_final.pdf?1569020423)

and Yolo has worked with the Sacramento Area Council of Governments to secure an additional \$2.9 million for further EV charging infrastructure development.<sup>9</sup>

### Active Transportation<sup>10</sup>

Statewide, 9.4 percent of workers commuted using active transportation in 2018—2.7 percent of commuters walked to work, just 1.1 percent biked to work, and 5.7 percent worked from home. The share of workers commuting using active transportation has increased modestly in recent years, mostly due to the growing acceptance of remote working. This year, the COVID-19 pandemic has greatly increased the share of workers that work from home, and while the share will surely decrease as restrictions are lifted over the coming year, some studies suggest that as many as 29<sup>11</sup> to 37<sup>12</sup> percent of workers nationwide could potentially work remotely full-time (a choice that favors higher-wage professional workers compared to lower-skilled or essential workers). If more people continue to work from home even after restrictions are lifted, it could have a meaningful impact on active transportation over a longer time horizon.

### Urban County Findings

- **Population density is not necessarily correlated with high levels of active transportation.** Riverside and San Bernardino counties, despite both having similar density levels as neighboring Inland Empire counties, saw a large difference in the share of commuters using active transportation—it increased by 0.5 percent in San Bernardino while remaining the same in Riverside County between 2013 and 2018.

- **Mid-sized urban counties are pursuing more comprehensive active transportation plans to encourage fewer VMT per capita.** Fresno, for example, saw a drop in active transport users (-0.3%) and an increase in car-based commutes (+1.1%) between 2013 and 2018. In 2017, the City of Fresno approved plans to invest \$1.3 billion over at least ten years to create 947-mile bicycle path network and 661 miles of new sidewalk infrastructure. Importantly, the Fresno Active Transportation Plan emphasizes the need for equitable solutions and selects projects using a weighted rubric that prioritizes equity, community needs, and improved access to transportation.<sup>13</sup>

### Rural County Findings

- **Rural counties with relatively low population density are among the most-improved in terms of active transportation usage from 2013 to 2018.** Trinity County, the third-least dense county, saw the share of commuters using active transportation nearly double (+96.7%) from 12.3 percent in 2013 to 24.2 percent in 2018—the largest improvement of any county in the state—while the share of those that commute by car dropped from 77.3 percent to 71.7 percent (-7.2%). Similarly, Sierra (+72.5%) and Calaveras (+36.5%) Counties had the next largest improvements in the share of commuters using active transportation over the time period—both of which are also less densely populated than the state overall—with 24.5 percent in Sierra and 11.6 percent in Calaveras using active transportation in 2018.

9 "Green Region Program Draft Funding Recommendations" SACOG Board of Directors. November 9, 2018. Available at: [https://www.sacog.org/sites/main/files/file-attachments/9a\\_-\\_green\\_region\\_0.pdf?1541796783](https://www.sacog.org/sites/main/files/file-attachments/9a_-_green_region_0.pdf?1541796783)

10 Defined in this study as biking or walking to work, or working from home.

11 "Bureau of Labor Statistics, U.S. Department of Labor, The Economics Daily, 29 percent of wage and salary workers could work at home in their primary job in 2017–18." Bureau of Labor Statistics, U.S. Department of Labor, The Economics Daily. Available at: <https://www.bls.gov/opub/ted/2019/29-percent-of-wage-and-salary-workers-could-work-at-home-in-their-primary-job-in-2017-18.htm>

12 Dingel, J.I. & Neiman, J. "How many jobs can be done at home?" Brecker Friedman Institute for Economics at the University of Chicago. April 2020. Available at: [https://bfi.uchicago.edu/wp-content/uploads/BFI\\_White-Paper\\_Dingel\\_Neiman\\_3.2020.pdf](https://bfi.uchicago.edu/wp-content/uploads/BFI_White-Paper_Dingel_Neiman_3.2020.pdf)

13 Perez, Minerva. "Fresno's Active Transportation Plan is a Go." Streetsblog CAL. March 6, 2017. Available at: <https://cal.streetsblog.org/2017/03/06/fresnos-active-transportation-plan-is-a-go/>



- **Four rural counties have a higher share of commuters by active transportation than San Francisco (22%):** Sierra County (24.5%), Trinity County (24.2%), Modoc County (22.7%), and Mariposa County (22.2%). Statewide, the ten counties with the best performance in terms of active transportation use are majority rural: Trinity, Sierra, Mariposa, Modoc, Mono, Alpine, and Lake.

### Public Transit

Public transit in California is highly visible but underutilized in most cases. In 2018, only 5.1 percent of Californians commuted via public transportation—down slightly from the 5.2 percent who commuted using public transit in 2013.

#### Urban County Findings

- **The Bay Area has the highest share of commuters using public transit compared to other counties falling under large metropolitan planning organizations—particularly the five counties that make up the Bay’s San Francisco-Oakland-Berkeley metropolitan statistical area.**<sup>14</sup> These five counties have also experienced an uptick in the percentage of commuters using public transit. Yet even the Bay Area Rapid Transit (BART) system has experienced some setbacks, with weekend ridership falling from 62.2 passengers in 2015 to 52.7 million in 2019.<sup>15</sup>
- **Even though urban areas have far more robust public transit infrastructure in place compared to rural areas, ridership continues to drop in many urban counties.** Southern California, in particular, has been struggling to attract and retain riders. Between 2013 and 2018, transit use fell 16.7 percent in San Bernardino (serving 1.5% of total commut-

ers as of 2018) and 7.1 percent in Riverside (serving 1.3% of total commuters in 2018). Los Angeles’ public transit decline is well documented,<sup>16</sup> and over the same time period the share of commuters using public transit in LA County fell 15.5 percent. The County—in collaboration with the Southern California Association of Governments—has attempted to reverse this trend in recent years by investing in rail service (the Metro Exposition line and five additional major projects) and expanding access to bus rapid transit (the Metro Orange Extension). Since the Expo line’s expansion to Santa Monica was completed, ridership on that line nearly doubled.<sup>17</sup>

#### Rural County Findings

- **The share of commuters using public transit increased the most in rural Mono County**—from five percent in 2013 to 18.9 percent in 2018—as a new joint-power authority with the Town of Mammoth Lakes, City of Bishop, Inyo and Mono counties was established to provide transit service to the Eastern Sierra.<sup>18</sup> As the fifth-most sparsely-populated county, creating a new regional partnership with the other populated areas of the region enabled Mono County to expand public transit options and increase its use among residents as an alternative to driving. Over the same period, the share of commuters using a car in the county fell from 61 percent to 53.4 percent and the share using active transportation decreased from 26.3 percent to 21.8 percent, suggesting that greater availability of public transit led to changes in commuter behavior. Commute patterns indeed seem to have shifted; the share of commuters in Mono County that used public transit increased from five percent in 2013 to 18.9 percent in 2018.

14 Alameda County, Contra Costa County, Marin County, San Francisco County, and San Mateo County.

15 Swan, Rachel. “BART has lost nearly 10 million passengers on nights and weekends. Can it lure them back?” San Francisco Chronicle. February 12, 2020. Available at: <https://www.sfchronicle.com/bayarea/article/BART-has-lost-nearly-10-million-riders-on-nights-15050371.php>

16 Nelson, Laura J. “L.A. is hemorrhaging bus riders — worsening traffic and hurting climate goals.” Los Angeles Times. June 27, 2019. Available at: <https://www.latimes.com/local/lanow/la-me-ln-bus-ridership-falling-los-angeles-la-metro-20190627-story.html>

17 Chiland, Elijah. “Rail ridership dips as Metro loses passengers for fifth straight year.” Curbed Los Angeles. February 1, 2019. Available at: <https://la.curbed.com/2019/2/1/18204376/los-angeles-transit-ridership-down-trains-buses>

18 “Local Transportation Commission: Transportation Issues.” Mono County. Available at: <https://monocounty.ca.gov/ltc/page/transportations-issues>

**TABLE ES.2** Urban County Sustainable Transportation Scores

	Vehicle Miles Traveled (40)	Active Transportation (15)	Public Transit (10)	Alternative Fuel Vehicle (7.5)	Equity (25)	Density (2.5)	Total (100)
Alameda	21.9	7.4	4.3	6.4	16.7	0.9	56.8
Contra Costa	23.5	6.4	4.3	5.4	13.3	0.8	52.9
Fresno	21.2	5.2	1.6	3.2	10.3	0.3	41.5
Kern	20.2	4.5	1.3	2.6	9.3	0.3	37.9
Kings	19.7	6.4	1.8	2.5	13	0.3	43.5
Los Angeles	23.3	6.1	3.4	4.9	11.1	1.1	48.6
Marin	19.5	8.8	3.5	6.7	13.4	0.4	51.9
Orange	23.3	6.1	2	5.6	10.7	1.3	47.6
Riverside	21.4	5.3	1.4	3.6	14.1	0.4	45.7
Sacramento	21.9	6.1	2	3.9	17.7	0.7	51.7
San Bernardino	21.9	5.4	1.5	3.3	14.6	0.4	46.6
San Diego	21.6	6.9	2.6	4.6	11.6	0.6	47.2
San Francisco	37.9	10.1	8.5	6.2	16.3	2.5	79
San Joaquin	22.1	4.9	1.4	3.2	15.9	0.4	47.5
San Mateo	21.8	6.3	4.4	6.2	15.7	0.8	54.4
Santa Barbara	25	7.6	2.2	4	12.9	0.3	51.6
Santa Clara	25.7	6.2	2.7	7.3	17	0.6	58.8
Santa Cruz	29	8.8	2.3	5.2	12.7	0.4	58
Stanislaus	22.6	5.2	1.1	2.7	15	0.3	46.6
Ventura	25.3	5.8	1.4	4.4	15.8	0.4	52.7
California	21.8	6.4	2.9	4.8	16.3	0.4	52.2

- **Nevada County reduced VMT per capita by 6 percent—the largest decline statewide**—by aggressively pursuing regional partnerships and thinking holistically by integrating multiple modes of transit into one plan. The Trans-Sierra Transportation Plan released in 2015 envisions that this regional alignment of these transportation networks would create 10,000 new well-paying jobs, expand economic activity to generate an additional \$29.9 billion in economic output (including \$11.3 billion in labor income), and result in vehicle operating cost savings of an estimated \$9.9 billion by 2035.<sup>19</sup>

To help illustrate how primarily urban and primarily rural counties are generally doing with respect to equitable use of sustainable transportation modes, Table ES.2 and Table ES. 3 provide respective scores based on the authors' calculations.

Large-scale transportation planning, management, and funding streams are typically conducted by regional planning organizations. Therefore, understanding what transportation sustainability means at a regional level has implications for the kinds of policies to pursue and under which circumstances those policies are likely to succeed. Sustainable transportation options and utilization will vary considerably across different environments, demographics, and capacities—which requires careful

<sup>19</sup> Trans-Sierra Transportation Plan. The Trans-Sierra Transportation Coalition. March 2015. Available at: [https://www.nctc.ca.gov/documents/Reports/TransSierraPlan\\_FINAL\\_e-version%20March%202015.pdf](https://www.nctc.ca.gov/documents/Reports/TransSierraPlan_FINAL_e-version%20March%202015.pdf)

**TABLE ES.3** Rural County Sustainable Transportation Scores

	Vehicle Miles Traveled (40)	Active Transportation (15)	Public Transit (10)	Alternative Fuel Vehicle (7.5)	Equity (25)	Density (2.5)	Total (100)
Alpine	10.2	9.2	0.3	2	11	0	32.8
Amador	19.9	7.2	0.3	2.4	11	0.1	40.8
Butte	22.6	6.9	1.3	2.6	8.4	0.2	41.7
Calaveras	25.9	8.2	0.7	2.5	11	0.1	48.3
Colusa	13	5.3	0.4	1.9	6.2	0.1	26.8
Del Norte	20.7	6.6	0.6	2.4	11.7	0.2	41.9
El Dorado	21.7	7.7	1.1	4	13	0.2	47.5
Glenn	16.1	6.6	0.4	1.8	6.2	0.1	31.1
Humboldt	20.7	8.1	0.9	3.9	12.2	0.1	45.7
Imperial	17	5.5	1.1	1.6	7.3	0.2	32.6
Inyo	12.3	8.2	0.6	2.4	11	0	34.5
Lake	21.2	9.2	0.5	2.7	11.1	0.2	44.6
Lassen	16.9	6	0.4	1.3	11.7	0.1	36.3
Madera	19.6	4.7	0.4	2.5	12.3	0.2	39.6
Mariposa	19.5	10.1	0.8	2.3	11	0.1	43.7
Mendocino	18.3	7.7	0.3	3.6	11.1	0.1	40.9
Merced	21.2	4.7	1.2	2.4	13.2	0.2	42.7
Modoc	15.3	10	0	1.4	11.7	0	38.4
Mono	15.4	9.4	4.1	2.1	11	0	42.1
Monterey	21.4	5.8	1.6	3.3	13.8	0.2	46
Napa	22.7	6.7	1.6	4.6	16.3	0.2	51.9
Nevada	24.8	8.6	0.5	3.4	19.9	0.2	57.1
Placer	22.8	7.1	1	4.4	14.6	0.4	49.9
Plumas	20.7	6.7	0.4	1.7	11.7	0.1	41.3
San Benito	20.1	4.8	0.4	3.6	14.4	0.1	43.3
San Luis Obispo	19.2	7.4	1.4	4.2	10.8	0.2	43
Shasta	19.6	5.9	1	2.4	11	0.2	40
Sierra	12.7	14.3	0.3	1.5	19.9	0.1	48.7
Siskiyou	15	8.3	0.4	1.8	11.7	0.1	37.3
Solano	19.1	4.9	1.8	3.8	15.1	0.5	44.7
Sonoma	21.5	6.9	1.6	5.2	17.2	0.3	52.4
Sutter	21	5.7	1.1	2.3	14.7	0.3	44.8
Tehama	17.7	5.8	0.3	1.8	6.2	0.1	31.8
Trinity	19.3	14.9	0.4	1.9	6.2	0	42.7
Tulare	22.2	4.8	1	2.3	13.3	0.2	43.5
Tuolumne	18.9	5.5	0.4	2.2	11	0.1	38.1
Yolo	20.7	8.4	2.6	4.6	11.3	0.2	47.7
Yuba	21.4	5.3	1.2	2.2	14.7	0.2	44.8
California	21.8	6.4	2.9	16.3	0.4	4.8	52.2

consideration of which policy tools to employ to ensure climate goals (i.e. GHG emission reductions), economic growth, and equitable access are all realized.

In other words, the number of options available to any given jurisdiction is determined by the feasibility of connecting as many people as possible (equitable access) to employment centers or relatively more job-rich areas (economic growth) with travel modes that produce less carbon than combustion-engine passenger vehicles (emissions reductions). In high-density, job-rich counties like Los Angeles, for example, robust fixed-route infrastructure may exist but buses may need to further expand services to connect lower-income residents living on the urban periphery to centrally located employment centers. Conversely, in a low-density, job-poor county like Imperial, promoting greater access to electric vehicles will replace carbon-emitting passenger vehicles residents use for long-distance commutes to job-rich areas. To that end, Table ES.4 summarizes some of the key opportunities for counties to work toward progress on sustainable transportation access and utilization, based on density and employment opportunity.

