

# Transportation Mode Share White Paper

May, 2017

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Prepared for the Missoula Metropolitan Planning Organization

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## **ACKNOWLEDGEMENTS**

I would like to thank Jessica Morriss and Aaron Wilson of the Missoula Metropolitan Planning Organization Transportation Planning Division. It was a pleasure to work with both of them, and I hope I am fortunate enough in the future to work with colleagues of their caliber again.

I would also like to thank the Brainerd Foundation, which generously supports the University of Montana Environmental Studies program. Without the foundation's funding this project would not have been possible.

Thank you to the city planners who responded to my emails and engaged in the conversation with me: Eli Cooper of Ann Arbor, MI; Brandon Vieg of Chico, CA; Aaron Iverson of Fort Collins, CO; Adam Fukushima of San Luis Obispo, CA.

A special thank you to Randall Rustch, Senior Transportation Planner in Boulder, Colorado and Tyler Deke, Transportation Manager with Bend's Metropolitan Planning Organization, who both took the time out of their busy schedules to patiently answer my questions.

Lastly, I owe a debt of gratitude to my advisor Dr. Robin Saha. He provided valuable feedback and has been instrumental in my education at the University of Montana.

## **EXECUTIVE SUMMARY**

In 2016, the Missoula Metropolitan Planning Organization (MPO) set out to research transportation mode share goals as part of its 2016 Long Range Transportation Plan. Mode share goal setting is a relatively new method for encouraging a shift away from single-occupancy vehicle (SOV) use and toward multi-modal transportation options, such as walking, bicycling, transit, and carpooling. Mode share goals can help encourage the shift away from single occupancy vehicles toward a more balanced multi-modal transportation system. Increasing multi-modal transportation options is important for a number of reasons relating to growth management, safety and public health, roadway efficiency, social equity, and mitigating climate change. Setting mode share goals also directs policy formulation and funding allocations. By implementing policy and funding changes, the city and county can facilitate steady movement toward these goals over the next 30 years.

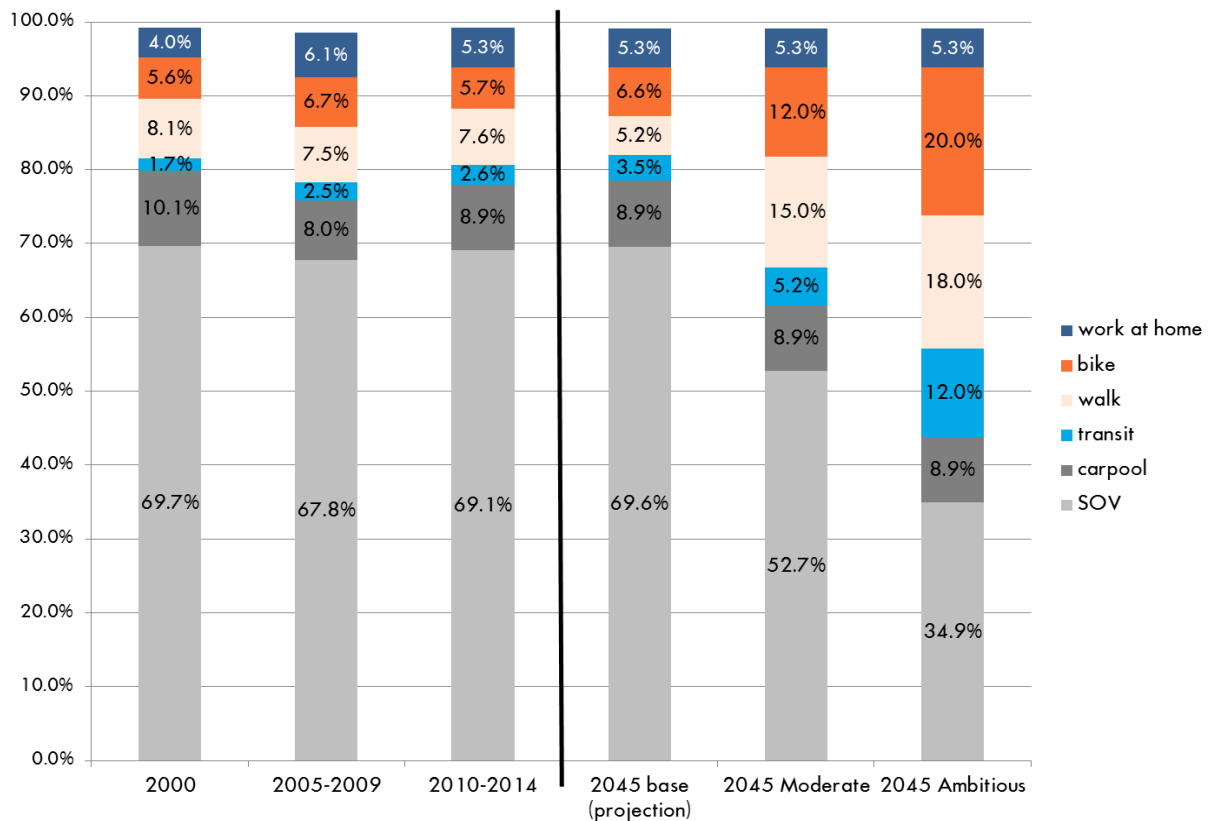
The purpose of this paper is to document the methods and process of how the MPO researched and set mode share goals, providing a framework/blueprint for city planners in other communities, should they consider setting mode share goals of their own. This paper is also intended to help guide planners in considering different policy options that will help support mode share goals and ultimately help reduce SOV usage.

To begin the process of setting mode share goals, relevant case study information needed to be collected from other communities. Knowing what the mode share goals are for other communities was a critical first step. The objective of the case studies was twofold: to determine *what* mode share goals are for other communities similar to Missoula, and perhaps more importantly, to get a better understanding of *how* these communities set their goals. In order to set thoughtful, reasonable mode share goals for Missoula, we needed to better understand how other communities have approached mode share goal setting. We were also looking for critical insight into the most effective and common transportation policies and practices used to affect mode share.

With the help of transportation planners Jessica Morriss and Aaron Wilson, I identified a preliminary list of cities to study. I then contacted each community and examined planning documents to see if any mode share goals had been set. Once preliminary information was collected, case studies were narrowed down to nine communities. Three of the chosen communities do not have mode share goals, but they do have transportation policies that aim to reduce single-occupancy vehicle use, which was worth investigating further. Three other communities have only select mode share goals, such as goals for cycling or walking. The last three communities have mode share goals for all modes of transportation. Each of the nine communities was studied in-depth. I looked at their mode share goals, if they had any, and researched *how* they developed these goals.

Once sufficient data were collected from these nine case study communities, I created three different mode share goal options for the MPO to review. Mode share goal options were categorized under “business as usual”, moderate, and ambitious. Using my data,

transportation planners created a graph to compare Missoula’s historical mode share trends side-by-side with each mode share goal option:



After developing these mode share goal options, I analyzed policy documents from each case study community and identified a host of relevant transportation policies that were either associated with mode share goals or aimed at single-occupancy vehicle reduction. I also contacted city planners in these nine communities. I interviewed planners from Bend, OR and Boulder, CO and exchanged emails with several other planners to find out what policies are being implemented in their communities. Missoula MPO Transportation Planning Manager Jessica Morriss reviewed this list of policies that I compiled and, based on her professional recommendations, assisted with sorting them into three different feasibility categories: easy, medium, and difficult. The resulting document is a “policy feasibility matrix”, which is intended to serve as a menu of transportation policies that planners may use to influence modal choices.

Finally, this paper concludes with my own brief list of policy suggestions that I put together for the MPO to consider in conjunction with setting mode share goals. It is not within the scope of this paper to do a comprehensive policy analysis. These suggestions are simply a list that identifies some of the most common and effective policies and programs that I came

across in my case study research. These are tactics that other communities are using to support achievement of mode share goals and, ultimately, reductions in SOV use.

My policy suggestions include:

- 1) Increase funding for non-motorized and transit transportation projects
- 2) Move away from exclusively Level of Service and toward Multi-Modal Level of Service
- 3) Increase mixed-use urban infill and density
- 4) Consider feasibility of parking districts or other parking management strategies
- 5) Promote, educate, advocate
- 6) Continue to increase mode share data gathering
- 7) Assess progress, review policies, and revise goals

The City of Missoula and Missoula County face important transportation challenges in the future. Setting mode share goals is the first critical step that will hold decision makers accountable and shape policy that will lead to a more sustainable transportation system. A future transportation system with more multi-modal options will improve safety for all roadway users, improve air quality by reducing emissions, improve public health by encouraging more active transportation, ease congestion by reducing our dependence on single-occupancy vehicles, address social equity by diversifying our transportation options, and limit our contribution to global climate change by reducing the amount of fossil fuels consumed in our community. The City of Missoula and Missoula County have an opportunity to create a transportation system that serves all Missoulians and sets the standard for other communities.

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## INTRODUCTION

The City of Missoula has shown a commitment to solving the social, economic, and environmental issues that face our community and modern society at-large. According to the City of Missoula's Growth Policy, "By providing guidance for the development of different types of land uses, their design, their accessibility, and their intensity, it [the Growth Policy] becomes the foundation for ensuring economic vitality, affordable housing, efficient transportation planning, environmental protection, and the health, welfare, and happiness of the community's residents."<sup>1</sup> Adoption of transportation mode share goals as part of the 2016 Long Range Transportation Plan is another step toward meeting these foundational commitments.

It is helpful to know how residents in the community travel to work. Measuring mode share gives city planners a sense of transportation habits and trends over time. When we understand how people travel in the community, we understand what modes of transportation need more or less attention. We see where we need to move resources in order to accommodate the needs of various modes of transportation. We may find that cycling ridership is on the rise and therefore additional facilities may be needed to accommodate this growth. Or, we may find that cycling ridership is trending down, so we may opt to increase funding for education and advocacy programs that promote cycling. Knowing how residents move around the city is crucial to providing the best transportation system possible and understanding where money is best spent.

Understanding these mode share patterns over time gives us a baseline when considering future mode share goals and what is reasonable and realistic. For example, a community with a current bicycle mode-share of 5% may not want to set a mode share goal of 20%, especially if they set that goal for a short timeline. This may be too ambitious, based on the available commute data that tracks historical trends. Conversely, for a community with a current bicycle mode share of 18%, setting a goal of 20% might not be ambitious enough. Knowing your baseline data is critical for setting realistic, achievable, thoughtful goals.

The purpose of this paper is to document the methods and process of how the Missoula Metropolitan Planning Organization researched and set mode share goals, providing a framework/blueprint for city planners in other communities, should they consider setting mode share goals of their own. This paper is also intended to help guide planners in considering different policy options that will help support mode share goals and ultimately help reduce SOV usage.

This paper will define transportation mode share, explain the reasons behind setting mode share goals, outline our methodology for case study data collection, provide background data on Missoula's historic and current transportation mode share trends, present the case study data and discuss some of the relevant transportation policies from each community, and then finish with a list of my own policy suggestions for the Missoula MPO.

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<sup>1</sup> City of Missoula, Montana. (2015). Our Missoula: 2035 City Growth Policy. Pg 9. Missoula, MT.

## **BACKGROUND**

This paper was written for the Missoula Metropolitan Planning Organization. Any urbanized area with a population of more than 50,000 has a metropolitan planning organization (MPO) that plans out transportation systems at a regional level.<sup>2</sup> A board made up of local elected officials sets policy for an MPO and adopts long-range plans and short-range programs of future transportation improvements.<sup>3</sup>

“Mode” simply refers to the type of transportation being used. Mode share is a breakdown of the percentage of residents using a particular form of transportation. The US Department of Transportation (USDOT) breaks down modes of transportation into four distinct categories; two motorized and two non-motorized. Motorized categories are split between public and private vehicles. Non-motorized categories are split between bicycling and walking.<sup>4</sup>

The USDOT defines commute mode share as the percentage of workers aged 16 years and over who commute either 1) by bicycle; 2) by private vehicle, including car, truck, van, taxicab, and motorcycle; 3) by public transportation, including bus, rail, and ferry; and 4) by foot.<sup>5</sup>

As Anthony Downs argued in his important 2004 book *Still Stuck in Traffic*, “Congested roads waste commuters’ time, cost them money and degrade the environment.”<sup>6</sup> Around the United States, more and more communities are recognizing the need to address transportation issues brought on by an over-reliance on automobile travel. This over-reliance leads to crumbling infrastructure and increased maintenance costs.<sup>7</sup> It is expensive to build roads and it is expensive to maintain them. But Downs only offers a partial list of the problems associated with congestion and heavy automobile use.

With the population of Missoula expected to continue growing at 1.5% per year, shifting our community’s transportation habits away from single-occupancy vehicle (SOV) use and toward non-motorized and transit modes is important for growth management.<sup>8</sup> Managing this growth is necessary to maintain and even reduce current congestion levels on our roadways, to maintain or improve air quality standards in the Missoula air shed by reducing vehicle-related pollutants, and to illustrate Missoula’s commitment to mitigating greenhouse gas emissions that contribute to global climate change. Additionally, reducing over-reliance on single-

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<sup>2</sup> United States Department of Transportation, Federal Highway Administration, Federal Transit Administration. (2015). *A Guide to Transportation Decisionmaking*. Washington, D.C.

<sup>3</sup> Ibid.

<sup>4</sup> United States Department of Transportation, Office of Policy. (2016). *Commute Mode Share*. Washington, D.C. Retrieved from: <https://www.transportation.gov/mission/health/commute-mode-share>

<sup>5</sup> Ibid.

<sup>6</sup> Downs, A. (2004). *Still Stuck in Traffic: Coping with Peak-Hour Traffic Congestion*. Pg 460. Washington D.C.: Brookings Institution Press.

<sup>7</sup> Ibid.

<sup>8</sup> United States Census Bureau. *Annual Estimates of the Population for the United States, Regions, States, and Puerto Rico: April 1, 2010 to July 1, 2015*. Retrieved on 10/31/2016 from: <https://www.census.gov/data/tables/2016/demo/popest/nation-total.html>



occupancy vehicles helps increase safety for all roadway users and supports a more equitable transportation system. Setting mode share goals is an important component in the process of shifting to a more sustainable, resilient, just, and equitable transportation system that prioritizes more multi-modal transportation options.

The following is a more in-depth look at why a community may decide to set mode share goals with the aim of reducing SOV usage. There are a host of benefits, which include, but are not limited to:

### *Growth Management*

The intermountain west is one of the fastest growing areas in the country and Western Montana has been experiencing similar growth trends. In Ravalli County, just south of Missoula, the population increased 41% from 1990-1999.<sup>9</sup> In Missoula, this growth has “contributed to increased congestion, decreased air quality, and longer commute times for many Missoulians.”<sup>10</sup> The challenge Missoula faces is addressing the transportation needs of a growing population without resorting to the failed policies that lead to suburban sprawl and outward expansion, which consumes land and forces heavier reliance on single occupancy vehicles.

Setting mode share goals supports the City of Missoula’s Growth Policy, which takes a “Focus Inward” approach to development by promoting “sustainable urban development and re-use rather than consumption and expansion into open space, agricultural resources, and natural areas.”<sup>11</sup>

Transportation plays a key role in the “focus inward” approach: “As the foundation for the Growth Policy, the [Focus Inward] strategy is aimed at reducing automobile-dominated suburban development which not only helps to improve community health, cost of living, lower city infrastructure and service costs, but also mitigates the effects of climate change and lessens use of carbon-based fuels and subsequent greenhouse gas production.”<sup>12</sup> From land use policy to health and wellness to environmental concerns, the Growth Policy recognizes that transportation serves as a foundation for achieving sustainability and resilience in Missoula.

### *Safety*

Safety and wellness is one of the six key elements of the Growth Policy.<sup>13</sup> There are a number of transportation initiatives in the Growth Policy that highlight transportation’s role in creating a safe community. Goal number one in the Safety And Wellness section of the Growth Policy is to

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<sup>9</sup> State of Montana. Department of Commerce, Community Development Division. (2006). Montana’s Growth Policy Resource Book. Pg 6. Helena, MT. Retrieved from:  
<https://comdev.mt.gov/Portals/95/shared/Resources/docs/Publications/GrowthPolicyResourceBook.pdf>

<sup>10</sup> City of Missoula, Montana. (2015). Growth Policy. Pg 202.

<sup>11</sup> Ibid. Pg 11.

<sup>12</sup> Ibid. Pg 11.

<sup>13</sup> Ibid. Pg 37.

“Encourage healthy lifestyles by having a complete active transportation and transit network for all abilities and recreational opportunities that are safe, clean, beautiful, and navigable.”<sup>14</sup> Objective 7 under that goal is to “Set and strive to achieve a mode-split goal for the overall transportation system”, which is the genesis for the mode share case study.<sup>15</sup>

According to a recent study from the Michigan Transportation Institute, Montana ranks first in the rate of per-capita vehicle fatalities.<sup>16</sup> In fact, Montana’s rate (22.6 per 100,000 people) is double the national average.<sup>17,18</sup> Population density and speed limits are both variables that are correlated with this unfortunate statistic. Montana is a large state with one of the lowest population densities in the country, ranking 48th. Montana is also one of only 7 states with a maximum speed limit of 80 miles per hour; the other states include Wyoming, Nevada, Idaho, South Dakota and Utah, as well as parts of Texas.<sup>19</sup> Of these 7 states, Nevada is the only one that is not in the top 10 in per capita vehicle fatalities.<sup>20</sup> Montana’s rural landscape and high traffic speeds are possible factors for such high fatality rates.

Mitigating congestion by balancing our transportation system with more non-motorized users improves safety for all roadway users. Maintaining efficient roadways also reduces the likelihood of automobile drivers cutting through neighborhoods to avoid congested areas. Keeping automobiles on major arterials helps keep traffic down in our residential neighborhoods and improves safety for those living there. Providing sidewalks and bicycle lanes helps keep non-motorized travelers safe by keeping them separated from vehicles. Building more densely and avoiding sprawl allows for less reliance on single occupancy vehicles and promotes built environments that are “human scale.” These are all ways to achieve greater safety for all users of our transportation system.

### *Public Health*

Shifting transportation modes away from single-occupancy vehicle use will also help to address public health issues. Besides safety, which is considered a public health issue, there are two other major public health issues associated with transportation choices. One is the issue of air quality and the other is the dangerous rise of obesity. Air quality concerns include harmful emissions from vehicles like carbon monoxide, benzene, volatile organic compounds, hydrocarbons, and dust in the form of particulate matter 2.5 and 10. This is an important public

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<sup>14</sup> City of Missoula, Montana. (2015). Growth Policy. Pg 39.

<sup>15</sup> Ibid.

<sup>16</sup> Schoettle, B. & Sivak, M. (2015). Mortality from Road Crashes in the Individual U.S. States: A Comparison with Leading Causes of Death. *The University of Michigan & Sustainable Worldwide Transportation*. Ann Arbor, MI.

<sup>17</sup> Florida, R. (2015). “The Geography of Car Deaths in America.” [Blog Post]. CityLab, *The Atlantic*. Retrieved from: <http://www.citylab.com/commute/2015/10/the-geography-of-car-deaths-in-america/410494/>

<sup>18</sup> Litman, Todd. (2016). “Rethinking Traffic Safety.” [Blog Post]. Planetizen. Retrieved from: <http://www.planetizen.com/node/88561/rethinking-traffic-safety>

<sup>19</sup> Insurance Institute for Highway Safety & Highway Loss Data Institute. (2017). “Map: maximum posted daytime speed limits on rural interstates.” Retrieved from: <http://www.iihs.org/iihs/topics/laws/speedlimits/mapmaxspeedonruralinterstates?topicName=Speed>

<sup>20</sup> Florida, R. (2015).

health concern for Missoula, a community with historic air quality issues due to its situation in the Bitterroot Valley.

