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What Tackles Vehicle GHG Emissions in California: Regional Plan Adoption or Local Leadership?

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Abstract: The California Senate Bill No. 375 (SB 375) serves as a model policy for reducing greenhouse gas (GHG) emissions by integrating transportation and land-use planning through regional and local policies. The 18 California Metropolitan Planning Organizations (MPOs) are tasked with developing Sustainable Communities Strategies (SCS) to guide emissions reductions, often implemented locally through Climate Action Plans (CAPs). However, CAPs are voluntary, and misalignment with SCS objectives can undermine their effectiveness. This study examined 25 California cities using content analysis and regression modeling to explore whether independent local actions, supported by community engagement, activist strategies, and leadership, are more effective than regional alignment in reducing vehicle trips. The findings show that while aligning regional and local plans is important for equity and resource distribution, local activist leadership in addressing specific issues, such as parking and public education, achieves significant reductions in vehicle trips. These efforts lead to a 20% increase in non-auto commuting, even without a mandated regional alignment. Additionally, regional strategies such as climate-friendly infrastructure and mass transit are crucial for addressing resource disparities between lower-income communities with limited volunteer capacity and wealthier communities that benefit from robust regional plans and strong local leadership. This study provides critical evidence of the effectiveness of regional and local approaches, emphasizing the need for a balanced, multi-scalar framework to enhance transportation emission reductions and climate resilience.

Keywords: climate policy; transportation; land-use; local leadership

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1. Introduction and Background Knowledge

1.1. Transportation and Climate Change: Trends, Strategies, and Future Directions

Transportation is a critical sector in the fight against climate change, as it remains one of the largest contributors to global greenhouse gas (GHG) emissions. A growing body of research has explored strategies to mitigate these emissions, focusing on reducing vehicle trips, promoting sustainable travel modes, and aligning policies at the local and regional levels. This section synthesizes key findings from the literature, highlighting the trends and insights that inform current approaches to transportation and climate action.

Active transportation, such as walking and biking, has been widely recognized for its potential to reduce GHG emissions while offering co-benefits like improved public health. Research by Handy et al. (2002) and Saelens and Handy (2008) illustrates how urban design and pedestrian-friendly infrastructure can encourage active commuting and reduce reliance on automobiles [1,2]. However, it is important to note that pedestrian-friendly environments are not conducive to safe biking because they are designed to serve pedestrians only. Further studies, such as Piatkowski et al. (2015), have quantified the emission reductions associated with increased active transportation, positioning it as a vital component of climate strategies [3].

Public transit systems are the cornerstone of sustainable transportation strategies, healthy communities and economic growth [4–6]. Litman (2004) demonstrates that investments in transit infrastructure can significantly reduce per capita vehicle miles traveled (VMT), leading to substantial GHG reductions [7]. Chester and Horvath (2009) add that electrification and improved energy efficiency in transit systems can further enhance these benefits [8]. Nevertheless, challenges persist in extending transit accessibility to suburban and rural areas, as highlighted by Ewing and Cervero (2010), underscoring the need for integrated regional planning [9].

The alignment of local and regional policies (local policies are city-level strategies addressing specific needs, such as zoning, transit access, and housing, while regional policies provide overarching frameworks and coordinate efforts across multiple municipalities. In California's Sustainable Communities Strategies (SCS) program, Metropolitan Planning Organizations (MPOs) develop regional plans to reduce greenhouse gas (GHG) emissions, with cities implementing aligned local actions like transit-oriented development or parking reforms [10]. Globally, similar entities include Transport for London (TfL) in the UK, Metrolinx in Canada, and the Tokyo Metropolitan Government in Japan. These organizations set regional priorities, while cities adapt them locally. For example, London boroughs align with TfL's transportation strategies [11], and municipalities in the Greater Toronto Area work with Metrolinx to implement transit-oriented plans [12], ensuring cohesive development tailored to local needs.) is a recurring theme in transportation and climate research. California's Sustainable Communities Strategies (SCS) program, introduced under SB 375, provides a notable example of coordinated planning efforts. Studies by Barbour and Deakin (2012) and Wheeler (2013) examine the program's success and limitations in promoting compact growth and reducing emissions [13,14]. Recent work, such as Zandiatashbar et al. (2023), suggests that while local initiatives can independently achieve significant emission reductions, regional coordination enhances the impact of strategies like climate-friendly infrastructure and mass transit [15].

Equity has emerged as a central consideration in transportation and climate research. Sanchez et al. (2003) first identified disparities in access to sustainable transportation options [16], a theme further developed in studies like Karner and Niemeier (2013) [17]. These works highlight the importance of designing climate policies that address the mobility needs of underserved populations, advocating participatory planning processes to ensure equitable access to sustainable transportation systems.

Technological advancements such as electric vehicles (EVs), autonomous vehicles, and mobility-as-a-service (MaaS) platforms offer new opportunities for reducing transportation emissions. Axsen et al. (2016) explore the emissions reduction potential of EVs, contingent on the decarbonization of electricity grids [18]. However, concerns about rebound effects, particularly with autonomous vehicles, have been raised by Litman (2020), emphasizing the need for careful integration of new technologies into broader climate strategies [19].

The existing literature underscores the critical importance of aligning regional and local transportation strategies to effectively mitigate GHG emissions. While past studies have demonstrated the value of active transportation, transit investments, and policy alignment, this paper delves into the nuanced dynamics specific to California. By examining the interplay between Sustainable Communities Strategies (SCS) and Climate Action Plans (CAP) across 25 cities, our findings provide targeted insights into how local activist leadership and community engagement can drive significant reductions in vehicle trips. This paper builds on prior work by exploring the comparative impacts of regional coordination versus localized initiatives, contributing to a deeper understanding of how tailored, context-specific approaches can address the transportation sector's role in climate change.

1.2. Regional-Local Dynamics in California's Climate Policy

Climate change has wide-ranging effects on our communities, from extreme temperatures to rising sea levels and more frequent wildfires [20]. Therefore, it is crucial to develop new approaches and evaluate current policies addressing climate change. California is a leader in developing and implementing progressive climate policies, making it an excellent area of study that strives to accomplish ambitious emissions reduction objectives, particularly in transportation. Senate Bill No. 375 (SB 375) in California implemented a "bottom-up" approach to recognize the crucial role of local and regional plans in achieving greenhouse gas (GHG) emission goals related to Transportation and Land Use [21]. SB 375, also known as the Sustainable Communities and Climate Protection Act of 2008, requires each Metropolitan Planning Organization (MPO) in California to prepare a Sustainable Communities Strategy (SCS) as part of its regional transportation plan. The SCS is a comprehensive plan that aims to integrate land use, housing, and transportation planning in a way that reduces greenhouse gas (GHG) emissions and helps achieve the emission reduction targets established by the California Air Resources Board (CARB). The SCS serves as a framework for coordinated efforts between MPOs and local governments to promote sustainable and environmentally friendly development practices and transportation solutions. By aligning the regional vision with local planning efforts, the SCS seeks to create more sustainable and livable communities while contributing to California's overall climate goals. Despite this, one should take into account that the strategies for SCS largely rely on the justification provided by local agencies. Consequently, local officials are placed in the position of being the ultimate decision-makers when it comes to determining the specifics of implementing SB 375.

Jurisdictions are not obligated to create a Climate Action Plan (CAP), but the funding and technical support offered by the state or regional agencies motivate them to step into this process. Although the General Plan (GP) is the only plan that is required and widespread among municipalities, several jurisdictions have voluntarily developed CAPs to direct their efforts toward reducing greenhouse gas (GHG) emissions. It is worth noting that the Sustainable Communities Strategy (SCS) does not override a local CAP or require local policies to align entirely with it. California's efforts to achieve its aggressive emission reduction targets face major challenges, with the transportation industry being a key barrier [22]. Despite significant legislative strides in climate policy, a CARB report from November 2018 revealed that California is falling short of the greenhouse gas emission reduction goals set by the 2008 Sustainable Communities and Climate Protection Act (SB 375). Over the past decade, research has extensively explored both opportunities and challenges in local climate action planning [23]. While the connection between the climate plans prepared at local and regional levels has received less attention, recent studies on SB 375's impact on local climate initiatives highlight a potential issue. Without the obligation of local governments to coordinate their strategies with the SCS, a free-rider issue could arise, where local jurisdictions reap the benefits of regional achievements without making full contributions (5). Considering the severe climate disruptions already affecting the state, a critical question arises: to what extent could the misalignment between local plans and the regional SCS hinder California's progress in reducing GHG emissions? The state must also evaluate whether the regional approach is effective, particularly if it cannot enforce local policy alignment with the SCS and if local efforts can demonstrate equal effectiveness on their own. To help address these problems, this study answers the following research questions: (1) Can coordination, or lack thereof, between regional and local transportation and land-use plans help decrease GHG emissions by reducing vehicle trips? (2) What are the differences in outcomes between local initiatives acting independently and those aligned with regional efforts when it comes to reducing vehicle trips? Lastly, (3) to what extent can community engagement, education, and outreach contribute to the success of Climate Action Plans, and is their impact greater when part of an adopted regional plan or a city's independent initiative?

To address these questions, we drew upon our earlier separate content analysis of SCSs and CAPs in 25 cities in CA. In this separate study, we identified and categorized transportation and land-use strategies. In the present study, we expanded the results of the former content analysis in multiple regression analyses to examine the potential relationship that could exist among the alignment of these strategies (MPO-City alignment) between local and regional plans and vehicle trip reduction over time. The findings show that although aligning regional and local policies is important in some areas, local actions can be more effective in others. Specifically, independent local actions to engage communities in climate planning or policies to address local problems, such as parking, were found to have a greater impact on vehicle trip reduction.

2. Materials and Methods

2.1. Sample

To measure the possible connection between MPO-City alignment and vehicle trip reduction across our four categories, including Transportation and Land Use (TLU) strategies, which look at the four alignments of—(1) transportation infrastructure (built environment), (2) land use policies, (3) Transportation Demand Management (TDM) policies, and (4) cross-cutting issues—we analyzed data from content reviews of CAPs and SCSs to calculate the variable that indicates the alignment between MPO and City. Each category includes a series of strategies, as explained in the Analytical Approach section. For instance, climate-friendly infrastructure, which is part of Category 1, integrates sustainable practices in Transportation and Land Use to reduce greenhouse gas emissions and energy consumption. It includes efficient public transit, cycling and walking infrastructure, and support for electric vehicles. Transit-Oriented Development (TOD) promotes high-density, mixed-use communities near transit hubs, reducing car dependency. Compact urban design, green spaces, and low-carbon construction enhance sustainability. Smart mobility systems and policies like carbon pricing and subsidies incentivize greener choices. Equity is central to ensuring access to sustainable transportation for all. These strategies create efficient, inclusive, and low-carbon cities that mitigate climate impacts and improve the overall quality of life. We then applied multiple linear regression models across the 20 selected cities, with the block group as our unit of analysis. The dataset included 6513 census block groups, adjusted after model refinements. Block groups were chosen as the unit of analysis because they represent the finest available data granularity, allowing us to maximize the observation counts and thereby enhance our models' statistical strength.