**TABLE ES.4** Policy Planning Matrix

	High-Density Region	Low-Density Region
High Number of Employment Opportunities	<ul style="list-style-type: none"> <li>• Enhancements to fixed- route transit service</li> <li>• Installation of active transportation infrastructure</li> </ul>	<ul style="list-style-type: none"> <li>• Employer-sponsored vanpools or shuttles</li> </ul>
Low Number of Employment Opportunities	<ul style="list-style-type: none"> <li>• Rideshare service expansion</li> <li>• Short-term Alternative Fuel Vehicle Rental</li> <li>• Non-fixed route service</li> <li>• Rapid transit</li> </ul>	<ul style="list-style-type: none"> <li>• Alternative Fuel Vehicle ownership incentives</li> <li>• Rideshare service expansion</li> <li>• Short-term Alternative Fuel Vehicle Rental</li> </ul>

# Introduction

Although California continues to lead the nation in developing innovative approaches to greenhouse gas (GHG) emission reductions, the COVID-19 outbreak is an inadvertent reminder of the outsized role the transportation sector has on expanding the state's carbon footprint.<sup>20</sup> In the days following the first stay-at-home orders, a precipitous drop in traffic—by a third in Los Angeles and by over 60 percent in San Francisco, for example—played a significant role in improving air quality to levels not seen since 1980.<sup>21</sup> On a global level, the carbon emissions from surface transportation declined by 36 percent at the peak of the economic shutdowns.<sup>22</sup> These effects will subside as the economy continues to reopen and populations adjust to “new (if not temporary) normal,” as we have seen elsewhere.<sup>23</sup> Still for a few days, Californians had a chance to experience what a future with less vehicle-borne pollution could look like.<sup>24</sup>



While managing the public health crisis remains top-of-mind for state and local leaders, there is an opportunity to align the goals of improving public health and the economy while working to reduce GHG emissions. Recent (not-yet peer-reviewed) reports have noted the relationship between air quality and severe complications from COVID-19,<sup>25</sup> highlighting that reducing transportation emissions benefits not only our climate goals but the health of Californians across the state (and particularly in low-income communities).<sup>26</sup> Moreover, rising housing are pushing residents further away from employment centers, extending commutes, and limiting economic opportunities. By improving options and access to cleaner transportation alternatives, California not only makes progress towards its climate goals and improved air quality, but also addresses equity across public health and economic dimensions.

The state has passed a number of policies and programs to advance cleaner fuels, provide transportation alternatives, and encourage development that can allow for lower vehicle miles traveled (VMT)—yet there remain opportunities and challenges for advancing sustainable transportation options across the state. The degree to which a county can contribute to statewide climate goals and improve regional air quality conditions rests largely in its ability to reduce its population’s dependence on carbon-emitting means of travel. To be sure, local conditions vary greatly throughout California, making some options more viable than others. Yet while the specific steps a given county takes towards sustainable transportation may differ, progress across the state could help deliver significant benefits, and the current

public health crisis may actually provide policymakers and planners statewide the opportunity to reassess the transportation sustainability goals in their respective regions.

This study provides a baseline on which county and regional transportation authorities can benchmark progress towards greater transportation sustainability, defined here as the collection of incentives, infrastructure, and access that not only achieves GHG reductions, but promotes economic growth and equitable outcomes. It seeks to foster discussions to help further that progress by highlighting successful initiatives and programs that may be adapted to different regions and also point to areas warranting further attention.

## APPROACH

### Scope

This study employs two levels of analysis to assess sustainable transportation systems and planning efforts across California. First, data are collected and analyzed at the County-level to understand what transit infrastructure is currently in place, evaluate the travel options afforded to residents, and determine which modes of travel residents tend to use. Although many cities manage their own transit agencies, the County lens provides a broader view of travel patterns and captures jurisdictions that may not maintain independent transit operations (such as some unincorporated areas). The second level of analysis occurs at a regional scale via metropolitan planning organizations (MPOs) or regional transportation planning agencies (RTPAs).<sup>27</sup> Since MPOs and RTPAs are responsible

20 In 2017, the transportation sector overall accounted for 41 percent of statewide emissions. See *2019 California Green Innovation Index*. Next 10. October 8, 2019. Available at: <https://www.next10.org/publications/2019-gii>

21 Barboza, T. “L.A. coronavirus clean air streak has already come to an end. Here’s why.” *Los Angeles Times*. April 28, 2020. Available at: <https://www.latimes.com/environment/story/2020-04-28/coronavirus-la-air-quality-improved-pandemic-dont-expect-it-to-last>

22 Le Quéré, C., Jackson, R.B., Jones, M.W. et al. (2020). Temporary reduction in daily global CO<sub>2</sub> emissions during the COVID-19 forced confinement. *Nat. Clim. Chang.* 10, 647–653.

23 He, G., Pan, Y. & Tanaka, T. (2020). The short-term impacts of COVID-19 lockdown on urban air pollution in China. *Nature Sustainability*.

24 The environmental benefits from less auto-dependent and more transit-oriented development are significant. The American Public Transportation Association (2013) estimated that reductions in driving facilitated by public transit save 37 million metric tons of carbon dioxide annually across the nation—the equivalent to the emissions from generating electricity for 4.9 million households. See “The Benefits of Public Transportation,” American Public Transportation Association. Available at: <https://www.apta.com/news-publications/public-transportation-benefits/>

25 Wu, X., Nethery, R. et al. Exposure to air pollution and COVID-19 mortality in the United States: A nationwide cross-sectional study. *MedRxiv*. April 24, 2020. Available at: <https://projects.iq.harvard.edu/covid-pm>

26 Wang, T., Jiang, Z., Zhao, B. et al. (2020). Health co-benefits of achieving sustainable net-zero greenhouse gas emissions in California. *Nature Sustainability*.

27 In cases where a county is itself also an MPO/RTPA – such as in urban counties like San Diego or rural ones like Butte – the distinction between regional and county-level scale is non-existent, but planning, implementation, and operations may still span several entities.

**TABLE 1** Metropolitan Planning Organization Member Counties<sup>28</sup>

Metropolitan Planning Organization	Member Counties	County Density
Association of Monterey Bay Area Governments (AMBAG)	Monterey	Rural
	San Benito	Rural
	Santa Cruz	Urban
Butte County Association of Governments (BCAG)	Butte	Rural
Fresno Council of Governments (FresnoCOG)	Fresno	Urban
Kings County Association of Governments (KCAG)	Kings	Urban
Kern Council of Governments (KCOG)	Kern	Urban
Madera County Transportation Commission (Madera CTC)	Madera	Rural
Merced County Association of Governments (MCAG)	Merced	Rural
Metropolitan Transportation Commission (MTC)	Alameda	Urban
	Contra Costa	Urban
	Marin	Urban
	Napa	Rural
	San Francisco	Urban
	San Mateo	Urban
	Santa Clara	Urban
	Solano	Rural
	Sonoma	Rural
Sacramento Area Council of Governments (SACOG)	El Dorado	Rural
	Placer	Rural
	Sacramento	Urban
	Sutter	Rural
	Yuba	Rural
San Diego Association of Governments (SANDAG)	San Diego	Urban
Santa Barbara County Association of Governments (SBCAG)	Santa Barbara	Urban
Southern California Association of Governments (SCAG)	Los Angeles	Urban
	Ventura	Urban
	Riverside	Urban
	San Bernardino	Urban
	Imperial	Rural
Shasta County Regional Transportation Planning Agency (SCRTPA)	Shasta	Rural
San Joaquin Council of Governments (SJCOG)	San Joaquin	Urban
San Luis Obispo Council of Governments (SLOCOG)	San Luis Obispo	Rural
Stanislaus Council of Governments (StanCOG)	Stanislaus	Urban
Tulare County Association of Governments (TCAG)	Tulare	Rural

<sup>28</sup> There exists an 18th MPO, the Tahoe Metropolitan Planning Organization (TMPO), which includes El Dorado, Placer, Douglas (Nevada), Washoe (Nevada), and Cities of Carson City and South Lake Tahoe. El Dorado and Placer are also members of SACOG. For the purpose of this brief, TMPO is ignored as El Dorado and Placer are analyzed within the regional context of SACOG, while Douglas and Washoe are outside of California.

for developing long-range, comprehensive transportation plans and securing infrastructure funding, understanding how they approach transportation sustainability – as well as the challenges they face in doing so – contributes to a more holistic view of the current landscape.

**Indicators**

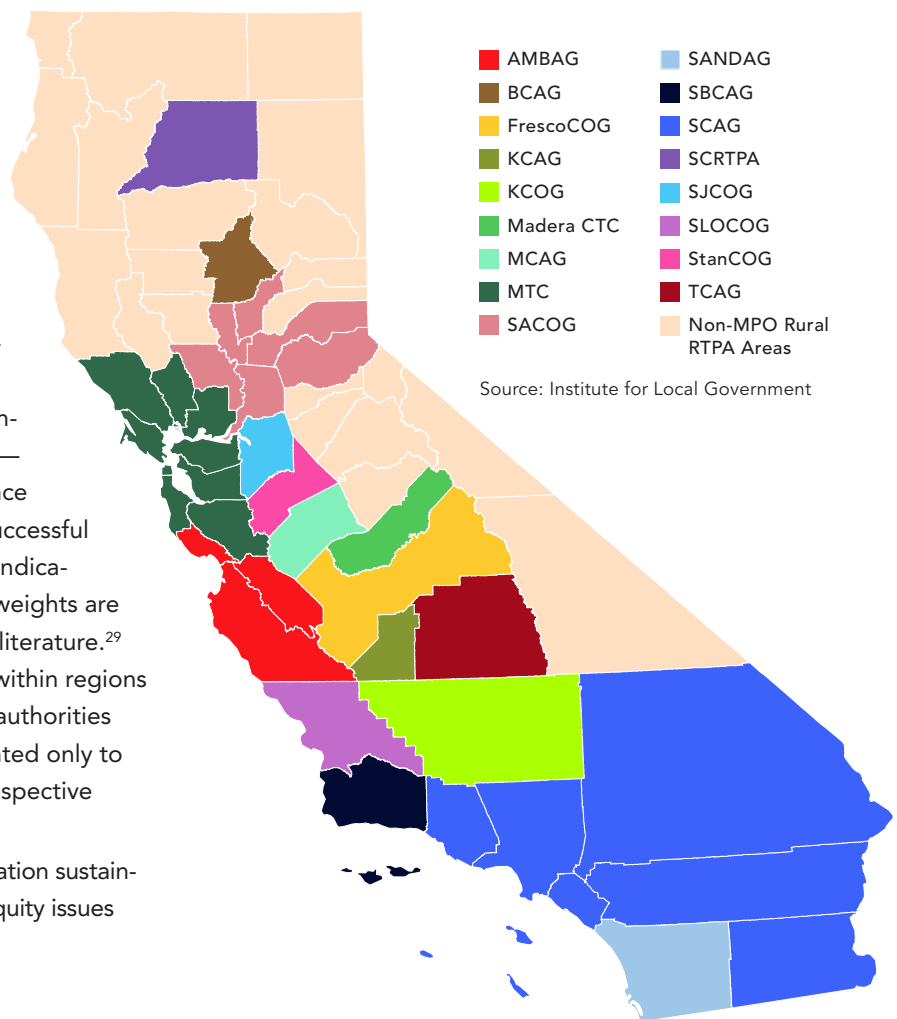
To help illustrate recent trends and current conditions, this study provides a scorecard that assesses the state’s 58 counties across four categories—vehicle miles traveled, electric vehicle adoption, public transit ridership, and active transportation usage—which collectively consist of 12 indicators. Since some indicators are more determinative of successful sustainable transportation than others, each indicator is assigned a weighted score; how these weights are determined is based on a review of previous literature.<sup>29</sup> Although comparisons are made across and within regions to provide analytical insights, transportation authorities should adapt and apply the indicators presented only to the extent to which is appropriate for their respective regions, budgets, and needs.<sup>30</sup>

In addition to these indicators, the transportation sustainability assessment framework also considers equity issues and population density.

**Equity**

Low-income communities—especially low-income communities of color—are chronically underserved with respect to accessible, efficient, and effective transit infrastructure. Commuters who took public transit to work in California actually out-earned those who drove to work (\$68,771 versus \$63,647, respectively)—a function of an urbanized economy that attracts high-wage workers to city centers. Although low-income residents make up the largest share of public transit riders across the state, they are more

**FIG 1** Metropolitan Planning Organization/Regional Transportation Transportation Planning Agencies Map



Source: Institute for Local Government

likely to rely on cars for their commutes due to the lack of convenient and adequate transit access in the communities in which they live. Effective reductions in the transportation sector’s GHG emissions can be achieved only if everyone is involved and everyone benefits: Californians of all income levels, and of every race and ethnicity. Therefore, equity considerations are built into this paper’s assessment framework for each county and will be discussed within each category.<sup>31</sup>

29 The development of these indicators is inspired by three recent studies that used similar methodologies: (1) StreetLight Data’s 2020 U.S. Transportation Climate Impact Index, which ranked the nation’s largest metro areas with respect to VMT, bike commuting, pedestrian commuting, transit ridership, geographic density, and circuitry; (2) Fabric Insurance Agency’s 2019 Ten Family-Friendly Cities with the Best Public Transit report, which ranked the best transit systems in the country based on approval ratings, share of workers who commute using public transit, trips taken per person, and difference in earnings between public transit and car commuters; and Walkscore.com’s 2020 Walk Score, Transit Score, and Bike Score study, which ranked cities in the U.S., Canada, and Australia by walk score, transit score, and bike score.

30 Results for each county are listed in the Appendix.

31 See Appendix for “equity” definition and weighted value.



**TABLE 2** Sustainable Transportation Indicators

	Description	Indicators
Vehicle Miles Traveled (VMT)	Miles traveled by vehicle within city roads, unincorporated county roads, and state highways weighted by resident population. Weighted at 40 percent due to its direct contribution to greenhouse gas emissions.	<ul style="list-style-type: none"> <li>• VMT per capita</li> <li>• VMT improvement over time</li> <li>• Percentage of commutes by driving</li> <li>• Change in percentage of commutes by driving</li> </ul>
Alternative Fuel Vehicle (AFV) Adoption	Percentage of alternative fuel passenger vehicles registered relative to total passenger vehicles registered. Weighted at 7.5 percent with the highest weight assigned for battery-electric vehicles and less for hybrid plug-in vehicles and compressed natural gas vehicles.	<ul style="list-style-type: none"> <li>• Battery electric vehicle adoption</li> <li>• Plug-in hybrid electric vehicle adoption</li> <li>• Other alternative (hybrid-electric and natural gas) vehicle adoption</li> </ul>
Active Transportation	Percentage of commuters who commute by active transportation such as biking or walking. Weighted at 15 percent because it replaces regular vehicle trips and is emission-free.	<ul style="list-style-type: none"> <li>• Percentage of commutes by active transportation</li> <li>• Percentage of commutes by active transportation improvement over time</li> </ul>
Public Transit	Percentage of commuters who commute by public transit and ridership. <sup>32</sup> While it displaces longer distanced vehicle trips than active transportation, it is not emissions free, and hence the lower weight (15 percent) compared to active transportation.	<ul style="list-style-type: none"> <li>• Percentage of commutes by public transit</li> <li>• Percentage of commutes by public transit improvement over time</li> <li>• Public transit ridership per capita</li> </ul>

**TABLE 3** California Counties by Population Density

RURAL COUNTIES			URBAN COUNTIES	
Alpine	Madera	Shasta	Alameda	San Diego
Amador	Mariposa	Sierra	Contra Costa	San Francisco
Butte	Mendocino	Siskiyou	Fresno	San Joaquin
Calaveras	Merced	Sonoma	Kern	San Mateo
Colusa	Modoc	Sutter	Kings	Santa Barbara
Del Norte	Mono	Tehama	Los Angeles	Santa Clara
El Dorado	Monterey	Trinity	Marin	Santa Cruz
Glenn	Napa	Tulare	Orange	Solano
Humboldt	Nevada	Tuolumne	Riverside	Stanislaus
Imperial	Placer	Yolo	Sacramento	Ventura
Inyo	Plumas	Yuba	San Bernardino	
Lake	San Benito			
Lassen	San Luis Obispo			

Source: Rural County Representatives of California<sup>33</sup>

**Population Density**

Whether a county is rural or urban has significant implications for the availability of feasible and effective transportation options. Recreating the Bay Area Rapid Transit

(BART) system in Alpine County makes little sense, nor should residents in Butte be expected to reduce VMT per capita to the same extent Los Angeles residents aspire to. This study acknowledges such differences exist and addresses rural and urban considerations separately.<sup>32</sup>

32 Excludes taxicab and ride-hailing services. People who commute by taxicab or ride-hailing services are grouped under those who drive to work. The rationale is taxi or ride-hailing can actually generate even more greenhouse gas emissions than driving.