A 2013 study published in the *Journal of Environmental Health* states that there are “links between vehicle emissions and air quality, as well as the health and economic benefits from alternative transport use”, and the authors argue that, “a comprehensive understanding of the multiple benefits of alternative transport could assist with policy making in the areas of transport, health, and environment.”<sup>21</sup>

The link between walkability and air pollution is also highlighted in a 2009 study published in *Environmental Health Perspectives*. One of the conclusions of the article is that, “neighborhoods with high pollution and low walkability are far from the city center.”<sup>22</sup> These areas are suburban sprawl, where land uses are highly segregated and design is based around the automobile.

In addition to public health issues related to air quality, there are also an increasing number of studies that show how the lack of “active” transportation, such as walking or cycling, is closely linked to a rise in obesity and certain cardiovascular diseases.<sup>23,24</sup> Land-use planning and urban design are important factors in the link between public health and transportation.<sup>25,26</sup> In other words, how we design our community influences how we travel around it. And how we travel has direct impacts on our health.<sup>27,28,29</sup>

A 2004 study also indicates that “land-use mix had the strongest association with obesity” and suggests that “strategies to increase land-use mix and distance walked while reducing time in a

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<sup>21</sup> Xia, T., Zhang, Y., Crabb, S., & Shah, P. (2013). Cobenefits of Replacing Car Trips with Alternative Transportation: A Review of Evidence and Methodological Issues. *Journal of Environmental and Public Health*, 2013. Pg 1. doi:10.1155/2013/797312.

<sup>22</sup> Marshall, J. D., Brauer, M., & Frank, L. D. (2009). Healthy Neighborhoods: Walkability and Air Pollution. *Environmental Health Perspectives*, 117(11), 1752. Pg 1757.

<sup>23</sup> Sallis, J. F., Frank, L. D., Saelens, B. E., & Kraft, M. K. (2004). Active Transportation and Physical Activity: Opportunities for Collaboration on Transportation and Public Health Research. *Transportation Research Part A*, 38(4), 249-268. doi:10.1016/j.tra.2003.11.003

<sup>24</sup> Yang, J., & French, S. (2013). The Travel - Obesity Connection: Discerning the Impacts of Commuting Trips with the Perspective of Individual Energy Expenditure and Time Use. *Environment and Planning B: Planning and Design*, 40(4), 617-629. doi:10.1068/b38076

<sup>25</sup> Frumkin H, Frank L, Jackson R. (2004). *Urban Sprawl and Public Health: Design, Planning, and Building for Healthy Communities*. Washington, DC: Island Press.

<sup>26</sup> Zhao, Z., & Kaestner, R. (2010). Effects of Urban Sprawl on Obesity. *Journal of Health Economics*, 29(6), 779-787. doi:10.1016/j.jhealeco.2010.07.006

<sup>27</sup> Frank, L. D. (2000). Land Use and Transportation Interaction: Implications on Public Health and Quality of Life. *Journal of Planning Education and Research*, 20(1), 6-22. doi:10.1177/073945600128992564

<sup>28</sup> Frank, L. D., & Engelke, P. O. (2001). The Built Environment and Human Activity Patterns: Exploring the Impacts of Urban Form on Public Health. *Journal of Planning Literature*, 16(2), 202-218. doi:10.1177/08854120122093339

<sup>29</sup> Gelormino, E., Melis, G., Marietta, C., & Costa, G. (2015). From Built Environment to Health Inequalities: An Explanatory Framework Based on Evidence. *Preventive Medicine Reports*, 2, 737-745. doi:10.1016/j.pmedr.2015.08.019

car can be effective as health interventions.”<sup>30</sup> As all of these studies show, there is a close link between transportation, community design, and public health.

These connections are being taken seriously at the highest level of transportation government. In 2012, the Federal Highway Administration established the Health in Transportation Working Group in order to “develop an agency-wide understanding of health in transportation, identify aspects of existing agency programs that relate to health, and address health-related concerns and communicate these concerns with management.”<sup>31</sup>

### *Efficiency*

Setting multi-modal transportation goals aims to move more people more efficiently, which will help mitigate traffic congestion as Missoula grows. By setting mode share goals and implementing relevant policies to go along with them, we use the current transportation network more efficiently, and we avoid the failed practices of suburban sprawl and the resulting road expansions.

In the Growth Policy, efficiency is tied to Travel Demand Management (TDM) initiatives. Missoula In Motion is an example of an organization implementing TDM strategies by advocating for sustainable transportation and promoting educational events.<sup>32</sup> Other organizations include Associated Students of the University of Montana’s Office of Transportation and the Missoula-Ravalli Transportation Management Division.<sup>33</sup>

### *Social Equity*

Historically, social equity is not considered in transportation plans, but this is beginning to change.<sup>34</sup> Providing more transportation options and improving access to those options addresses, if at least indirectly, socioeconomic imbalances in the community. A single occupancy vehicle becomes just one of several reasonable and reliable transportation choices. An equitable transportation system does not *require* the use of a single occupancy vehicle for any given trip. Instead, it balances the needs of all transportation system users and provides safe, convenient options.

Missoula’s Growth Policy touches on transportation’s role in social equity in the Economic Health section. Goal 13 states: “Provide a full range of viable transportation mode choices to

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<sup>30</sup> Frank, L. D., Andresen, M. A., & Schmid, T. L. (2004). Obesity relationships with community design, physical activity, and time spent in cars. *American Journal of Preventive Medicine*, 27(2), 87-96. Pg 87. doi:10.1016/j.amepre.2004.04.011.

<sup>31</sup> United States Department of Transportation, Federal Highway Administration. (2015). Health in Transportation Working Group - 2015 Annual Report. Pg 1. Washington, D.C. Retrieved from: [http://www.fhwa.dot.gov/planning/health\\_in\\_transportation/workgroup/2015\\_annual\\_report/ar02.cfm](http://www.fhwa.dot.gov/planning/health_in_transportation/workgroup/2015_annual_report/ar02.cfm)

<sup>32</sup> City of Missoula, Montana. (2015). Growth Policy.

<sup>33</sup> Ibid.

<sup>34</sup> Manaugh, K., Badami, M. G., & El-Geneidy, A. (2015). Integrating social equity into urban transportation planning: A critical evaluation of equity objectives and measures in transportation plans in North America. *Transport Policy*, 37, 167-176. doi:10.1016/j.tranpol.2014.09.013

meet the needs of residents, businesses, and visitors.”<sup>35</sup> This goal is certainly a step forward in promoting alternative forms of transportation that meet the needs of all Missoulians and meets the needs of our most vulnerable populations. These populations can include low-income residents, residents with specific mobility challenges, historically marginalized neighborhoods, the elderly, and children, just to name a few.

#### *Policy Formulation*

Setting mode share goals provides guidance when making policy decisions and helps keep the city accountable for achieving those goals. Setting goals is only the first step; drafting policies and implementing those policies is the important (and difficult) part. Mode share goals mean nothing without relevant policies to back them up. Multi-modal planning policies include prioritizing urban infill and compact community design to encourage walking and cycling, implementing parking districts that generate funding, and promoting educational events such as bike to work day.

#### *Funding Allocations*

Related to policy, setting mode share goals informs funding allocations. To be serious about shifting transportation patterns, funding must work together in relative unison with the mode share goals and policy. San Luis Obispo has taken important steps by tying funding directly to mode share goals.<sup>36</sup> Practically speaking, this means increasing funding for alternative transportation like transit and prioritizing non-motorized capital improvement projects, such as bike lanes and sidewalks.

#### *Climate Change*

Perhaps most importantly, for the long-term health of our planet, shifting away from single-occupancy vehicles reduces greenhouse gas (GHG) emissions and sets the tone for a future transportation system that works to address the seriousness of climate change and takes direct action to mitigate impacts from one of the contributing causes. According to the United States Environmental Protection Agency (EPA), the transportation sector made up 26% of total GHG emissions in 2014, which “primarily come from burning fossil fuel for our cars, trucks, ships, trains, and planes.”<sup>37</sup>

Missoula’s Growth Policy addresses climate change and the environmental impacts of transportation. In the Environmental Quality section of the Growth Policy, goal number one states that, “In order to build a more resilient community, Missoula will promote local decisions that mitigate the effects of climate change and prepare the City and its residents for the

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<sup>35</sup> City of Missoula, Montana. (2015). Growth Policy. Pg 57.

<sup>36</sup> Meyer, E. & Revorie, D. (2015). “How San Luis Obispo Established the Most Powerful Bike Funding Policy in the Nation.” *Alliance for Biking And Walking*. Retrieved from: <http://www.bikewalkalliance.org/blog/535-how-san-luis-obispo-just-established-the-most-powerful-bike-funding-policy-in-the-nation>

<sup>37</sup> United States Environmental Protection Agency. (2014). Sources of Greenhouse Gas Emissions. Washington, D.C. Retrieved from: <https://www.epa.gov/ghgemissions/sources-greenhouse-gas-emissions>

impacts climate change will have on the human, natural, and built environments.”<sup>38</sup> Objective number two under this goal deals directly with transportation: “Reduce reliance on single-occupancy vehicles and continue support for the expansion of public transportation and cycling/walking systems.”<sup>39</sup> Lastly, goal five in the Environmental Quality section states that, “Missoula will have a safe and efficient transportation system that reduces impacts to the environment and emphasizes walking, bicycling, and transit.”<sup>40</sup>

There are a host of reasons to set mode share goals and prioritize multi-modal transportation options. From public health and safety to climate change to traffic congestion, setting mode share goals and following through with those commitments will help alleviate a number of problems associated with over-reliance on single-occupancy vehicles.

## **METHODS**

For this study we did not measure mode share of all trips, but instead just measured commute mode share. The reason for this is because it is the only accurate and measureable data that is currently available for the Missoula MPO area. Some communities have done studies using trip diaries, including Boulder, CO, Bellingham, WA and San Luis Obispo, CA. But most communities do not have the funding or resources to implement travel studies in such a comprehensive and detailed way. Our case study analysis was done based on American Community Survey (ACS) 5-year averages (2010-2014) of commute data. ACS commute data is, at this moment, the most accurate, consistent and reliable data available for measuring the Missoula communities travel habits.

It should not be assumed that commute mode choice is an accurate representation of *all* trips taken by any given individual. An individual may use a single-occupancy vehicle because their workplace is too far to ride or walk or not on a bus route, and then they might use a bicycle for a significant portion of other trips because they live very close to amenities (grocery store, bank, entertainment, etc). Or they may ride a bike, take the bus, or walk to work if it is close and use a vehicle for trips to access amenities, such as businesses on Reserve Street or recreation opportunities farther away. The point is that we are dynamic travelers, using various forms of transportation based a number of factors, including trip purpose, distance, weather, convenience, speed, etc. Commute data is only part of the story.

However, using commute data to understand modal choice does give us insight into the larger, more general trends of city residents. Commute mode share reflects, to some degree, the modal choice of an individual for any given trip. If an individual take the bus to commute to work, it is not unreasonable to posit that this person also takes the bus for other trips. The same can be said for cycling, walking, or single-occupancy vehicle use.

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<sup>38</sup> City of Missoula, Montana. (2015). Growth Policy. Pg 81.

<sup>39</sup> Ibid. Pg 81.

<sup>40</sup> Ibid. Pg 83.

Commute information helps us build a rough understanding of general mode share patterns and trends in the Missoula MPO area. Extrapolating commute data to general travel trends is a very loose, heuristic, and observational approach, but worth explaining. As stated before, it is currently the best (and only) way we can begin to understand larger travel patterns in the Missoula MPO area.

Early in my preliminary research, I came across a case study completed by Fehr & Peers Transportation Consultants for the City of Fresno, California. The study compiled a list of 24 jurisdictions around the United States and the world to understand best policies and practices for implementing bicycle mode share goals.<sup>41</sup> The study was done as part of the City of Fresno's Bicycle Master Plan, in which bicycle mode share goals were set. The Fresno report gave us a good starting point for what a mode share case study might look like.

We brainstormed a list of jurisdictions that are similar to Missoula in a few important ways, including: demographics, climate, landscape, population, and if it has a university or not. These were loose guidelines for choosing our locations, but they provided some framework and context with which to work. For instance, it is not particularly useful to study mode share in Miami, Florida. The population is much larger, population density is greater, the demographics are much different, the climate is warmer and the landscape is flat. These are all reasons that comparison studies with Miami would not be appropriate.

We did consider one community outside of the United States that has set mode share goals and two states that have set statewide mode share goals. (See Figure 1). Despite these exceptions, we tried to focus our case studies on similar sized communities located in the West.

**Figure 1: Preliminary List of Case Study Communities**

Ann Arbor, Michigan	Austin, Texas	Bend, Oregon
Bellingham, Washington	Boulder, Colorado	Burlington, Vermont
Calgary, Alberta, Canada	Chicago, Illinois	Chico, California
Fort Collins, Colorado	Minneapolis, Minnesota	Portland, Oregon
San Luis Obispo, California	State of Nevada	State of Wisconsin

From this list, I contacted each jurisdiction with a list of questions to see whether they set mode share goals, and if so, how. (See appendix A for full list of interview questions). At the same time, I reviewed documents from each city to find anything on mode share goal setting.

Based on responses (or not) from city planners and using the information that I found in city documents regarding mode share goals, we ended up selecting nine communities. In order to get a wider range of data, we chose three communities without mode share goals, three with

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<sup>41</sup> Fehr & Peers Transportation Consultants. Prepared for the City of Fresno, California. (N.D.). *City, County, and State Bicycle Goals Across the Country and Abroad*. Los Angeles, CA.

only select mode share goals, and three with goals set for all modes of transportation. (See Figure 2: Case Study Map on page 13).

The purpose of selecting cities with no mode share goals or with only a few mode share goals was to get a larger sample of communities. There are not a lot of communities that have set mode share goals for all forms of transportation, particularly those that align with some of the demographic criteria we were looking for. Had we only chosen communities that were very similar to Missoula and that had mode share goals for all forms of transportation, our case study sampling would have been quite limited. Additionally, the communities we selected that do not have mode share goals do have relevant and interesting transportation policies that aim to reduce SOV use, and we felt that they were worth investigating further.

I used American Community Survey (ACS) data to find mode share percentages for each case study community and I graphed each community's current mode share percentages up against their respective mode share goals. Some communities did not have mode share goals to graph, while some communities had multiple mode share goals for different timelines or geographic areas. Using this information, I created three different mode share goal options for the Missoula MPO: None, which we name "business as usual", moderate, and ambitious. The methods for developing these three options will be discussed later in the paper.

After creating three different mode share goal options, I read through each of the nine case study community's respective transportation (and other) planning documents. I identified transportation policies that were either associated with mode share goals or aimed at SOV reduction. I also contacted city planners in these nine communities. I interviewed planners from Bend, OR and Boulder, CO and exchanged emails with several other planners to find out what policies are being implemented in their communities. (See Appendix B for list of supplementary questions.)

This research formed the basis for the development of the policy feasibility matrix, which was a compilation of policy options from all case study communities. Each policy was then reviewed and categorized into "Easy", "Medium" and "Difficult", based on professional recommendations from Jessica Morriss and Aaron Wilson. Jessica provided final adjustments and additions to the policy feasibility matrix. (See Table 4 on page 45).

Lastly, I put together a short list of policy suggestions that the Missoula MPO might consider in achieving mode share goals. These suggestions are based on some of the more common policies and programs that I came across in my case study research, and are tactics that other communities are using to support achievement of mode share goals.



Before looking at case study results, it is important to understand more about Missoula's mode share. According to 5-year averages of ACS data from 2010-2014, the average percentage of commuters using single-occupancy vehicles to get to and from work was about 70%.<sup>42</sup>

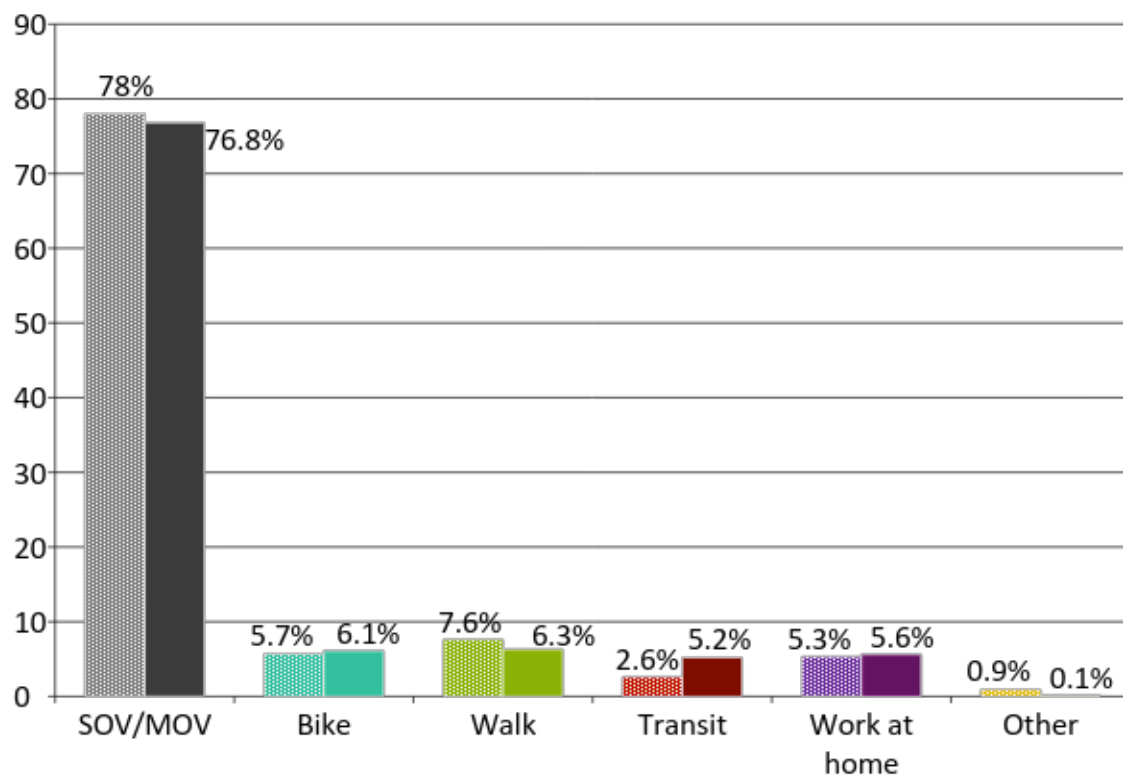
Figure 2 shows side-by-side comparisons of 5-year and 2014 estimates for each mode of transportation.<sup>43</sup> Figure 3 (pg 12) shows Missoula's mode share trends from 2000-2014 for each mode of transportation. Figure 4 (pg 13) shows Missoula's mode share trends from 2000-2014 for multi-modal transportation, which includes walking, cycling, and transit.

Missoula, Montana

Total Population (2013): 69,122

Estimated population of workers 16 years and over: 43,632

**Figure 2: Missoula's Current Mode Share - 5-year and 2014 Estimates, side-by-side comparison**



<sup>42</sup> United States Census Bureau. 2010-2014 American Community Survey 5-Year Estimates. Table S0801: Commuting Characteristics By Sex. Retrieved on 7/6/2016 from <https://factfinder.census.gov/>

<sup>43</sup> Note: In Figure 2, SOV/MOV is combined to show total vehicle commute rates.

