POISED FOR PEDALING: COMPARING BICYCLE INFRASTRUCTURE IN COPENHAGEN, DENMARK AND PORTLAND, OREGON

by

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This thesis investigates the following question: how can Portland learn from Copenhagen's policy successes and failures to better develop, implement, and utilize bicycle infrastructure going forward? The thesis begins by addressing each city's mobility history and how that history contributes to current transportation networks. Historical cycling support helps explain Copenhagen's strong network today, while the US's embrace of the automobile prevented Portland from fully embracing the bicycle. The thesis then deconstructs the differences between bicycle infrastructure in Copenhagen and Portland along five focus areas: design, municipal control, societal values, current politics, and equity. Copenhagen's cyclist-friendly design, egalitarian societal values, and strong social safety net contribute to its superior cycling network and bring more cyclists to the streets. These advantages serve as models for Portland for emulate. However, the cities' common struggles with municipal infrastructure control and mobility politics demonstrate cycling's divisive nature regardless of locale. They also show that improvement remains well within Portland's reach.

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Introduction

On June 13th, 2019, the City of Portland celebrated a major milestone. The city, as part of its Vision Zero plan, spent $9 million to redesign a 40-block stretch of Foster Boulevard.[1] The redesign removed a vehicle traffic lane in each direction and added a center turn lane, making room for 40 new blocks of bicycle lanes. Additionally, the city added six new mid-block pedestrian crossings, upgraded ADA curb ramps, expanded sidewalks, and planted 200 new trees in the corridor. Transportation planners and commissioners rejoiced. Even local business owners, often fearful of projects that reduce vehicle traffic, joined the celebration, with one local owner declaring "[T]his is really good for my business."[2] Portland announced the project's completion in a press release, welcoming residents to "a walkable and bikeable commercial main street for Portlanders of all ages to enjoy."[3]

That evening, on the same stretch of newly improved urban corridor, an 82-year-old woman lay dead in the street.[4] She was hit and killed by a car while trying to cross Foster Boulevard at an unmarked crosswalk. The driver responsible cooperated with investigators and was released without arrest. The news agency reporting on her death "noticed other pedestrians having a hard time crossing the road" at the same location.[5] Despite the city's best efforts, drivers continued to treat the road like a major thoroughfare and the corridor remained dangerous. In fact, despite Portland's

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[1] Andrew Theen, "Southeast Portland's Foster Road 'Diet,' Is Complete, City and Neighborhood Hope Area Becomes Destination," The Oregonian, June 13, 2019, https://www.oregonlive.com/commuting/2019/06/southeast-portlands-foster-road-diet-is-complete-city-and-neighborhood-hope-area-becomes-destination.html.
[2] Ibid.
[3] "Pedestrian Killed on SE Foster Road After City Finishes Safety Improvement Project," KATU, June 14, 2019, https://katu.com/news/local/pedestrian-hit-on-se-foster-road-dies-in-hospital.
[4] Ibid.
[5] Ibid.

commitment to its Vision Zero plan and its best redesign efforts on major streets, 2019 saw the most traffic deaths in the city since 1997.[6] What if when pedestrians tried to cross busy Portland streets, they were faced not with a two ton metal vehicle traveling 35 miles per hour, but with a person on a 20 pound bicycle traveling at 15 miles per hour?

Almost 5,000 miles away, the people of Copenhagen, Denmark know the answer to this question. Shortly after Portland announced its redesign of Foster Boulevard, Copenhagen released its mobility statistics for the year. Nearly 62% of residents in the city proper commuted to work or school by bicycle, up 10% from just three years prior.[7] On certain streets, rush hour bicycle traffic creates longer lines than vehicle traffic. Most people in Copenhagen rarely use a car; in fact, many residents do not even own one. When Danes look to cross the street in Copenhagen, they check for hordes of cyclists, not large motor vehicles. When the biggest threat to your safety is another human on a bicycle, the results are dramatic: 76% of Copenhageners feel safe in traffic and only eight people died in traffic collisions in 2018 (compared to 34 in Portland that same year).[8,9,10] Copenhagen's bicycle infrastructure has saved hundreds of lives and created a safer, more livable city for its residents.

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[6] Andrew Theen, "49 People Died in Portland Traffic Deaths in 2019, the Most Since 1997," *The Oregonian*, January 2, 2020, https://www.oregonlive.com/commuting/2019/12/vision-zero-portland-saw-most-traffic-deaths-since-1997-many-out-of-our-control.html.

[7] Erik Kirschbaum, "Copenhagen Has Taken Bicycle Commuting to a Whole New Level," *The Los Angeles Times*, August 8, 2019, https://www.latimes.com/world-nation/story/2019-08-07/copenhagen-has-taken-bicycle-commuting-to-a-new-level.

[8] Stefan Gössling, "Urban Transport Transitions: Copenhagen, City of Cyclists," *Journal of Transport Geography* 33 (December 1, 2013): 196–206, https://doi.org/10.1016/j.jtrangeo.2013.10.013.

[9] "Injured and Killed in Road Traffic Accidents by Region, Casualty, Motor Vehicles Involved, Age and Sex," Statistics Denmark, accessed February 4, 2020, https://www.statbank.dk/statbank5a/selectvarval/saveselections.asp.

[10] Theen, "49 People Died."