33 While many counties are home to a mix of both rural and urban communities, for the purposes of this brief, county findings are categorized as either urban or rural based on the list of member counties in the Rural County Representatives of California. These counties self-identify as having rural characteristics and work together on related policy and planning matters. A full list of RCRC counties available at: <https://www.rcrcnet.org/counties>

## The Impact of COVID-19 on California's Transportation Sustainability Efforts

**The COVID-19 pandemic has greatly disrupted the U.S. economy, workforce, schools, and everyday life for most people.** Although the long-term impacts of COVID-19 on travel behavior in California are yet to be determined, social isolation policies are clearly affecting traffic volumes and public transit usage across the state. From a transportation sustainability perspective, the outcomes are seemingly positive. In Los Angeles County, for example, VMT dropped 34 percent from 96 million miles in early March to 63 million miles in early April,<sup>34</sup> which in turn contributed to a 31 percent decrease in PM 2.5 pollutants.<sup>35</sup> Overall, Southern California experienced a 20 percent improvement in air quality during this period.<sup>36</sup>

Such trends are seen statewide as well to varying degrees, but these effects are likely temporary. Absent an unprecedented shift to public transit or rapid adoption of electric vehicles in the near-term, there are few indications that post-pandemic patterns will deviate much from their pre-pandemic trajectories. With sales of electric vehicles projected to drop 43 percent this year<sup>37</sup>—due as much to the economic uncertainty prompted by COVID-19 as the precipitous drop in oil prices—the prognosis is less than optimistic (though such dire outlooks may prompt advocates and legislators to launch more aggressive campaigns reverse such trends).

Such sentiments are reinforced by the fact that public transit usage has plummeted in recent weeks as well. Ridership on the Bay Area's BART system dropped from nearly 385,000 users on March 4 to 30,000 on April 1—a 92 percent decrease. Although ridership in 2020 was already down compared to ridership in 2019 when Governor Newsom issued the stay-at-home order on March 16th, July BART ridership levels continued to be 88 percent below the baseline on average through July 23, 2020.<sup>38</sup>

The situation in Los Angeles is not as dire, but low ridership now may have consequences for the future. In a May update to the Board of Directors, LA Metro anticipates a \$1.8 billion revenue shortfall as a result of the pandemic—assuming the recovery starts by September 2020—as a result of sales tax revenue that is \$1.5 billion lower than pre-COVID, weekly ridership levels that are down 70 percent, and fare revenue that has fallen from \$0.69 per boarding to \$0.09.<sup>39</sup> In response to the negative impacts to urban public transit systems throughout the country, the CARES Act made \$25 billion in federal funding available via the Federal Transit Administration,<sup>40</sup> with \$1.068 billion allocated to LA Metro. Even with federal funding to help mitigate revenue loss, the LA Metro board expects that

34 Data from Caltrans Traffic Operations Division via Fonseca, R. "Here's What The Coronavirus Crisis Is Doing To LA's Freeway Traffic." LAist. April 13, 2020. Available at: <https://laist.com/2020/04/13/coronavirus-los-angeles-freeways-caltrans.php>

35 Data from IQAir via Dormido, H. "These Cities Now Have Less Air Pollution During Virus Lockdowns." Bloomberg. April 22, 2020. Available at: <https://www.bloomberg.com/graphics/2020-pollution-during-covid-19-lockdown/>

36 Data from UCLA's Institute of the Environment & Sustainability via Thiessen, T. How Clean Air Cities Could Outlast COVID-19 Lockdowns. Forbes. April 10, 2020. Available at: <https://www.forbes.com/sites/tamarathiessen/2020/04/10/how-clean-air-cities-could-outlast-covid-19-lockdowns/#397439f46bb5>

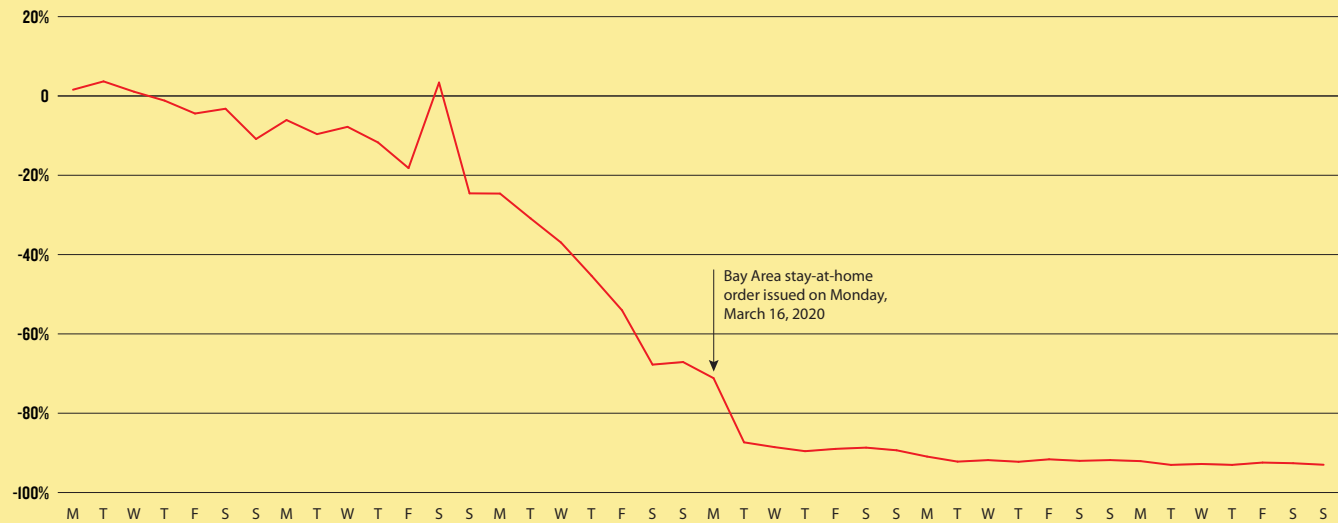
37 Chandrasekaran, R, and Montgomery, G. "Electric vehicles: coronavirus wreaks havoc across the supply chain." Wood Mackenzie. April 8, 2020. Available at: <https://www.woodmac.com/news/opinion/electric-vehicles-coronavirus-wreaks-havoc-across-the-supply-chain>

38 Data from BART ridership reports, available at: <https://www.bart.gov/news/articles/2020/news20200225>

39 "COVID-19 Loss and Mitigation Metro Board of Director Update." LA Metro. May 2020. Available at: <http://metro.legistar1.com/metro/attachments/d969624a-ff0b-46da-8891-6898b1512ead.pdf>

40 Coronavirus Aid, Relief, and Economic Security (CARES) Act. Federal Transit Administration. March 2020. Available at: <https://www.transit.dot.gov/cares-act>

**FIG 2** Percentage Change in BART Ridership: Last Week of February to First Week of April, 2019 vs. 2020



Source: Bay Area Rapid Transit<sup>41</sup>

it may take up to two years to return to pre-COVID levels of ridership and revenue. The extent to which California “returns to normal” or transitions to a “new normal” over the long-term is uncertain, but gaining a better understanding the consequences of COVID-19 on the state’s transportation infrastructure today may help drive smarter and more sustainable policies tomorrow.<sup>41</sup>

*The pandemic may accelerate acceptance of remote working, which translates to a direct decrease in transportation emissions.*

On the other hand, this pandemic is pushing a significant portion of the workforce to work from home instead of commuting to an office, illustrating that certain sectors of the economy can function with remote, distributed work arrangements. This greatly decreases traffic and consumption of motor<sup>42</sup> vehicle fuels. While this provides a temporary boon to emission reductions and improves commutes for those who cannot

work from home and must drive, an ironic consequence of a prolonged reduction in rush hour traffic is that fewer cars on the road also means fewer dollars collected in gas tax revenue that could be allocated towards the construction of sustainable public and active transportation infrastructure.

Moving forward, although the pandemic may accelerate acceptance of remote working, which translates to a direct decrease in transportation emissions, the extent of this increased acceptance remains uncertain. Some studies suggest that as many as 29<sup>43</sup> to 37<sup>44</sup> percent of workers nationwide could potentially work remotely full-time (a choice that favors higher wage professional workers compared to lower-skilled or essential workers). Some California companies, such as Twitter and Square in the Bay Area, have already announced that they will allow most

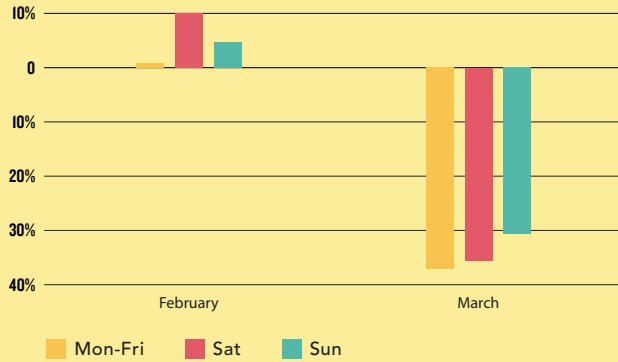
41 Data from BART Ridership Reports. Available at: <https://www.bart.gov/news/articles/2020/news20200225> and <https://www.bart.gov/about/reports/ridership>

42 Interactive Estimated Ridership Stats. LA Metro. Available at: <http://isotp.metro.net/MetroRidership/Index.aspx>

43 29 percent of wage and salary workers could work at home in their primary job in 2017-18.” Bureau of Labor Statistics, U.S. Department of Labor, The Economics Daily. September 30, 2019. Available at: <https://www.bls.gov/opub/ted/2019/29-percent-of-wage-and-salary-workers-could-work-at-home-in-their-primary-job-in-2017-18.htm>

44 Dingel, J.I. & Neiman, J. “How many jobs can be done at home?” Brecker Friedman Institute for Economics at the University of Chicago. June 2020. Available at: [https://bfj.uchicago.edu/wp-content/uploads/BFI\\_White-Paper\\_Dingel\\_Neiman\\_3.2020.pdf](https://bfj.uchicago.edu/wp-content/uploads/BFI_White-Paper_Dingel_Neiman_3.2020.pdf)

**FIG 3** Year-Over-Year Percentage Change in Daily Average LA Metro Ridership, February and March 2020 Compared to 2019



Source: LACMTA Interactive Estimated Ridership Stats<sup>42</sup>

employees to work from home indefinitely—even after the pandemic ends.<sup>45</sup>

If more people continue to work from home even after restrictions are lifted, it could have a meaningful impact on active transportation over a longer time horizon. On the other hand, the pandemic may also steer people away from using public transportation as an alternative to driving due to social distancing norms, which will likely pose challenges to current and future transportation sustainability planning efforts.

45 Baron, Ethan. "Coronavirus: Another Bay Area tech firm says employees can work from home indefinitely." The Mercury News. May 18, 2020. Available at: <https://www.mercurynews.com/2020/05/18/coronavirus-another-bay-area-tech-firm-says-employees-can-work-from-home-permanently/>

# County-Level Findings

This section discusses the main findings from the analysis for each of the four categories and highlights opportunities and challenges regions may encounter as they seek to establish more sustainable transportation systems.



## Vehicle Miles Traveled

Vehicle miles traveled is by far the largest factor contributing to GHG emissions from transportation. In 2018, VMT per person per day averaged 23.8 miles in California, an increase of two percent from five years prior.<sup>46</sup> In an environment where workers with a car have access to 30 times more jobs compared to those who rely on public transit,<sup>47</sup> such increases in VMT are understandable as the distance between affordable housing and employment opportunities has expanded over time. Households in lower-income areas typically own fewer vehicles than in moderate- to high-income areas, but the vehicles they do own tend to be older, less fuel-efficient, and used for longer commutes on average.<sup>48</sup>

### Urban County Findings

- **The San Francisco Bay Area performs best with respect to VMT.** Among the top 10 ranking urban counties in terms of lowest VMT per capita, three were located in the Bay Area.
- **Eleven of the 17 counties that either experienced a decline in VMT per capita or saw no change between 2013 and 2018 were located in urban areas.** Of those, San Francisco saw the greatest decline (-5.1%) while Santa Cruz followed closely behind (-4.9%). While the Bay Area did perform best overall in terms of VMT, the decline of San Francisco's was tempered by an increase in VMT from its neighbor to the north, Marin County (+12.3%). Marin County's daily VMT per capita of 32.0 was three times higher than San Francisco County's 10.1 rate in 2018. Given that San Francisco has the highest population density and lowest VMT per capita per day statewide, this difference exemplifies a divide even among counties in close proximity to each other that have different community preferences, land use policies, and transportation needs.

- **An increase in the share of commuters using cars does not necessarily mean that VMT per capita (or VMT overall) is moving in the same direction, as evidenced in Southern California.** Although the share of commuters by car increased in five of the largest Southern California counties from 2013 to 2018—Los Angeles (+2%), Orange (+1.3%), Riverside (+1%), San Bernardino (+1.5%), and San Diego (+0.3%)—VMT per capita actually declined by one to two percent in some cases (San Bernardino and Orange) or stayed the same (Los Angeles).