Figure 3: Missoula Mode Share Trends, 2000-2014

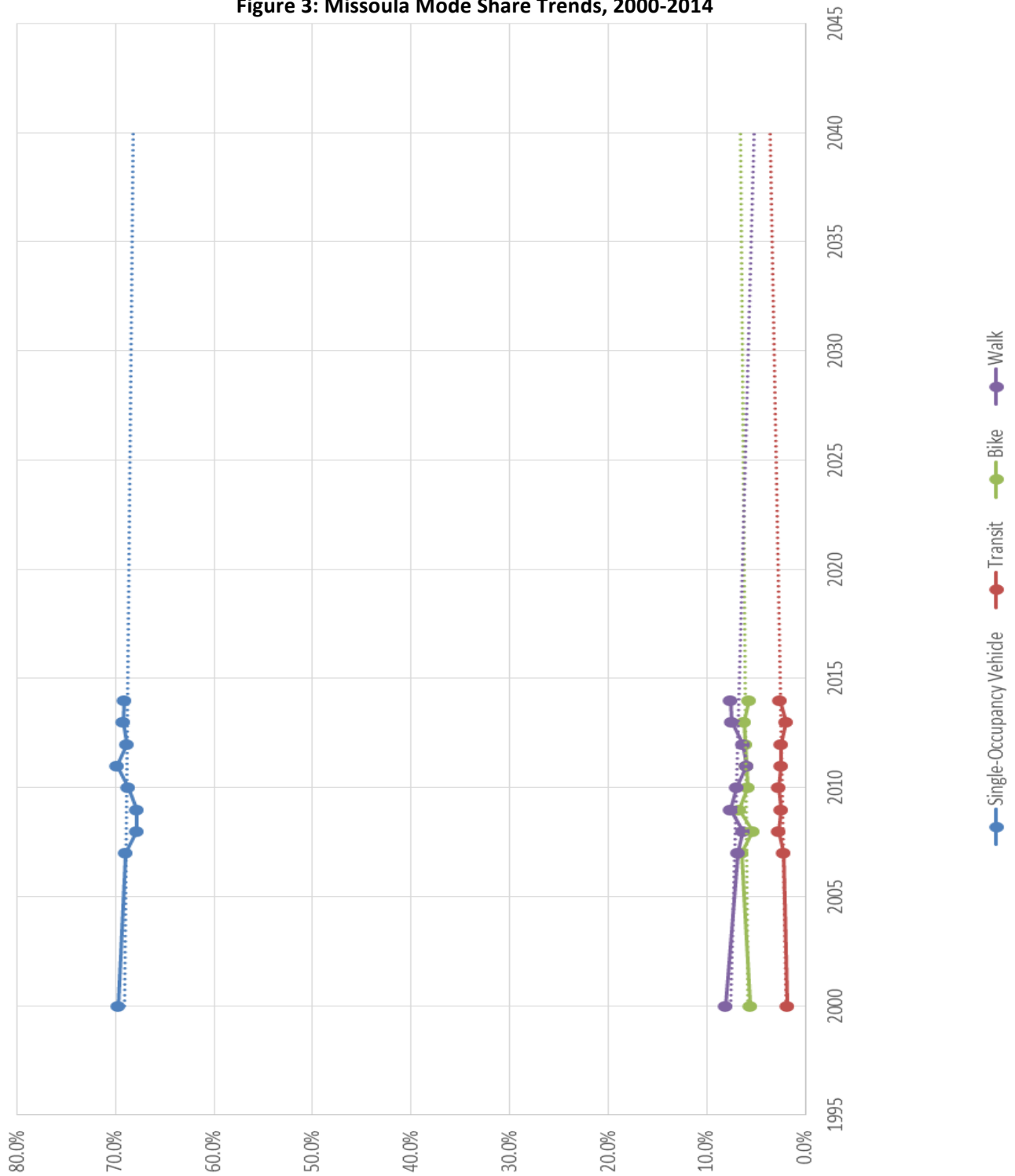
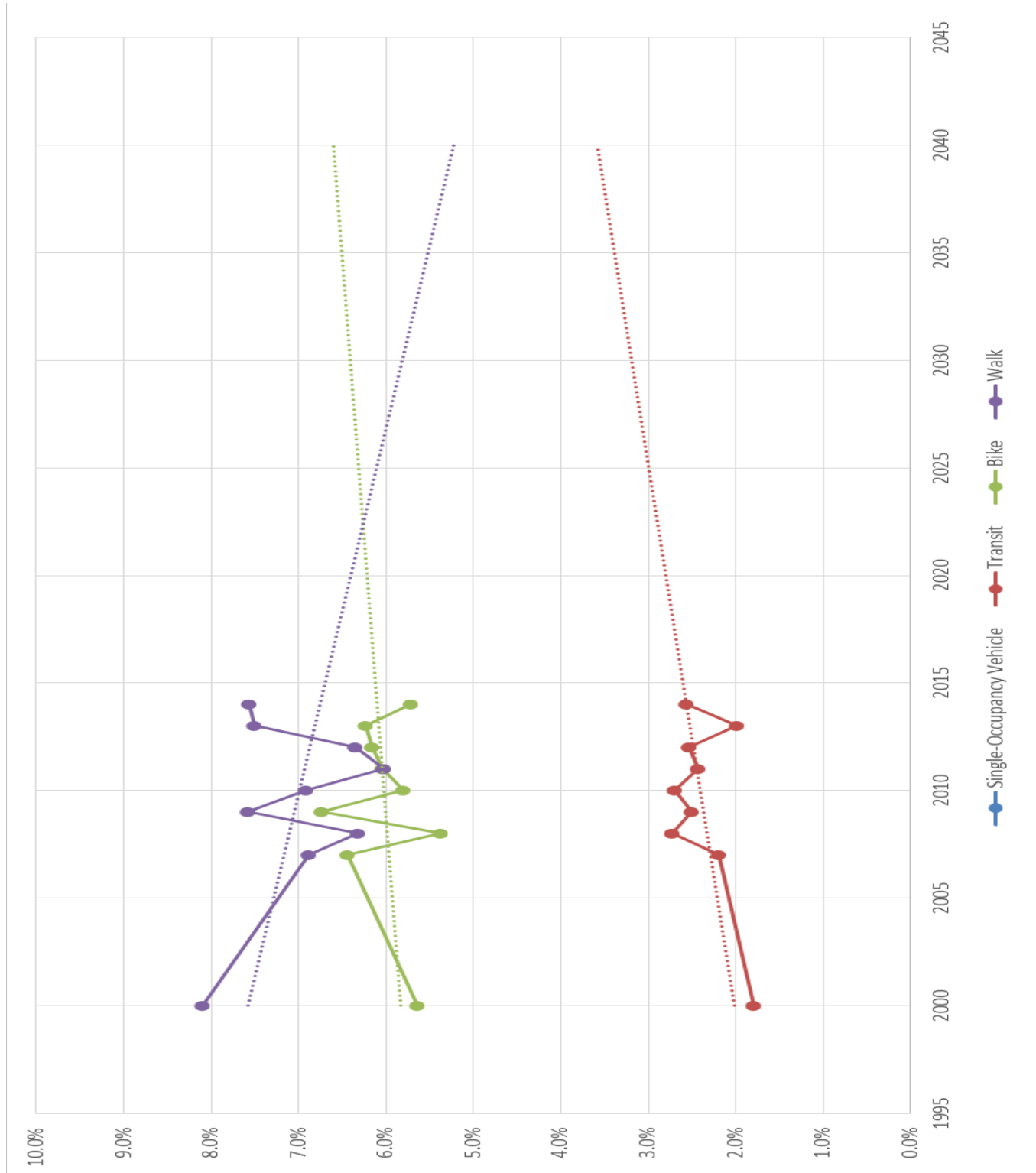
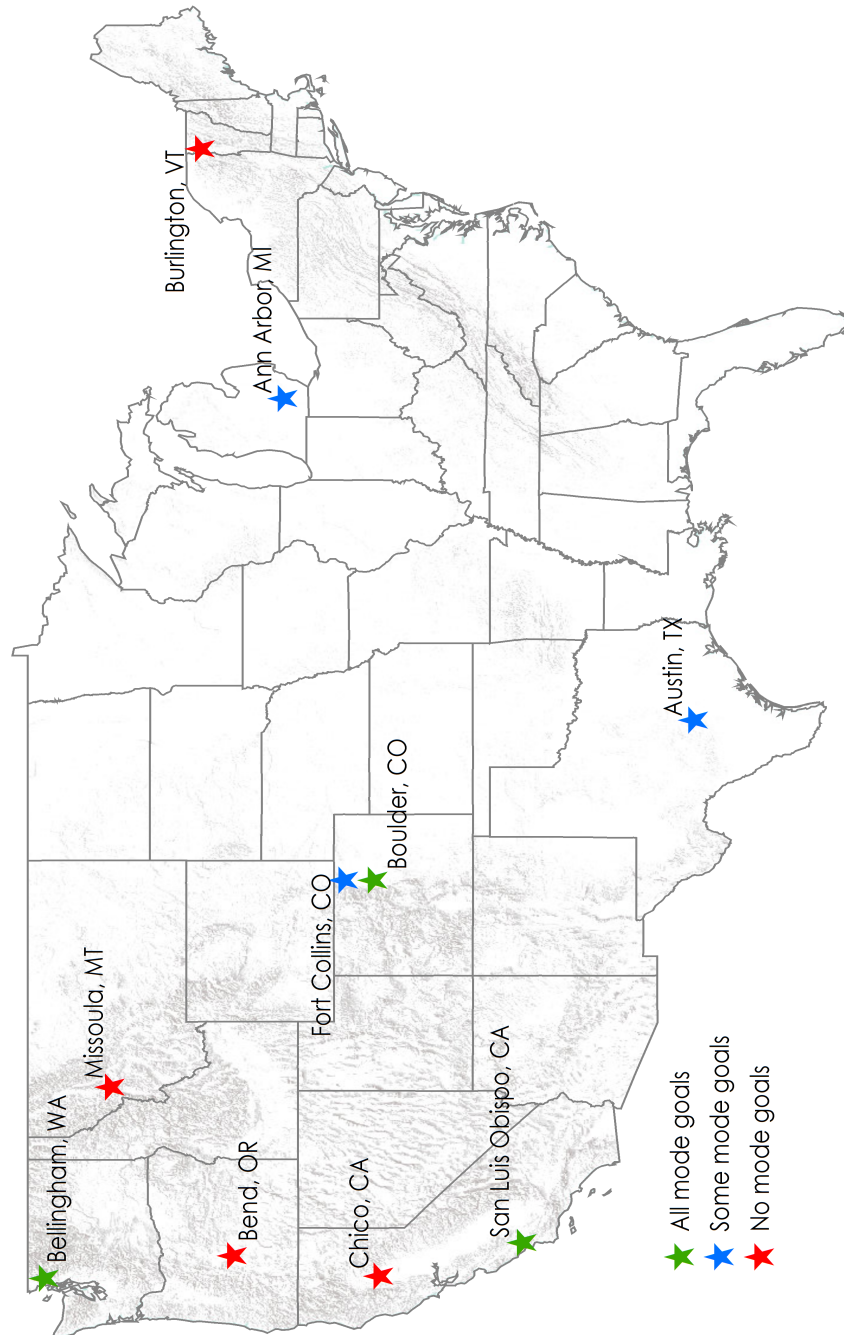


Figure 4: Missoula Multimodal (Bike, Walk, Transit) Trends, 2000-2014



## CASE STUDIES

Figure 5: Case Study Map



### No Mode Share Goals

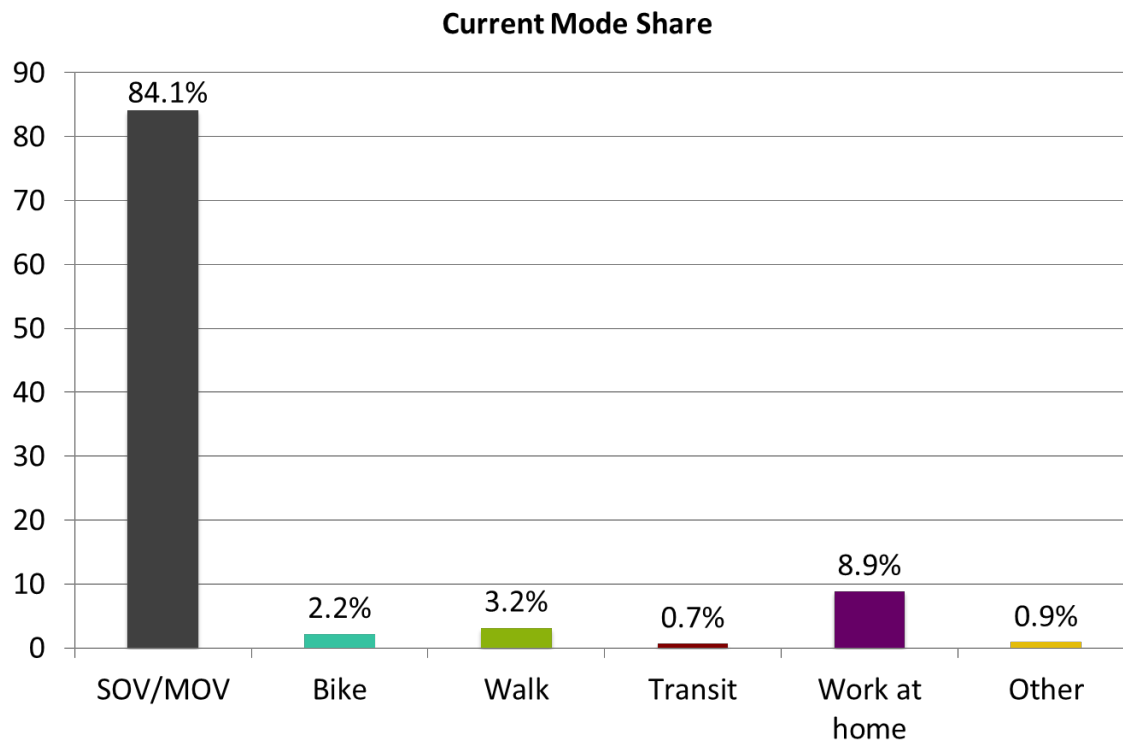
These three case study communities did not set mode share goals. One of the reasons we chose to study these communities is to find out why mode share goals were not set and what the community is or is not doing to facilitate a shift away from SOVs. There were numerous important transportation policy findings that are applicable for the Missoula MPO.

### Bend, Oregon

Total Population (2013): 81,236

Estimated population of workers 16 years and over: 37,918

Figure 2: Bend, Oregon Current Mode Share (2010-2014 Average)



Of all the case studies, Bend had the highest SOV/MOV mode share and some of the lowest bike/walk/transit rates. This was a surprising discovery, considering Bend touts itself as a bike-friendly community and has earned labels such as “Bike Town USA”, as well as a silver rating from the League of American Bicyclists.<sup>44,45</sup>

Interestingly, the “work from home” rate in Bend is quite high compared to the other case study communities. In my interview with Bend MPO Manager Tyler Deke, he indicated that

<sup>44</sup> Rook, Erin. (2015). “Bike Town USA: Does Bend deserve the accolades?” The Source Weekly. Bend, OR. Retrieved from: <http://www.bendsource.com/bend/bike-town-usa/Content?oid=2426700>

<sup>45</sup> League of American Bicyclists. (2016). Award Database: Bend, Oregon Report Card. Retrieved from: [http://bikeleague.org/sites/default/files/bfareportcards/BFC\\_Fall\\_2016\\_ReportCard\\_Bend\\_OR.pdf](http://bikeleague.org/sites/default/files/bfareportcards/BFC_Fall_2016_ReportCard_Bend_OR.pdf)

Bend's work from home rates are about twice the national average and have been increasing in the last several years.<sup>46</sup>

Deke indicated that conversations around mode share goals were just starting to happen. One of the reasons mode share goals have not been set is because focus has been on expanding the Urban Growth Boundary (UGB), which are required for every community in Oregon.<sup>47</sup>

Despite not having mode share goals yet, Bend has set other important goals that are designed to help lead to the reduction of single-occupancy vehicle use, including Green House Gas (GHG) reductions and Vehicle Miles Traveled (VMT) reductions. GHG reduction mandates come from the Oregon Sustainable Transportation Initiative, which was developed by the Oregon Department of Transportation and the Department of Land Conservation and Development.<sup>48</sup> The 2011 GHG emissions reduction target for the Bend metropolitan area is an 18% reduction per capita in greenhouse gas emissions in the year 2035 below year 2005 emissions levels.<sup>49</sup>

The VMT reduction mandate comes from Oregon Transportation Planning Rule, which states that Metropolitan Planning Organizations (An MPO is an urbanized area with a population of 50,000 or more) can be in compliance of the rule "by demonstrating to the commission that adopted plans and measures are likely to achieve a five percent reduction in VMT per capita over the 20-year planning period."<sup>50</sup> Deke explained that, "They haven't been able to do so because of UGB expansion. Small communities can show VMT reductions, but city-wide it is very difficult."<sup>51</sup>

I asked Deke about other policies that Bend has been exploring to help facilitate mode shift. Deke mentioned the possibility of transitioning to a Multi-Modal Level of Service (MMLOS) instead of the traditional Level of Service (LOS), which is an automobile-centric way of measuring roadway efficiency. Because LOS only measures automobile usage on a roadway, it becomes a tool to justify widening roadways and making other changes that only accommodate the needs of vehicles.

Deke indicated that Bend had been experimenting with MMLOS, saying, "Some MMLOS was done with a couple specific corridors in Bend. ODOT has developed a tool called Bicycle Level

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<sup>46</sup> Tyler Deke, Bend MPO Manager. Personal Interview. (7/21/16). Bend, OR.

<sup>47</sup> Ibid.

<sup>48</sup> State of Oregon, Department of Transportation. (2011). Oregon Sustainable Transportation Initiative. Salem, OR. Retrieved from: <http://www.oregon.gov/ODOT/TD/OSTI/Pages/index.aspx>

<sup>49</sup> State of Oregon, Land Conservation and Development Commission. (2011). Adopted New Rules: Metropolitan Greenhouse Gas Reduction Targets. Salem, OR. Retrieved from: [https://www.oregon.gov/LCD/docs/rulemaking/trac/660\\_044.pdf](https://www.oregon.gov/LCD/docs/rulemaking/trac/660_044.pdf)

<sup>50</sup> State of Oregon, Department of Land Conservation and Development. (2011). Transportation Planning Rule 660-012-0035: Evaluation and Selection of Transportation System Alternatives. *Oregon Administrative Rules*. Salem, OR. Retrieved from: [http://arcweb.sos.state.or.us/pages/rules/oars\\_600/oar\\_660/660\\_012.html](http://arcweb.sos.state.or.us/pages/rules/oars_600/oar_660/660_012.html)

<sup>51</sup> Tyler Deke, Bend MPO Manager. Personal Interview. (7/21/16). Bend, OR.

of Stress.<sup>52</sup> If a street is too stressful for bicycles, they might move the bicycle corridor over a block or two to reduce stress for cyclists. Bend has identified several parallel corridors/routes where traffic volume is high and cyclists feel stressed.”<sup>53</sup>

As we were closing our interview, Deke mentioned, “One policy that was on the table but didn’t get passed was no more road expansion beyond three lanes.”<sup>54</sup> Deke said that despite that policy not being passed, residents living on Westside of Bend are, “well-organized politically, and they influence policy. Because of this, the City must go through comprehensive planning process before widening roads beyond three lanes. About ten to 15 years ago, it divided the community, but looking back now it was a good policy decision.”<sup>55</sup> Deke said that Westside residents have held firm in not wanting to expand roads in their area, despite the fact that “tourist influx is really stressing out the Westside, increasing 50% the just last three years!”<sup>56</sup>

He went on to say that “Bend has chosen not to expand these roads because people in those neighborhoods don’t want bigger roads. They want roads to operate as efficiently as possible. Expanding roads just doesn’t work politically. Safety is also an issue. Crashes are heavily concentrated on the larger roadways. Expanding roads equals more dangerous roads: for cyclists, pedestrians and motorists.”<sup>57</sup>

Limiting road expansion is not an official policy in Bend because it is a politically “tough sell.” While it is not likely to happen in the near future, adopting a no-road-expansion policy, officially or unofficially, requires planners to push for creative multimodal transportation options. In closing Deke asked, “What does Bend need to do to help keep people from driving short distances on the Westside?”<sup>58</sup>

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<sup>52</sup> State of Oregon, Department of Transportation. (2016). “Oregon Bicycle and Pedestrian Plan.” An Element of the Oregon Transportation Plan. Salem, OR.

<sup>53</sup> Tyler Deke, Bend MPO Manager. Personal Interview. (7/21/16). Bend, OR.

<sup>54</sup> Ibid.

<sup>55</sup> Ibid.

<sup>56</sup> Ibid.

<sup>57</sup> Ibid.