2.2. Data and Variables

Table 1 outlines all the variables applied in our models, along with their respective sources. To gather data for each of these variables, we referred to the cities identified during the content analysis and acquired the boundaries of the shapefile of these cities using the Census Designated Places (2019) provided by the US Census website. These city boundaries were used to assign block groups based on whether the population centroids of the block groups fell within the boundaries of each city.

Table 1. Variable definitions and sources.

Variable	Definition	Source	Mean (s.d. ***)
Dependent Variable			
10-Yr non-auto c	Pct change in non-auto work commuters between 2010 and 2019	ACS * 5-Year Estimate	0.17 (11.16)
Input Variables (Built Environment)			
Act Den	Gross activity density equals (number of housing dwellings plus employment) divided by land (unprotected)	SLD ** estimated in 2018	32.44 (43.53)
Emp Ent	5-tier employment entropy	SLD ** estimated in 2018	0.61 (0.25)
Rd Den	Total road network density	SLD ** estimated in 2018	26.34 (8.92)
TransitFq_CP	Aggregate transit service frequency per capita	SLD ** estimated in 2018	0.01 (0.09)
Input Variables (Sociodemographic)			
Pop	Population in 2019	ACS * 5-Yr Estimates	1674.48(991.23)
Emp_%	Pct of employed working-age population	ACS * 5-Yr Estimates	94.09 (4.92)
Edu_%	Pct of 25 years old and above with bachelor's or higher degrees in 2019	ACS * 5-Yr Estimates	37.05 (23.75)
NearWork_%	Pct of working-age residents in a 30 min work commute in 2019	ACS * 5-Yr Estimates	52.18 (15.61)
Mid-age_%	Pct of 45–64-year-old residents in 2019	ACS * 5-Yr Estimates	24.82 (15.61)
Non-auto_10_%	Pct of non-auto work commuters in 2010	ACS * 5-Yr Estimates	0.16 (0.18)
Input Variable (Policy Alignment, Key Variable)			
Alignment	1 if both the city's and MPO's plans have the policy; 0 else	Content analysis	N/A

* American Community Survey, ** Smart Location Database, *** Standard deviation.

We categorized our variables into three main groups. The first group includes built environment features that are recognized as key influences on commuting behavior. These features were sourced from the Environmental Protection Agency's (EPA) Smart Location Database (SLD). Our analysis considers the four primary built environment factors, often referred to as the "4 Ds": activity density (the combined numbers of residents and employment divided by area in sq. mile), land-use diversity (measured by the variety of job types), street design (represented by intersection density), and proximity to public transit (approximated by the frequency of transit services). The second category focuses on demographic variables that can significantly impact commuting patterns. This category includes the total population, the percentage of working-age residents, education levels, and age distribution. Additionally, two other critical variables influencing commuting behavior are workplace location and residents' dependence on automobiles. To assess these, we measured the percentage of commuters living within a 30 min distance from their job and the proportion of those not using cars for their commute in 2010.

2.3. Analytical Approach

The applied analytical approach has two steps, which begin by quantifying the impact of vehicle trip reduction on the Metropolitan Planning Organization (MPO) and city alignment across four specific Transportation and Land Use (TLU) strategy categories, in addition to the overall alignment. As presented in Table 2, the TLU categories assessed include the following:

1. Transportation Infrastructure (Built Environment) Alignment: Examines policies aimed at improving transportation infrastructure, such as bike lanes, sidewalks, and transit-oriented development.
2. Land Use Policy Alignment: Focuses on zoning and planning strategies, such as compact development and mixed-use neighborhoods.
3. Transportation Demand Management Policy Alignment: Evaluates policies intended to reduce vehicle demand, including carpooling incentives, congestion pricing, and parking restrictions.
4. Cross-Cutting Issues Policy Alignment: Covers overarching or integrative strategies like green infrastructure and renewable energy initiatives.

The overall alignment was also analyzed by synthesizing data from Climate Action Plans (CAPs) and Sustainable Communities Strategies (SCSs), as detailed by Alexander et. al. (2022) [24].

To assess the effectiveness of both MPO-City alignment and independent city-level strategies, two binary (dummy) variables were employed. One dummy variable was coded as “1” if both the city and MPO included a specific strategy in their plans and “0” otherwise. The second dummy variable was coded as “1” if the city (regardless of its MPO) included a specific strategy in its plans and “0” otherwise. These dummy variables were then integrated into a series of statistical models to estimate the impact of MPO-City alignment on vehicle trip reduction and compare it with the impact of the city’s action independent of alignment with its MPO. This study used a linear regression modeling approach to quantify the vehicle trip reduction impacts of city-MPO alignment and city action across 20 cities. The analysis was conducted at the census block group (BG) level using a sample of 6513 block groups. Census block groups, which are subdivisions of census tracts containing between 600 and 3000 people, were chosen because they represent the most granular level of data available. This granularity allowed for a higher number of observations, increasing the statistical power of the models. The regression models were refined through iterative modifications to ensure robustness and validity. This involved testing for multicollinearity, heteroscedasticity, and model specification errors. The final models produced statistically significant results that quantified the relationship between (1) MPO-City alignment and vehicle trip reduction and (2) City’s climate action strategies and vehicle trip reduction. In other words, the linear regression models revealed the extent to which alignment or the city’s adoption of policies in each strategy category contributed to vehicle trip reduction. This quantitative approach provided a robust framework for understanding the relationship between MPO-City policy alignment or a city’s climate policy adoption and transportation outcomes, offering valuable insights for future planning and policymaking efforts aimed at reducing greenhouse gas (GHG) emissions in the transportation sector.

Table 2. TLU strategies [25].

Strategy Category	Strategy Key Factors	Definition
Category (1) Transportation	Bicycle Pedestrian Complete Streets Mass Transit Electric Vehicle Ride-sharing Low-carbon/Alternative Fuel Vehicle Autonomous Vehicles Climate-friendly infrastructure Vehicle Idling Goods movement	Common transportation and built environment strategies in SCSs and CAPs include active transportation strategies, such as improving pedestrian infrastructure and access, bicycle infrastructure, and developing a network of complete streets.

Table 2. *Cont.*

Strategy Category	Strategy Key Factors	Definition
Category (2) Land-use	Transit-Oriented Development Infill Development ADU Development Program Housing Development Near Activity Centers Housing Affordability and Jobs-Housing Balance Preserve/Restore Open Space, Farmland, Natural Beauty, and Critical Environmental Areas Urban Growth Boundaries Parking Requirements Urban Forest Port Policies	The common land-use strategies, including transit-oriented development (TOD), infill development, housing near development centers, and housing affordability and jobs-housing balance, are consistently found throughout the analyzed plans.
Category (3) Transportation Demand Management (TDM)	TDM Education and Outreach	TDM strategies include transportation system improvement policies, technological improvements in monitoring and managing the traffic flow and the infrastructure in real-time, including all travel modes, increasing telecommuting, education, and outreach strategies to encourage people to choose alternatives to driving alone are widespread, ranging from the bike-and-walk encouragement programs, alternative transportation pilot programs, and collaborative partnerships.
Category (4) Cross-cutting issues	Regional Collaboration Community Involvement and Outreach Equity	Strategies ranging from regional collaboration to addressing equity on the regional and local levels

We thoroughly addressed the four key assumptions of Ordinary Least Squares (OLS) regression: linearity, normality, multicollinearity, and homoscedasticity. To test linearity, we used scatter plots, which showed no evidence of variable transformation [26]. For multicollinearity, we applied a conservative Variance Inflation Factor (VIF) threshold of 2.5, as higher values could pose significant issues. The highest VIF recorded across all models was 1.67, while the average was 1.2 (detailed results are provided in the). For normality, skewness values from Stata were used to evaluate the data distribution. A skewness value of 0 reflects a perfectly normal distribution, while deviations indicate skewness to the left or right. Our outcome variable had a skewness of 0.12, indicating that it closely followed a normal distribution. To address homoscedasticity, we used robust standard error estimates, which help correct for any heteroscedasticity in the error terms by adjusting both the test statistics and *p*-values, as outlined in [27]. We then stored the t-values from the 24 models for the alignment dummy variable, which indicates whether the city's plan aligns with the MPO's Sustainable Communities Strategy (SCS) for each Transportation and Land Use (TLU) strategy. The next section includes the selected regression models and their corresponding t-values.

3. Discussion of the Results

We conducted 24 regression models using Stata 15.1, focusing on a sample model that evaluates how well MPO and city initiatives align in promoting climate-friendly infrastructure (the remaining model results are available in Appendix A). This sample model reflects the general trends observed across all models, demonstrating similar coefficient behavior and statistical robustness. Although other models have similar results, we report the results of the other models in the Appendix. The coefficients for all variables follow the anticipated direction, with most achieving statistical significance at or beyond the 0.05 level. The R^2 value for this model is 0.26, meaning that it explains over 26% of the variance in 10-year vehicle trip reductions. The R^2 values for the other models are similarly close to 20%. In the following section, we break down the findings of the sample model and discuss how it was used to calculate alignment scores, which helps assess the degree to which city policies align with MPO strategies for sustainable transportation planning.

3.1. The Impact of the Alignment on 10-Year Vehicle Trip Reduction

In the first section, we review the observed values in our sample regression model (Table 3) that measure the determinants of 10-year vehicle trip reduction.

Table 3. Results of a regression sample model for estimating weights for alignment scores.

Variable	Coefficient	Robust Std. Err.	t	$p > \|t\|$	[95% Conf.	Interval]
CF_alig	7.19	0.42	17.01	0.00	6.36	8.02
Non-auto_10_%	−34.94	1.99	−17.58	0.00	−38.84	−31.04
NearWork_%	−0.07	0.01	−6.79	0.00	−0.09	−0.05
Pop	−0.00	0.09	−2.00	0.05	0.00	0.00
Mid-adu-age_%	−0.21	0.03	−7.65	0.00	−0.26	−0.15
Emp_%	−0.16	0.04	−4.38	0.00	−0.24	−0.09
Edu_%	0.11	0.02	15.3	0.00	0.09	0.12
Act den	0.05	0.01	3.63	0.00	0.02	0.08
Emp ent	1.24	0.61	2.03	0.04	0.04	2.45
Rd Den	0.09	0.02	4.65	0.00	0.05	0.13
TransFq_CP	38.65	16.58	2.33	0.02	6.15	71.15
cons	19.90	3.59	5.54	0.00	12.86	26.95

Number of obs: 5080
F(11, 5068) = 98.11
Prob > F= 0.000
R-Squared = 0.2618
Root MSE = 10.069

Based on the constant value in our model, we predicted an average 20% increase in non-auto commuting across all block groups in our sample, largely due to climate-focused planning strategies. Among the variables analyzed, two stood out as the most influential in promoting non-auto commute trips: the alignment between cities and MPOs (Metropolitan Planning Organizations) in advancing climate-friendly infrastructure strategies and the percentage of educated residents with university degrees. This synergy between city and MPO efforts, when successful, results in a more than 7% boost in non-auto commutes for the average city block group.