### Rural County Findings

- **Of the top ten ranking rural counties in terms of lowest VMT per capita, three counties saw 2018 VMT levels fall below the statewide average** of 23.8 miles/person/day: Napa (22.9), Butte (22), Tulare (22.9).
- **Six rural counties (Calaveras, Merced, Napa, Nevada, Placer, and Plumas) saw a reduction in VMT per capita between 2013 and 2018.** Of those, Nevada County saw the sharpest decline (-6.0%), which may be in part attributed to an increase in teleworking (even before COVID-19) and rising interest in active and public transportation modes among residents.<sup>49</sup> In the case of Calaveras—where over 6,000 of residents work in neighboring counties—the share of commuters who travel by car declined from 85.8 percent to 81.5 percent over the period. This progress may to some extent be due to the county's efforts to expand active transportation. The 2017 Calaveras County Regional Transportation Plan includes 170 active transportation projects with an estimated cost of \$24 million and has allocated 50 projects in the main population center of Angel's Camp to minimize traffic volumes.<sup>50</sup>

46 Based on California Public Road Data, which is derived from the Highway Performance Monitoring System (HPMS). The HPMS is a national level highway information system that includes data on the extent, condition, performance, use and operating characteristics of the nation's highways. For more information, see <https://www.fhwa.dot.gov/policyinformation/hpms.cfm>

47 Boarnet, M.G. & Giuliano, G. & Hou, Y & Shin, E.J. "First/last mile transit access as an equity planning issue." *Transportation Research Part A: Policy and Practice*, vol. 103(C), pages 296-310. September 2017. Available at: <https://ideas.repec.org/a/eee/transa/v103y-2017icp296-310.html>

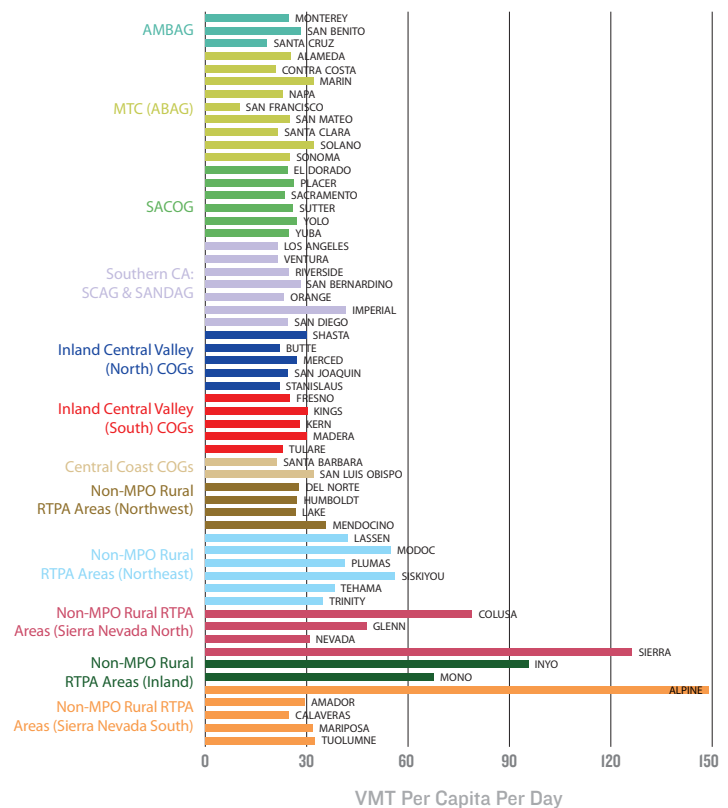
48 "Transportation Equity: Relationship to Public Health." U.S. Department of Transportation. Available at: <https://www.transportation.gov/mission/health/equity>

49 *Nevada County Regional Transportation Plan: 2015-2035*. Nevada County Transportation Commission. January 2018. Available at: [https://www.nctc.ca.gov/documents/RTP/Final%20Nevada%20Co%20RTP%2017\\_18.pdf](https://www.nctc.ca.gov/documents/RTP/Final%20Nevada%20Co%20RTP%2017_18.pdf)

50 2017 Calaveras Regional Transportation Plan. Calaveras Council of Governments. October 4, 2017. Available at: <https://calacog.org/wp-content/uploads/2020/06/2017-Regional-Transportation-Plan-RTP-Update.pdf>

- Rural counties on average have higher average VMT per capita than urban counties, though there is a high degree of variation from one county to another.** Alpine County has far and away the highest VMT/person/day at 149.1 miles/person/day (or an increase from 59.4 to 73.2 percent of all commuters between 2013 and 2018).<sup>51</sup> At the other end of the spectrum, Butte County’s average VMT per capita was only 22 miles/person/day—nearly two miles less than the statewide average of 23.8 in 2018—while the share of commuters by car increased one percent.
- Economic factors are affecting some rural counties more than others.** Counties with high VMT per capita all experienced significant increases between 2013 and 2018. Most notable is Sierra County, where VMT per capita increased 47.8 percent to 126.3 miles per person per day (even as the share of commuters who use cars declined from 81.7 to 68.4 percent over the same time period). While the county indicates this large shift may be in part due to changes in VMT analysis methodology, it still marks a significant increase.

**FIG 4 Daily Vehicle Miles Traveled per Capita, by County and MPOs, 2018**



Source: California Public Road Data, California Department of Transportation, California Department of Finance

### Alternative Fuel Vehicle Adoption

Given the extent to which Californians rely on cars—especially outside densely populated urban cores—expanding access to alternative fuel vehicles will play an important role in reducing vehicle-borne emissions.<sup>52</sup> Alternative fuel vehicles are inclusive of all zero emission vehicles (ZEV), as well as other cleaner alternatives to internal combustion engine vehicles (ICEV) that are not ZEVs. Even though California leads the nation with a five percent AFV adoption rate, efforts to scale up have encountered notable challenges:<sup>53</sup>

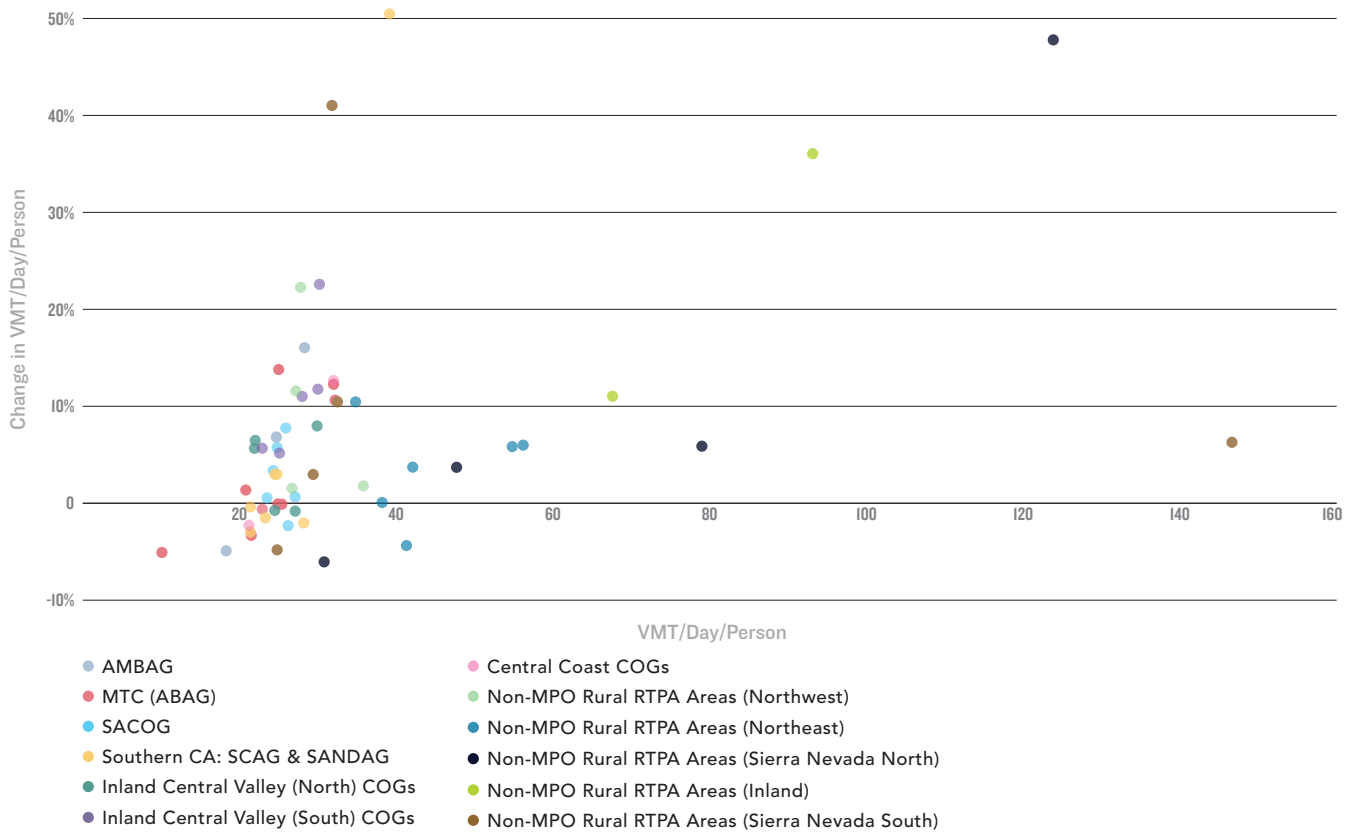
- Infrastructure:** The extent to which consumers pursue AFV’s—particularly battery electric vehicles (BEVs) and plug-in hybrid electric vehicles (PHEVs), which state policy prioritizes and incentivizes the adoption of—on a broader scale is primarily dependent upon the availability of a robust and accessible charging infrastructure. In addition to ensuring that there are enough publicly available charging stations installed across the state, ensuring residential charging stations extend to multifamily buildings will be necessary to make BEV and PHEV adoption a viable option for a broader range of consumers.

51 Alpine’s extremely low density and population - 96 percent of the County sits on public lands - coupled with a lack of major employment centers nearby are major determining factors. Per the county’s regional transportation plan, Alpine is primarily automobile-oriented due to the rural nature of the local communities, low development densities, and limited options for using alternative modes of travel with regional traffic fluctuations as a result of outdoor tourism.

52 Battery electric vehicles, plug-in hybrid electric vehicles, hybrid electric vehicles, and compressed natural gas vehicles. For the purpose of this brief, biofuels are not considered to be a cleaner alternative. In the U.S., biofuels are mostly derived from corn, which is not been demonstrated as a definitive cleaner option over conventional gasoline powered vehicles from a life-cycle assessment basis.

53 More insight on trends in AFV and ZEV adoption, including barriers and challenges to broader adoption, can be found in the Next 10 brief *The Road Ahead for Zero-Emission Vehicles in California: Market Trends & Policy Analysis*, available at <https://www.next10.org/publications/zev>

**FIG 5** Daily Vehicle Miles Traveled Per Capita and Percentage Change, Color-Coded by MPO, 2013-2018



Source: California Public Road Data, California Department of Transportation; California Department of Finance

- Cost:** Even with California’s “Clean Vehicle Rebate Program” (CVRP)—which provides up to a \$7,500 rebate for qualifying new vehicles—BEV and PHEV ownership remains out of reach for many residents and particularly those in low-income communities. Indeed, most rebate recipients are from households with over \$100,000 in annual income (though approximately 45% of whom are of non-white race/ethnicity).<sup>54</sup>

The state is actively addressing both challenges: New incentives targeting disadvantaged communities aim to close the “equity gap” between lower- and higher-income electric vehicle adoption rate by 2030.<sup>55</sup> Recent efforts to increase standard CVRP rebate levels to low- to moderate-income households (by \$2,500 and \$2,000) have shown some promise in terms of increasing adoption among drivers of non-white races/ethnicities, lower income and education levels, and women.<sup>56</sup> The expansion of the Clean Cars 4 All program has increased incentives by \$9,500 for disadvantaged populations, providing up to \$14,000 in subsidies when combined with existing

54 Myers, A. “4 U.S. Electric Vehicle Trends to Watch in 2019.” Forbes. January 2, 2019. Available at: <https://www.forbes.com/sites/energyinnovation/2019/01/02/4-u-s-electric-vehicle-trends-to-watch-in-2019/#5071601f5a3c>

55 Clean Transportation: An Economic Assessment of More Inclusive Vehicle Electrification in California. Next 10. January 28, 2020. Available at: <https://www.next10.org/publications/ev-benefits>

56 Bodanyi, Ryan. “EV Charging and the Vehicle Purchase Process: Lessons Learned from Rebated Consumers.” Center for Sustainable Energy. February 27, 2019. Available at: [https://cleanvehiclerebate.org/sites/default/files/attachments/EUEC\\_2019\\_EV\\_Charging\\_0.pdf](https://cleanvehiclerebate.org/sites/default/files/attachments/EUEC_2019_EV_Charging_0.pdf)



rebates.<sup>57</sup> In addition, the California Public Utilities Commission sponsored several pilot programs in recent years where Southern California Edison installed 50 percent of its new charging ports in disadvantaged communities<sup>58</sup> and Pacific Gas & Electric installed 51 percent of its stations in multifamily housing.<sup>59</sup> Policies to streamline the permitting process for new charging stations and to target investment in charging in low-income and disadvantaged communities have expanded in recent years, as well. As of 2019, disadvantaged communities were included as a targeted population for approved utility programs to expand EV adoption and infrastructure that totaled an estimated value of \$700 million.<sup>60</sup>

### Urban Findings

- **Rates of adoption are higher in urban areas.** Not surprisingly, concentrations of wealth and more robust charging infrastructure due to increased levels of demand are key drivers. Indeed, the top five cities in the country that boast the greatest electric vehicle market share are all located in California: San Jose, San Francisco, San Diego, Los Angeles, and Sacramento.<sup>61</sup> Statewide, the top ten counties in terms of highest AFV adoption are all in urban counties.
- **Even though urban areas generally have higher rates of AFV adoption compared to rural areas, variation exists.** The combined battery electric vehicle (BEV) and plug-in hybrid vehicle (PHEV) adoption rates in urban counties in the Bay Area—especially in Marin (2.4%) and San Francisco (3.1%)—compare

favorably against Southern California, where BEVs and PHEVs represented less than two percent of all vehicles in 2018 except for Orange County (which is slightly higher at 2.2% of total vehicles).