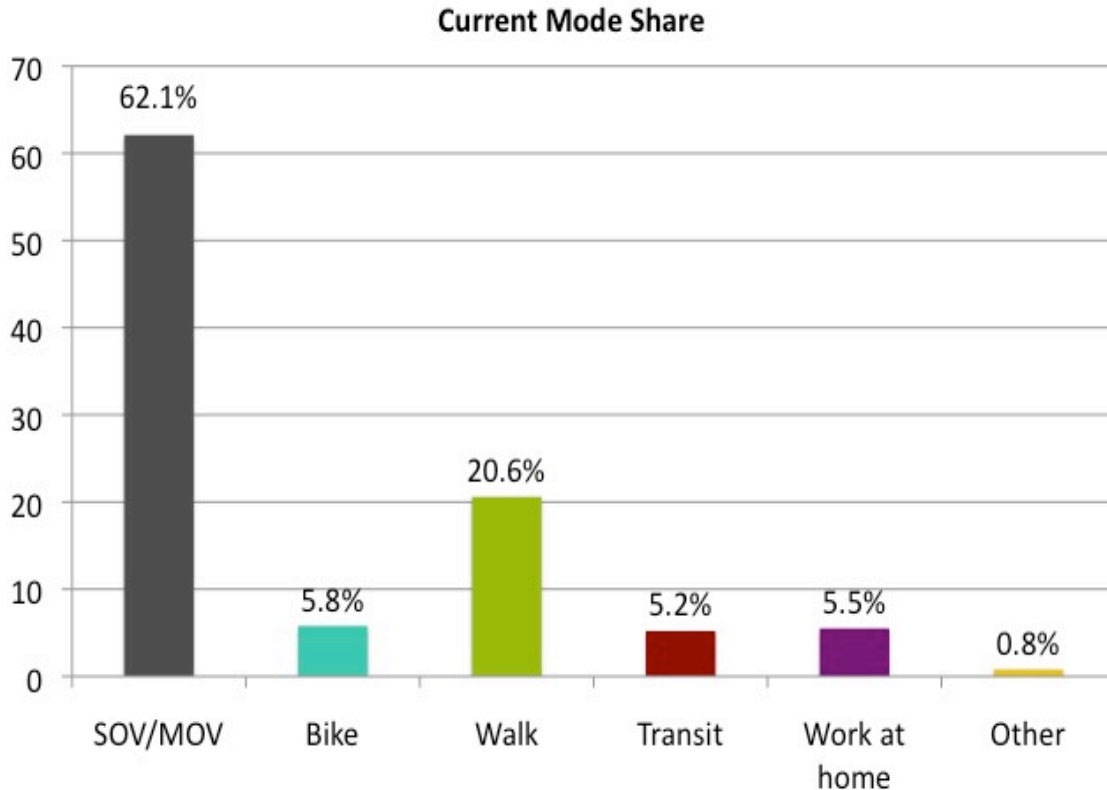
<sup>58</sup> Ibid.

### Burlington, Vermont

Total Population (2013): 42,284

Estimated population of workers 16 years and over: 21,345

**Figure 3: Burlington, Vermont Current Mode Share (2010-2014 Average)**



Burlington's walk mode share immediately stands out as the highest of all case study communities. Without having a conversation with a city planner and without having first-hand experience with Burlington, it is hard to speculate as to why the walk rates are so high.

Burlington's 2014 Municipal Development Plan includes a transportation chapter, which was last updated in 2011.<sup>59</sup> While the city does not have mode share goals, it does have a number of policy initiatives designed to influence mode share choices away from SOVs, which include:

- Supporting creation of a downtown Transportation Management Association (TMA).
- Changing speed limits to 20 mph in the downtown Slow Streets zone and to 25 mph on neighborhood streets without posted speed limits.
- Supporting improvements to the western corridor rail infrastructure and expansion of passenger rail services to Burlington.
- Supporting alternative funding sources for public transit operations.
- Changing zoning parking requirements to permit impact fee or payment-in-lieu options.<sup>60</sup>

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<sup>59</sup> City of Burlington, Vermont. (2014). *2014 Municipal Development Plan*. "Chapter 5: Moving Forward Together: Transportation Plan for the City of Burlington." Burlington, VT.

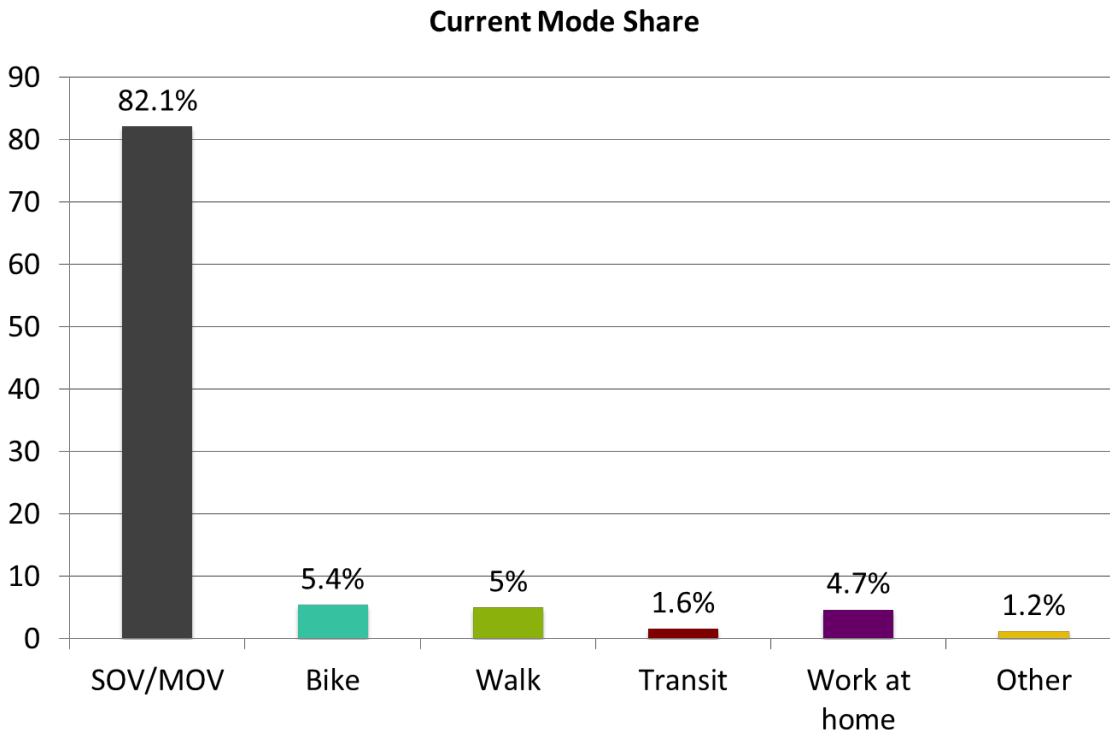


## Chico, California

Total Population (2013): 88,077

Estimated population of workers 16 years and over: 39,841

**Figure 4: City of Chico, California Current Mode Share (2010-2014 Average)**



Chico is similar to Bend in that the SOV mode share is above the national average. However, the walk and bike mode share are both a few percentage points higher in Bend, which is significant considering they share almost the same size population.

Chico's 2020 Climate Action Plan (CAP), adopted in 2012, set overall GHG reduction goals for the city: "The ultimate goal of the Climate Action Plan is to reduce emissions for the year 2020 to 385,749 MtCO<sub>2</sub>e, 25% below the base year (2005) levels."<sup>61</sup> The CAP comes from mandates set in the 2030 General Plan, which was adopted in 2011.<sup>62</sup> The General Plan serves as the major guiding document that informs other city plans. The Circulation Element of 2030 General Plan lists specific transportation policies and contains a list of 9 Goals, Policies, and Actions.<sup>63</sup>

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<sup>60</sup> City of Burlington, Vermont. (2014). *2014 Municipal Development Plan*. "Chapter 5: Moving Forward Together: Transportation Plan for the City of Burlington." Burlington, VT.

<sup>61</sup> City of Chico, California. Sustainability Task Force. (2012). *Chico 2020 Climate Action Plan*. Pg 19. Chico, CA.

<sup>62</sup> City of Chico, California (2011). *Chico 2030 General Plan*. Chico, CA.

<sup>63</sup> City of Chico, California (2011). *Chico 2030 General Plan*. "Chapter 4: Circulation Element." Chico, CA.

In my email conversation with Community Development Director Brendan Vieg, I asked about some of the policies that Chico has adopted or is planning to adopt in order to reduce SOV use. He said that, “We do have an adopted GHG emission reduction goal, which relies very heavily on reducing SOV use through enhancements to the City’s bicycle infrastructure and promotion of transit.”<sup>64</sup> A GHG reduction goal is something that came up repeatedly when analyzing other city plans.

I asked about plans to adopt a Multimodal Level of Service policy, and Vieg said that, “We haven’t adopted MMLOS yet, but our General Plan directs us to investigate and adopt standards in the future.”<sup>65</sup> This corroborates with a specific action item found in the Circulation Plan, which mandates the city to: “Monitor the development of MMLOS standards by the Transportation Research Board and other jurisdictions. When a valid methodology for Chico is identified, develop and adopt Transportation Impact Analysis Guidelines that include MMLOS standards specific to Chico to supersede the LOS standards.”<sup>66</sup> As with Bend, Chico is seeing that moving away from LOS as the dominant transportation measure is an important policy tool for shifting mode share.

About mode share goals specifically, Vieg said, “I’ve not heard of any push to set a mode split, nor am I aware of any particular reason to do so. Mode split is not necessarily the language used in the discussion, but everyone knows that the goal is to get people out of their cars.”<sup>67</sup>

### **Some Mode Share Goals**

The following communities have only set select mode share goals. One of the reasons we chose to study these communities is to see why goals were set for only certain modes. For some city planners, setting goals for all modes of transportation was not as important as setting goals for non-motorized transportation. The theory is that setting goals for increasing non-motorized transportation use will in turn reduce single occupancy vehicle use.

*Note about the graphs in this section:* I reduced the SOV/MOV part of the graph in accordance with the bike and walk goal increases. (See Fig. 8 below) In other words, when all of the 6.7% total *increase* in bike and walk mode share was taken from SOV/MOV, the result was a 6.7% *decrease* in SOV/MOV usage, lowering SOV/MOV mode share to 57.1%. I did this for Ann Arbor, Austin, and Fort Collins. I assumed a 1 to 1 shift, meaning all additional increases in bike and walk percentage were taken from *only* the SOV/MOV percentage. However, it should be noted that this is not likely the reality, as increases in biking and walking rates *could* pull from other modes besides SOV/MOV, such as transit or other modes. For example, a new bicycle lane might prompt someone to ride a bike to work instead of taking transit as they usually do.

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<sup>64</sup> Brendan Vieg, Community Development Director. Email. (7/18/16). Chico, CA.

<sup>65</sup> Ibid.

<sup>66</sup> City of Chico, California (2011). *General Plan*. “Chapter 4” Pg 22.

<sup>67</sup> Brendan Vieg, Community Development Director. Email. (7/18/16). Chico, CA.

One of the reasons I did this is because the following cities do not have SOV/MOV reduction goals. They only have goals for increasing walking, cycling, or both. Missoula city planners wanted to see what the impacts on SOV reduction would be if the mode share goals were met. We felt that for the purposes of this study, it would be interesting to see what the impact would be if we took the total mode share goal percentage increases and subtracted it from SOV/MOV mode share percentage. It is not intended to be more than an observation and should not be considered an accurate model of mode shift.

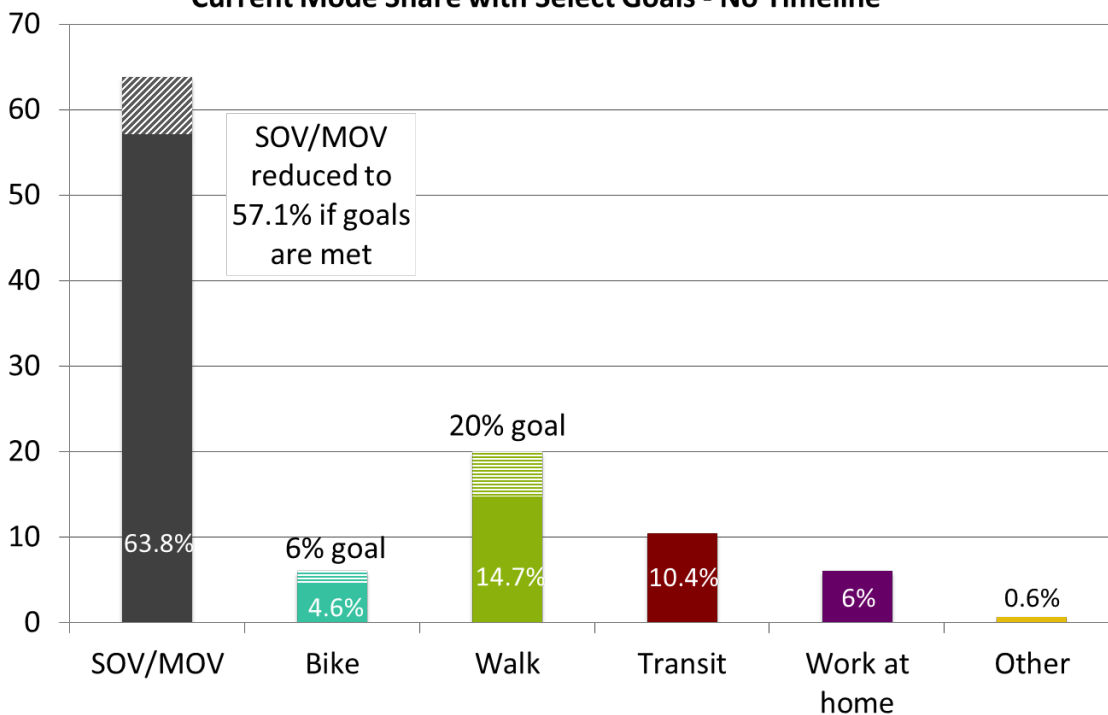
### Ann Arbor, Michigan

Total population (2013): 117,025

Estimated population of workers 16 years and over: 57,113

Document: 2013 Non-Motorized Transportation Plan

**Figure 5: City of Ann Arbor, Michigan Current Mode Share (2010-2014 Average) and Goals**  
**Current Mode Share with Select Goals - No Timeline**



Ann Arbor has relatively high walk rates compared to the other case study communities. This is partly due to the University of Michigan. In my email conversation with Eli Cooper, Ann Arbor's Transportation Program Manager, he said that the University of Michigan's "primary campus is adjacent to and integrated into our downtown."<sup>68</sup> With the University located so close to downtown, large numbers of students walk to access amenities.

He continued to explain other factors that contribute to Ann Arbor's high walk rates by saying that "the fact we have a compact, walkable downtown is another feature that facilitates high

<sup>68</sup> Eli Cooper, Transportation Manager. Email. (11/4/2016). Ann Arbor, MI.

levels of pedestrian activity here. We also have higher-density, viable, vibrant neighborhoods immediately adjacent to the downtown core and UM campus area. So the physical layout of our city clearly fosters increased pedestrian activity. Would also want to be on record of providing input that our city infrastructure, streets, sidewalks, crosswalks, pedestrian signal timing and the like, have for decades realized and accommodated pedestrian activity.”<sup>69</sup>

Ann Arbor’s mode share goals were initially set in the 2007 Non-Motorized Transportation Plan (NTP), which was last updated in 2013.<sup>70</sup> There is no set timeline for achieving these goals, which was unique among case studies. All other communities (except for San Luis Obispo who requires a biannual review<sup>71</sup>) have some kind of timeline. In an email response to my question about *how* Ann Arbor set their non-motorized mode share goals, Cooper said the goals were set based on “a combination of professional judgment, analysis of existing facilities, and data from other similar cities reasonable targets.”<sup>72</sup>

An important policy that Ann Arbor is considering that relates to bicycle mode share is urban design standards. The 2013 update of the 2007 NTP includes a policy that seeks to assess the feasibility of implementing an Urban Bikeway Design Guide in Ann Arbor.<sup>73</sup> This design guide comes from the National Association of Transportation Officials (NACTO), a non-profit organization that sets best practices and design guides for city planners.<sup>74</sup> The Ann Arbor policy states that, “During and following the review process, NACTO guidelines will be scrutinized to determine whether they comply with Michigan law and whether the proposed designs are feasible in Ann Arbor.”<sup>75</sup> Adopting an Urban Bikeway Design Guide will help the city design bicycle facilities that are safer and more intuitive, which will encourage cycling.

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<sup>69</sup> Eli Cooper, Transportation Manager. Email. (11/4/2016). Ann Arbor, MI.

<sup>70</sup> City of Ann Arbor Planning and Development Services and the Alternative Transportation Program. (2013). *City of Ann Arbor Non-Motorized Transportation Plan Update 2013*. Ann Arbor, MI.

<sup>71</sup> City of San Luis Obispo, California. (2014). *2035 General Plan*. “Chapter 2: Circulation Element.” San Luis Obispo, CA.

<sup>72</sup> Eli Cooper, Transportation Manager. Email. (7/6/2016). Ann Arbor, MI.

<sup>73</sup> City of Ann Arbor Planning and Development Services and the Alternative Transportation Program. (2013).

<sup>74</sup> National Association of City Transportation Officials. (2014). *Urban Bikeway Design Guide*, 2<sup>nd</sup> Edition. Island Press: Washington, D.C.

<sup>75</sup> City of Ann Arbor Planning and Development Services and the Alternative Transportation Program. (2013). Pg 16.

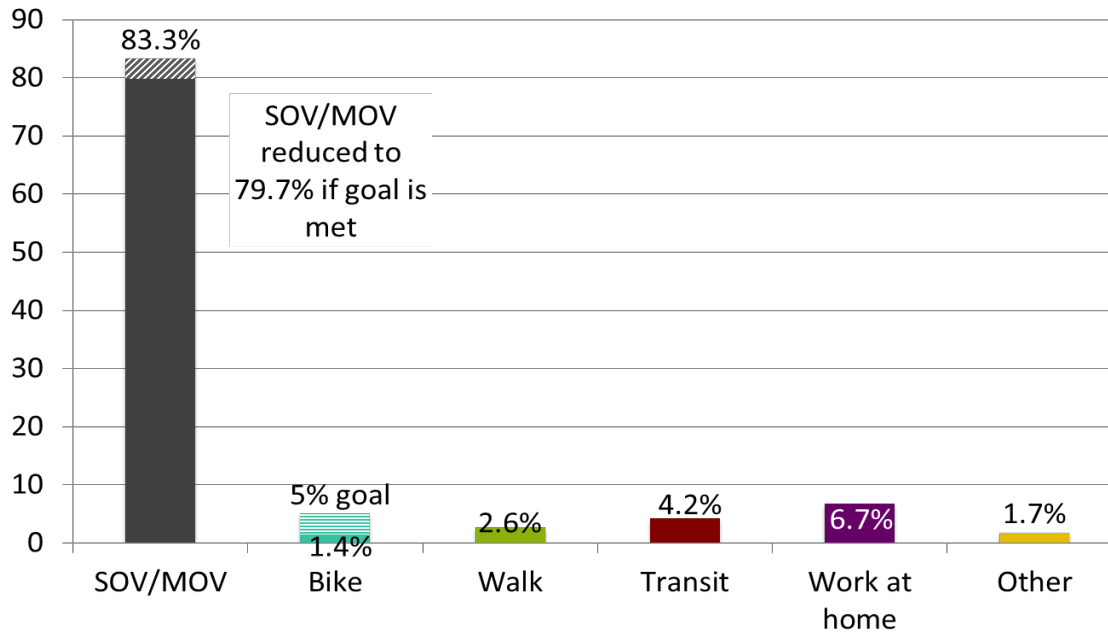
### Austin, Texas

Total Population (2013): 885,400

Estimated population of workers 16 years and over: 464,085

Document: 2014 Bicycle Master Plan

**Figure 6: City of Austin, Texas Current Mode Share (2010-2014 Average) and Goal**  
**Current Mode Share with Select Goals - 2020**



A 5% bicycle mode share goal for a city the size of Austin is quite ambitious. In fact, of all case study communities it had the highest percentage increase from current levels, at 257%! The bike mode share goal comes from the 2014 Bicycle Master Plan, in which 61 objectives and benchmarks are set,<sup>76</sup> which include:

- Increase citywide workforce commuter bicycle mode to 3% by 2015 and 5% by 2020
- Increase central city workforce commuter bicycle mode to 10% by 2015 and 15% by 2020
- Achieve League of American Bicyclists gold status by 2015 and platinum by 2021
- Reduce bicycle fatalities by 50% from 2009 levels by 2015 and eliminate completely by 2020
- Expand the city's BikeShare system from 40 to 100 stations by 2016 and 300 stations by 2017
- Distribute 5,000 bicycle maps each year
- Increase number of bike to work day participants by 10% each year
- Increase bicycle mode share of children commuting to school to 25% by 2020
- Train 100% of Austin Police Department officers in bicyclist and motorist issues.<sup>77</sup>

<sup>76</sup> City of Austin Transportation Department and the Active Transportation Program. (2014). *2014 Bicycle Master Plan*. Austin, TX.