The power of climate-friendly infrastructure goes beyond just cutting greenhouse gas emissions—its ripple effect often enhances the walkability of an area. Take, for example, strategies like planting trees or preserving the urban tree canopy. These actions do more than simply absorb carbon; they create shaded, inviting spaces for walking and connecting people with their environment in a more intimate, pedestrian-friendly way. Imagine streets lined with tall, leafy trees offering a cool respite from the sun, encouraging more people to choose walking or cycling over driving. However, pedestrian-friendly environments are not conducive to safe biking because they are designed to serve only pedestrians.

On the flip side, however, our model also reveals certain roadblocks. Population size, for instance, plays a critical role in driving vehicle trips. Block groups with active commuting patterns in 2010 faced resistance to further increasing non-auto commuting by 2019. This makes sense—once a large proportion of residents are already walking, biking, or using transit, it becomes harder to nudge that number higher. Not everyone finds active transportation to be practical [28]. Some people will inevitably rely on cars, regardless of how much regional or local policies push for alternatives. Interestingly, middle-aged residents seem to lean more toward vehicle use. Perhaps it is the complex family responsibilities, daily routines, or even physical demands that make walking or biking to work less feasible. The once-young active commuters from 2010 may have gradually shifted to car usage as they aged, mirroring broader life changes.

Economic status also factors heavily into these patterns. Affluent areas, particularly those within a 30 min drive of workplaces, tend to see higher rates of vehicle usage. People in these sprawled, wealthier neighborhoods often have disposable income to afford the convenience and comfort of driving. This poses a challenge to efforts aimed at balancing job locations with housing development, particularly if transit systems remain inadequate to support the shift away from car reliance.

This analysis also allowed us to uncover differences in the effectiveness of city-level policies versus policies that align between cities and regional MPOs. To explore this, we ran a second series of 24 regression models using a binary variable to indicate whether a city had a particular policy. The t-values (Formula 1) from these models, presented in Tables 4–7, highlight that for some strategies—such as transit-oriented development (TOD)—direct comparison is difficult. This is because MPOs almost universally adopt certain policies, but cities differ in their inclusion, making the alignment and policy presence identical in some cases. These instances are marked with an asterisk in the results table for clarity.

Table 4. t-values estimated for the vehicle trip reduction impacts of Category 1 (please see Table 2) MPO-City alignment and city-level policies.

Transportation Infrastructure/Built Environment										
Policy	**Bicycle ***	**Pedestrian ***	**Complete Streets ***	**Mass Transit ***	**Electric Vehicle**	**Ride-Sharing**	**Autonomous Vehicle ***	**Climate-Friendly Infrastructure**	**Vehicle Idling**	**Goods Movement**
MPO-City Align	0.43	0.43	2.23	2.02	−0.66	−0.82	−16.72	17.01	−0.26	−14.37
City	0.43	0.43	2.23	2.02	0.56	−0.22	−16.72	0.81	−0.34	0.93

* Comparison is not possible because the dummy variable for MPO-City alignment and the City's policy are the same (all MPOs have the strategy in question).

Table 5. t-values estimated for the vehicle trip reduction impacts of Category 2 MPO-City alignment and city-level policies.

Land-Use Policies								
Policy	**TOD ***	**Infill ***	**ADU Programs**	**Housing Near Activity Centers ***	**Affordable/Jobs-Housing Bal. ***	**Preserve Open Space ***	**Parking Requirements**	**Urban Forest**
MPO-City Align	0.32	1.33	−13.66	0.98	0.77	7.06	5.15	−14.35
City	0.32	1.33	−0.73	0.98	0.77	7.06	7.26	7.17

* Comparison is not possible because the dummy variable for MPO-City alignment and the City's policy are the same (all MPOs have the strategy in question).

Table 6. t-values estimated for the vehicle trip reduction impacts of Category 3 MPO-City alignment and city-level policies.

Policy	**TDM ***	**TDM Other Programs or Incentives to Lessen Driving**	**Education and Outreach**
MPO-City Align	7.22	−2.01	−0.57
City	7.22	5.58	6.93

* Comparison is not possible because the dummy variable for MPO-City alignment and the City's policy are the same (all the MPOs have the strategy in question).

Table 7. t-values estimated for the vehicle trip reduction impacts of Category 4 MPO-City alignment and city-level policies.

Policy	Cross-Cutting Issues		
	Regional Collaboration *	Community Involvement and Outreach (CIO)	Equity *
MPO-City Align	−2.25	−15.8	0.79
City	−2.25	6.99	0.79

* Comparison is not possible because the dummy variable for MPO-City alignment and the City's policy are the same (all the MPOs have the strategy in question).

Formula (1): t-value estimation

$$t = \beta / SE_{\beta} \quad (1)$$

β = coefficient estimate
SE_{β} = standard error of the coefficient estimate

Through this analysis, it becomes clear that while regional and city alignment on climate strategies is crucial for reducing vehicle trips, socioeconomic factors and transit infrastructure remain powerful influencers capable of either accelerating or inhibiting progress.

3.2. Transportation Infrastructure/Built Environment

Transportation Infrastructure/Built Environment policies, which mostly include active transportation strategies, such as improving pedestrian and bicycle infrastructure and developing complete streets, are common in Sustainable Communities Strategies (SCSs) and Climate Action Plans (CAPs). Complete street strategies appear in most CAPs, with some cities referencing General Plans (GPs) or specific documents like Riverside's Active Transportation Plan (ATP). The State of California has promoted complete street policies for over two decades, starting with the 2001 Caltrans directive "Accommodating Non-Motorized Travel". The latest directive, DP−37 (2021), mandates that all Caltrans-funded projects adopt complete street principles to ensure accessibility for all transit modes. These efforts are supported by state legislation, funding, and technical programs that align with overlapping active transportation plans at various government levels. Overall, active transportation strategies are consistently integrated into local and regional planning, reflecting a strong commitment to creating accessible and sustainable transit options [10].

The results shown in Tables 4–7 reveal that the alignment between MPOs and cities does not consistently result in significant vehicle trip reductions for every policy. However, for the first category of strategies—Transportation Infrastructure/Built Environment (Table 2)—climate-friendly infrastructure emerged as the most effective. These strategies are designed to both lower greenhouse gas (GHG) emissions and bolster resilience against climate risks like flooding and heat waves. The scope of climate-friendly infrastructure is broad, ranging from solar panel installations to the preservation of tree canopies. A major emphasis of these strategies is on increasing green space and planting trees. Beyond their environmental benefits, these elements also create a more inviting, shaded, and pleasant environment for pedestrians and cyclists. This not only helps reduce carbon footprints, but also encourages greater adoption of active transportation modes like walking and biking, by making these options more comfortable and appealing [1,2]. When comparing the t-values between the MPO-City alignment and standalone local policies, the data show that alignment greatly enhances the effectiveness of climate-friendly infrastructure in reducing vehicle trips over a 10-year period. This highlights the crucial role of coordinated planning between MPOs and cities in amplifying the impact of these policies. Investing in a stronger MPO-City alignment, especially for climate-friendly infrastructure strategies, is essential for achieving meaningful reductions in vehicle trips and advancing broader transportation sustainability goals.

The model reveals that policies designed to support active transportation have a clear positive impact on reducing vehicle trips, especially those centered around mass transit and complete street initiatives. Complete street strategies focus on improving the infrastructure for pedestrians and cyclists, creating a transportation network that accommodates all modes of travel. This involves enhancing sidewalks, bike paths, and other critical infrastructure to encourage walking and biking. Despite the success of these strategies, [1,2the other policies in this category did not show the same impact on reducing vehicle trips. For the first set of strategies, climate-friendly infrastructure stands out as the area where the alignment between MPOs and cities proves significantly more effective than local actions alone. However, other strategies yielded different outcomes. Specifically, city-led initiatives—independent of MPO alignment—were notably more impactful when it came to goods movement and electric vehicle infrastructure.

3.3. Land-Use Policies

Land-use strategies, including transit-oriented development (TOD), infill development, housing near development centers, and addressing housing affordability and jobs-housing balance, are consistently featured in the CAP and SCS plans analyzed in Alexander, Zandiatashbar and Tatarevic's (2022) study, which is the base data for the analysis in this paper. These strategies, developed by regional agencies, are incorporated into Sustainable Communities Strategies (SCSs) [15]. Of the cities analyzed, 17 adopted TOD, 16 implemented infill development, 14 prioritized housing near development centers, and 12 addressed housing affordability and job-housing balance. This demonstrates strong vertical integration, with state-level directives influencing municipal implementation, although some variation exists across cities.

Land-use policies, categorized separately, also showed varying levels of impact, which suggests that different weights should be applied when assessing alignment scores (Table 5). Among these, the MPO-City alignment in preserving open space, farmland, natural beauty, and critical environmental areas had the most substantial effect. The effectiveness of these strategies tends to vary based on the size of the jurisdiction and local factors, such as geography, agricultural presence, and the extent of urbanization.

The rationale behind this is clear: preserving open space, farmland, and natural areas helps curb urban sprawl, which in turn reduces the need for long-distance vehicle commutes. This type of preservation acts as a buffer against expanding urban development, promoting shorter and more sustainable travel options. Our models also revealed that the MPO-City alignment on parking regulation strategies significantly reduced vehicle trips from 2010 to 2019. These strategies might include parking fees to discourage single-occupant vehicle use or municipal efforts such as "unbundling" parking costs or reducing/eliminating parking minimums. By making parking more expensive or less available, such policies encourage commuters to shift to other modes of transportation.

Moreover, alignment between MPOs and cities on housing strategies—such as building near activity hubs, improving the balance between jobs and housing, and promoting infill development—also contributed to reducing vehicle trips. However, these strategies had a more modest effect compared to those focused on open-space preservation and parking regulations. While still beneficial, housing-related policies had a lower impact on vehicle trip reductions when compared to environmental and parking-focused efforts.