- **Some counties and cities are experimenting with community carshare programs to extend AFV usage to low-income communities.** Sacramento's Community CarShare program (launched in 2017) provides a free electric vehicle car sharing service, with EVs based at selected affordable housing communities throughout the city.<sup>62</sup> In Los Angeles, the BlueLA program (launched in 2018) offers an all-electric carshare service that provides discounted rates to low-income residents, and standard rates city-wide. The goals of both programs are to provide easy and affordable access to cleaner vehicles, with more flexibility compared to public transit options. The Sacramento program encountered challenges in its first phase of implementation but has continued to grow with support of an expansion grant from the California Air Resources Board (CARB).<sup>63</sup> Results for BlueLA have been mixed—largely due to poor vehicle maintenance—but the program has also continued to expand with support from CARB.<sup>64</sup> As BlueLA operates as a private-public partnership and is not fully-funded through grants, it remains to be seen whether this particular program model can be financially viable over the long-term.<sup>65</sup>

57 Shahan, Cynthia. "California Offers Up To \$9,500 To Purchase Used or New Electric Vehicle, Focus on Lower-Income Motorists." CleanTechnica. January 5, 2020. Available at: <https://cleantechnica.com/2020/01/05/california-offers-up-to-9500-to-purchase-a-used-or-new-electric-vehicle-focus-on-lower-income-motorists/>

58 "Charge Ready Pilot Final Report: Results and Findings." Southern California Edison. Available at: <https://www.edison.com/content/dam/eix/documents/innovation/charge-ready-final-report-summary.pdf>

59 "EV Charge Network Quarterly Report." Pacific Gas and Electric Company. Report Period: July 1, 2018—September 30, 2018. Available at: [https://www.pge.com/pge\\_global/common/pdfs/solar-and-vehicles/your-options/clean-vehicles/charging-stations/program-participants/PGE-EVCN-Quarterly-Report-Q3-2018.pdf](https://www.pge.com/pge_global/common/pdfs/solar-and-vehicles/your-options/clean-vehicles/charging-stations/program-participants/PGE-EVCN-Quarterly-Report-Q3-2018.pdf)

60 Smith, Conner. "California Could Make up 90 Percent of U.S. Electric Utility Investment with a Transportation Equity Focus." July 11th, 2019. EV Hub. Available at: [https://www.atlasevhub.com/data\\_story/california-could-make-up-90-percent-of-u-s-electric-utility-investment-with-a-transportation-equity-focus/](https://www.atlasevhub.com/data_story/california-could-make-up-90-percent-of-u-s-electric-utility-investment-with-a-transportation-equity-focus/)

61 The Surge of electric vehicles in United States cities. The International Council on Clean Transportation (ICCT). June 2019. Available at: [https://theicct.org/sites/default/files/publications/ICCT\\_EV\\_surge\\_US\\_cities\\_20190610.pdf](https://theicct.org/sites/default/files/publications/ICCT_EV_surge_US_cities_20190610.pdf)

62 Our Community CarShare Sacramento. Available at: <http://www.airquality.org/Our-Community-CarShare/Apply-for-Our-CarShare>

63 *Our Community CarShare Sacramento Case Study*. Shared-Use Mobility Center. February 2020. Available at: <https://learn.shareduse-mobilitycenter.org/wp-content/uploads/Our-Community-Car-Share-Case-Study-Final.pdf>

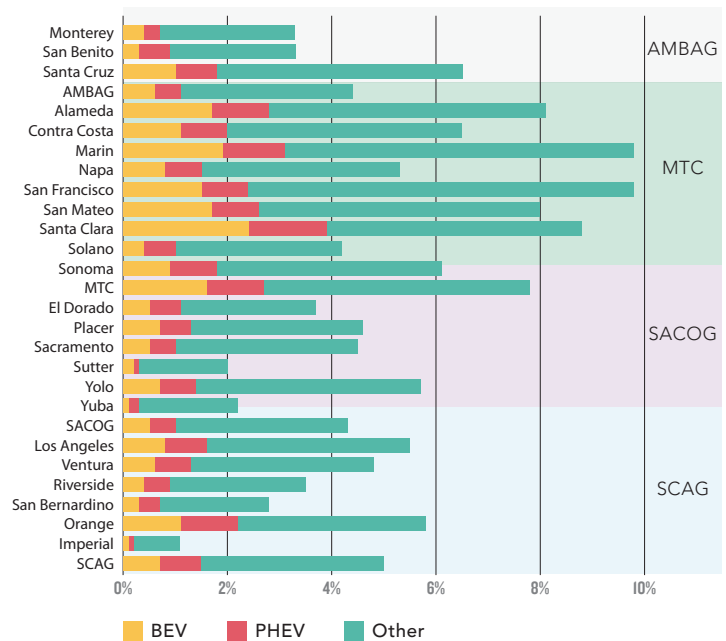
64 *Electric and Equitable: Learning from the BlueLA Carsharing Pilot*. Electric Vehicle Carshare Case Study. Shared-Use Mobility Center. April 2019. Available at: [https://learn.sharedusemobilitycenter.org/wp-content/uploads/NewFile\\_SUMC\\_04.15.19.pdf](https://learn.sharedusemobilitycenter.org/wp-content/uploads/NewFile_SUMC_04.15.19.pdf)

65 Iaconangelo, David and David Ferris. "Los Angeles bid to bridge the EV divide." E&E News. November 22, 2019. Available at: [https://www.eenews.net/special\\_reports/EEnews\\_highlights/stories/1061603873](https://www.eenews.net/special_reports/EEnews_highlights/stories/1061603873)

Rural Findings

- Income is a currently a stronger predictor of alternative fuel vehicle adoption rates than rurality.** Sonoma County, whose median annual household income is over \$81,000, outpaced adoption rates in many urban areas and ranked 9th, 5th, and 8th among all counties in terms of adoption of BEVs, PHEVs, and other alternative fuel vehicles, respectively, in 2018.
- State incentives to build charging infrastructure are as important as the incentives encouraging AFV ownership.** Recent efforts by the Sonoma Coast Incentive Project to provide over seven million dollars in rebates over the next three years to private sector, public sector, and nonprofit entities in Sonoma and Mendocino counties—with at least 25% of investment going to disadvantaged communities—will increase the viability of AFV ownership.<sup>66</sup> The statewide California Electric Vehicle Incentive Project (Cal-eVIP)—of which the Sonoma project is a part—has so far brought nearly \$71 million in incentive funding to communities across California.<sup>67</sup>
- Counties that prioritize charging infrastructure can drive increased adoption.** At a population of 220,000 residents, Yolo County boasts an AFV adoption rate of nearly six percent. The Institute for Local Government ranks the County highly in terms of its current deployment of electric vehicle charging and hydrogen fuel stations,<sup>68</sup> and Yolo has worked with the Sacramento Area Council of Governments to secure an additional \$2.9 million for further charging infrastructure development.<sup>69</sup>

FIG 6 Alternative Fuel Vehicles as Percentage of Registered Vehicles, 2018



Source: California Energy Commission; California Department of Finance

- Rural counties are experimenting with AFV carshare and rideshare programs targeted at low-income residents as well.** In 2019, Tulare County (in partnership with Kern County) developed and launched the \$3.8 million Miocar carshare program that promotes 100% electric vehicles that can be rented from multiple rural housing complexes on an hourly or daily basis.<sup>70</sup> As of January 1st, there were about 170 users and the reservation counts were doubling every four weeks.<sup>71</sup> While Fresno County fell within the urban category for this brief’s analysis, the predominantly rural city of Huron in west Fresno County in late 2018 launched a rideshare program called Green Raiteros, which took

66 “Electric vehicle charger incentives bring EV accessibility to Sonoma and Mendocino counties.” CALCCA Press Release. June 30, 2020. Available at: <https://cal-cca.org/electric-vehicle-charger-incentives-bring-ev-accessibility-to-sonoma-and-mendocino-counties/>

67 *ibid.*

68 “County of Yolo: Sustainability Best Practice Activities.” Institute for Local Government. Available at: [https://www.ca-ilg.org/sites/main/files/file-attachments/yolo\\_county\\_bp\\_final.pdf?1569020423](https://www.ca-ilg.org/sites/main/files/file-attachments/yolo_county_bp_final.pdf?1569020423)

69 “Green Region Program Draft Funding Recommendations” SACOG Board of Directors. November 9, 2018. Available at: [https://www.sacog.org/sites/main/files/file-attachments/9a\\_-\\_green\\_region\\_0.pdf?1541796783](https://www.sacog.org/sites/main/files/file-attachments/9a_-_green_region_0.pdf?1541796783)

70 Yeager, J. “Meet Miocar: An electric car-share you can rent in Visalia for \$4.” Visalia Times Delta. November 4, 2019. Available at: <https://www.visaliatimesdelta.com/story/news/2019/11/04/meet-miocar-electric-car-you-can-rent-visalia-4/4126674002/>

71 Higgins, Bill. “Innovative Car Sharing Serves Rural Communities.” CALCOG. September 30, 2020. Available at: <https://www.calcog.org/index.php?src=blog&month=12&year=2019&srctype=detail&blogid=56>

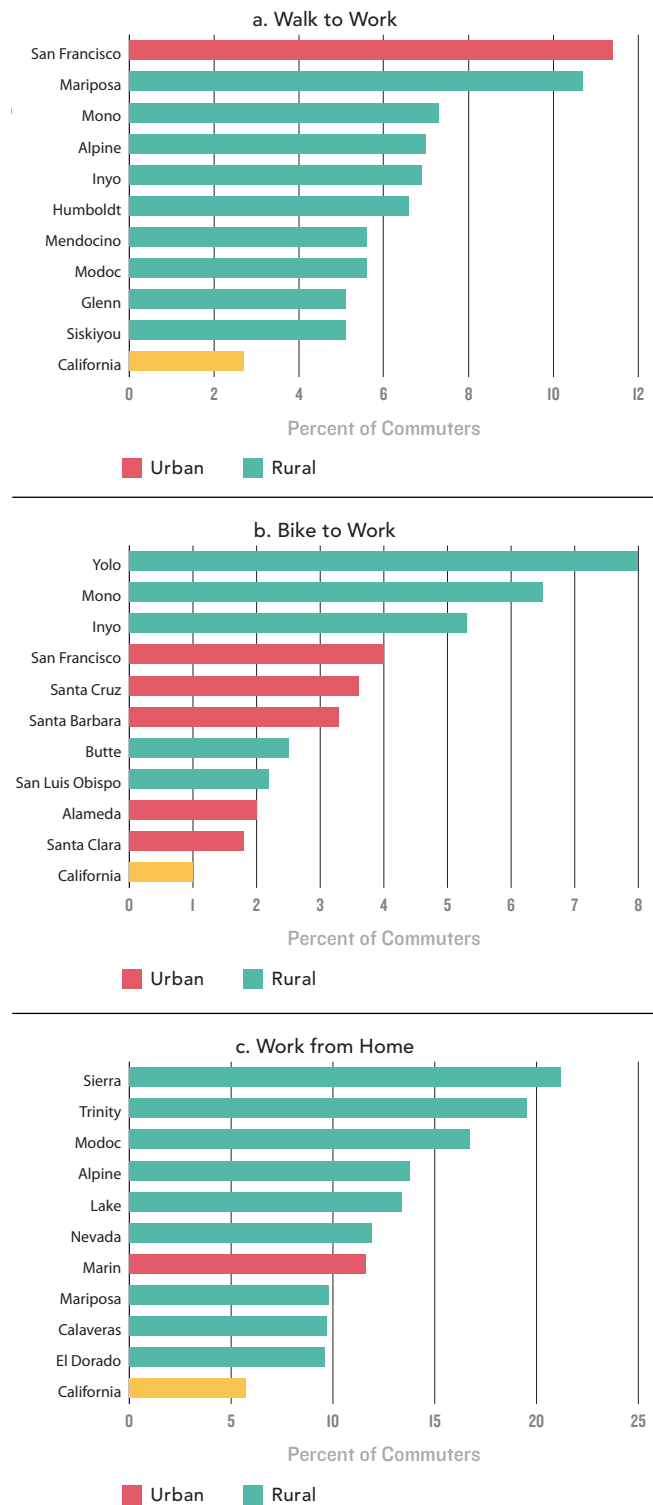
advantage of an existing informal network of drivers who provide rides to appointments or errands for community members and formalized the network with a dispatch system, garage, and two EVs. Green Raiteros still does allow drivers to use their own vehicles, which tend to be internal combustion engine vehicles and not electric, but program administrators hope to secure additional support to expand the EV component of the program.<sup>72</sup>

### Active Transportation

Active transportation includes walking, biking to work, or working from home. It is the only carbon-free mode of transportation and can displace shorter vehicle trips more conveniently than public transportation. Although the segment of the population who work from home do not technically commute, these workers are included here since the primary criterion for this category is whether a worker avoids a carbon emissions-based mode of travel as a function of employment. Statewide, 9.4 percent of workers commuted using active transportation in 2018—2.7 percent of commuters walked to work, just 1.1 percent biked to work, and 5.7 percent worked from home. Overall, rural counties tend to have a higher share of commuters who walk to work or work from home, whereas urban counties, particularly the Bay Area and Central Coast, have a higher share of commuters by bike.

Between 2013 and 2015, the share of workers commuting using active transportation had increased slightly from nine percent, mostly due to the growing acceptance of remote working. The COVID-19 pandemic has greatly increased the share of workers that work from home, and while the share will surely decrease as restrictions are lifted over the coming months, some studies suggest that

**FIG 7** Counties with the Highest Share of Commuters Who (a) Walk to Work; (b) Bike to Work; and (c) Work from Home, 2018



Source: American Community Survey

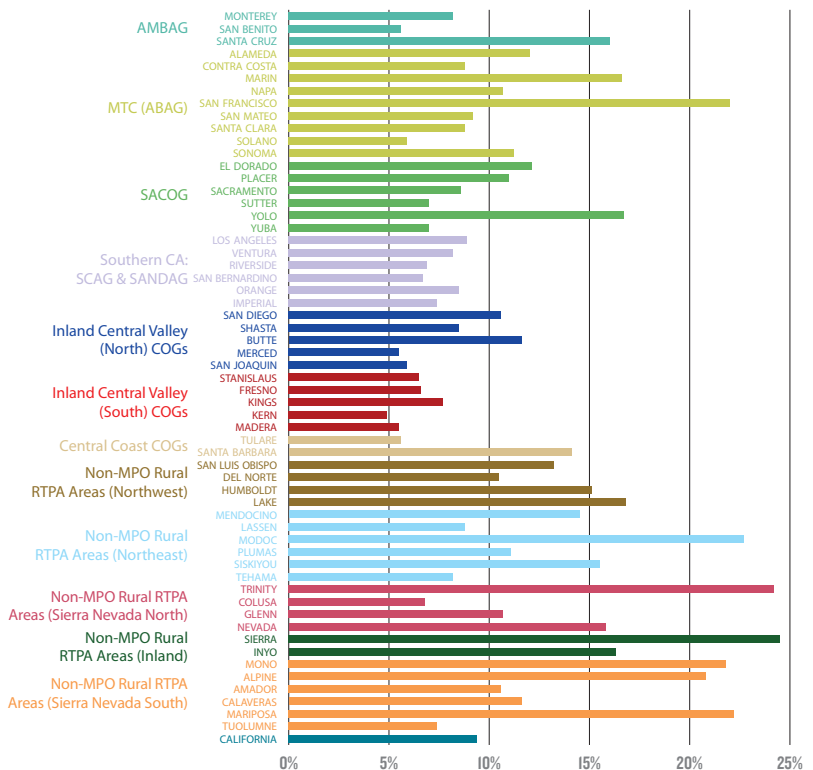
72 *Story of Green Raiteros: A Shared & Electric Lifeline for California Farmworkers*. Shared-Use Mobility Center. February 2020. Available at: [https://learn.sharedusemobilitycenter.org/wp-content/uploads/GreenRaiteros\\_0220.pdf](https://learn.sharedusemobilitycenter.org/wp-content/uploads/GreenRaiteros_0220.pdf)

as many as 29<sup>73</sup> to 37<sup>74</sup> percent of workers nationwide could potentially work remotely full-time (a choice that favors higher wage professional workers compared to lower-skilled or essential workers). If more people continue to work from home even after restrictions are lifted, it could have a meaningful impact on active transportation over a longer time horizon.