<sup>77</sup> Ibid.

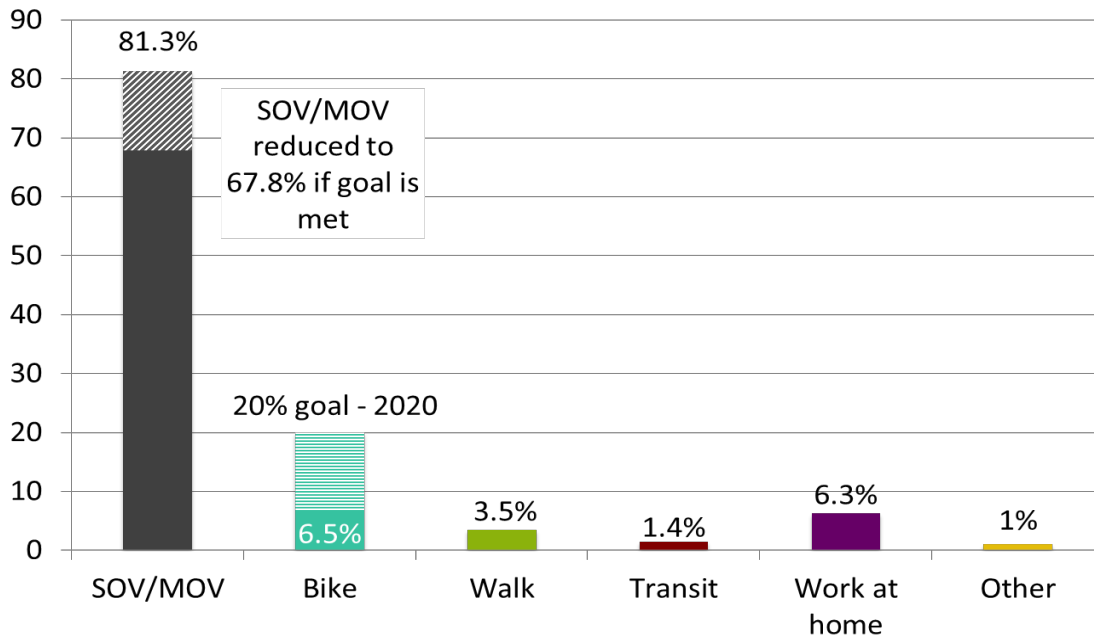
### Fort Collins, Colorado

Total Population (2013): 152,061

Estimated population of workers 16 years and over: 77,462

Document: 2014 Bicycle Master Plan

**Figure 7: City of Fort Collins, Colorado Current Mode Share (2010-2014 Average) and Goal**  
**Current Mode Share with Select Goals – 2020**



In the 2014 Bicycle Master Plan, Fort Collins set their goal of 20% bicycle mode share by 2020, and, like Ann Arbor, is considering a policy endorsing NACTO Urban Bikeway Design Guide standards.<sup>78</sup> When asked how the goal was decided, Senior Transportation Planner Aaron Iverson told me that, “The bicycle modal percentage was chosen as a representative goal based on similar communities and community input.”<sup>79</sup>

In 2015, Fort Collins adopted a Climate Action Plan. A number of ambitious GHG reduction goals are set in this plan, including:

- 20% below 2005 by 2020
- 80% below 2005 by 2030
- Carbon neutrality by 2050
- VMT 29% below 2015 by 2030<sup>80</sup>

<sup>78</sup> City of Fort Collins, Colorado. (2014). *2014 Bicycle Master Plan*. Fort Collins, CO.

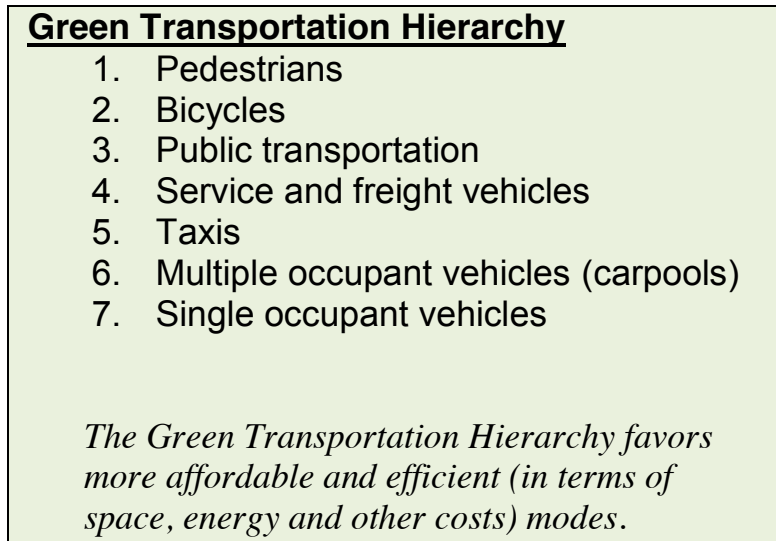
<sup>79</sup> Aaron Iverson, Senior Transportation Planner. Email. (7/8/16) Fort Collins, CO.

<sup>80</sup> City of Fort Collins, Colorado. (March, 2015). *A Climate Action Plan Framework*. Pg 2. Fort Collins, CO.

One policy being considered by Fort Collins, as well a number of other communities is to “evaluate codifying modal hierarchy with a Complete Streets policy.”<sup>81</sup> In a multi-modal hierarchy, sometimes called a green transportation hierarchy, single-occupancy vehicle needs would not always come first. In fact, most modal hierarchy models place the needs of single occupancy vehicles last in the hierarchy of consideration and favors more affordable and efficient modes of transportation, such as walking and cycling.<sup>82</sup> (See Figure 11 below and Figure 14, example of modal hierarchy from 2016 Bellingham Draft Comprehensive Plan).

The Fort Collins Bicycle Transportation Plan justifies and explains this policy by saying “The adoption of a transportation mode hierarchy in Fort Collins could help streamline decision-making and clarify priorities for different areas of the City based on the surrounding land use and adopted transportation plans.”<sup>83</sup>

**Figure 8: Example of Green Transportation Hierarchy from “Introduction to Multi-Modal Planning: Policies and Practices.” Victoria Transport Policy Institute, 2014.**



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<sup>81</sup> City of Fort Collins, Colorado. (2014). *2014 Bicycle Master Plan*. Pg 32. Fort Collins, CO.

<sup>82</sup> Litman, Todd. (2014). *Introduction to Multi-Modal Transportation Planning: Principles and Practices*. Victoria Transport Policy Institute. Victoria, British Columbia, Canada.

<sup>83</sup> City of Fort Collins, Colorado. (2014). *2014 Bicycle Master Plan*. Pg 32. Fort Collins, CO.

## All Mode Share Goals

The following communities have set mode share goals for all modes of transportation, and in the case of Bellingham, for “work from home” as well. These were the most intensively studied communities and provided the most information about mode share goal setting and policies.

### Bellingham, Washington

Total Population (2013): 82,631

Estimated population of workers 16 years and over: 40,660

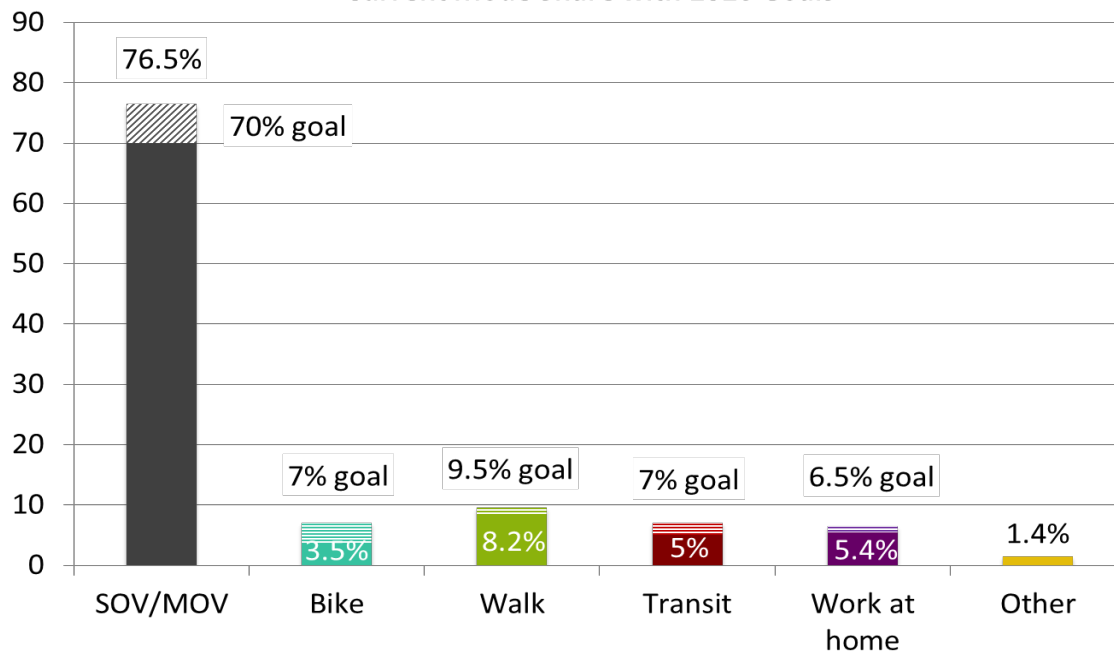
Document: 2016 (Draft) Comprehensive Plan

A number of goals and strategies were set in Bellingham’s 2014 Bicycle Master Plan, including:

- 100% of bicycle network completed by 2035.
- 100% of households in Bellingham within 1/4 mile of a bicycle facility by 2035.
- League of American Bicyclists Gold rating by 2020, Platinum rating by 2035.
- Increase bicycle mode share.<sup>84</sup>

Goals for all modes were then set in the Multimodal Transportation Chapter of the 2016 draft Comprehensive Plan.<sup>85</sup> Bellingham is unique in that they set two goal timelines; 2026 and 2036.

**Figure 9: City of Bellingham, WA - Current Mode Share (2010-2014 Average) and 2026 Goals**  
**Current Mode Share with 2026 Goals**



<sup>84</sup> City of Bellingham, Washington. (2014). *Bicycle Master Plan*. Bellingham, WA.

<sup>85</sup> City of Bellingham, Washington. (2016). *Bellingham Draft Comprehensive Plan*. “Multimodal Transportation Chapter.” Bellingham, WA.



Figure 10: City Of Bellingham, WA - current mode share (2010-2014 Average) and 2036 goals

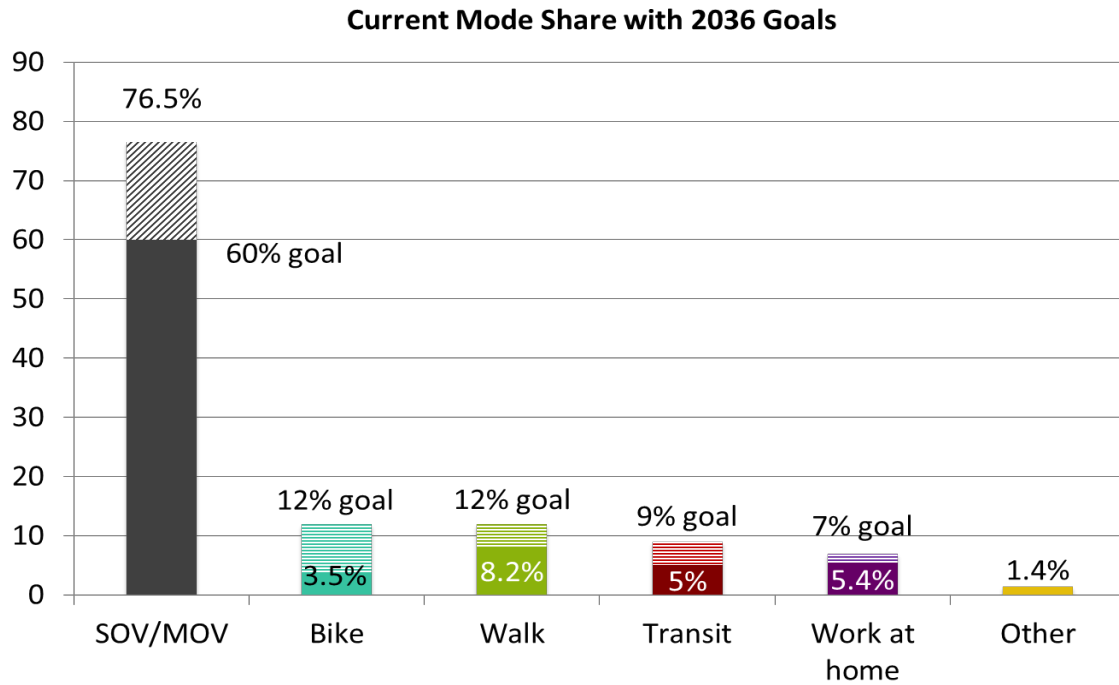
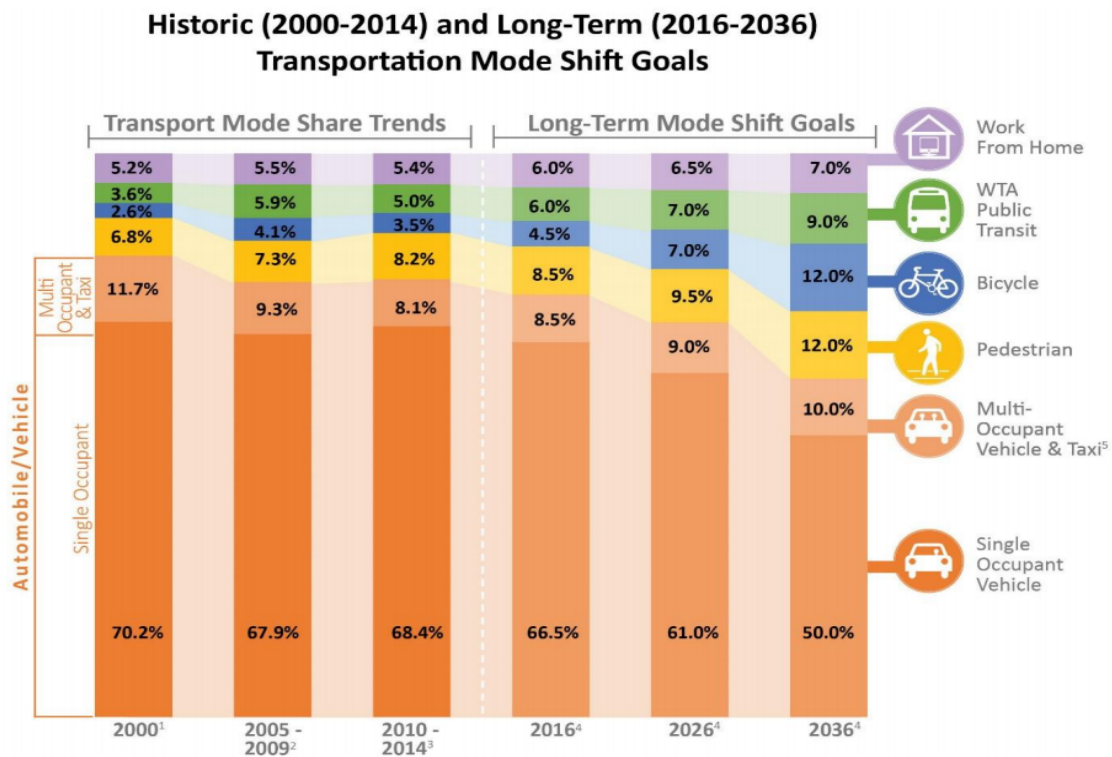


Figure 11: Bellingham, WA Historic Trends and Long-Term Goals, from 2016 Draft Comprehensive Plan

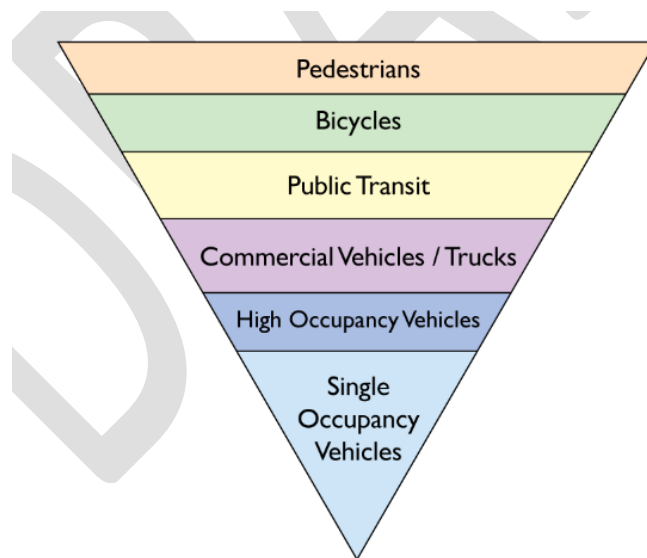


Bellingham has been conducting travel surveys over the past several years. A 2012 document by Socialdata, a transportation-consulting firm based in Munich, Germany, provides highly detailed information about the travel behaviors of Bellingham residents.<sup>86</sup> Socialdata collected information via two Individualized Marketing (Indi-Mark) projects in Bellingham; a 2004 pilot project, a 2008 large-scale project, and an in-depth mobility survey in 2007.<sup>87</sup>

As a result of this extensive data collection, planners have pinpointed the types of trips people make, the distances travelers are willing to go, the purpose of trips and a lot of other highly-valuable travel data. Again, collecting data is crucial for understanding travel behaviors, setting informed mode share goals and implementing relevant policy.

One major policy that Bellingham has adopted is to implement a priority hierarchy on all roadway projects, from existing street improvements to new road builds. This policy comes from the goal of providing “safe, well-connected and sustainable mobility options for all.”<sup>88</sup> Implementing a priority hierarchy considers the needs of all user groups, with “priority emphasis placed on the most vulnerable user groups.”<sup>89</sup>

**Figure 12: Example of Modal Hierarchy, from 2016 Bellingham Draft Comprehensive Plan**



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<sup>86</sup> Socialdata Consulting Firm. Prepared for the City of Bellingham, Washington. (2012). *The Surprising Story of Travel Behavior in Bellingham, Washington*. Bellingham, WA.

<sup>87</sup> Ibid.

<sup>88</sup> City of Bellingham, Washington. (2016). *Bellingham Draft Comprehensive Plan*. “Multimodal Transportation Chapter.” Pg 1. Bellingham, WA.

<sup>89</sup> Ibid. Pg 7.