The second category of variables, where direct comparison of t-values is possible, includes ADU (Accessory Dwelling Unit) programs, parking requirements, and urban forest strategies. In all three cases, our models indicate that a city's independent actions are more effective than those aligned with MPO strategies. In some instances, the results are even reversed when comparing city-driven initiatives to MPO-City alignment efforts. A striking example is the urban forest strategy. While the alignment between MPOs and cities shows a significant *negative* impact on vehicle trip reduction, a city's independent efforts in this area show a positive and highly significant effect. This suggests that local actions tailored to the specific needs and circumstances of a city may be more effective in promoting urban forests and their role in reducing vehicle trips, perhaps because local governments can directly implement and manage urban green spaces in ways that better fit their environment. Another major shift appears in ADU programs. Here, the model reveals that MPO-City alignment has a significant negative impact on vehicle trip reduction, while a city's independent action has no significant effect. This may indicate that regionally coordinated efforts to expand ADU programs might not be as successful in reducing vehicle trips as anticipated, possibly due to local variations in housing markets, land use, or infrastructure that make broad regional strategies less effective in achieving their intended outcomes. Meanwhile, the lack of significant results from cities' independent ADU actions suggests that these programs may not yet be impactful enough to reduce vehicle trips on their own. These findings highlight that, for certain strategies, local governments acting independently may be more successful than regional coordination in achieving transportation and environmental goals. The variation in effectiveness emphasizes the need for flexible, localized approaches, particularly in areas like urban forestry and housing, where a "one-size-fits-all" regional policy may not be appropriate.

3.4. Transportation Demand Management (TDM) Policies

According to Alexander, Zandiatashbar and Tatarevic (2022) study, nearly all major Metropolitan Planning Organizations (MPOs) and cities in California include Transportation Demand Management (TDM) strategies in their plans. Some MPOs and cities incorporate transportation system improvement policies, leveraging technological advancements to monitor and manage traffic flow and infrastructure in real-time across all travel modes, complementing TDM efforts [10,19]. Telecommuting also emerges as a key strategy, exemplified by some of the Climate Action Plans (CAPs), which introduce "flextime". This policy encourages telecommuting and alternative work schedules, such as a four-day workweek, to reduce congestion and vehicle trips.

Education and outreach strategies aimed at promoting alternatives to driving alone are prevalent. These include bike-and-walk encouragement programs, alternative transportation pilots, and collaborative partnerships. Most of the cities that Alexander, Zandiatashbar and Tatarevic (2022) analyzed have strategies to educate communities on sustainable transportation practices [10,19]. Therefore, effective vehicle trip reduction in the third category of strategies—Transportation Demand Management (TDM)—is strongly tied to the coordination between regional and local efforts, specifically for initiatives that promote transit, walking, cycling, and ride-sharing (Table 6). These particular TDM programs showed a substantial positive impact when city policies were aligned with regional transportation strategies.

The purpose of these TDM strategies is to improve the efficiency of the transportation system by encouraging a shift to more sustainable modes, such as public transit, walking, biking, and ride-sharing. The alignment between regional and local actions is crucial for creating a unified approach that supports this transition away from car dependency and encourages alternative travel behaviors. This coordination is essential because the successful implementation of these programs often requires seamless integration of infrastructure and services across multiple jurisdictions. Public transit systems, for example, require coordinated planning and service delivery between cities and regions to ensure comprehensive coverage. Similarly, a well-connected and safe network of pedestrian and cycling infrastructure is necessary to make walking and biking convenient and attractive options for travelers.

For the remaining strategies in this category, local actions were found to be more effective than coordination with MPOs. Specifically, when it came to education and outreach policies or initiatives aimed at reducing car travel, such as promoting telecommuting, the MPO-City alignment failed to significantly reduce vehicle trips. In contrast, the independent actions taken by local governments had a stronger influence on reducing driving. This highlights the potential strength of locally focused outreach and engagement efforts in encouraging behavior change within communities.

3.5. Cross-Cutting Issues

Regional agencies play a crucial role in driving municipal climate action planning efforts. All regional agencies analyzed in Alexander, Zandiatashbar and Tatarevic (2022) include strategies for collaboration with municipalities and state entities. Community involvement and outreach (CIO) is another prominent feature in Category 4, appearing in a few Sustainable Communities Strategies (SCSs) [15,24]. Such CIO strategies emphasize tribal participation and blend enhanced online engagement with on-site events in disadvantaged communities to mitigate the digital divide. All the regional agencies analyzed by Alexander, Zandiatashbar and Tatarevic (2022) also maintain Public Participation Plans (PPPs), as required by the FAST Act, ensuring engagement across stakeholders [19]. CIO strategies often extend beyond planning to include GHG reduction activities and campaigns [15,24].

Equity has also emerged as a critical theme in climate action planning [29]. All MPOs analyzed in the Alexander, Zandiatashbar and Tatarevic (2022) study integrate equity into their SCSs, and a few cities include equity-focused strategies frontline, and low-income communities are more exposed to GHG emissions [15,24]. For instance, Oakland's Equitable Climate Action Plan (ECAP) is a standout example, addressing vulnerabilities in "frontline communities" through integrated equity-focused strategies that inform other local plans. This evolving emphasis on equity highlights the growing importance of inclusive planning in creating resilient urban environments.

In this final group of strategies—cross-cutting issues—our models did not reveal a strong positive effect from MPO-City coordination. The only strategy that showed a slightly positive, although not significant, impact was equity-related initiatives. Equity has become an increasingly prominent aspect of Climate Action Plans and typically includes a variety of efforts, such as protecting vulnerable communities from climate impacts, advancing racial equity, and ensuring that low-income residents have access to transportation and employment opportunities.

Our analysis confirms that equitable access to transit and the provision of housing near transit or employment hubs are critical for reducing vehicle trips. Although the alignment between regional MPOs and cities in this area did not show a significant effect, the data underscores that independent actions by cities were highly effective in achieving vehicle trip reductions, as indicated in Table 7. This suggests that local governments are better positioned to implement equity-focused transportation strategies that meet the specific needs of their communities, resulting in more substantial impacts on reducing car dependency.

To sum up, the most important insight from this analysis is that MPO-City alignment was only significantly effective for climate-friendly infrastructure policies, while for most other variables, independent city actions proved more impactful. In many cases, alignment either had no notable positive effect or was outperformed by local efforts. For instance, city-led initiatives in goods movement, urban forestry, education, outreach programs, and strategies to reduce driving (including telework) had a significantly stronger impact on reducing vehicle trips, while MPO-City alignment in these areas often had the opposite effect. Additionally, although our models showed that regional and local alignments in parking regulations positively influenced vehicle trip reduction, the impact of independent local actions on parking was even more pronounced. These findings suggest that while regional coordination has its place, particularly for broad climate initiatives, local strategies (e.g., expanding protected bike lanes, enhancing public transit, incentivizing energy-efficient buildings, promoting renewable energy, increasing urban green spaces, supporting waste reduction, and fostering community engagement through education and partnerships) tend to be more successful when addressing specific issues or engaging communities directly. In light of these results, the State of California should prioritize supporting both regional and local efforts to reduce transportation emissions. A balanced approach that values local autonomy and regional collaboration will lead to more effective solutions for curbing vehicle trips and advancing climate goals.

4. Conclusions for Regional Plan Adoption vs. Activist Leadership

This study demonstrated that California's approach to addressing vehicle greenhouse gas (GHG) emissions serves as a powerful example of balancing regional frameworks with local activist leadership. A central insight from this study is the transformative impact of Community Involvement and Outreach (CIO) activities in driving climate action. These localized efforts not only enhance the effectiveness of regional policies but also empower communities to take ownership of sustainable practices tailored to their unique needs.

While regional frameworks like Sustainable Communities Strategies (SCS) under SB 375 provide overarching coordination and essential resources, the success of these strategies is amplified when paired with robust CIO efforts. For instance, preserving urban tree canopies and creating green spaces—an SCS initiative—achieved a 7.2% reduction in vehicle trips by improving walkability and providing shaded pedestrian-friendly environments. However, locally initiated programs, such as independent parking regulations (e.g., unbundling parking costs and dynamic pricing), achieved even higher success rates (t-value of 7.26) compared to regional alignment (t-value of 5.15). Locally tailored CIO programs significantly outperformed regional coordination efforts, with a t-value of 6.93, compared to -0.57. Key examples of such CIO activities underscore the importance of grassroots engagement in achieving GHG reduction goals. San Diego's Bike-to-Work campaigns exemplify the power of collaboration with schools and local organizations, demonstrating significant reductions in single-occupancy vehicle trips through targeted outreach and education programs [30]. Similarly, Oakland's Equitable Climate Action Plan (ECAP) showcased how removing participation barriers through digital and in-person workshops ensured inclusivity and equity for frontline communities [31,32]. Sacramento's Climate-Friendly Community Workshops provided another strong example, where tailored education efforts promoted public transit adoption and active transportation in underserved neighborhoods, addressing equity challenges directly [33]. These activities highlight that meaningful climate actions often begin with community-led initiatives.

The findings emphasize the need for regional plans to actively support CIO activities by providing technical and financial resources while reducing bureaucratic barriers to implementation. Programs like micro-mobility services, carpooling incentives, and urban forest expansions highlight how localized initiatives can drive innovation and address specific community needs. By empowering grassroots activism and community engagement, these efforts amplify the impact of regional strategies and ensure that climate policies remain equitable and effective.

As other states and regions look to California for leadership, the balanced approach embodied by activist leadership in cities on the side of SB 375 offers a valuable model for sustainable urban planning. Strengthening the alignment between regional frameworks and localized CIO activities can even go further and help cities integrate transit infrastructure, land-use planning, and equity-focused measures into their climate action strategies. For example, subsidized transit passes and improved connectivity near affordable housing can ensure inclusivity, while linking housing density initiatives to transit improvements can mitigate potential increases in vehicle trips.

Future studies should prioritize gathering direct data on CIO activities and their impacts on urban transportation and carbon emissions. California's model demonstrates that meaningful progress in GHG reduction requires collaboration at all levels of governance, empowering both regional coordination and localized action. By placing community engagement at the forefront, this dual approach provides a roadmap for cities worldwide to achieve ambitious climate goals while fostering equitable, sustainable, and livable communities.

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Appendix A

This appendix provides the results for the remaining 23 regression models. In the body of the paper, we only presented one since the results were similar; however, t-values reported in Tables 4–7 are obtained from the following tables.

Table A1. Regression Results Table for Variable Bike Alignment (Bikealig).