**Urban Findings**

- **Population density is not necessarily correlated with high levels of active transportation.** Riverside and San Bernardino counties, despite both comprising the Inland Empire, saw a large difference in the share of commuters using active transportation—it increased by 0.5 percent in San Bernardino while remaining the same in Riverside County between 2013 and 2018.
- **Mid-sized urban counties are pursuing more comprehensive active transportation plans to encourage fewer VMT per capita.** Fresno, for example, saw a drop in active transport users and an increase in car-based commutes between 2013 and 2018. With the goal of improving connectivity to public transit and increasing equitable access to walking and biking, the City of Fresno in 2017 approved plans to invest \$1.3 billion over at least 10 years to create 947-mile bicycle path network and 661 miles of new sidewalk infrastructure.<sup>75</sup> Importantly, the Fresno Active Transportation Plan emphasizes the need for equitable solutions and selects projects using a weighted rubric that prioritizes equity, community needs, and improved access to transportation. The rubric was developed in collabora-

**FIG 8** Percentage of Commuters by Active Transportation, by County and MPOs (2018)



Source: American Community Survey

tion with a stakeholder advisory committee and modeled on a similar tool developed by the city of Rancho Cucamonga in San Bernardino County.<sup>76</sup>

**Rural Findings**

- **Rural counties with relatively low population density are among the most-improved in terms of the share of commuters using a car and active transportation from 2013 to 2018.** Trinity County, the third-least dense county, saw the share of commuters using active transportation nearly double (+96.7%) from 12.3 percent in 2013 to 24.2 percent in 2018—the

73 “29 percent of wage and salary workers could work at home in their primary job in 2017–18.” Bureau of Labor Statistics, U.S. Department of Labor, The Economics Daily. Available at: <https://www.bls.gov/opub/ted/2019/29-percent-of-wage-and-salary-workers-could-work-at-home-in-their-primary-job-in-2017-18.htm>

74 Dingel, J.I. & Neiman, J. “How many jobs can be done at home?” Brecker Friedman Institute for Economics at the University of Chicago. April 2020. Available at: [https://bfi.uchicago.edu/wp-content/uploads/BFI\\_White-Paper\\_Dingel\\_Neiman\\_3.2020.pdf](https://bfi.uchicago.edu/wp-content/uploads/BFI_White-Paper_Dingel_Neiman_3.2020.pdf)

75 Active Transportation Plan. City of Fresno. December 2016. Available at: <https://www.fresno.gov/publicworks/wp-content/uploads/sites/17/2016/09/170022FresnoATPFinal012017.pdf>

76 Perez, Minerva. “Fresno’s Active Transportation Plan is a Go.” Streetsblog CAL. March 6, 2017. Available at: <https://cal.streetsblog.org/2017/03/06/fresnos-active-transportation-plan-is-a-go/>

largest improvement of any county in the state—while the share of those that commute by car dropped from 77.3 percent to 71.7 percent (a 7.2% reduction). Similarly, Sierra (+72.5%) and Calaveras (+36.5%) Counties had the next largest improvements in the share of commuters using active transportation over the time period—both of which are also less densely-populated than the state overall—with 24.5 percent in Sierra and 11.6 percent in Calaveras using active transportation in 2018.

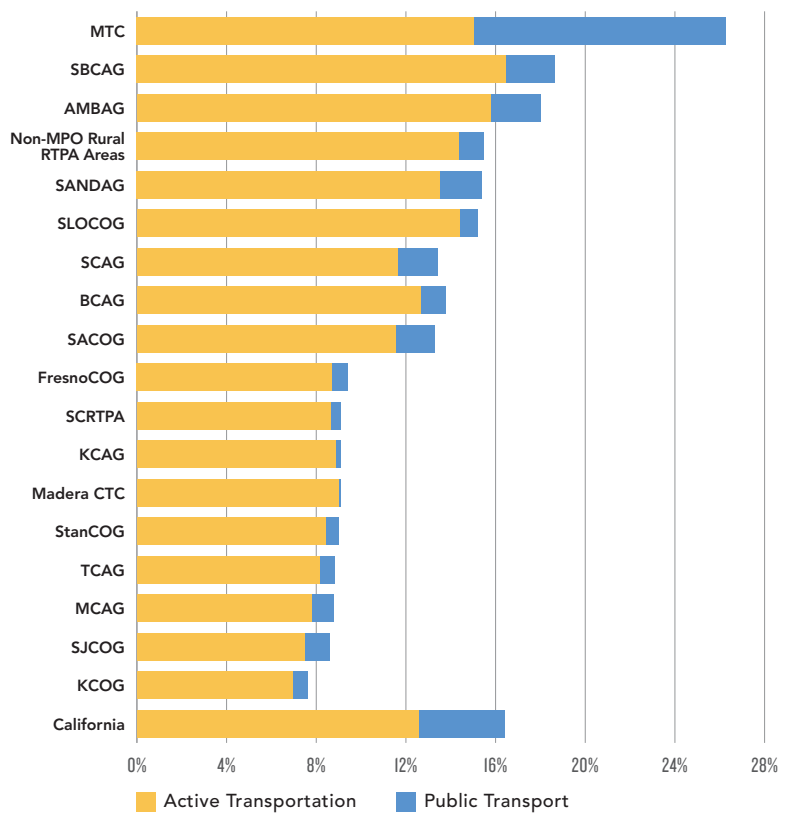
- **Four rural counties have a higher share of commuters by active transportation than San Francisco (22%): Sierra County (24.5%), Trinity County (24.2%), Modoc County (22.7%), and Mariposa County (22.2%).** Of the top ten counties in the state in terms of active transportation use, the majority are rural.

### Public Transit

Public transit in California is highly visible but underutilized in most cases. In 2018, only 5.1 percent of Californians commuted via public transportation, with only four percent of racial minority individuals commuting via public transportation versus six percent of non-Hispanic white populations. Recognizing that communities of color are more likely to be underserved by public transit infrastructure, the California Air Resources Board is issuing up to \$22 million in grants—via the Sustainable Transportation Equity Project—to assist in the development and implementation of “clean-based” transportation solutions in low-income areas.

Statewide, 13 percent of non-minority individuals commute via active or public transportation, compared to 16 percent of racial minority individuals in Figure 9. The share of non-minority individuals who do not drive is lower than that of minority individuals in every MPO except for SCRTPA (Shasta County), where a comparable percentage from both groups do not commute by car. The difference is the starkest in AMBAG, where 18 per-

**FIG 9** Percentage of Racial Minority Commuters by Active Transportation or Public Transit, 2018



Source: American Community Survey Public Use Microdata Samples

cent of racial minority commuters do not drive compared to only nine percent of non-minority commuters.

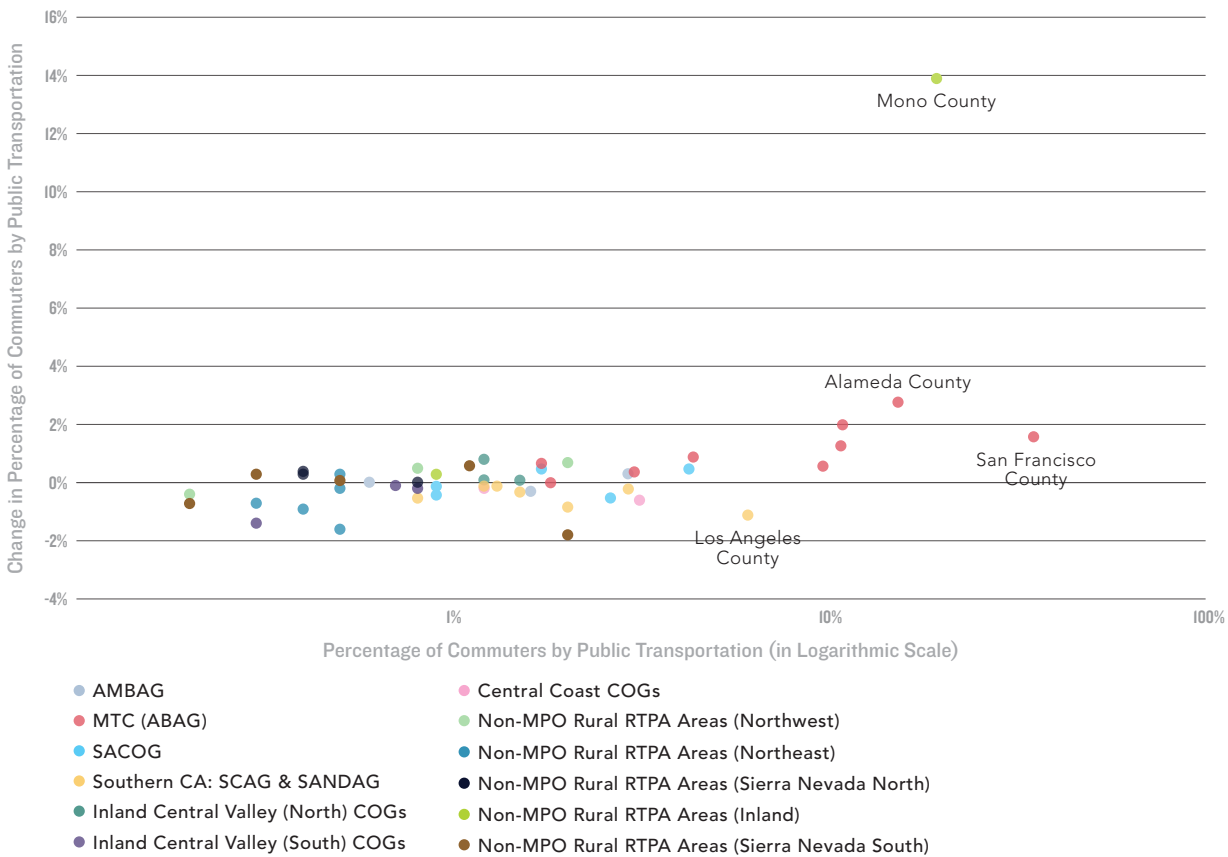
At the county level, Nevada and Sierra have the most similar (equitable) transportation utilization by race, followed by Kings County. In the SCAG region, Los Angeles and Orange counties performed poorly in terms of equitable distribution of ridership by race: LA ranked 44th statewide and Orange 43rd, while Imperial County ranked last (58th) statewide. MTC performed relatively better than SCAG, with Napa County being the lowest ranking member (27th).

### Urban Findings

- **The Bay Area has a substantially higher share of commuters using public transit compared to other counties falling under large metropolitan planning organizations—particularly the five counties that make up San Francisco-Oakland-Berkeley metropolitan statistical area.<sup>77</sup>** These five counties have also

77 Alameda County, Contra Costa County, Marin County, San Francisco County, and San Mateo County.

**FIG 10** Percentage of Commuters by Public Transportation and Percentage Change, Color-Coded by MPO (Logarithmic Scale), 2013–2018



Source: California Public Road Data, California Department of Transportation; California Department of Finance

experienced an uptick in the percentage of commuters using public transit. Yet even the Bay Area Rapid Transit (BART) system has experienced some setbacks, with weekend ridership falling from 62.2 passengers in 2015 to 52.7 million in 2019.<sup>78</sup>

- **Even though urban areas have far more robust public transit infrastructure in place compared to rural areas, ridership continues to drop in many urban counties.** Southern California, in particular, has been struggling to attract and retain riders. Between 2013 and 2018, transit use fell 16.7 percent in

San Bernardino (serving 1.5% of total commuters as of 2018) and 7.1 percent in Riverside (serving 1.3% of total commuters in 2018). Los Angeles’ public transit decline is well documented,<sup>79</sup> but the County—in collaboration with the Southern California Association of Governments—has attempted to reverse this trend in recent years by investing in rail service (the Metro Exposition line and five additional major projects) and expanding access to bus rapid transit (the Metro Orange Extension). Since the Expo line’s expansion to Santa Monica was completed, ridership on that line nearly doubled.<sup>80</sup>

78 Swan, Rachel. “BART has lost nearly 10 million passengers on nights and weekends. Can it lure them back?” San Francisco Chronicle. February 12, 2020. Available at: <https://www.sfchronicle.com/bayarea/article/BART-has-lost-nearly-10-million-riders-on-nights-15050371.php>

79 Nelson, Laura J. “L.A. is hemorrhaging bus riders — worsening traffic and hurting climate goals.” Los Angeles Times. June 27, 2019. Available at: <https://www.latimes.com/local/lanow/la-me-ln-bus-ridership-falling-los-angeles-la-metro-20190627-story.html>

80 Chiland, Elijah. “Rail ridership dips as Metro loses passengers for fifth straight year.” Curbed Los Angeles. February 1, 2019. Available at: <https://la.curbed.com/2019/2/1/18204376/los-angeles-transit-ridership-down-trains-buses>

### Rural Findings

- **The share of commuters using public transit increased the most in rural Mono County—from five percent in 2013 to 18.9 percent in 2018—as a new joint-power authority with the Town of Mammoth Lakes, City of Bishop, Inyo and Mono counties was established to provide transit service to the Eastern Sierra.**<sup>81</sup> As the fifth-most sparsely-populated county, creating a new regional partnership with the other populated areas of the region enabled Mono County to expand public transit options and increase its use among residents as an alternative to driving. Over the same period, the share of commuters using a car in the county fell from 61 percent to 53.4 percent and the share using active transportation decreased from 26.3 percent to 21.8 percent, suggesting that greater availability of public transit led to changes in commuter behavior. Commute patterns indeed seem to have shifted; the share of commuters in Mono County that used public transit increased from five percent in 2013 to 18.9 percent in 2018.
- **Nevada County reduced VMT per capita by six percent—the largest decline statewide—by aggressively pursuing regional partnerships and thinking holistically by integrating multiple modes of transit into one plan.** The Trans-Sierra Transportation Plan released in 2015 brought together 11 counties and other stakeholders to create a multimodal regional transportation system that meets the needs of residents and takes into account the region’s unique geography and population demographics. The plan envisions that this regional alignment of these transportation networks would create 10,000 new well-paying jobs, expand economic activity to generate an additional \$29.9 billion in economic output (including \$11.3 billion in labor income), and result in vehicle operating cost savings of an estimated \$9.9 billion by 2035.<sup>82</sup>
- **Where new public transit systems may be too costly to install and operate, some less-densely populated counties have worked to deploy options beyond traditional fixed-route systems.** Vanpools have been used in both urban and rural communities throughout the state for many years to reduce single-occupancy vehicles during commute times—the California Vanpool Authority (CalVans) serves 17 mostly agricultural California counties and had a total of 350 vanpools in operation as of 2017.<sup>83</sup> It uses a publicly-owned model where individuals who wish to commute with their coworkers can apply to form a vanpool and is currently one of the very few transit agencies that is profitable. Last year, CARB awarded CalVans \$6 million through the California Climate Investments program to pilot the Agricultural Worker Vanpool Project in the San Joaquin Valley and other low-income agricultural areas of the state. Under the pilot, CalVans will deploy 154 new, 15-passenger hybrid vans to agricultural job sites.<sup>84</sup>

81 In 2014, Eastern Sierra Transit Authority (ESTA), which services Inyo and Mono counties, updated its Inyo-Mono Counties Coordinated Public Transit – Human Services Transportation Plan, which evaluated and implemented coordinated strategies to better serve the region’s transportation needs. Despite being mostly a sparsely-populated rural county, over half of the residents reside in Mammoth Lakes, the only incorporated community in Mono County. The successful implementation of its transportation plan’s coordinated strategies and the relative concentration of its population in one area ultimately contribute to the high share of people using public transportation in the county. Available at: <https://monocounty.ca.gov/ltc/page/transportations-issues>

82 Trans-Sierra Transportation Plan. The Trans-Sierra Transportation Coalition. March 2015. Available at: [https://www.nctc.ca.gov/documents/Reports/TransSierraPlan\\_FINAL\\_e-version%20March%202015.pdf](https://www.nctc.ca.gov/documents/Reports/TransSierraPlan_FINAL_e-version%20March%202015.pdf)

83 History of CalVans available at: <https://calvans.org/history>

84 “2019 Profiles: Agricultural Worker Vanpool Pilot Project in the San Joaquin Valley.” California Climate Investments. Available at: <http://www.caclimateinvestments.ca.gov/2019-profiles/lct-vanpool>

# Regions in Focus

Large-scale transportation planning, management, and funding streams are typically conducted at the MPO- or RTPA-level. Therefore, understanding what transportation sustainability means at a regional level has implications for the kinds of policies to pursue and under which circumstances those policies are likely to succeed. Within each large MPO, for example, sustainable transportation options and utilization vary considerably by environments, demographics, and capacities.