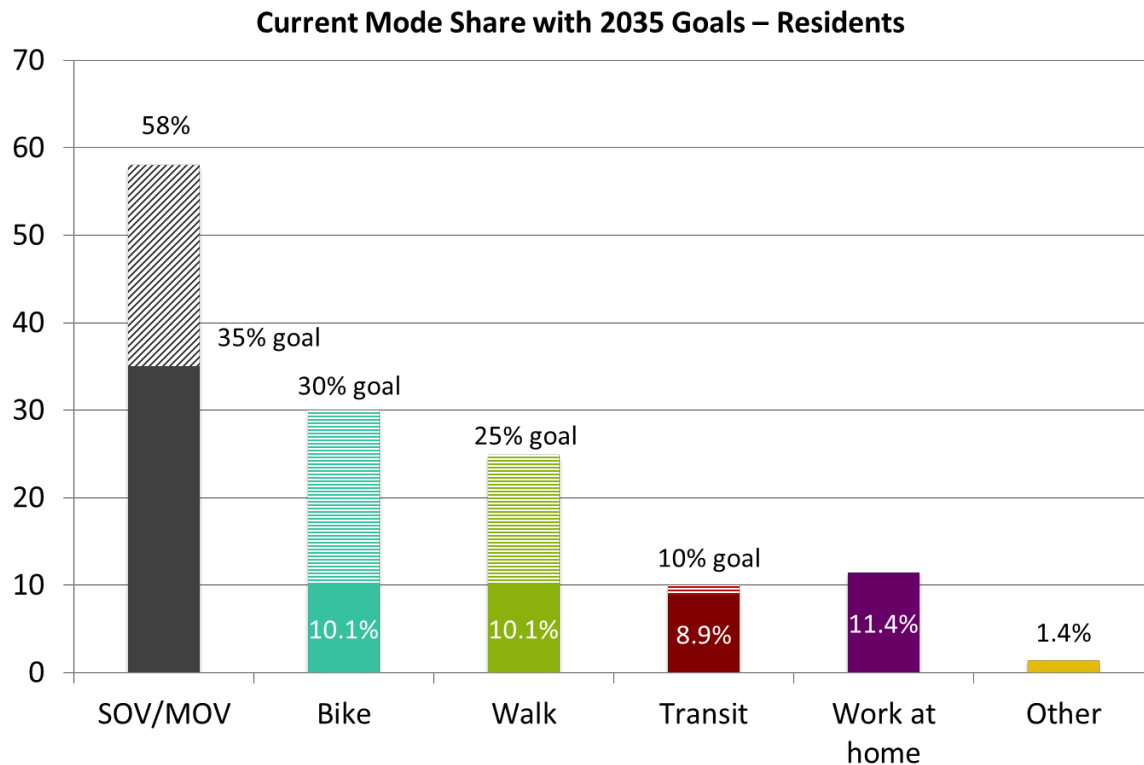
## Boulder, Colorado

Total Population (2013): 103,166

Estimated population of workers 16 years and over: 54,516

Document: 2014 Transportation Master Plan

**Figure 13: City of Boulder, CO - current mode share (2010-2014 avg) and 2035 goals – Residents Only**



Not surprisingly, Boulder’s mode share goals for residents are very ambitious. SOV use in Boulder is already low, and reducing that even further down to 35% would have incredible impacts on transportation patterns in the community. Additionally, the cycling and walking rates are already quite high compared to the national average, so increasing these would set Boulder apart from the rest of the country.

Interestingly, Boulder also has a mode share goal for non-residents, which is unique among our case studies. (See Figure 14 below) Part of this is due to its proximity to Denver and the number of commuters who live in Denver and work in Boulder.

Figure 14: City of Boulder, CO - Current mode share (2010-2014 avg) and 2035 goals – *Non-Residents*

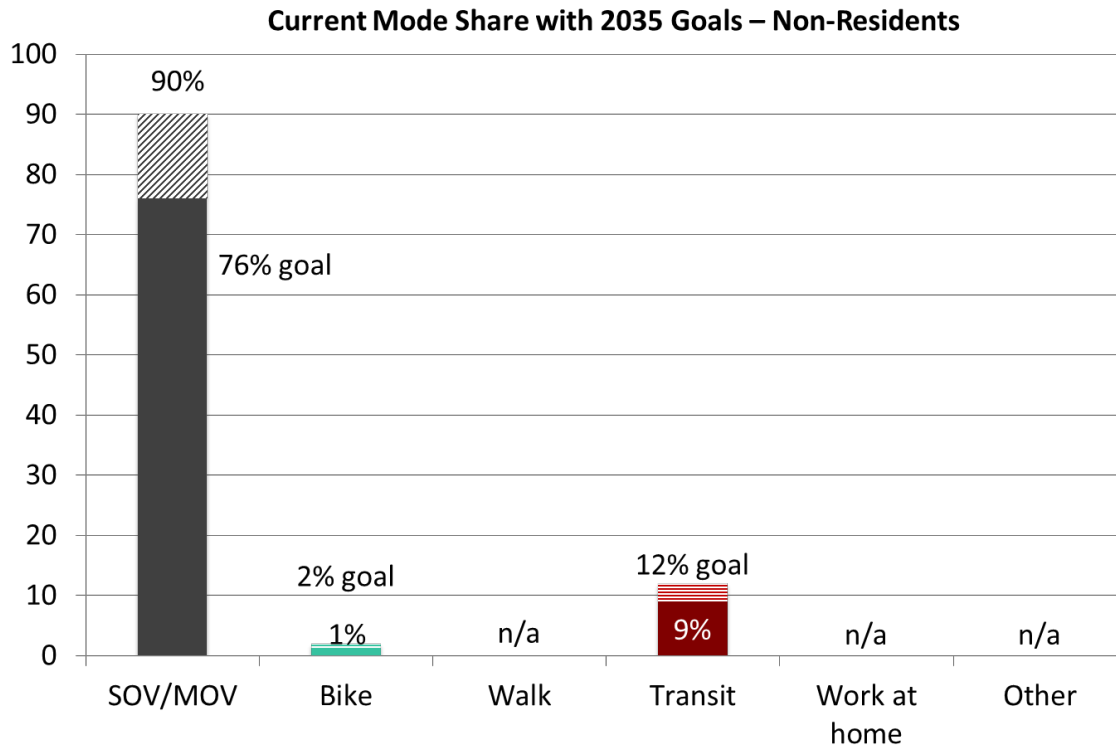
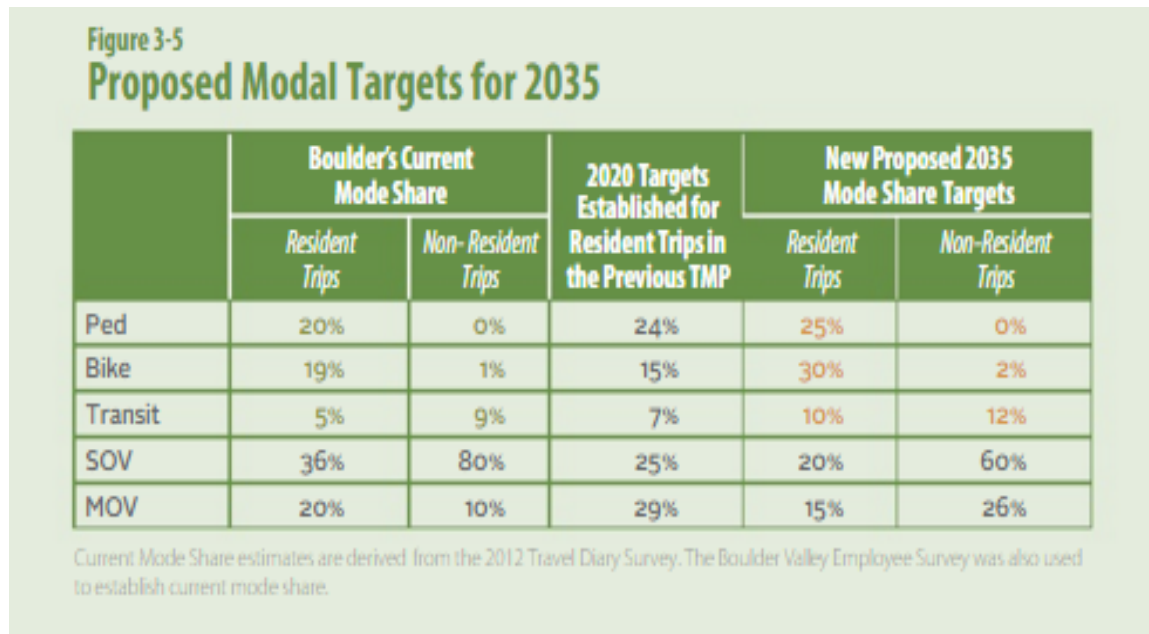


Table 1: Boulder, CO “Proposed Modal Targets for 2035”, from 2014 Master Transportation Plan



Beyond mode share goals, Boulder’s 2014 Transportation Master Plan has a number of additional goals, including:

- 16% GHG reduction by 2035
- 20% VMT reduction by 2035
- 80% of residents in complete street neighborhoods
- Reduce daily VMT to 7.3 miles per capita<sup>90</sup>

Boulder has done extensive trip diary studies to survey in detail the transportation habits of its residents. 2012 marked the 9<sup>th</sup> and latest replication of the original survey, conducted by the National Research Center (NRC) located in Boulder.<sup>91</sup> In my interview with Randall Rutsch, Boulder’s Senior Transportation Planner, he explained the history of the NRC: “An audits and evaluation division was established in 1990s. There were 5 or 6 people in that office that did various surveys for the city. Eventually, they moved on and formed a private business called the National Research Center. These same people have been doing surveys in Boulder since 1991.”<sup>92</sup>

Because of this partnership with the NRC, Boulder has an incredible database of information about the travel patterns of its residents. As a result, they have the ability to track data very closely, which helps in assessing the impact of a given policy.

One regulatory policy that has shown significant results in facilitating mode shift is the implementation of parking districts. Boulder’s Transportation Master Plan justifies parking districts in this way: “Studies have calculated that the auto driver only pays for 10 to 60% of the true cost of an auto trip. One of the largest hidden costs is ‘free parking’ and paying for parking is one of the biggest factors in mode choice. The city has developed principles to minimize the amount of required parking, increase parking efficiency, and support mode shift. Minimizing required parking promotes high quality urban design, place-making and the pedestrian oriented place that support community.”<sup>93</sup>

Rutsch explained some of the implications with parking districts, saying that “The University District is all paid parking and there are three other paid parking districts in the city. The downtown parking district is the big one. When we compare the effects of paid parking versus other parts of town, it doubles and triples non-SOV mode share. For Boulder, paid parking generates a lot of revenue and is a foundation for disincentives.”<sup>94</sup>

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<sup>90</sup> City of Boulder, Colorado. (2014). *2014 Transportation Master Plan*. Boulder, CO.

<sup>91</sup> National Research Center. Prepared for the City of Boulder, Colorado. (2013). *Modal Shift in the Boulder Valley, 1990-2012*. Boulder, Colorado.

<sup>92</sup> Randall Rutsch, Senior Transportation Planner. Phone call. (7/7/2016). Boulder, CO.

<sup>93</sup> City of Boulder, Colorado. (2014). *2014 Transportation Master Plan*. Pg 44. Boulder, CO.

<sup>94</sup> Randall Rutsch, Senior Transportation Planner. Phone call. (7/7/2016). Boulder, CO.

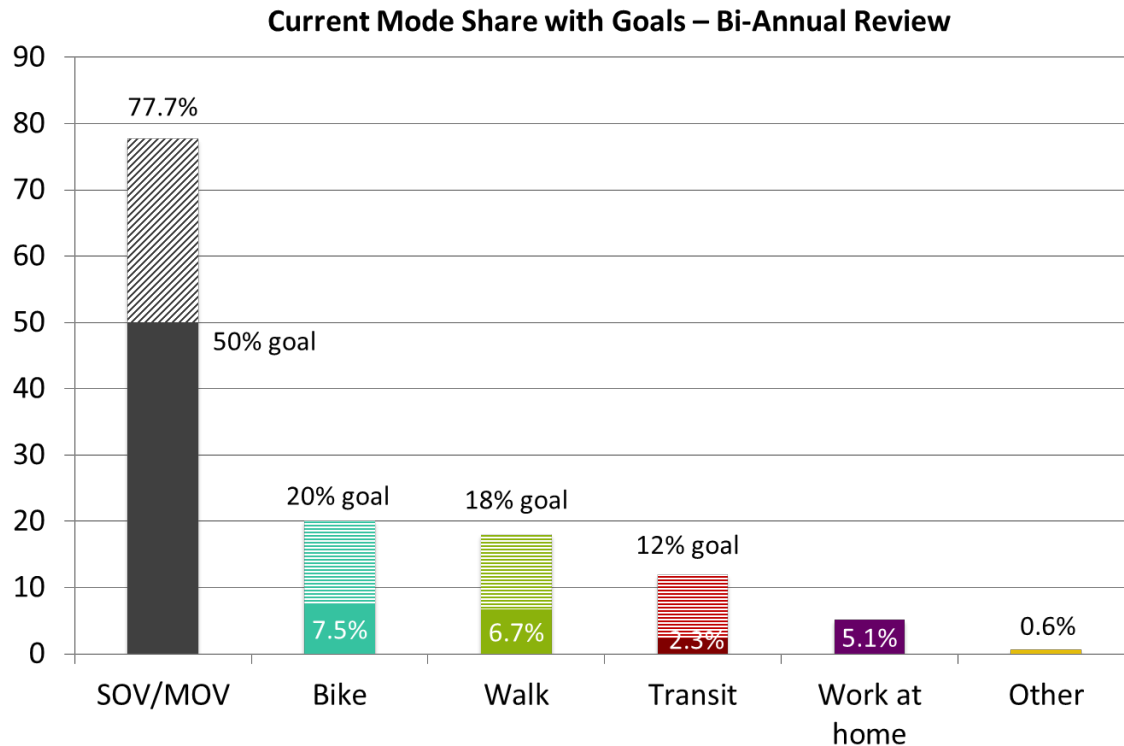
### San Luis Obispo, California

Total Population (2013): 46,377

Estimated population of workers 16 years and over: 22,376

Document: 2014 General Plan

**Figure 15: City of San Luis Obispo, CA - Current mode share (2010-2014 avg) and goals**



Mode share goal setting in San Luis Obispo has followed an incremental approach. The goals were originally set in the Circulation Element of the General Plan.<sup>95</sup> The 2012 Climate Action Plan (CAP) moderately increased the mode share goals with the aim of improving air quality.<sup>96</sup> Adam Fukushima, Active Transportation Manager, explained the process by saying, “it was an exercise in building upon prior precedent. The former Circulation Element set a goal of 16% bikes by 2020. The Climate Action Plan sought to increase that to 20%.”<sup>97</sup>

The 2013 Master Bike Plan (MBP) then adopted those goals to be consistent with the CAP.<sup>98</sup> Finally, in 2014, a major update to the Circulation and Land Use Element of the General Plan

<sup>95</sup> City of San Luis Obispo, California. (2014). *2035 General Plan*. “Ch. 2: Circulation Element.” San Luis Obispo, CA.

<sup>96</sup> City of San Luis Obispo, California. Community Development Department. (2012). *Climate Action Plan*. San Luis Obispo, CA.

<sup>97</sup> Adam Fukushima, Active Transportation Manager. Email. (7/18/16). San Luis Obispo, CA.

<sup>98</sup> City of San Luis Obispo, California. Public Works Department. (2013). *Bicycle Transportation Plan*. San Luis Obispo, CA.

adopted the goals set in the previous two documents.<sup>99</sup> San Luis Obispo shows a high level of consistency between planning documents.

The 2014 General Plan changed roadway analysis to MMLOS: “The City shall strive to achieve level of service objectives and shall maintain level of service minimums for all four modes of travel: Pedestrians, Bicyclists, Transit, & Vehicles.”<sup>100</sup> However, the city did not stop with just MMLOS policy.

It also established modal priorities in accordance with MMLOS standards. In an article for the Alliance for Biking and Walking, authors Eric Meyer and Dan Rivoire explain: “With this MMLOS objective in mind, the city re-prioritized the modal hierarchy of all of its streets. Some high-traffic arterials are automobile-focused, then transit, then bikes, then pedestrians. Other streets have different hierarchies. Residential neighborhood streets are prioritized for pedestrians first. Major arterials are prioritized for transit first. It is a complex ‘complete streets’ effort that will balance the needs of all modes in the city over time as streets are rebuilt or modified.”<sup>101</sup>

A key point of these priority rankings is that “construction, expansion, or alteration for one mode should not degrade the service level of a higher priority mode.”<sup>102</sup> Table 2 below provides a general outline of areas in San Luis Obispo and the corresponding priority mode ranking.

**Table 2: San Luis Obispo, CA - Modal Priorities for Level of Service, from 2014 General Plan**

Complete Streets Areas	Priority Mode Ranking
Downtown & Upper Monterey Street	1. Pedestrians 2. Bicycles 3. Transit 4. Vehicle
Residential Corridors & Neighborhoods	1. Pedestrians 2. Bicycles 3. Vehicle 4. Transit
Commercial Corridors & Areas	1. Vehicles 2. Bicycles 3. Transit 4. Pedestrians
Regional Arterial and Highway Corridors	1. Vehicles 2. Transit 3. Bicycles 4. Pedestrians

*Notes: Exceptions to multimodal priorities may apply when in conflict with safety or regulatory requirements or conflicts with area character, topography, street design, and existing density.*

Perhaps most importantly, the 2014 General Plan update created a policy that allocates general fund transportation spending by mode to match the mode share percentage goals desired.<sup>103</sup>

<sup>99</sup> City of San Luis Obispo, California. (2014). *2035 General Plan*. “Chapter 2”.

<sup>100</sup> City of San Luis Obispo, California. (2014). *2035 General Plan*. “Chapter 2” Pg 20.

<sup>101</sup> Meyer, E. & Revorie, D. (2015). “How San Luis Obispo Established the Most Powerful Bike Funding Policy in the Nation.” *Alliance for Biking And Walking*. Retrieved from: <http://www.bikewalkalliance.org/blog/535-how-san-luis-obispo-just-established-the-most-powerful-bike-funding-policy-in-the-nation>

<sup>102</sup> City of San Luis Obispo, California. (2014). *2035 General Plan*. “Chapter 2” Pg 20.

Meyer and Revorie explain that this policy “mandates that our city must allocate general fund transportation spending at the same ratio as the mode share goal desired. Meaning 20 percent of funding needs to go to bicycling.”<sup>104</sup>

San Luis Obispo is perhaps the best example of a community that is very intentional about attaching policy measures and appropriate funding to mode share goals. Without policy and funding, there is less accountability and little to support the goals. Both are important components and outcomes of mode share goal setting.

## **DISCUSSION**

Despite a number of case studies having no or only select mode share goals, the overall goal was the same: Reduce the use of single-occupancy vehicles. Some cities, such as Bend, went about it by seeking VMT reductions or GHG reductions. Others just had select mode share goals, hoping that increasing cycling and walking will in turn reduce SOV use. A couple of planners I spoke with told me that to a certain degree, it does not matter what the actual mode share breakdown is, as long as people are driving less.

As for the actual goals themselves, cycling was the most common mode share goal and it tended to be the most ambitious of all modes. Figure 20 (below) shows the average percentage increase for each mode. At 175%, biking is easily the highest increase of all mode shares.

One of the most important findings of our research was discovering that there is essentially no analytical process for setting mode share goals. It was very difficult to figure out *how* these case study communities set mode share goals. Most city planners I spoke with could not directly answer that question. There was very little, if any, comprehensive research done to see what other communities are doing and to see what kind of mode share goals were reasonable and attainable. And perhaps most importantly, there is virtually no implementation research that identifies what policies are most effective for reaching those goals.

Additionally, there is little federal support for mode share goal setting. There is no federal guidance or best practices. There is one document from 2010, and in it there are recommendations for “Setting mode share targets for walking and bicycling and tracking them over time: A byproduct of improved data collection is that communities can establish targets for increasing the percentage of trips made by walking and bicycling.”<sup>105</sup> However, in the 2015

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<sup>103</sup> City of San Luis Obispo, California. (2014). *2035 General Plan*. “Chapter 2”.