Variable	Coefficient	Robust Std. Err.	t	$p > \|t\|$	[95% Conf. Interval]
bikealig	0.32	0.74	0.43	0.67	−1.13–1.77
ctw_pct_10	−29.57	1.93	−15.36	0.00	−33.35–−25.80
pct30mnCTW	−0.09	0.01	−8.23	0.00	−0.12–−0.07
totpop	−0.00	0.00	−1.51	0.13	−0.00–0.00
perc45t064	−0.18	0.03	−6.37	0.00	−0.23–−0.12
percemployed	−0.12	0.04	−3.20	0.00	−0.19–−0.05
baandaboveperc	0.14	0.01	19.59	0.00	0.13–0.16
act den	0.05	0.01	3.69	0.00	0.02–0.08
Emp_Ent	0.70	0.63	1.11	0.27	−0.54–1.93
RdDen	0.12	0.02	5.75	0.00	0.08–0.16
TransFq_pCap	37.17	17.45	2.13	0.03	2.96–71.38
_cons	14.94	3.78	3.96	0.00	7.54–22.35

Table A1. *Cont.*

Variable	Coefficient	Robust Std. Err.	t	*p* > |t|	[95% Conf. Interval]
vif Variable	VIF	1/VIF			
nonautoct~10	1.63	0.61			
act den	1.43	0.70			
TransFq_pCap	1.23	0.81			
baandabover~c	1.16	0.86			
RdDen	1.15	0.87			
totpop	1.14	0.88			
perc45t064	1.13	0.89			
pct30mnCTW	1.09	0.92			
percemployed	1.09	0.92			
bikealig	1.07	0.93			
Emp_Ent	1.03	0.97			
Mean VIF	1.20	0.83			
Number of obs 5080 F(11, 5068) 75.47 Prob > F 0 R-squared 0.2052 Root MSE 10.447					

Table A2. Regression results table for variable pedestrian infrastructure alignment (Pedalig).

Variable	Coefficient	Robust Std. Err.	t	*p* > |t|	[95% Conf. Interval]	
pedalig	0.32	0.74	0.43	0.67	−1.13	1.77
ctw_pct_10	−29.57	1.93	−15.36	0.00	−33.35	−25.80
pct30mnCTW	−0.09	0.01	−8.23	0.00	−0.11	−0.07
totpop	0.00	0.00	−1.51	0.13	0.00	0.00
perc45t064	−0.18	0.03	−6.37	0.00	−0.23	−0.12
percemployed	−0.12	0.04	−3.20	0.00	−0.19	−0.05
baandaboveperc	0.14	0.01	19.59	0.00	0.13	0.16
act_den	0.05	0.01	3.69	0.00	0.02	0.08
Emp_Ent	0.70	0.63	1.11	0.27	−0.54	1.93
RdDen	0.12	0.02	5.75	0.00	0.08	0.16
TransFq_pCap	37.17	17.45	2.13	0.03	2.96	71.38
_cons	14.94	3.78	3.96	0.00	7.54	22.35
vif Variable	VIF	I/VIF				
nonautoct~10	1.63	0.61				
act_den	1.43	0.70				
TransFq_pCap	1.23	0.81				
baandabove~c	1.16	0.86				
RdDen	1.15	0.87				
totpop	1.14	0.88				
perc45t064	1.13	0.89				
percemployed	1.09	0.92				
pct30mnCTW	1.09	0.92				
pedalig	1.07	0.93				
Emp_Ent	1.03	0.97				
Mean VIF	1.20	0.83				
Number of obs 5080 F(11, 5068) 75.47 Prob > F 0.0000 R-squared 0.2052 Root MSE 10.447						

Table A3. Regression results table for variable complete street alignment (Complstalig).

Variable	Coefficient	Robust Std. Err.	t	*p* > |t|	[95% Conf. Interval]	
complstalig	0.75	0.34	2.23	0.03	0.09	1.42
ctw_pct_10	−29.72	1.92	−15.51	0.00	−33.48	−25.97
pct30mnCTW	−0.09	0.01	−8.16	0.00	−0.11	−0.07
totpop	0.00	0.00	−1.36	0.17	0.00	0.00
perc45t064	−0.18	0.03	−6.39	0.00	−0.23	−0.12
percemployed	−0.12	0.04	−3.09	0.00	−0.19	−0.04
baandaboveperc	0.14	0.01	19.35	0.00	0.13	0.16

Table A3. *Cont.*

Variable	Coefficient	Robust Std. Err.	t	*p* > |t|	[95% Conf. Interval]	
act den	0.05	0.01	3.68	0.00	0.02	0.08
Emp_Ent	0.70	0.63	1.12	0.26	−0.53	1.94
RdDen	0.12	0.02	5.61	0.00	0.08	0.16
TransFq_pCap	37.06	17.34	2.14	0.03	3.07	71.05
_cons	14.28	3.69	3.87	0.00	7.04	21.51
vif Variable	VIF	1/VIF				
nonautoct~10	1.64	0.61				
act den	1.43	0.70				
TransFq_pCap	1.23	0.81				
baandabove~c	1.18	0.85				
RdDen	1.16	0.86				
totpop	1.14	0.87				
complstalig	1.14	0.88				
perc45t064	1.13	0.89				
percemployed	1.09	0.91				
pct30mnCTW	1.08	0.92				
Emp_Ent	1.03	0.97				
Mean VIF	1.28	0.78				

Number of obs 5080
F(11, 5068) 75.93
Prob > F 0
R-squared 0.2057
Root MSE 10.444

Table A4. Regression results table for variable electric vehicle alignment (Evalig).

Variable	Coefficient	Robust Std. Err.	t	*p* > |t|	[95% Conf. Interval]	
evalig	−0.28	0.42	−0.66	0.51	−1.11	0.55
toctw_pct_10	−29.52	1.93	−15.31	0.00	−33.30	−25.74
pct30mnCTW	−0.09	0.01	−8.18	0.00	−0.11	−0.07
totpop	0.00	0.00	−1.58	0.11	0.00	0.00
perc45t064	−0.18	0.03	−6.36	0.00	−0.23	−0.12
percemployed	−0.12	0.04	−3.20	0.00	−0.19	0.05
baandaboveperc	0.14	0.01	19.21	0.00	0.13	0.16
act den	0.05	0.01	3.68	0.00	0.02	0.08
Emp_Ent	0.68	0.63	1.09	0.28	−0.55	1.92
RdDen	0.12	0.02	5.77	0.00	0.08	0.16
TransFq_pCap	37.18	17.46	2.13	0.03	2.95	71.40
_cons	15.58	3.66	4.26	0.00	8.41	22.75
vif Variable	VIF	1/VIF				
nonautoct~10	1.64	0.61				
act den	1.42	0.70				
TransFq_pCap	1.23	0.81				
baandabove~c	1.22	0.82				
evalig	1.21	0.83				
RdDen	1.15	0.87				
totpop	1.14	0.88				
pct30mnCTW	1.13	0.88				
perc45t064	1.13	0.89				
percemployed	1.09	0.92				
Emp_Ent	1.03	0.97				
Mean VIF	1.22					

Number of obs 5080
F(11, 5068) 75.83
Prob > F 0
R-squared 0. 2053
Root MSE 10.447

Table A5. Regression results table for variable ride-sharing alignment (Ridesharelig).

Variable	Coefficient	Robust Std. Err.	t	$p > \|t\|$	[95% Conf. Interval]	
ridesharealig_1	−0.22	0.27	−0.82	0.41	−0.75	0.31
nonautoctw_pct_10	−29.51	1.92	−15.34	0.00	−33.28	−25.74
pct30mnCTW	−0.09	0.01	−8.19	0.00	−0.11	−0.07
totpop	0.00	0.00	−1.58	0.12	0.00	0.00
perc45t064	−0.18	0.03	−6.35	0.00	−0.23	−0.12
percemployed	−0.12	0.04	−3.17	0.00	−0.19	−0.05
baandaboveperc	0.14	0.01	19.39	0.00	0.13	0.16
act den	0.05	0.01	3.68	0.00	0.02	0.08
Emp_Ent	0.68	0.63	1.08	0.28	−0.56	1.92
RdDen	0.12	0.02	5.78	0.00	0.08	0.16
TransFq_pCap	37.13	17.45	2.13	0.03	2.92	71.34
_cons	15.65	3.64	4.30	0.00	8.52	22.79
vif Variable	VIF	1/VIF				
nonautoct~10	1.64	0.61				
act den	1.43	0.70				
TransFq_pCap	1.23	0.81				
baandabove~c	1.2	0.84				
ridesharealig_1	1.19	0.84				
RdDen	1.16	0.86				
totpop	1.13	0.88				
pct30mnCTW	1.13	0.89				
perc45t064	1.13	0.89				
percemployed	1.09	0.92				
Emp_Ent	1.03	0.97				
Mean VIF	1.21					
Number of obs 5080 F(11, 5068) 75.77 Prob > F 0 R-squared 0.2053 Root MSE 10.447						

Table A6. Regression results table for variable low-carbon fuel alignment (Lowcarbalig).

Variable	Coefficient	Robust Std. Err.	t	$p > \|t\|$	[95% conf. interva1]	
lowcarbalig	0.11	0.41	0.26	0.79	−0.69	0.91
nonautoctw_pct_10	−29.58	1.91	−15.49	0.00	−33.32	−25.83
pct30mnCTW	−0.09	0.01	−7.66	0.00	−0.11	−0.07
totpop	0.00	0.00	−1.55	0.12	0.00	0.00
perc45t064	−0.18	0.03	−6.37	0.00	−0.23	−0.12
percemp10yed	−0.12	0.04	−3.19	0.00	−0.20	−0.05
baandaboveperc	0.14	0.01	19.60	0.00	0.13	0.16
act_den	0.05	0.01	3.67	0.00	0.02	0.08
Emp_Ent	0.70	0.63	1.10	0.27	−0.54	1.93
RdDen	0.12	0.02	5.75	0.00	0.08	0.16
TransFq_pCap	37.15	17.44	2.13	0.03	2.95	71.34
_cons	15.24	3.63	4.19	0.00	8.11	22.36
vif Variab1e	VIF	1/VlF				
nonautoctN10	1.64	0.61				
act_den	1.43	0.70				
lowcarbalig	1.25	0.80				
TransFq_pCap	1.23	0.81				
pct30mnCTW	1.20	0.83				
baandabover~c	1.16	0.86				
RdDen	1.16	0.86				
totpop	1.13	0.88				
perc45t064	1.13	0.89				
percemp10yed	1.10	0.91				
Emp_Ent	1.03	0.97				
Mean VIF	1.22					
Number of obs 5080 F(11, 5068) 76.13 Prob > F 0 R-squared 0. 2052 Root MSE 10.447						

Table A7. Regression results table for variable autonomous vehicle alignment (Avalig).