This section highlights such variations and notable findings within three of the state's largest MPOs—The Bay Area Metropolitan Transportation Commission (MTC), the Southern California Association of Governments (SCAG), and the Sacramento Area Council of Governments (SACOG)—as they each comprise a mix of urban and rural counties.

## The Bay Area Metropolitan Transportation Commission (MTC)/Association of Bay Area Governments (ABAG)

The Bay Area Metropolitan Transportation Commission and Association of Bay Area Governments (ABAG) together serve as the fourth-largest MPO in the country and coordinate transportation and planning activities for nine counties, which range from the urban technology-hub of San Francisco to the rural vineyards of Napa County. More than seven million Californians live within the MTC/ABAG region that encompasses approximately 7,000 square miles in the Bay Area.<sup>85</sup> In their Plan Bay Area 2040, MTC and ABAG forecast that the region will add two million people and 1.3 million new jobs between 2010 and 2040 (600,000 of those jobs were already added between 2010 and 2015).<sup>86</sup> Ensuring that the transportation systems current and future workers rely on are equitable and efficient will be essential for fueling that economic growth, meeting future emissions targets, and providing a good quality of life for all Bay Area residents.

Most counties in MTC performed reasonably well across the six sub-indices (Table 4), and the region includes the two best-performing counties statewide—San Francisco (1st) and Santa Clara (2nd). San Francisco is also the most densely populated county and has the lowest VMT and highest public transit usage of any county in California. However, it performed worse than six rural counties, including Alpine (1st) and Mono (2nd), in terms of the share of commuters using active transportation. Santa Clara, on the other hand, has the most alternative

fuel vehicle adoption—both within the Bay Area and in the state overall.

Overall, Solano County had the lowest score within the Bay Area. According to the U.S. Census Bureau, Solano County has one of the lowest median incomes in the MTC/ABAG region and had the highest unemployment rate pre-COVID—about one percentage point higher than the other eight counties in the region. Compared to the other two Bay Area counties which have similar median household income levels and are more rural than Solano in terms of “lived density” (Napa and Sonoma), Solano County has significantly higher VMT, lower share of active transportation users, and lower alternative fuel vehicle adoption. However, Solano did perform better than Contra Costa and Marin counties in terms of equity, meaning that access and usage of the various modes of transportation is relatively equal among different races and income levels.

At a regional level, MTC and ABAG have committed to a number of targets for improving access to sustainable transportation options under their Sustainable Communities Strategy (SCS) and regional plan. While the region is a top performer in the state in terms of public transit ridership and active transportation use, they are not on track to achieve their goal for increases under these modes. Under their SCS, MTC committed in 2011 to increasing non-auto mode-share (the percentage of commuters traveling by public transit or active transportation modes) by 10 percent. However, based on current performance, the region is on track to achieve only a four-percentage point increase. By their own account, this shortfall reflects the challenges of transitioning to more sustainable transportation options within a mature region without adequate changes to transportation and land use planning.<sup>87</sup>

The California Air Resources Board has found that the balance of jobs and housing has grown increasingly divergent in the MTC region in recent years, underscoring the challenge that a lack of affordable housing has presented in terms of commute patterns.<sup>88</sup> Solano County provides an example: in 2018, under 60 percent of the

85 Nine Bay Area Counties. Metropolitan Transportation Commission. Available at: <https://mtc.ca.gov/about-mtc/what-mtc/nine-bay-area-counties>

86 Forecasting the Future. Plan Bay Area 2040 Final Plan. Available at: <http://2040.planbayarea.org/forecasting-the-future>

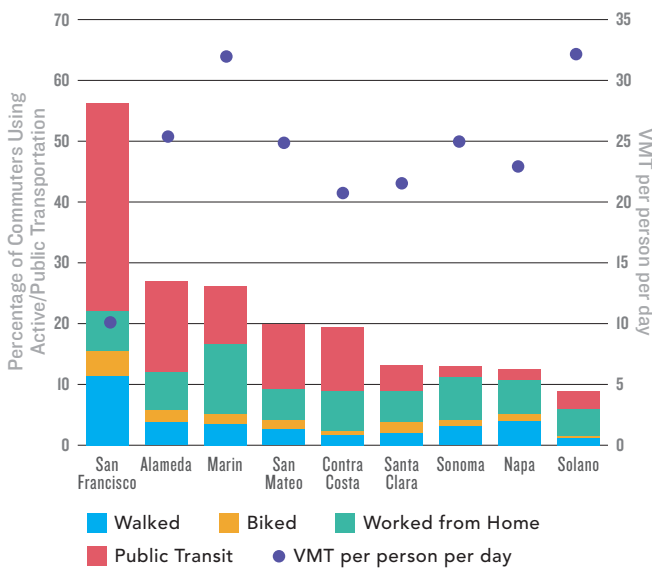
87 *Final Performance Assessment Report*. Plan Bay Area 2040. July 2017. Available at: [http://2040.planbayarea.org/sites/default/files/2017-07/Performance%20Assessment%20Report\\_PBA2040\\_7-2017\\_0.pdf](http://2040.planbayarea.org/sites/default/files/2017-07/Performance%20Assessment%20Report_PBA2040_7-2017_0.pdf)

88 *2018 Progress Report: California's Sustainable Communities and Climate Protection Act*. California Air Resources Board. Available at: [https://ww2.arb.ca.gov/sites/default/files/2018-11/Final2018Report\\_SB150\\_112618\\_02\\_Report.pdf](https://ww2.arb.ca.gov/sites/default/files/2018-11/Final2018Report_SB150_112618_02_Report.pdf)

**TABLE 4** Indicators Scorecard for Metropolitan Transportation Commission

	Vehicle Miles Traveled (40)	Active Transportation (15)	Public Transit (10)	Alternative Fuel Vehicle (7.5)	Equity (25)	Density (2.5)	Total (100)
San Francisco	38.2	9.8	8.5	6.2	16.3	2.5	81.6
Santa Clara	25.7	6.2	2.7	7.3	17	0.6	59.5
Alameda	22	7.5	4.3	6.4	16.7	0.9	57.8
San Mateo	21.8	6.3	4.4	6.2	15.7	0.8	55.2
Contra Costa	23.5	6.7	4.3	5.4	13.3	0.8	54
Sonoma	21.5	6.9	1.6	5.2	17.2	0.3	52.7
Marin	19.5	8.7	3.5	6.7	13.4	0.4	52.3
Napa	22.7	6.7	1.6	4.6	16.3	0.2	52.2
Solano	19.1	4.9	1.8	3.8	15.1	0.5	45.2
MTC	22.6	7.3	4.4	6.3	17.9	0.6	59

**FIG 11** Percentage of Commuters by Active or Public Transportation, MTC Member Counties, 2018



Source: California Public Road Data, California Department of Transportation; California Department of Finance; American Community Survey

**TABLE 5** Commuting Patterns of Outer Member Counties of MTC Region

Place of Work	PLACE OF RESIDENCE		
	Napa	Solano	Sonoma
Live and Work in Same County	80%	58%	87%
San Francisco MSA	9%	26%	10%
Sacramento MSA	1%	6%	0%
Santa Clara	0%	1%	0%
Napa County	x	6%	2%
Solano County	7%	x	0%
Sonoma County	3%	2%	x
Other	1%	1%	2%

Source: American Community Survey Public Use Microdata Samples

**TABLE 6** Indicators Scorecard for Southern California Association of Governments

	Outbound Commute	Active Transportation (15)	Public Transit (10)	Alternative Fuel Vehicle (7.5)	Equity (25)	Density (2.5)	Total (100)
Ventura	25.3	5.8	1.4	4.4	15.8	0.4	53.1
Los Angeles	23.3	6.1	3.4	4.9	11.1	1.1	49.7
Orange	23.3	6.2	2	5.6	10.7	1.3	49
San Bernardino	21.9	5.6	1.5	3.3	14.6	0.4	47.2
Riverside	21.4	5.3	1.4	3.6	14.1	0.4	46.2
Imperial	17	5.6	1.1	1.6	7.3	0.2	32.8
SCAG	22	5.9	2.7	4.7	11.1	0.6	47

county's residents worked in the same county, compared to 80 percent of Napa County's residents and 87 percent of Sonoma County's residents. Over a quarter of Solano's residents commute to the San Francisco metro area,<sup>89</sup> while six percent commute to the Sacramento Area and Napa County. The diverse commuting patterns of Solano County residents may explain the county's relatively high VMT per capita and lower levels of active transportation and public transit usage.

### Southern California Association of Governments (SCAG)

The Southern California Association of Governments oversees planning for a region that accounts for approximately 25 percent of the state's land mass and consists of six counties, ranging from the large media and biotech economies of Los Angeles and Orange counties, respectively, to the logistics hubs in San Bernardino and Riverside, to more rural Imperial County. With 191 member cities and a population of more than 19 million, SCAG serves as the largest MPO in both the state and the nation.<sup>90</sup> In their 2020-2045 Regional Transportation Plan/Sustainable Communities Strategy (titled ConnectSoCal), SCAG forecasts that the

region will grow by 3.6 million residents, and an additional 1.6 million jobs over the next 25 years.<sup>91</sup> By their own recognition, counties in the SCAG region face numerous challenges on their path to a more sustainable transportation model, including insufficient funding, rising housing costs, and shifting demographics.<sup>92</sup> Furthermore, several regional stakeholder groups have pushed for a greater emphasis on equitable planning and environmental justice beyond what is currently in Connect SoCal.<sup>93</sup>

Most counties in the SCAG region achieved scores close to the statewide average of 52.2, with the exception of Ventura County (53.1), who had a lower average daily VMT per capita than all other SCAG counties and performed best with respect to equity, meaning that access and usage of the various modes of transportation is relatively equal among different races and income levels, in comparison to neighboring counties. Los Angeles County held the second highest overall score for the region and tied with Orange County for greatest active transportation utilization. In terms of equitable utilization of sustainable transportation modes, all SCAG counties scored below the state average (16.3).

89 San Francisco-Oakland-Berkeley Metropolitan Statistical Area, which is comprised of Alameda, Contra Costa, Marin, San Francisco, and San Mateo.

90 About SCAG. SCAG. Available at: <http://www.scag.ca.gov/Pages/default.aspx>

91 Connect SoCal. SCAG. Available at: <https://www.connectsocial.org/Pages/Who-Are-We-Planning-For.aspx>

92 The 2016-2040 Regional Transportation Plan/Sustainable Communities Strategy. Southern California Association of Governments. Available at: <http://scagrtpscs.net/Documents/2016/final/f2016RTPSCS.pdf>

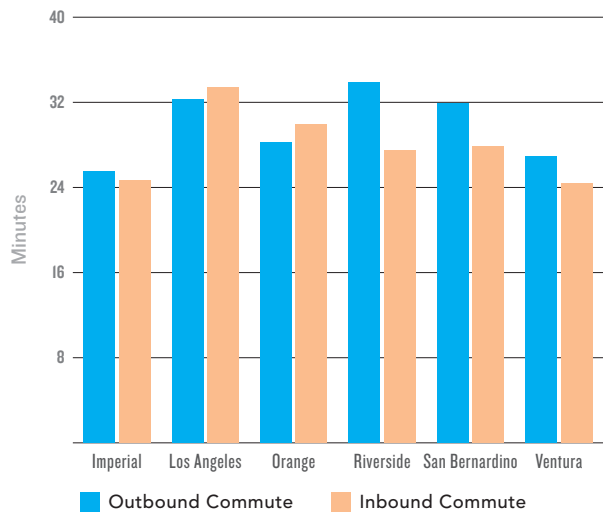
93 "Comments on Connect SoCal 2020-2045 Regional Transportation Plan and Sustainable Communities Strategy." Southern California Association of Governments. January 24, 2020. Available at: [https://www.saferoutespartnership.org/sites/default/files/connect\\_so-cal\\_comment\\_letter\\_01.24.20\\_final\\_srp.pdf](https://www.saferoutespartnership.org/sites/default/files/connect_so-cal_comment_letter_01.24.20_final_srp.pdf)

In recent years, the housing affordability issue has added another hurdle to sustainable transportation in Los Angeles County. Many of its residents endure long commutes with high traffic congestion far from their places of work since the county’s main jobs-rich areas are unaffordable, even for many households making above the 2018 area median income of \$69,300. Car ownership has grown significantly, with residents registering an additional 2.1 million more cars between 2000 and 2015, nearly keeping pace with a population increase of 2.3 million people over the same period.<sup>94</sup> Despite LA Metro’s public transit expansion projects, such as the rollout of new active transportation infrastructure and investments in rail extensions,<sup>95</sup> connector services and new transit corridors, low-income residents who would otherwise be the county’s largest patrons of its public transit systems are increasingly being priced out of the areas where these projects are planned.

The average commute time is also longer in Los Angeles County than other counties in SCAG. Los Angeles County residents have the second-longest average commute (32.3 minutes) after Riverside County (33.9 minutes), but those who commute into Los Angeles County for work have by far the longest average commute (33.4 minutes), or 3.5 minutes longer than the next county (Orange County workers with 29.9 minutes). Not only are commutes clearly longer in Los Angeles County than its neighbors (Orange and Ventura), Inland Empire residents having much longer commutes than Inland Empire workers suggests that many of these Inland Empire residents work in Los Angeles County or Orange County, but the significantly higher housing costs in those counties have prevented them from moving closer to work or priced them out of the housing market.

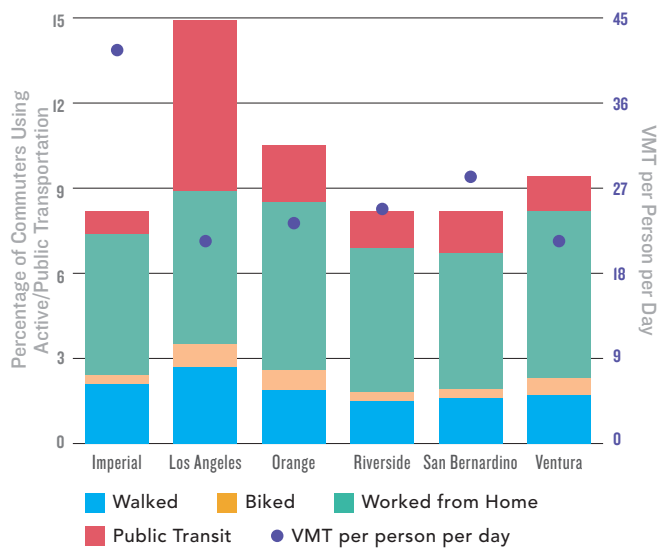
Imperial County faces challenges quite different from those felt by its more urbanized neighbors. As the only rural county in SCAG, Imperial has a similar share of commuters by active and public transportation compared to Riverside and San Bernardino Counties—but has a substantially higher VMT per capita than the rest of SCAG. Its highly agricultural economy suggests active and public transportation are not widely viable modes of transpor-

**FIG 12** Average Commute Time by SCAG Member Counties, All Modes, 2018



Source: American Community Survey Public Use Microdata Samples

**FIG 13** Percentage of Commuters by Active or Public Transportation by SCAG Member Counties, 2018



Source: California Public Road Data, California Department of Transportation; California Department of Finance; American Community Survey

94 Manville, M, Taylor, B. D., and Blumenberg, E. *Falling Transit Ridership: California and Southern California*. Los Angeles: Institute of Transportation Studies, University of California, Los Angeles. January 31, 2018. Available at: <https://www.its.ucla.edu/2018/01/31/new-report-its-scholars-on-the-cause-of-californias-falling-transit-ridership/>

95 Examples of recent expansions include Expo Line Phase 2 (2016), Gold Line eastbound extension to Azusa (2016), Purple Line expansion (in progress).