<sup>104</sup> Meyer, E. & Revorie, D. (2015). “How San Luis Obispo Established the Most Powerful Bike Funding Policy in the Nation.” *Alliance for Biking And Walking*. Retrieved from: <http://www.bikewalkalliance.org/blog/535-how-san-luis-obispo-just-established-the-most-powerful-bike-funding-policy-in-the-nation>

<sup>105</sup> United States Department of Transportation, Federal Highway Administration. (2010) United States Department of Transportation Policy Statement on Bicycle and Pedestrian Accommodation Regulations and Recommendations. Retrieved from: [http://www.fhwa.dot.gov/environment/bicycle\\_pedestrian/guidance/policy\\_accom.cfm](http://www.fhwa.dot.gov/environment/bicycle_pedestrian/guidance/policy_accom.cfm)



update, FHWA Guidance: Bicycle and Pedestrian Provisions of Federal Transportation Legislation, mode share goals were removed as a recommendation.<sup>106</sup>

Perhaps this speaks to the fact that setting a mode share goals is something that is still relatively new. Besides Boulder, who set mode share goals in the 1990's, all other communities set their goals in the last 10 years. As discussed earlier, setting mode share goals is an important new tactic for facilitating a shift away from single occupancy vehicles and toward more sustainable forms of transportation. Still, *how* mode share goals are set is entirely up to city planners. Since there is no standardization for the process of mode share goal setting, city planners must use the best data possible and their own professional judgment to decide what goals are appropriate and achievable. Regardless of how it is done, mode share goal setting is a way to start the conversation and encourage policies and programs that support multi-modal transportation choices and reduce single-occupancy vehicle use.

### **MODE SHARE GOAL OPTIONS FOR MISSOULA**

Using the mode share goals from the case studies, I formulated three different mode share goal options for the Missoula MPO: None, which we name “business as usual”, moderate, and ambitious.

One part of my methodology worth noting is that I did *not* factor timeline into my calculations or considerations. Each community has different timelines for achieving their mode share goals, which makes the yearly percent increase variable between communities. Timeline impacts the goal. For example, Austin’s 2013 goal of 5% bicycle mode share by 2020 is a 257% increase in 7 years. That is a roughly 37% yearly increase in bicycle commute rates, which is quite a significant yearly increase for their population. Thus, timeline impacts policy considerations and feasibility in reaching the goals.

Missoula’s Long Range Transportation Plan projects out to 2045, which is later than most of the other case study communities. (The latest of the case studies is Bellingham’s second phase goal, which stretches out to 2036.) The “ambitious” goals are perhaps not as ambitious when considering Missoula’s 2045 timeline is quite longer than the other case study communities. For this reason, the Missoula MPO might consider adopting more ambitious mode share goals.

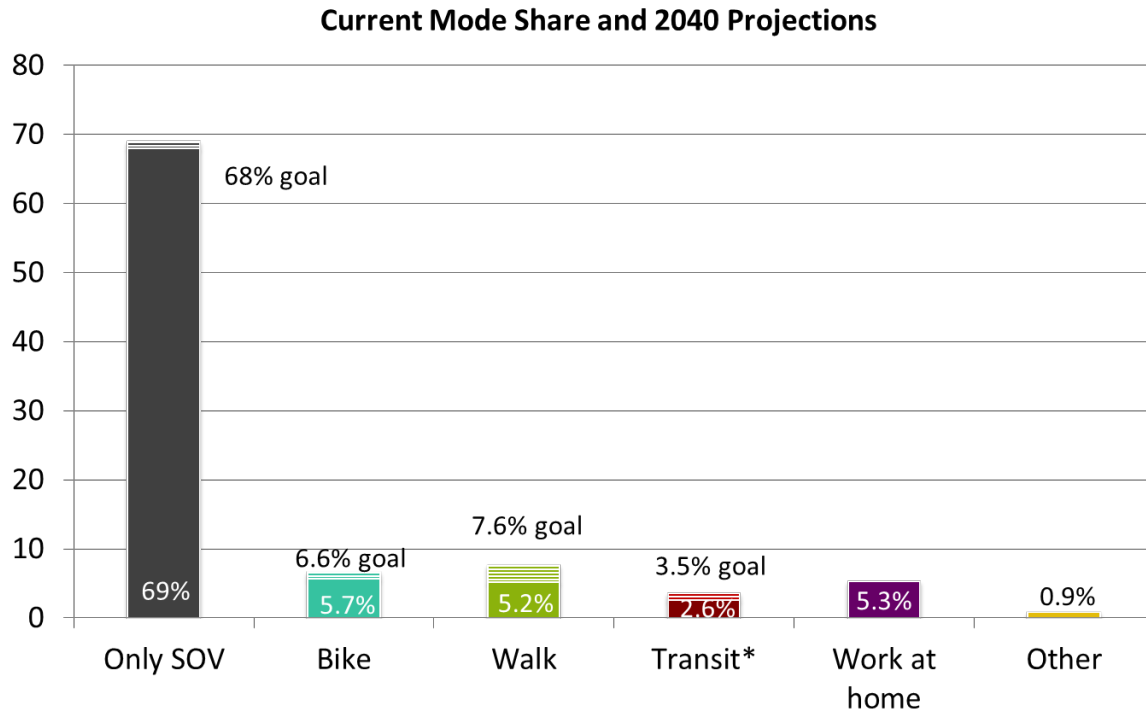
#### *Option 1: Business as Usual*

The first graph is “business as usual.” Extrapolating current trends out to 2045, with no goal setting, this is what we can reasonably expect the mode share to look like.

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<sup>106</sup> United States Department of Transportation, Federal Highway Administration. (2015). FHWA Guidance: Bicycle and Pedestrian Provisions of Federal Transportation Legislation. From: [http://www.fhwa.dot.gov/environment/bicycle\\_pedestrian/guidance/guidance\\_2015.cfm#bp7](http://www.fhwa.dot.gov/environment/bicycle_pedestrian/guidance/guidance_2015.cfm#bp7)

Figure 16: Missoula, MT - Current Mode Share and 2045 Projections - “Business As Usual”



As we can see, the trends will not change dramatically. All mode share percentages will remain relatively stagnant, with very modest increases over the next 30 years.<sup>107</sup> This of course does not take into account the emergence of autonomous vehicles, which is a technology that could rapidly change the transportation landscape in the United States, for better or worse. There is no way to know the impact that this technology will have on our transportation systems.

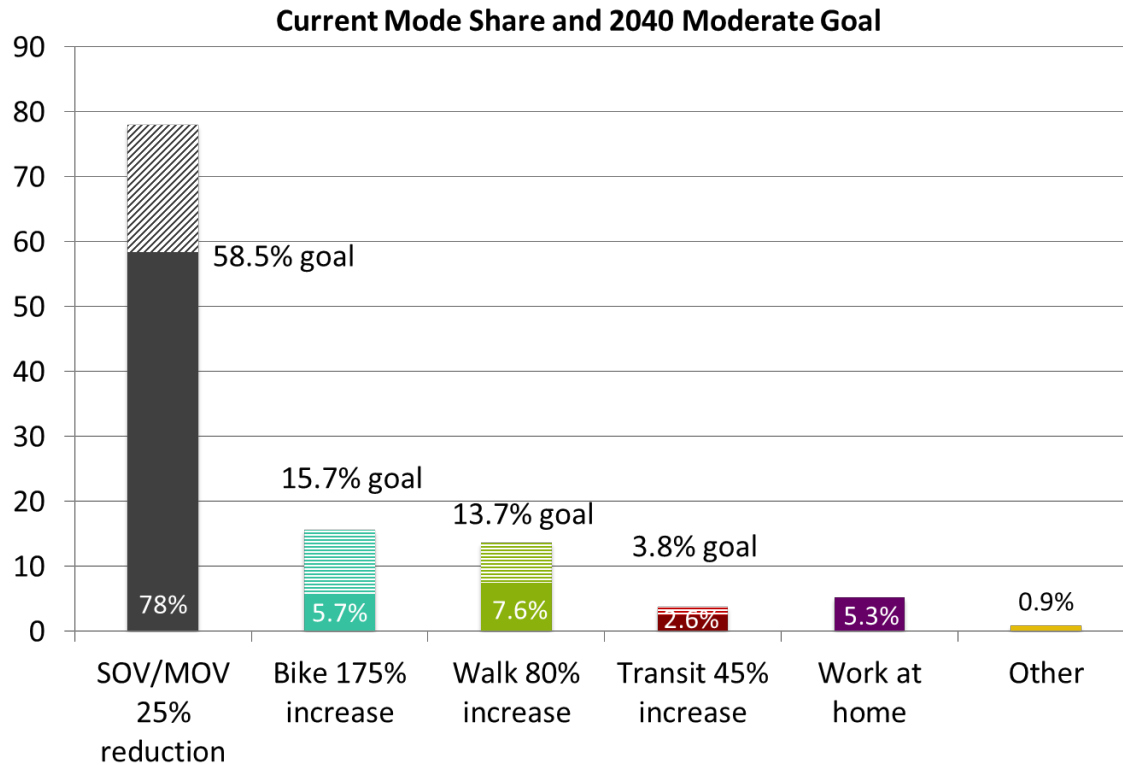
#### Option 2: Moderate Goals

This graph represents “moderate goals” based on the case studies. Moderate goals were developed by first calculating the percentage increase from current rate to the goal for each mode of transportation. For example, Fort Collins’ current bicycle mode share percentage is 6.5%. Their goal is 20%, which calculates to a 208% increase. I did this calculation for each community (as well as the 2026 and 2036 goals for Bellingham) and then totaled up the percentage increases. I then divided the overall percentage by the number of communities to find the average percentage increase for bicycle mode share. I used this same method for each different mode of transportation.<sup>108</sup>

<sup>107</sup> Note: The asterisk on “Transit” indicates that Missoula may already be surpassing 2040 transit mode share projections. Preliminary data suggests that since the inception of Zero Fare in January of 2015 and the increased service on high volume routes, transit ridership has increased significantly.

<sup>108</sup> Note: In my transit calculations, I did not use San Luis Obispo’s transit goal. At 422%, the percentage increase was such an outlier it would have significantly skewed the data toward a higher percentage. The transit goals set in other communities is 40%, 80%, and 12%, which are the figures I used to calculate the goal for Missoula.

Figure 17: Missoula, MT - Current Mode Share and 2045 Projections - Moderate

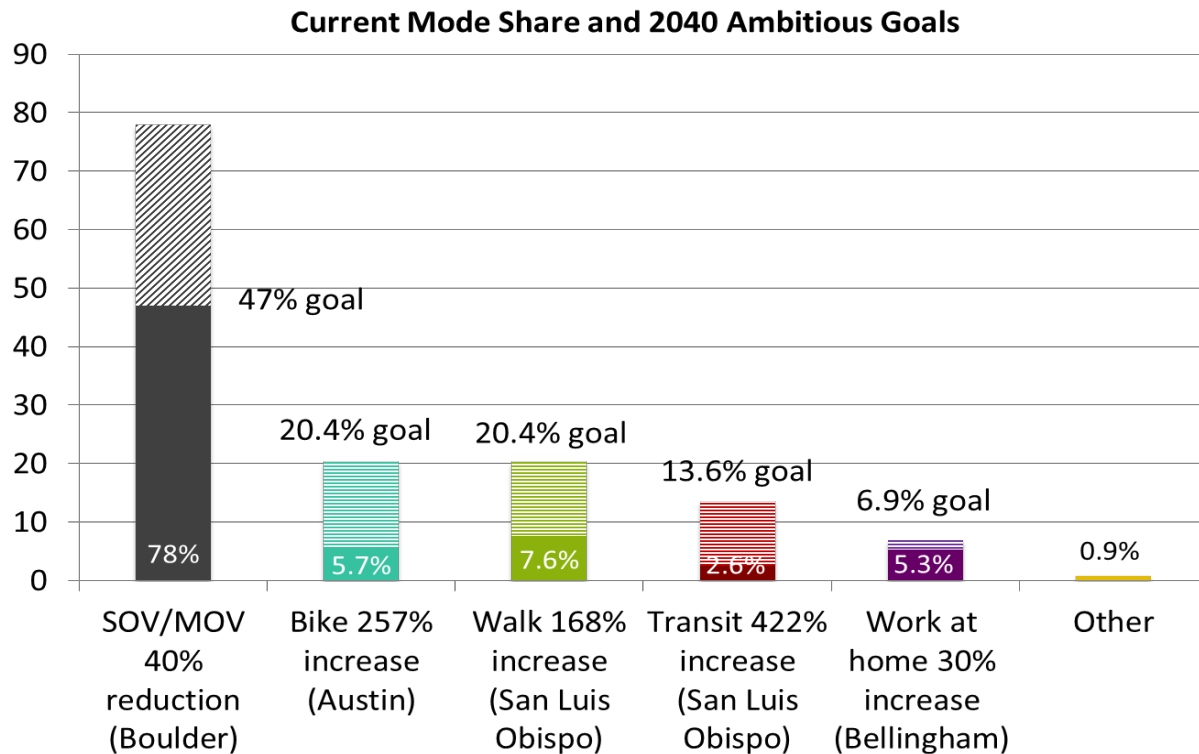


Increasing bicycle mode share tends to be what most cities target most aggressively. Even though 175% seems like a large increase, it was the average from all of our case studies. This would bring Missoula's bike mode goal to around 15%, which is similar to San Luis Obispo's goal and Bellingham's 2036 goal. Walking mode share goals tended to follow a similar pattern to bike, which were both relatively high increases compared to transit increases or SOV/MOV decreases.

### Options 3: Ambitious Goals

The third graph is ambitious mode share goals. For these goals, I did not use the highest percentage goal itself, but the greatest *percentage increase* from the current mode share to the proposed goal. For example, San Luis Obispo's current walk mode share is 6.7% and their goal is 18%. This is a 168% increase, which was the largest percent increase of all the case study communities. To apply this to Missoula, I calculated a 168% increase from Missoula's current walk rate, which came to 20.4%. In order to match the ambitiousness of San Luis Obispo, Missoula would need to set a walk share goal of roughly 20%.

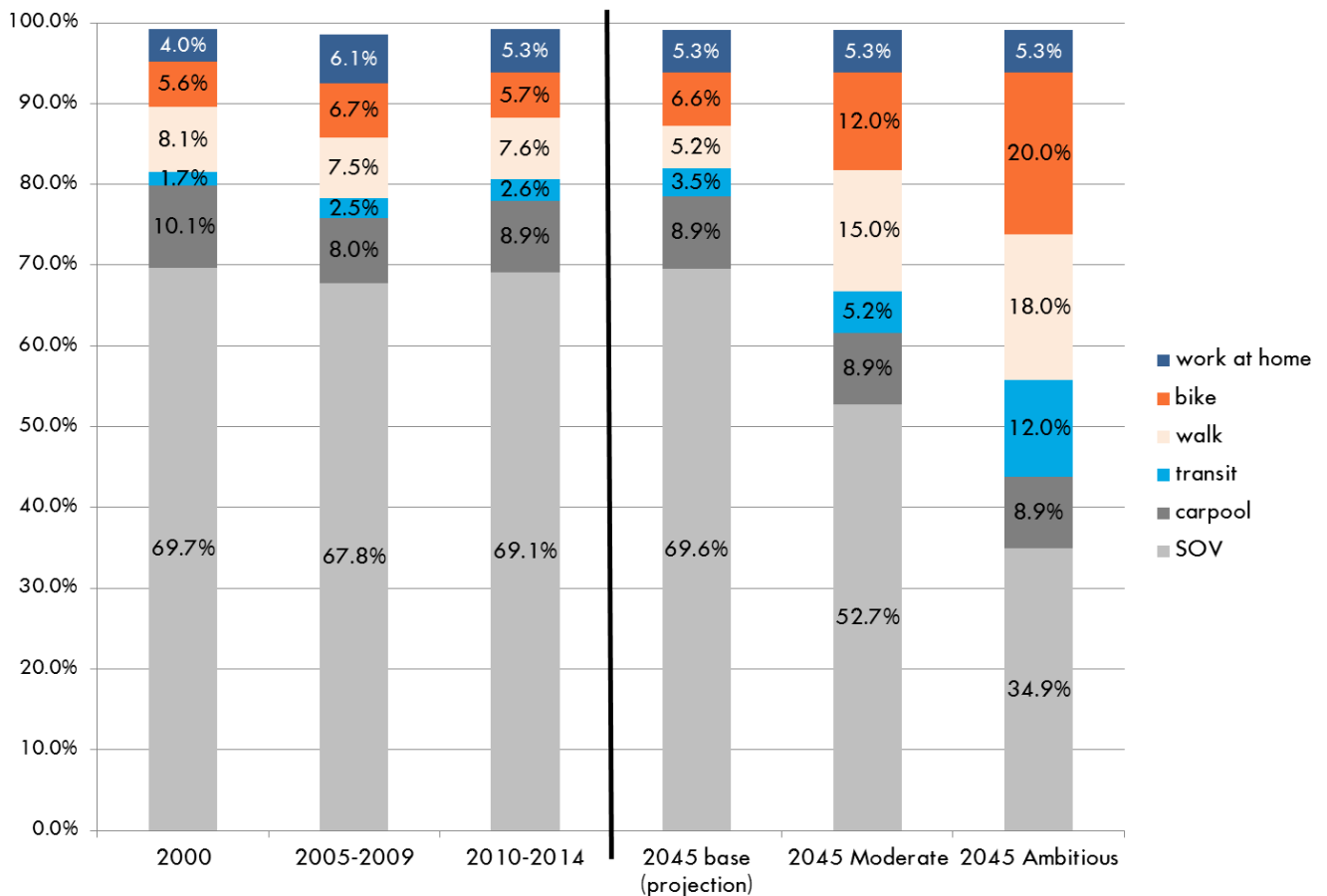
Figure 18: Missoula, MT - Current Mode Share and 2045 Projections - Ambitious



Some of these goals would put Missoula on par with the most progressive places in the country, including Boulder, Fort Collins, and San Luis Obispo. Achieving this percentage of mode share would have significant implications on traffic patterns in Missoula, which will be discussed in further detail below.

Missoula MPO planners Jessica Morriss and Aaron Wilson took these three mode share goal options and made minor adjustments based on their professional judgment. The result of the changes is the graph below, which is another way to view all three mode-share goal options, but put together against an historic timeline of mode share in Missoula. It was modeled after the Bellingham graph. (See Figure 13 above)

Figure 19: Missoula, MT - Historic Trends and Long-Term Goals



#### Mode Share Goals and Traffic Projections

The following table below (Table 3) shows future SOV traffic projections based on each of the three mode share goals. It is extremely important to understand and is worth taking a moment to explain in detail.

In the first row is the 2014 single-occupancy vehicle baseline data according to the ACS (does not include multi-occupancy vehicle mode share, i.e. carpooling) The data includes the estimated number of workers in Missoula (43,632) and the estimated percentage of workers using single-occupancy vehicles to get to work (71.9%). From this data, we can calculate the estimated number of commuters using single-occupancy vehicles for any given workday (33,528). The daily trips column is simply the number of estimated commuters multiplied by two, which accounts for travel to and from work (67,056). Under the “Workers” column, the next three cells represent the estimated number of workers in Missoula in 2045 (69,223), which was calculated based on Missoula’s yearly growth average of 1.5%.

**Table 3: Future traffic projections based on each Mode Share Goal option**

Year	Workers	SOV Mode %	SOV Commuters	Daily Trips
<b>2014 - Baseline</b>	43,632	71.9%	33,528	67,056
<b>2045 BAU</b>	69,223	70.5%	48,802	97,604
<b>2045 Moderate goals</b>	69,223	50.0%	34,611	69,223
<b>2045 Ambitious goals</b>	69,223	34.1%	23,605	47,210

*Note: SOV mode % does not include MOV (carpool).*

Notice the 2045 Moderate goals row. If we set “moderate” mode share goals and achieve the 50% single-occupancy vehicle use goal by 2045, we have roughly *the same number of single-occupancy vehicle commuters on the road as we have today*. In other words, assuming no expansion of our roadway system and a steady population increase, just *maintaining* the current congestion rates requires reducing single-occupancy vehicle use down to 50% over the next 30 years.

Given the population increase trends in Missoula, if we do not set mode share goals and reduce SOV usage but instead choose to continue with the “business as usual” approach, we will have roughly 15,000 more commuters on the road in 2045. This calculates to an additional 30,000+ trips per day! Imagine that scenario on an already stressed transportation system. If we want to manage traffic in this community without continually expanding roads, we must support and implement policies that encourage people to get out of their vehicles and use alternative forms of transportation.