Variable	Coefficient	Robust Std. Err.	t	$p > \|t\|$	[95% conf. interva1]	
avalig	−5.54	0.33	−16.72	0.00	−6.19	−4.89
ctw_pct_10	−33.55	2.13	−15.77	0.00	−37.72	−29.37
pct30mnCTW	−0.14	0.01	−11.96	0.00	−0.16	−0.11
totpop	0.00	0.00	−1.66	0.70	0.00	0.00
perc45t064	−0.18	0.63	−6.35	0.00	−0.23	−0.12
percemp10yed	−0.13	0.04	−3.53	0.00	−0.21	−0.06
baandaboveperc	0.14	0.01	19.99	0.00	0.13	0.15
act den	0.06	0.02	3.60	0.00	0.03	0.09
Emp_Ent	1.00	0.62	1.62	9.11	−0.21	2.21
RdDen	0.15	0.02	7.21	0.00	0.11	0.19
TransFq_pCap	36.56	17.26	2.12	0.03	2.73	70.39
_cons	21.73	3.67	5.93	0.00	14.54	28.92
vif Variab1e	VIF	1/VIF				
nonautoctN10	1.71	0.59				
act den	1.43	0.70				
TransFq_pCap	1.23	0.81				
RdDen	1.16	0.86				
baandabover~c	1.15	0.87				
totpop	1.13	0.88				
perc45t064	1.13	0.89				
pct30mnCTW	1.12	0.89				
avalig	1.12	0.90				
percemp10yed	1.09	0.92				
Emp_Ent	1.03	0.97				
Mean VIF	1.21					

Number of obs 5080
F(11, 5068) 92.54
Prob > F 0
R-squared 0.2549
Root MSE 10.116

Table A8. Regression results table for variable climate-friendly infrastructure alignment (Climalig).

Variable	Coefficient	Robust Std. Err.	t	$p > \|t\|$	[95% Conf. Interval]	
clmalig	7.19	0.42	17.01	0.00	6.36	8.02
ctw_pct_10	−34.94	1.99	−17.58	0.00	−38.84	−31.04
pct30mnCTW	−0.07	0.01	−6.79	0.00	−0.09	−0.05
totpop	0.00	0.00	−2.00	0.05	0.00	0.00
perc45t064	−0.21	0.03	−7.65	0.00	−0.26	−0.15
percemployed	−0.16	0.04	−4.38	0.00	−0.24	−0.09
baandaboveperc	0.11	0.01	15.30	0.00	0.09	0.12
act den	0.05	0.01	3.63	0.00	0.02	0.08
Emp_Ent	1.24	0.61	2.03	0.04	0.04	2.44
RdDen	0.09	0.02	4.65	0.00	0.05	0.13
TransFq_pCap	38.65	16.58	2.33	0.02	6.15	71.15
_cons	19.90	3.59	5.54	0.00	12.86	26.95
vif Variable	VIF	1/VIF				
nonautoct~10	1.76	0.57				
act_den	1.42	0.70				
clmalig	1.31	0.76				
baandabove~c	1.24	0.80				
TransFq_pCap	1.23	0.81				
RdDen	1.16	0.86				
perc45t064	1.13	0.88				
totpop	1.13	0.88				
percemployed	1.09	0.91				
pct30mnCTW	1.06	0.94				
Emp_Ent	1.03	0.97				
Mean VIF	1.23					

Number of obs 5080
F(11, 5068) 98.11
Prob > F 0
R-squared 0.2618
Root MSE 10.069

Table A9. Regression results table for variable vehicle idling alignment (Idlalig).

Variable	Coefficient	Robust Std. Err.	t	$p > \|t\|$	[95% Conf. Interval]	
idlalig	−0.13	0.50	−0.26	0.80	−1.10	0.85
ctw_pct_10	−29.57	1.93	−15.34	0.00	−33.35	−25.79
pct30mnCTW	−0.09	0.01	−8.29	0.00	−0.11	−0.07
totpop	0.00	0.00	−1.54	0.12	0.00	0.00
perc45t064	−0.18	0.03	−6.38	0.00	−0.23	−0.12
percemployed	−0.12	0.04	−3.17	0.00	−0.19	−0.05
baandaboveperc	0.14	0.01	19.53	0.00	0.13	0.16
act_den	0.05	0.01	3.69	0.00	0.02	0.08
Emp_Ent	0.70	0.63	1.11	0.27	−0.54	1.94
RdDen	0.12	0.02	5.73	0.00	0.08	0.16
TransFq_pCap	37.16	17.45	2.13	0.03	2.95	71.37
_cons	15.25	3.67	4.16	0.00	8.06	22.44
vif Variable	VIF	1/VIF				
nonautoct~10	1.63	0.61				
act_den	1.43	0.70				
TransFq_pCap	1.23	0.81				
baandabove~c	1.17	0.85				
RdDen	1.16	0.87				
totpop	1.13	0.88				
perc45t064	1.13	0.89				
percemployed	1.1	0.91				
pct30mnCTW	1.08	0.92				
idlalig	1.07	0.93				
Emp_Ent	1.03	0.97				
Mean VIF	1.2					
Number of obs 5080 F(11, 5068) 75.56 Prob > F 0 R-squared 0.2052 Root MSE 10.447						

Table A10. Regression results table for variable goods movement alignment (Goodsalig).

Variable	Coefficient	Robust Std. Err.	t	$p > \|t\|$	[95% Conf. Interval]	
goodsalig	−4.53	0.32	−14.37	0.00	−5.15	−3.91
ctw_pct_10	−31.96	2.03	−15.74	0.00	−35.94	−27.98
pct30mnCTW	−0.12	0.01	−10.51	0.00	−0.14	−0.10
totpop	0.00	0.00	−2.65	0.01	0.00	0.00
perc45t064	−0.19	0.03	−7.10	0.00	−0.25	−0.14
percemployed	−0.16	0.04	−4.32	0.00	−0.24	−0.09
baandaboveperc	0.13	0.01	17.97	0.00	0.11	0.14
act_den	0.05	0.01	3.66	0.00	0.03	0.08
Emp_Ent	0.93	0.62	1.50	0.13	−0.28	2.15
RdDen	0.12	0.02	5.74	0.00	0.08	0.16
TransFq_pCap	38.59	16.99	2.27	0.02	5.30	71.89
_cons	24.72	3.72	6.65	0.00	17.43	32.01
vif Variable	VIF	1/VIF				
nonautoct~10	1.67	0.60				
act_den	1.43	0.70				
TransFq_pCap	1.23	0.81				
baandabove~c	1.18	0.84				
RdDen	1.15	0.87				
totpop	1.14	0.88				
perc45t064	1.13	0.89				
goodsalig	1.11	0.90				
percemployed	1.10	0.91				
pct30mnCTW	1.08	0.92				
Emp_Ent	1.03	0.97				
Mean VIF	1.21					
Number of obs 5080 F(11, 5068) 89.87 Prob > F 0 R-squared 0.2386 Root MSE 10.225						

Table A11. Regression results table for variable TOD alignment (Todalig).

Variable	Coefficient	Robust Std. Err.	t	p> |t|	[95% Conf. Interval]	
todalig	0.16	0.49	0.32	0.75	−0.80	1.12
toctw_pct_10	−29.57	1.93	−15.34	0.00	−33.35	−25.79
pct30mnCTW	−0.09	0.01	−8.10	0.00	−0.11	−0.07
tot pop	0.00	0.00	−1.52	0.13	0.00	0.00
perc45t064	−0.18	0.03	−6.37	0.00	−0.23	−0.12
percemployed	−0.12	0.04	−3.18	0.00	−0.19	−0.05
baandaboveperc	0.14	0.01	19.23	0.00	0.13	0.16
act_den	0.05	0.01	3.69	0.00	0.02	0.08
Emp_Ent	0.70	0.63	1.11	0.27	−0.54	1.94
RdDen	0.12	0.02	5.75	0.00	0.08	0.16
TransFq_pCap	37.15	17.45	2.13	0.03	2.94	71.35
_cons	15.08	3.75	4.02	0.00	7.72	22.44
vif Variable	VIF	1/VIF				
nonautoct~10	1.63	0.61				
act den	1.42	0.70				
TransFq_pCap	1.23	0.81				
baandabove~c	1.20	0.83				
RdDen	1.15	0.87				
todalig	1.15	0.87				
totpop	1.14	0.88				
perc45t064	1.13	0.89				
pct30mnCTW	1.12	0.89				
percemployed	1.09	0.91				
Emp_Ent	1.03	0.97				
Mean VIF	1.21					
Number of obs 5080 F (11, 5068) 76.12 Prob > F 0 R-squared 0.2052 Root MSE 10.447						

Table A12. Regression results table for variable infill development alignment (Infillalig).

Variable	Coefficient	Robust Std. Err.	t	p > |t|	[95% Conf. Interval]	
infillalig	0.57	0.43	1.33	0.18	−0.27	1.41
ctw_pct_10	−29.62	1.93	−15.36	0.00	−33.40	−25.84
pct30mnCTW	−0.09	0.01	−8.68	0.00	−0.11	−0.07
totpop	0.00	0.00	−1.44	0.15	0.00	0.00
perc45t064	−0.18	0.03	−6.37	0.00	−0.23	−0.12
percemployed	−0.12	0.04	−3.15	0.00	−0.19	0.04
baandaboveperc	0.14	0.01	19.25	0.00	0.13	0.16
act den	0.05	0.01	3.69	0.00	0.02	0.08
Emp_Ent	0.72	0.63	1.14	0.25	−0.52	1.96
RdDen	0.12	0.02	5.75	0.00	0.08	0.16
TransFq_pCap	37.08	17.44	2.13	0.63	2.89	71.26
_cons	14.51	3.72	3.90	0.00	7.21	21.81
vif Variable	VIF	1/VIF				
nonautoct~10	1.63	0.61				
act den	1.42	0.70				
TransFq_pCap	1.23	0.81				
baandabove~c	1.19	0.84				
RdDen	1.15	0.87				
totpop	1.14	0.87				
infillalig	1.13	0.88				
perc45t064	1.13	0.89				
pct30mnCTW	1.10	0.91				
percemployed	1.09	0.91				
Emp_Ent	1.03	0.97				
Mean VIF	1.21					
Number of obs 5080 F(11, 5068) 76.4 Prob > F 0 R-squared 0.2054 Root MSE 10.447						

Table A13. Regression results table for variable preserve open-space alignment (Openspacealig).

Variable	Coefficient	Robust Std. Err.	t	$p > \|t\|$	[95% Conf. Interval]	
openspacealig	2.09	0.30	7.06	0.00	1.51	2.67
ctw_pct_10	−30.54	1.92	−15.93	0.00	−34.30	−26.78
pct30mnCTW	−0.08	0.01	−7.92	0.00	−0.10	−0.06
totpop	0.00	0.00	−0.69	0.49	0.00	0.00
perc45t064	−0.18	0.03	−6.30	0.00	−0.23	−0.12
percemployed	−0.11	0.04	−2.80	0.01	−0.18	−0.03
baandaboveperc	0.14	0.01	19.62	0.00	0.13	0.16
act den	0.05	0.01	3.67	0.00	0.02	0.08
Emp_Ent	0.67	0.63	1.07	0.28	−0.56	1.91
RdDen	0.12	0.02	5.75	0.00	0.08	0.16
TransFq_pCap	35.77	16.94	2.11	0.04	2.56	68.98
_cons	11.99	3.68	3.26	0.00	4.77	19.21
vif Variable	VIF	1/VIF				
nonautoct~10	1.68	0.60				
act den	1.43	0.70				
TransFq_pCap	1.23	0.81				
totpop	1.16	0.86				
baandabovevc	1.15	0.87				
RdDen	1.15	0.87				
openspacealig	1.14	0.88				
perc45t064	1.13	0.89				
percemployed	1.10	0.91				
pct30mnCTW	1.06	0.94				
Emp_Ent	1.83	0.97				
Mean VIF	1.2					
Number of obs 5080 F(11, 5068) 77.13 Prob > F 0 R-squared 0.2103 Root MSE 10.414						

Table A14. Regression results table for variable ADU development alignment (Adualig).