**TABLE 7** Indicators Scorecard for Sacramento Area Council of Governments

	Outbound Commute	Active Transportation (15)	Public Transit (10)	Alternative Fuel Vehicle (7.5)	Equity (25)	Density (2.5)	Total (100)
Sacramento	21.9	6.2	2	3.9	17.7	0.7	52.5
Placer	22.8	7.2	1	4.4	14.6	0.4	50.3
El Dorado	21.7	7.9	1.1	4	13	0.2	47.9
Yolo	20.7	8.4	2.6	4.6	11.3	0.2	47.9
Sutter	21	6.1	1.1	2.3	14.7	0.3	45.4
Yuba	21.4	5.3	1.2	2.2	14.7	0.2	45
SACOG	21.5	7.1	1.8	4	15.5	0.4	50.3

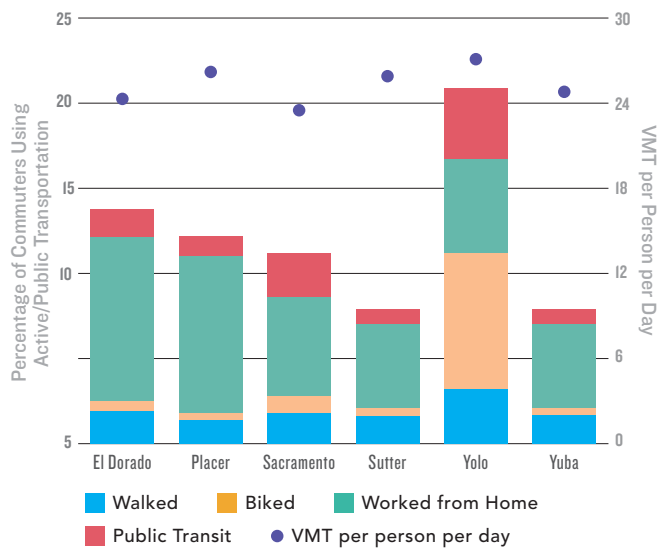
tation. In addition, many of the county’s residents and workers commute to and from the Yuma metro area in Arizona. Although intermittent bus services between the two areas exists, the long commute makes active and public transportation generally unfeasible.<sup>96</sup>

### Sacramento Area Council of Governments (SACOG)

The Sacramento Area Council of Government oversees transportation planning for the six-county capitol region. In contrast to Sacramento County, the other member counties are mostly rural with pockets commercial and tourism activity. Home to 22 cities and 2.3 million residents, the SACOG region is projected to grow by 620,000 people and 270,000 jobs by 2040. The region’s 2020 Metropolitan Transportation Plan/Sustainable Communities Strategy emphasizes the need for smart growth, improvements to mobility, and equity and commits to spend \$35 billion to improve the regional transportation system by 2036.<sup>97</sup>

SACOG performed slightly better than SCAG overall, but similar trends persist—rural counties and counties with low household income fared worse than the region’s average, and only Sacramento County (52.4) met or exceeded the statewide average score (52.2). Surprisingly, some the region’s more rural counties ranked highest within SACOG for both alternative fuel vehicle adoption

**FIG 14** Percentage of Commuters by Active or Public Transportation by SACOG Member Counties, 2018



Source: California Public Road Data, California Department of Transportation; California Department of Finance; American Community Survey

<sup>96</sup> These two areas are more than 60 miles apart. The bus service is only available Monday, Wednesday, and Friday, and takes more than one hour to travel. Source: Yuma County Intergovernmental Public Transportation Authority. Retrieved from [https://www.ycipta.org/documents/10\\_Turquoise\\_revised\\_07102018.pdf](https://www.ycipta.org/documents/10_Turquoise_revised_07102018.pdf)

<sup>97</sup> Metropolitan Transportation Plan/Sustainable Communities Strategy. 2020. SACOG. Available at: [https://www.sacog.org/sites/main/files/file-attachments/2020\\_mtp-scs.pdf?1580330993](https://www.sacog.org/sites/main/files/file-attachments/2020_mtp-scs.pdf?1580330993)

**TABLE 8** Commuting Patterns of SACOG Member Counties, 2018

Place of Work	PLACE OF RESIDENCE				
	Sutter & Yuba	El Dorado	Placer	Sacramento	Yolo
Live and Work in Same County	66%	59%	65%	81%	65%
Sutter & Yuba	x	0%	2%	0%	0%
El Dorado	0%	x	1%	1%	0%
Placer	10%	5%	x	7%	2%
Sacramento	10%	25%	25%	x	25%
Yolo	4%	1%	2%	5%	x
Other	10%	10%	6%	6%	8%

and active transportation (El Dorado, Placer, Yolo).

Sutter and Yuba—rural counties that have the lowest median household income in SACOG—performed in line with the rest of SACOG except in active transportation and alternative fuel vehicle categories. The six counties in SACOG make up two distinctively different metro areas: Sacramento-Roseville-Folsom MSA (El Dorado, Placer, Sacramento, and Yolo) and Yuba City MSA (Sutter and Yuba). As of February 2020, Yuba City MSA's unemployment rate was 6.6 percent, much higher than Sacramento MSA's 3.5 percent. Both metro areas also have a high level of government employment. However, while Sacramento MSA's state and local government agencies employ roughly the same number of people, Yuba City MSA's government jobs are mostly at the local level. While Yuba City MSA's economic landscape is more prosperous than that of Imperial County in SCAG, it is decidedly less so than the Sacramento MSA.

VMT per capita is about the same across SACOG, ranging from 23.5 miles per person per day in Sacramento County to 27.1 miles per person per day in Yolo County. Yolo County has a much higher share of commuters by active and public transportation than the rest of SACOG due to the large number of college students

and employees that bike and walk to the University of California, Davis campus, located within Yolo County south of Sacramento. Region-wide, SACOG projects that the share of commute trips by active transportation will rise from 10 percent in 2016 to 13.6 percent in 2040.<sup>98</sup>

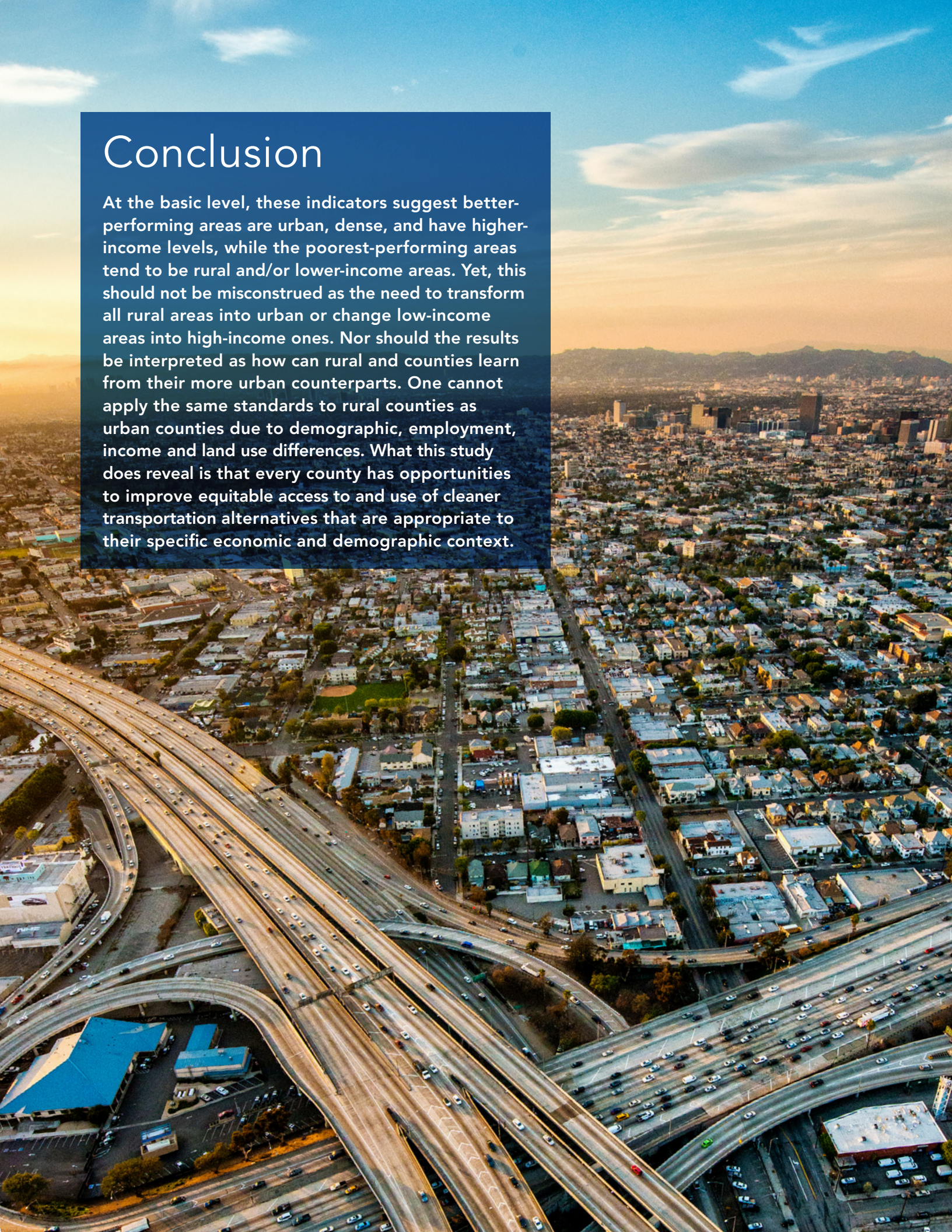
Similar to Solano County, many of Sutter and Yuba Counties' residents commute outside of the county for work. While this is also true for El Dorado, Placer, and Yolo, most of the people that reside in those counties commute to Sacramento County. On the other hand, 10 percent of the residents of Sutter and Yuba region each commute to Placer, Sacramento, and other regions outside of SACOG for work. Sutter and Yuba are primarily serviced by Yuba-Sutter Transit Authority, which provides local fixed routes, dial-a-ride, rural routes, and Sacramento route services. According to its Yuba-Sutter Short Range Transit Plan, 27 percent of its local fixed routes were at least five minutes behind schedule.<sup>99</sup> The lack of predictable and on-time service may be one factor deterring would-be patrons from using public transit. The issue is amplified in rural areas, where services tend to be more infrequent. Improving on-time performance would help meet current and future needs as well as encouraging ridership.

98 Ibid.

99 LSC Transportation Consultants, Inc. (2014, April 4). Inyo-Mono Counties Coordinated Public Transit – Human Services Transportation Plan. Eastern Sierra Transit Authority. April 4, 2014. Available at: <https://www.yubasuttertransit.com/files/128a7b321/Yuba+-Sutter+SRTP+2015.pdf>

# Conclusion

At the basic level, these indicators suggest better-performing areas are urban, dense, and have higher-income levels, while the poorest-performing areas tend to be rural and/or lower-income areas. Yet, this should not be misconstrued as the need to transform all rural areas into urban or change low-income areas into high-income ones. Nor should the results be interpreted as how can rural and counties learn from their more urban counterparts. One cannot apply the same standards to rural counties as urban counties due to demographic, employment, income and land use differences. What this study does reveal is that every county has opportunities to improve equitable access to and use of cleaner transportation alternatives that are appropriate to their specific economic and demographic context.



It should be noted that not all rural counties scored poorly (e.g., Nevada County had the fifth-highest overall score), and vice versa, not all large urban counties performed well (e.g., Fresno County ranked 42nd overall). The lessons that can be drawn from this brief are how can a large urban area learn from its peer counties and improve? Counties like Mono and Nevada demonstrate what can be done in rural counties with distributed population clusters to improve access to and use of public transportation. Sacramento and Los Angeles demonstrate that affordable and convenient access to electric and hybrid carshares is possible for communities traditionally underserved by cleaner transportation alternatives—even if those programs may still have room to grow and improve. And in San Francisco—the state’s top performing county—we still see that there is room for improvement in terms of equitable use of public transportation. Even in densely populated cities with a variety of clean transportation alternatives, land use decisions and housing dynamics can make public transit and active transportation modes all but impossible for those forced to live further from city centers.

The policy planning matrix summarizes some of these concepts and others with respect to both differences in density and opportunities for employment. Sustainable transportation options and utilization will vary considerably across different environments, demographics, and capacities—which requires careful consideration of which policy tools to employ to ensure climate goals (i.e. GHG emission reductions), economic growth, and equitable access are all realized.

The options available to any given jurisdiction is determined by the feasibility of connecting as many people as possible (equitable access) to employment centers or relatively more job-rich areas (economic growth) with travel modes that produce less carbon than combustion-engine passenger vehicles (emissions reductions). In high-density, job-rich counties like Los Angeles, for example, robust fixed-route infrastructure may exist, but buses may need to further expand services to connect lower-income residents living on the urban periphery to centrally located employment centers. Conversely, in a

**TABLE 9** Policy Planning Matrix

	High-Density Region	Low-Density Region
High Number of Employment Opportunities	<ul style="list-style-type: none"> <li>• Enhancements to fixed- route transit service</li> <li>• Installation of active transportation infrastructure</li> </ul>	<ul style="list-style-type: none"> <li>• Employer-sponsored vanpools or shuttles</li> </ul>
Low Number of Employment Opportunities	<ul style="list-style-type: none"> <li>• Rideshare service expansion</li> <li>• Short-term Alternative Fuel Vehicle Rental</li> <li>• Non-fixed route service</li> <li>• Rapid transit</li> </ul>	<ul style="list-style-type: none"> <li>• Alternative Fuel Vehicle ownership incentives</li> <li>• Rideshare service expansion</li> <li>• Short-term Alternative Fuel Vehicle Rental</li> </ul>

low-density, job-poor county like Imperial, promoting greater access to electric vehicles will replace carbon-emitting passenger vehicles residents use for long-distance commutes to job-rich areas.

Ideas such as these—that range from low-cost and low-tech to ambitious and large-scale—demonstrate that transportation sustainability can be achieved at different scales. As the index’s scores and rankings indicate, nearly every county has room to improve. Not all indicators will apply to every county nor will implementing all policies listed above be necessary, but collectively moving to cleaner alternatives to the fossil fuel status quo will be necessary to drive down transportation sector emissions and help California meet its longer-term climate goals. By adopting a transportation sustainability outlook and adapting these indicators to local planning contexts, regional transportation planning agencies will be several steps closer to a providing their communities with cleaner air, more equitable economic growth, and a healthier future overall.