## **POLICY OPTIONS**

After graphing mode share goals from each case study community and formulating three different options for the Missoula MPO, I read through each of the nine case study community’s respective transportation (and other) planning documents. I identified transportation policies that were either associated with mode share goals or aimed at SOV reduction. I also contacted city planners in these nine communities. I interviewed planners from Bend, OR and Boulder, CO and exchanged emails with several other planners to identify what policies are being implemented in their communities.

This research formed the basis for the development of the policy feasibility matrix. Each policy was reviewed and categorized into “Easy”, “Medium” and “Difficult”, based on professional recommendations from Jessica Morriss and Aaron Wilson, as well as from conversations with city planners from our case study communities. Jessica Morriss provided final adjustments and additions to the policy feasibility matrix. (See Table 4 below).

**Table 4: Policy Feasibility Matrix<sup>109</sup>**

<b>Easy</b>	<b>Medium</b>	<b>Difficult</b>
Adopt NACTO urban bikeway design guides (Fort Collins, Austin) and work with MDT to incorporate into projects	Adopt a Trip-Reduction Ordinance (Bend, Bellingham)	Increase or implement new taxes or fees: state gas tax, local option gas tax, development impact fees, local option sales tax, carbon tax, user fees, etc.
Create a dedicated funding source for bicycle projects (Fort Collins)	Require Travel Demand Management Plans as a Condition of Approval for Conditional Uses of a certain type (Bend, Chico)	Reduce or eliminate LOS requirements; implement MMLOS requirements and/or modal hierarchy (San Luis Obispo, Bellingham, Fort Collins)
Revise bicycle parking in Title 20 to separate from vehicle ratios and increase for certain uses	Implement additional Parking Management Strategies, including demand pricing, unbundling of parking, shared use, cash out, eliminating minimums, etc. (Boulder, Burlington)	Implement an urban growth boundary to prohibit outward development (Boulder, Bend); "no new annexations" policy
Provide back-in angle parking near bike lanes where feasible (Fort Collins)	Implement additional land use strategies to encourage biking, walking, and transit, such as overlays, Transit-Oriented Development, streetscape standards, smaller lot size requirements, etc.	Adopt a "no new roads/lane miles" policy; no new "cul de sacs" policy
Improve on-street winter bicycle facility maintenance (Fort Collins)	Increase residential and mixed use density in priority transit corridors	Adopt a "no new parking lots/garages" policy in CBD.
Encourage flexible work schedules or telework; adopt flex schedules or telework policies for large employers	Implement car-share or other shared-mobility technologies (Fort Collins, others)	Implement multi-modal concurrency requirements and tracking system (person trips per service area) (Bellingham)
Improve education and encouragement for non-SOV, including increased funding (Several cities)	Implement additional truck restrictions in certain areas or at certain times (e.g. downtown or peak hours)	Implement city-wide speed limit reductions (Boston, Burlington)
Implement online and mobile ride-sharing, trip planning applications (Boulder)	Utilize parking revenues for walking, biking, and transit projects. (Boulder)	Implement utility pricing, public service fees and taxes which reflect differences in the costs of supplying public services due to differences in location accessibility
Create dedicated funding source for traffic calming projects	Consider additional "road diets" where feasible to provide additional modal access and improve safety (Bend)	Apply special taxes to vacant, abandoned, blighted, and/or underutilized land to encourage redevelopment and infill
Implement incentives for development that discourage SOV use (several cities)	Increase funding for non-motorized transportation projects and operations, including sidewalks. (Several cities)	Apply special taxes or fees to parking facilities or on impervious surfaces (stormwater impacts)
Implement additional infill development incentives (Several cities)	Increase funding for transit, including capital and operational. (Burlington)	Implement Transfer of Development Rights policies and process

<sup>109</sup> Note: these are NOT policy recommendations by the MPO. These are examples of policies that staff has researched and have either been implemented in other locations or have been recommended by other transportation professionals to encourage mode shift.

## **CONCLUSIONS AND POLICY SUGGESTIONS**

It is beyond the scope of this paper to do a comprehensive policy analysis. However, based on my case study research, I have identified a number of policies that other communities are adopting and that could be considered by the Missoula MPO.

Each policy suggestion comes with its own set of challenges, from political to economic to administrative and others. Feasibility of implementing a policy is based on the magnitude of these challenges. The goal of policy-making is to find an optimal balance of all stakeholders involved, as well as balancing economic considerations with social and environmental impacts.<sup>110</sup>

Analyzing what policies are most effective for shifting transportation behaviors is a challenging task, and more policy research needs to be done in this area. It is extremely difficult to single-out any specific policy and pinpoint its influence as a causal factor in behavioral changes. This type of policy analysis would need to be part of a longer-term study. As far as I know, there are no comprehensive studies of mode share policy making and its impact on travel behavior.

It should also be noted that policy is not the only way to affect behavior. There are numerous other factors besides policy that contribute to behavior changes, including cultural values and norms, economic changes, changing climate patterns, technological developments and other factors. Shifting cultural values is one of the most important and powerful ways to change behavior. When discussing Ann Arbor's high walk commute rates, Transportation Manager Eli Cooper reinforced the influence that cultural values play on transportation choices by saying that "Above all is the fact Ann Arbor is a community with a strong environmental ethic. We have bicyclists that ride in our community with bumper stickers on their backpacks stating "Burn Calories, Not Carbon."<sup>111</sup>

While shifting societal norms is a complex equation of factors, policy does play an important role and *can* facilitate that shift by encouraging or discouraging certain behaviors. In other words, policy does not force the cultural shift, but rather supports it and guides it. City planners and officials, therefore, have a responsibility to cultivate the shift toward more responsible and sustainable forms of transportation.

These suggestions are simply a list that identifies some of the more common policies and programs that I came across in my case study research. These are tactics that other communities are using to support achievement of mode share goals and, ultimately, reductions in SOV use. In order to justify the following policy suggestions, I tied them to the Implementation Action Table found in Missoula's Growth Policy, which is a list of action items that address each of the 7 themes of the Growth Policy.<sup>112</sup>

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<sup>110</sup> Weimer, D. L., & Vining, A. (1992). *Policy Analysis, 2nd Ed.* "Chapter 10: Thinking Strategically About Adoption and Implementation." New Jersey: Prentice Hall.

<sup>111</sup> Eli Cooper, Transportation Manager. Email. (11/4/2016). Ann Arbor, MI.

<sup>112</sup> City of Missoula, Montana. (2015). Growth Policy. Pg 95.



*1) Increase funding and support for non-motorized and transit projects*

This is already being considered in the updated Long Range Transportation Plan. Increases in funding can be used for educational purposes, such as Missoula in Motion, or for capital improvement projects, such as sidewalks, bike lanes, greenways, etc.

This additional funding can be used to improve non-motorized infrastructure, particularly closing gaps in connectivity. The Reserve Street pedestrian overpass is a good example of addressing connectivity issues for non-motorized commuters. This facility helps commuters safely cross Reserve Street, which is a busy vehicle corridor and is challenging to cross.<sup>113</sup>

One tactic that could be used to help prioritize funding for non-SOV modes is to develop an investment hierarchy as Boulder and San Luis Obispo have done. This would prioritize non-motorized transportation (which tends to be the least expensive mode<sup>114</sup>) and transit over single-occupancy vehicles.

Another important program that must be supported is the Zero Fare program through Mountain Line. This program is critical to addressing issues of social equity and transportation justice in Missoula. As part of shifting toward a multi-modal future, continuing the Zero Fare program and expanding transit service and accessibility must be prioritized over roadway expansion and car-centric development.

Growth Policy Action 4.10: Invest in transportation improvements that promote safety, reduce crashes, and reduce bicycle/car/pedestrian conflicts.<sup>115</sup>

Growth Policy Action 8.2: Work with Mountain line transit to increase transit and para-transit options through more routes and expanded hours especially near affordable housing areas and health care facilities.<sup>116</sup>

Growth Policy Action 8.3: Continue to support free fares for transit while also evaluating the impacts to transportation costs for households.<sup>117</sup>

Growth Policy Action 8.22: Explore ways to reduce transportation costs for households by exploring bike share and car share programs.<sup>118</sup>

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<sup>113</sup> Erickson, David. (2016). "Construction of New South Reserve Pedestrian Bridge Begins." The Missoulian. Retrieved from: [http://missoulian.com/news/local/construction-of-new-south-reserve-pedestrian-bridge-begins/article\\_4988efad-921f-5a95-808d-5250230f456a.html](http://missoulian.com/news/local/construction-of-new-south-reserve-pedestrian-bridge-begins/article_4988efad-921f-5a95-808d-5250230f456a.html)

<sup>114</sup> Litman, Todd. (2014).

<sup>115</sup> City of Missoula, Montana. (2015). Growth Policy. Pg 100.

<sup>116</sup> Ibid. Pg 94 & 107.

<sup>117</sup> Ibid. Pg 107.

<sup>118</sup> Ibid. Pg 108.

Growth Policy Action 8.28: Coordinate with Missoula County to expand transit routes or van/car pool programs to more areas of the community.<sup>119</sup>

*2) Move away from exclusively LOS and toward MMLOS*

San Luis Obispo and Bellingham have set MMLOS policies. Bend and Chico exploring options. Missoula has the opportunity to follow the lead of other jurisdictions with MMLOS policies. Missoula can learn from these communities and should strive to implement similar policies.

There are some inherent problems with MMLOS. One often cited problem is that it takes a car-centric method of measurement and applies it to non-motorized travel, which results in forced values that drivers and cyclists/pedestrians do not share.<sup>120</sup> For example, unlike motorists, bicycle congestion is not an issue that cyclists tend to complain about. In fact, many cyclists find strength in numbers, so reducing congestion is not as equally valued in the cycling world. For transportation modeling, however, MMLOS is a step in a more equitable direction.

Growth Policy Action 1.21: De-emphasize motor vehicle LOS<sup>121</sup>

*3) Increase urban infill and density*

This is a policy that has been adopted by Missoula and is currently being implemented. The Missoula Redevelopment District is doing work in this area. The goal is to promote density, which tends to increase walking rates and reduce automobile use.<sup>122</sup> Additionally, urban infill policies help protect open space around the community, which can be used for local agriculture, outdoor recreation, environmentally sensitive land preservation or other purposes.

Growth Policy Action 5.2: Incentivize mixed-use development so that residences are within walking distance to grocery stores and other basic necessities.<sup>123</sup>

Growth Policy Action 5.3: Incentivize development that is close to existing infrastructure and that can utilize non-motorized and public transportation facilities.<sup>124</sup>

Growth Policy Action 5.4: Adopt policies to incentivize protecting open space such as infill and cluster development.<sup>125</sup>

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<sup>119</sup> City of Missoula, Montana. (2015). Growth Policy. Pg 108.

<sup>120</sup> Schmitt, Angie. (2013). Beyond "Level Of Service" - New Methods for Evaluating Streets. [Blog Post]. *StreetsBlog USA*. Retrieved from: <http://usa.streetsblog.org/2013/10/23/the-problem-with-multi-modal-level-of-service/>

<sup>121</sup> City of Missoula, Montana. (2015). Growth Policy. Pg 96.

<sup>122</sup> Frank, L. D., & Engelke, P. O. (2001). "The built environment and human activity patterns: Exploring the impacts of urban form on public health." *Journal of Planning Literature*, 16(2), 202-218.  
doi:10.1177/08854120122093339

<sup>123</sup> City of Missoula, Montana. (2015). Growth Policy. Pg 92 & 101.

<sup>124</sup> Ibid. Pg 92 & 101.

<sup>125</sup> Ibid. Pg 92 & 101.

Growth Policy Action 5.7: Incentivize new development and redevelopment that implements safe pedestrian design.<sup>126</sup>

*4) Consider feasibility of parking districts or other parking management strategies*

In my interview with Boulder Senior Transportation Planner Randall Rustch, we talked about the impact that parking districts have on mode share, and he said that in Boulder, the “University is all paid parking and there are three other paid parking districts. Downtown the big one. Compare the effects of paid parking versus other parts of town and it doubles and triples non-SOV mode share. Paid parking is the foundation for disincentives.”<sup>127</sup>

Growth Policy Action 9.7: Reduce parking requirements to promote transit-oriented design (housing and development).<sup>128</sup>

Growth Policy Action 9.18: Use overlay zones to promote how development looks and interacts with the street system, higher density housing on transit corridors, and urban design to de-emphasize parking and emphasize pedestrian scale development.<sup>129</sup>

Growth Policy Action 9.22: Develop new parking standards that reduce parking ratios, incentivize reduced parking supply and demand, support compact development, and recognize future land use needs.<sup>130</sup>

*5) Promote, Educate, Advocate*

The city could push to expand Missoula in Motion and to develop new programs and events. A program that could be worth examining is Commute Options in Bend, Oregon. This non-profit organization implements the Federal Safe Routes to School program and has a few initiatives similar to Missoula in Motion. Initiatives could include partnering with businesses for a trip reduction program, implementing more bike to work challenges, or even developing a car-share program similar to a Commute Options program called “Drive Less. Connect.”<sup>131</sup>

Consider including and expanding educational goals. For example, one of the goals set in Austin’s Bicycle Master Plan is for “90% of school children educated on bicycle safety each year.”<sup>132</sup> Reaching out to children in the community can help establish healthy transportation behaviors from a young age and can influence a larger cultural shift away from such heavy reliance on SOV use.

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<sup>126</sup> City of Missoula, Montana. (2015). Growth Policy. Pg 93 & 101.

<sup>127</sup> Randall Rustch, Senior Transportation Planner. Phone call. (7/7/2016). Boulder, CO.

<sup>128</sup> City of Missoula, Montana. (2015). Growth Policy. Pg 109.

<sup>129</sup> Ibid. Pg 110.

<sup>130</sup> Ibid. Pg 110.

<sup>131</sup> More information about Commute Options at: <http://www.commuteoptions.org/your-options/drive-less-connect/>

<sup>132</sup> City of Austin Transportation Department and the Active Transportation Program. (2014). *2014 Bicycle Master Plan*. Austin, TX.

In my interview with Randall Rustch, he said that one of the most important factors for shifting transportation habits in Boulder has been “promoting, encouraging, and educating.”<sup>133</sup> Boulder has been a leader in sustainable transportation, and the Missoula MPO could work to implement education and advocacy programs similar to Boulder’s.

Growth Policy Action 3.8: Continue to provide education and outreach on the benefits of public transit, active transportation options, promote car share opportunities, ways to reach health care facilities, and expand the employer outreach campaign.<sup>134</sup>

Growth Policy Action 6.17: Prioritize safety of the most vulnerable users in the design of the overall transportation network with consideration of such things as improved pedestrian and bicycle crossings in high traffic areas and safe routes to schools and parks.<sup>135</sup>

*6) Continue to increase data gathering*

The League of American Bicyclists publishes “report cards” for each bicycle-friendly community in the United States. Missoula is currently considered a Gold level cycling community.<sup>136</sup> One of the suggestions to help Missoula achieve Platinum status is to “Continue efforts to count bicyclists utilizing several methods of data collection to create an understanding of current bicyclists and the effects of new facilities on bicycling.”<sup>137</sup>

There are a number of ways more data could be gathered in Missoula. This could include some trip studies in the style of Boulder, Bellingham, and San Luis Obispo. I suggest that Missoula consider the feasibility of hiring a consulting firm to conduct an Individual Marketing Campaign, similar to what Socialdata did for Bellingham in 2012. Yearly reviews of ACS data will also help get general sense of transportation trends, even though yearly ACS data has relatively high margin of error and is not the most accurate source. The Missoula MPO already engages in trip counts, and this could also be expanded.

The City could also consider automated counters like Bend has been installing recently. In my interview with Tyler Deke of Bend, he said that the city had purchased several EcoCounters and is trying to get a contractor lined up to install these, which will provide a permanent source of pedestrian and bicycle counts at various points in the city.<sup>138</sup> Bend is hoping to partner with Oregon State University – Cascades student interns once the campus is completed in Bend.<sup>139</sup> The Missoula MPO could look into the feasibility of installing these devices.

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<sup>133</sup> Randall Rustch, Senior Transportation Planner. Phone call. (7/7/2016). Boulder, CO.

<sup>134</sup> City of Missoula, Montana. (2015). Growth Policy. Pg 99.

<sup>135</sup> Ibid. Pg 104.

<sup>136</sup> League of American Bicyclists. (2016). Award Database: Missoula, Montana Report Card. From: [http://bikeleague.org/sites/default/files/bfareportcards/BFC\\_Fall\\_2016\\_ReportCard\\_Missoula\\_MT.pdf](http://bikeleague.org/sites/default/files/bfareportcards/BFC_Fall_2016_ReportCard_Missoula_MT.pdf)

<sup>137</sup> Ibid.

<sup>138</sup> Tyler Deke, Bend MPO Manager. Personal Interview. (7/21/16). Bend, OR.

<sup>139</sup> Ibid.

Lastly, measuring and gathering data about acute air quality impacts from vehicle emissions should be improved and implemented. Knowing where dangerous air pollutants are most concentrated is important for implementing one of the Growth Policy objectives, which is to “encourage consideration of health impacts of poor air quality when reviewing policies for transportation, development regulations, and industrial developments.”<sup>140</sup>

Growth Policy Action 3.9: Relate Missoula City-County Health department air quality information to automobile travel.<sup>141</sup>

*7) Assess progress, review policies, and revise goals*

The process of shifting closer to our mode share goals should be reviewed as often as possible, which is a policy that is somewhat dependent on gathering good data. This may require updates in the mode share goals themselves or policy changes that further encourage the use of multimodal transportation options. Regardless, mode share goals should be continuously monitored and updated.

Growth Policy Action 7.8: Regularly update and implement transportation plans including the *Missoula Active Transportation Plan*, the *Missoula Community Transportation Safety Plan* and the *Long Range Transportation Plan* to promote such things as improved safety and the development of active transportation infrastructure.<sup>142</sup>

The City and County of Missoula face important transportation challenges in the future. Setting mode share goals is the first critical step that will hold decision makers accountable, help shape transportation policy, and inspire sustainable changes in our transportation system. A future transportation system with more multi-modal options will improve safety for all roadway users, improve air quality by reducing emissions, improve health by encouraging more active transportation, ease congestion by reducing our dependence on single-occupancy vehicles, address social equity by diversifying our transportation options, and limit our contribution to global climate change by reducing the amount of fossil fuels consumed in our community. The City of Missoula has an opportunity to create a transportation system that serves all Missoulians and sets the standard for other communities.

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<sup>140</sup> City of Missoula, Montana. (2015). Growth Policy. Pg 42.

<sup>141</sup> Ibid. Pg 99.

<sup>142</sup> Ibid. Pg 105.

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## **Appendix A: Initial Interview Questions**

Does (community) have an adopted mode share goal for each transportation mode? (i.e. a goal to increase bicycling or walking to X% by 20XX or to decrease single-occupancy vehicle use to XX% by 20XX)?

If so, what year was it established and in what community-based plan was it adopted (i.e. General Plan, Growth Policy, Transportation Plan, Climate Plan, etc.)?

How was the modal percentage chosen and why? Was there a specific methodology or analysis used to determine it?

What data source(s) do you use to measure the current mode split? (i.e. Census-based American Community Survey commute to work data, local transportation surveys, etc.)?

If you have *not* set a mode share goal, is there a particular reason why? Do you anticipate setting a goal in the future? If so, how do you foresee doing so?

## **Appendix B: Supplemental Interview Questions**

What process did they use, what data do they use to measure it? Who measures it and how often? Is it a 5 year goal or? When did they set it?

How is the goal applied - to whom – and for how long? For example: Residents, non-residents, all modes, one mode. Does the mode split goal apply to parallel jurisdictions such as University, local schools, large employers, etc?

What policies were in place at the time the mode split goal was approved? Has the jurisdiction changed or added any policies (land use, budgeting, infrastructure, trip reduction etc.) to help achieve it? What non-regulatory programs are in place that supports the goal (education, TDM, reward/incentive etc)

What benefits/consequences have the jurisdictions experienced? Are there best practices / common denominators / key elements of success that helped the jurisdictions make positive progress toward their goal?