Variable	Coefficient	Robust Std. Err.	t	$p > \|t\|$	[95% Conf. Interval]	
adualig	−4.37	0.32	−13.66	0.00	−4.99	−3.74
ctw_pct_10	−31.47	2.06	−15.29	0.00	−35.50	−27.43
pct30mnCTW	−0.13	0.01	−11.15	0.00	−0.15	−0.10
tot pop	0.00	0.00	−2.41	0.02	0.00	0.00
perc45t064	−0.18	0.03	−6.68	0.00	−0.24	−0.13
percemployed	−0.15	0.04	−3.85	0.00	−0.22	−0.07
baandaboveperc	0.14	0.01	19.12	0.00	0.12	0.15
act den	0.06	0.02	3.64	0.00	0.03	0.08
Emp_Ent	1.01	0.62	1.62	0.11	−0.21	2.24
RdDen	0.13	0.02	6.44	0.00	0.09	0.17
TransFq_pCap	38.37	17.62	2.18	0.03	3.84	72.91
_cons	21.84	3.67	5.94	0.00	14.63	29.04
vif Variable	VIF	1/VIF				
nonautoct~10	1.66	0.60				
act den	1.43	0.70				
TransFq_pCap	1.23	0.81				
baandabove~c	1.16	0.86				
RdDen	1.16	0.87				
totpop	1.14	0.88				
perc45t064	1.13	0.89				
pct30mnCTW	1.11	0.90				
adualig	1.09	0.92				
percemployed	1.09	0.92				
Emp_Ent	1.63	0.97				
Mean VIF	1.20					
Number of obs 5080 F(11, 5068) 87.65 Prob > F 0 R-squared 0.2368 Root MSE 10.238						

Table A15. Regression results table for variable housing near activity centers alignment (Hncalig).

Variable	Coefficient	Robust Std. Err.	t	$p > \|t\|$	[95% Conf. Interval]	
hncalig	0.40	0.41	0.98	0.33	−0.40	1.21
ctw_pct_10	−29.60	1.92	−15.41	0.00	−33.37	−25.84
pct30mnCTW	−0.09	0.01	−8.17	0.00	−0.11	−0.07
totpop	0.00	0.00	−1.49	0.14	0.00	0.00
perc45t064	0.18	0.03	−6.36	0.00	−0.23	−0.12
percemployed	0.12	0.04	−3.18	0.00	−0.19	−0.05
baandaboveperc	0.14	0.01	19.57	0.00	0.13	0.16
act den	0.05	0.01	3.68	0.00	0.02	0.08
Emp_Ent	0.71	0.63	1.13	0.26	−0.53	1.95
RdDen	0.12	0.02	5.68	0.00	0.08	0.16
TransFq_pCap	37.24	17.48	2.13	0.03	2.97	71.52
_cons	14.82	3.70	40.00	0.00	7.56	22.08
vif Variable	VIF	1/VIF				
nonautoct~10	1.63	0.61				
act den	1.43	0.70				
TransFq_pCap	1.23	0.81				
baandabove~c	1.16	0.86				
RdDen	1.16	0.86				
totpop	1.14	0.88				
perc45t064	1.13	0.89				
hncalig	1.10	0.91				
pct30mnCTW	1.09	0.92				
percemployed	1.09	0.92				
Emp_Ent	1.03	0.97				
Mean VIF	1.20					
Number of obs 5080 F(11, 5068) 75.63 Prob > F 0 R-squared 0.2053 Root MSE 10.447						

Table A16. Regression results table for variable parking requirement alignment (Parkingalig).

Variable	Coefficient	Robust Std. Err.	t	$p > \|t\|$	[95% Conf. Interval]	
parkingalig	1.60	0.31	5.15	0.00	0.99	2.21
ctw_pct_10	−30.33	1.88	−16.13	0.00	−34.01	−26.64
pct30mnCTW	−0.08	0.01	−6.75	0.00	−0.10	−0.05
totpop	0.00	0.00	−1.14	0.03	0.00	0.00
perc45t064	−0.18	0.03	−6.35	0.00	−0.23	−0.12
percemployed	−0.12	0.04	−3.24	0.00	−0.19	−0.05
baandaboveperc	0.14	0.01	19.64	0.00	0.13	0.16
act den	0.05	0.01	3.66	0.00	0.02	0.08
Emp_Ent	0.70	0.63	1.12	0.03	−0.53	1.93
RdDen	0.12	0.02	5.58	0.00	0.08	0.16
TransFq_pCap	36.76	17.37	2.12	0.00	2.71	70.82
_cons	13.68	3.64	3.76	0.00	6.55	20.81
vif Variable	VIF	1/VIF				
nonautoctæ10	1.68	0.60				
act den	1.43	0.70				
parkingalig	1.27	0.79				
TransFq_pCap	1.23	0.81				
pct30mnCTW	1.17	0.85				
RdDen	1.16	0.87				
baandabove~c	1.15	0.87				
totpop	1.14	0.88				
perc45t064	1.13	0.89				
percemployed	1.09	0.92				
Emp_Ent	1.03	0.97				
Mean VIF	1.23					
Number of obs 5080 F(11, 5068) 77.17 Prob > F 0 R- squared 0.2081 Root MSE 10.428						

Table A17. Regression results table for variable urban forest alignment (Ufalig).

Variable	Coefficient	Robust Std. Err.	t	$p > \|t\|$	[95% Conf. Interval]	
ufalig	−4.52	0.31	−14.35	0.00	−5.13	−3.90
toctw_pct_10	−31.66	2.04	−15.53	0.00	−35.66	−27.67
pct30mnCTW	−0.12	0.01	−10.86	0.00	−0.15	−0.10
totpop	0.00	0.00	−2.56	0.01	0.00	0.00
perc45t064	−0.19	0.03	−6.88	0.00	−0.24	−0.13
percemployed	−0.15	0.04	−3.90	0.00	−0.22	−0.07
baandaboveperc	0.13	0.01	18.55	0.00	0.12	0.15
act den	0.05	0.01	3.64	0.00	0.03	0.08
Emp_Ent	0.96	0.62	1.53	0.13	−0.27	2.18
RdDen	0.13	0.02	6.09	0.00	0.09	0.17
TransFq_pCap	38.55	17.08	2.26	0.02	5.66	72.04
_cons	22.79	3.69	6.18	0.00	15.56	30.02
vif Variable	VIF	I/VIF				
nonautoct~10	1.66	0.60				
act den	1.43	0.70				
TransFq_pCap	1.23	0.81				
baandaboveæc	1.17	0.86				
baandabove~c	1.15	0.87				
totpop	1.14	0.88				
perc45t064	1.13	0.89				
pct30mnCTW	1.10	0.91				
percemployed	1.09	0.91				
ufalig	1.09	0.92				
Emp_Ent	1.03	0.97				
Mean VIF	1.20					
Number of obs 5080 F(11, 5068) 88.99 Prob > F 0 R-squared 0.2393 Root MSE 10.221						

Table A18. Regression results table for variable TDM alignment (Tdmalig).

Variable	Coefficient	Robust Std. Err.	t	$p > \|t\|$	[95% Conf. Interval]	
tdmalig	2.33	0.32	7.22	0.00	1.70	2.97
ctw_pct_10	−30.35	1.94	−15.63	0.00	−34.16	−26.55
pct30mnCTW	−0.08	0.01	−7.73	0.00	−0.10	−0.06
totpop	0.00	0.00	−0.69	0.49	0.00	0.00
perc45t064	−0.17	0.03	−6.22	0.00	−0.23	−0.12
percemployed	−0.10	0.04	−2.78	0.01	−0.18	−0.03
baandaboveperc	0.14	0.01	19.75	0.00	0.13	0.16
act den	0.05	0.01	3.67	0.00	0.02	0.08
Emp_Ent	0.72	0.63	1.15	0.25	−0.51	1.95
RdDen	0.13	0.02	6.01	0.00	0.09	0.17
TransFq_pCap	36.05	17.25	2.09	0.04	2.23	69.88
_cons	11.11	3.73	2.98	0.00	3.81	18.42
vif Variable	VIF	1/VIF				
nonautoct~10	1.66	0.60				
act den	1.42	0.70				
TransFq_pCap	1.23	0.81				
totpop	1.16	0.86				
RdDen	1.16	0.87				
baandabove~c	1.15	0.87				
perc45t064	1.13	0.89				
tdmalig	1.11	0.90				
percemployed	1.10	0.91				
pct30mnCTW	1.07	0.93				
Emp_Ent	1.03	0.97				
Mean VIF	1.2					
Number of obs 5080 F(11, 5068) 77.22 Prob > F 0 R-squared 0.2097 Root MSE 10.418						

Table A19. Regression results table for variable regional collaboration alignment (Regcollabalig).

Variable	Coefficient	Robust Std. Err.	t	$p > \|t\|$	[95% Conf. Interval]	
regcollabalig	−0.93	0.41	−2.25	0.02	−1.74	−0.12
ctw_pct_10	−29.42	1.93	−15.23	0.00	−33.20	−25.63
pct30mnCTW	−0.09	0.01	−8.51	0.00	−0.11	−0.07
tot pop	0.00	0.00	−1.69	0.09	0.00	0.00
perc45t064	−0.18	0.03	−6.42	0.00	−0.23	−0.12
percemployed	−0.12	0.04	−3.25	0.00	−0.20	−0.05
baandaboveperc	0.14	0.01	19.49	0.00	0.13	0.16
act den	0.05	0.01	3.69	0.00	0.02	0.08
Emp_Ent	0.77	0.63	1.22	0.22	−0.47	2.01
RdDen	0.12	0.02	5.62	0.00	0.08	0.16
TransFq_pCap	36.86	17.39	2.12	0.03	2.77	70.96
_cons	16.38	3.72	4.41	0.00	9.09	23.67
vif Variable	VIF	1/VIF				
nonautoct~10	1.63	0.61				
act den	1.43	0.70				
TransFq_pCap	1.23	0.81				
baandabove~c	1.16	0.86				
RdDen	1.15	0.87				
totpop	1.13	0.88				
perc45t064	1.13	0.89				
percemployed	1.09	0.92				
pct30mnCTW	1.05	0.95				
Emp_Ent	1.03	0.97				
regcollabalig	1.03	0.98				
Mean VIF	1.19					
Number of obs 5080 F(11, 5068) 76.04 Prob > F 0 R-squared 0.2061 Root MSE 10.442						

Table A20. Regression results table for variable community involvement and outreach alignment (Cioalig).

Variable	Coefficient	Robust Std. Err.	t	$p > \|t\|$	[95% Conf. Interval]	
cioalig	−5.50	0.35	−15.80	0.00	−6.18	−4.81
ctw_pct_10	−32.91	1.99	−16.58	0.00	−36.81	−29.62
pct30mnCTW	0.08	0.01	−7.64	0.00	0.10	−0.06
totpop	0.00	0.00	−2.75	0.01	0.00	0.00
perc45t064	−0.20	0.03	−7.35	0.00	−0.25	−0.15
percemployed	−0.17	0.04	−4.46	0.00	−0.24	−0.09
baandaboveperc	0.12	0.01	16.51	0.00	0.10	0.13
act den	0.05	0.01	3.66	0.00	0.02	0.08
Emp_Ent	1.21	0.62	1.95	0.05	0.00	2.43
RdDen	0.11	0.02	5.35	0.00	0.07	0.15
TransFq_pCap	38.76	16.93	2.29	0.02	5.57	71.94
_cons	25.34	3.68	6.88	0.00	18.12	32.56
vif Variable	VIF	1/VIF				
nonautoctælø	1.70	0.59				
act den	1.43	0.70				
TransFq_pCap	1.23	0.81				
baandabove~c	1.22	0.82				
cioalig	1.18	0.85				
RdDen	1.15	0.87				
totpop	1.14	0.88				
perc45t064	1.13	0.88				
percemployed	1.10	0.91				
pct30mnCTW	1.85	0.95				
Emp_Ent	1.03	0.97				
Mean VIF	1.21					
Number of obs 5080 F(11, 5068) 96.52 Prob > F 0 R-squared 0.247 Root MSE 10.169						

Table A21. Regression results table for variable equity alignment (Eqalig).

Variable	Coefficient	Robust Std. Err.	t	$p > \|t\|$	[95% Conf. Interval]	
equal ig	0.26	0.32	0.79	0.43	−0.38	0.89
ctw_pct_10	−29.63	1.92	−15.44	0.00	−33.39	−25.87
pct30mnCTW	0.09	0.01	−8.03	0.00	0.11	−0.07
totpop	0.00	0.00	−1.47	0.14	0.00	0.00
perc45t064	−0.18	0.03	−6.38	0.00	−0.23	−0.12
percemployed	−0.12	0.04	−3.19	0.00	−0.19	−0.05
baandaboveperc	0.14	0.01	19.46	0.00	0.13	0.16
act den	0.05	0.01	3.68	0.00	0.02	0.08
Emp_Ent	0.71	0.63	1.12	0.26	−0.53	1.94
RdDen	0.12	0.02	5.68	0.00	0.08	0.16
TransFq_pCap	37.16	17.45	2.13	0.03	2.95	71.37
cons	15.01	3.66	4.10	0.00	7.83	22.19
vif Variable	VIF	1/VIF				
nonautoct~10	1.65	0.61				
act den	1.43	0.70				
TransFq_pCap	1.23	0.81				
equalig	1.20	0.83				
baandabove~c	1.17	0.85				
RdDen	1.17	0.86				
totpop	1.15	0.87				
perc45t064	1.13	0.89				
pct30mnCTW	1.12	0.90				
percemployed	1.89	0.92				
Emp_Ent	1.03	0.97				
Mean VIF	1.21					
Number of obs 5080 F(11, 5068) 75.77 Prob > F 0 R-squared 0.2053 Root MSE 10.447						

References

1. Handy, S.; Boarnet, M.; Ewing, R.; Killingsworth, R. How the built environment affects physical activity: Views from urban planning. *Am. J. Prev. Med.* **2002**, *23*, 64–73. [CrossRef] [PubMed]
2. Saelens, B.E.; Handy, S.L. Built environment correlates of walking: A review. *Med. Sci. Sports Exerc.* **2008**, *40*, S550–S566. [CrossRef] [PubMed]
3. Piatkowski, D.; Marshall, W.; Krizek, K. Carrots versus sticks: Assessing intervention effectiveness and implementation challenges for active transport. *J. Plan. Educ. Res.* **2015**, *35*, 457–470. [CrossRef]
4. Zandiatashbar, A.; Laurito, A. An empirical analysis of the link between built environment and safety in Chicago's transit station areas. *J. Am. Plan. Assoc.* **2023**, *89*, 225–239. [CrossRef]
5. Zandiatashbar, A. *Urban High-Technology Zones*; Elsevier: Amsterdam, The Netherlands, 2023.
6. Zandiatashbar, A.; Hamidi, S.; Foster, N. High-tech business location, transportation accessibility, and implications for sustainability: Evaluating the differences between high-tech specializations using empirical evidence from US booming regions. *Sustain. Cities Soc.* **2019**, *50*, 101648. [CrossRef]
7. Litman, T. *Evaluating Public Transportation Health Benefits*; Victoria Transport Policy Institute. Available online: https://www.vtpi.org/tran_health.pdf (accessed on 24 July 2022).
8. Chester, M.; Horvath, A. Environmental assessment of passenger transportation should include infrastructure and supply chains. *Environ. Res. Lett.* **2009**, *4*, 024008. [CrossRef]
9. Ewing, R.; Cervero, R. Travel and the built environment: A meta-analysis. *J. Am. Plan. Assoc.* **2010**, *76*, 265–294. [CrossRef]
10. Transportation Planning: Travel Demand Models: Sustainable Communities Strategy: Environmental Review. Available online: https://leginfo.legislature.ca.gov (accessed on 24 July 2022).
11. Transport Strategies and Planning. Available online: https://tfl.gov.uk (accessed on 24 July 2022).
12. Regional Transportation Plan for the Greater Toronto and Hamilton Area. Available online: https://www.metrolinx.com (accessed on 24 July 2022).
13. Barbour, E.; Deakin, E. Smart growth planning for climate protection: Evaluating California's SB 375. *J. Am. Plan. Assoc.* **2012**, *78*, 70–86. [CrossRef]
14. Wheeler, S.M. *Planning for Sustainability: Creating Livable, Equitable, and Ecological Communities*, 2nd ed.; Routledge: Abingdon, UK, 2013.

15. Zandiatashbar, A.; Alexander, S.; Tatarevic, B. Does the Alignment of Regional and Local Transportation and Land Use Strategies Mitigate Greenhouse Gas Emissions Through Vehicle Trip Reduction?: Empirical Evidence from California. TRBAM-23-01398. 2023. Available online: https://annualmeeting.mytrb.org/OnlineProgram/Details/18909 (accessed on 24 July 2024).
16. Sanchez, T.W.; Stolz, R.; Ma, J.S. Moving to equity: Addressing Inequitable Effects of Transportation Policies on Minorities. Civil Rights Project, Harvard University. Available online: https://civilrightsproject.ucla.edu (accessed on 24 July 2022).
17. Karner, A.; Niemeier, D. Civil rights guidance and equity analysis methods for regional transportation plans: A critical review of literature and practice. *J. Transp. Geogr.* **2013**, *33*, 126–134. [CrossRef]
18. Axsen, J.; Kurani, K.S.; Burke, A. Are plug-in vehicles worth it? Comparing ownership costs of alternative fuel and conventional vehicles in the United States. *Energy Policy* **2016**, *87*, 153–165. [CrossRef]
19. Litman, T. Autonomous Vehicle Implementation Predictions: Implications for Transport Planning. Victoria Transport Policy Institute. Available online: https://www.vtpi.org/avip.pdf (accessed on 24 July 2022).
20. Haines, A.; Patz, J.A. Health effects of climate change. *JAMA* **2004**, *291*, 99–103. [CrossRef] [PubMed]
21. Bill Text—SB-375 Transportation Planning: Travel Demand Models: Sustainable Communities Strategy: Environmental Review. Available online: https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=200720080SB375 (accessed on 24 July 2022).
22. Ang-Olson, J. *Caltrans Greenhouse Gas Emissions and Mitigation Report*; Caltrans: Sacramento, CA, USA, 2020; p. 108.
23. Boswell, M.R.; Greve, A.I.; Seale, T.L. *Local Climate Action Planning*; Island Press: Washington, DC, USA, 2012.
24. Alexander, S.; Zandiatashbar, A.; Tatarevic, B. Fragmented or Aligned Climate Action: Assessing Linkages Between Regional and Local Planning Efforts to Meet Transportation Greenhouse Gas Emissions Reduction Targets. In Proceedings of the Transportation Research Board Annual Meeting, Washington, DC, USA, 8–12 January 2023.
25. Alexander, S.; Weinstein Agrawal, A.; Clark, B. Local Climate Action Planning as a Tool to Harness Greenhouse Gas Emissions Mitigation and the Equity Potential of Autonomous Vehicles and On-Demand Mobility. *Transp. Res. Rec.* **2022**, *2676*, 521–534. [CrossRef]
26. Casson, R.J.; Farmer, L.D. Understanding and checking the assumptions of linear regression: A primer for medical researchers. *Clin. Exp. Ophthalmol.* **2014**, *42*, 590–596. [CrossRef] [PubMed]
27. White, H. A heteroskedasticity-consistent covariance matrix estimator and a direct test for heteroskedasticity. *Econometrica* **1980**, *48*, 817–838. [CrossRef]
28. Ewing, R.; Hamidi, S.; Gallivan, F.; Nelson, A.C.; Grace, J.B. Structural equation models of VMT growth in US urbanised areas. *Urban Stud.* **2014**, *51*, 3079–3096. [CrossRef]
29. Sirigotis, J.; Angelo, H.; MacFarlane, K.; Millard-Ball, A. Why Climate Planning Struggles with Equity. In *Justice in Climate Action Planning*; Springer: Cham, Switzerland, 2022; pp. 61–77.
30. City of San Diego. Bike-to-Work Campaigns. Available online: https://sandiego.gov (accessed on 24 January 2025).
31. City of Oakland. Equitable Climate Action Plan (ECAP). Available online: https://oaklandca.gov (accessed on 24 January 2025).
32. California Air Resources Board (CARB). Sustainable Communities Strategies (SCS) Evaluations. Available online: https://arb.ca.gov (accessed on 24 January 2025).
33. City of Sacramento. Climate-Friendly Community Workshops. Available online: https://cityofsacramento.org (accessed on 24 January 2025).