The purpose of this thesis is to determine how Copenhagen became a successful cycling city and if Portland can become more successful by approaching cycling similarly. Specifically, the thesis examines policy and political factors that contributed to cycling's development in both regions from the mid-20th century to the present day. For the purposes of this thesis, a policy is any act, rule, or plan established by a municipal or state government. A historical analysis connects Copenhagen's bicycle infrastructure to Portland and examines areas of opportunity. Specific research questions include the following: How can Portland learn from Copenhagen's political and policy successes (and failures) to better develop, implement, and utilize bicycle infrastructure going forward? Does Copenhagen present a better way for Portland to introduce changes, structure legislation, design infrastructure, and encourage use that will make said infrastructure more successful? If so, how can Portland change, and what is the best way to implement those changes?

This approach utilizes several factors to determine policy or political success. In the policy realm, success correlates to measurable and determinable factors. Bicycle infrastructure, including bike lane totals, protected or separated infrastructure distance, bike parking availability, and bike-share availability, indicate a city's investment in bicycle accessibility. Bicycle counts, including total number of cyclists in a region and cyclists' mode share percentage, provide an accurate assessment of whether cycling is well-utilized in each region. Examining these counts between years shows whether a region saw improved, steady, or diminished bicycle use over time. Survey data, such as share of cyclists who feel safe, percentage of residents who are happy with infrastructure, and public awareness of bicycle infrastructure, demonstrates how the

public perceives their city's efforts to expand cycling infrastructure. Crash, injury, and fatality rates reliably assess infrastructure safety. Comparing these factors to city budgets determines return on cycling investment.

Assessing political success is slightly more nebulous. Whether a bicycle-friendly policy, bill, or measure passed or failed is one simple way to analyze political success. Political challenges to bicycle infrastructure, including voter opposition, legal challenges, lobbyist opposition, and formal opposition from politicians, demonstrate the political challenges bicycle infrastructure and its proponents face. However, in many ways, political success is tied to policy success. Policy data often indicates a political strategy's effectiveness. Survey data underscores how residents feel about new policies and reflects their political support for related policies. Bike counts reveal how many cyclists use a route daily while illustrating cycling's political popularity within a neighborhood. Thus, examining policy effectiveness shines a light on the success of political strategies.

The thesis focuses on five primary contributors to successful bicycle infrastructure: design, municipal control, societal values, political conflicts, and equity concerns. The thesis assesses Copenhagen's success in these areas and determines how Portland's existing approach can be altered based on Copenhagen's successes and failures. The thesis also addresses how each city's mobility history contributes to current mobility policies and values. While not the primary focus, public transit, walkability, housing, and other tangential factors contribute to cycling's success and are addressed throughout this thesis. The thesis depicts Copenhagen as a model to learn from while underscoring its continued struggles as lessons to learn from.

Ultimately, the thesis examines Copenhagen's cycling policy successes and areas for improvement, providing Portland with a model for improving its cycling policy.

Background

Cycling creates more than simply a livable urban environment. It also leads to better health outcomes, prevents environmental degradation, and serves as a more equitable transportation mode. In Odense, Denmark, a study of cycling infrastructure revealed that "savings in health care costs and sick leave were more than 50 percent greater than" the city's cycling infrastructure costs.[11] A study from Lincoln, Nebraska found that four new cycling and walking trails generated more medical savings through increased physical activity than the trails' construction costs.[12] Cycling increases people's daily exercise by moving them from lethargic transportation modes (personal vehicles, public transit) to an active one. Given the US's ongoing obesity epidemic, this provides public health and economic incentives for cities like Portland to embrace cycling. 93.3 million US adults are obese (39.8% of the population), and when factoring in obesity's associated health conditions, obesity is the country's leading cause of preventable death.[13] Additionally, when including both direct (healthcare) and indirect (economic) losses, the cost of chronic diseases stemming from obese and overweight Americans totaled $1.72 trillion.[14] Cycling can help cities directly combat the obesity epidemic by providing convenient, daily exercise to more Americans.

Environmentally, every trip taken by a gasoline-powered personal vehicle exacerbates the devastating effects of climate change. Cycling can serve as a powerful tool to combat climate change and decrease global emissions. Like other countries

[11] Jeff Mapes, *Pedaling Revolution: How Cyclists are Changing American Cities* (Corvallis: Oregon State University Press, 2009), 237.
[12] Ibid.
[13] "Adult Obesity Facts," Centers for Disease Control and Prevention, last modified February 27, 2020, https://www.cdc.gov/obesity/data/adult.html.
[14] Hugh Waters and Marlon Graf, "America's Obesity Crisis: The Health and Economic Costs of Excess Weight," Milken Institute, October 26, 2018, https://milkeninstitute.org/reports/americas-obesity-crisis-health-and-economic-costs-excess-weight.

across the globe, the personal vehicle dominates the United States' transportation network. In 2015, personal vehicles made up 85.6% of US commuters, with 76.6% of those being single-occupancy vehicles.[15] The average US household owns two cars, with those vehicles traveling over 22,000 miles annually.[16] In 2017, emissions from US cars and light trucks totaled 1.1 billion metric tons of CO_2, representing 58% of US transportation-based greenhouse gas emissions and 17% of total US greenhouse gas emissions.[17] The US's transportation emissions alone would place it in the top five countries for total CO_2 emissions.[18] The US's reliance on personal vehicles places it among the leaders in per capita CO_2 emissions, ranking third globally at 16.24 tons per capita and trailing only Australia (16.9) and Saudi Arabia (19.28).[19] These emissions would decrease dramatically if more Americans relied on cycling as a sustainable, emission-free transportation mode. Cycling can help the US lower its emissions by shifting drivers to bicycles.

Cycling's benefits reach far more users than personal vehicles as cycling is a more equitable transportation mode. According to the Bureau of Labor Statistics, the average American spent $9,761 in 2018 on purchasing and operating personal vehicles.[20] In comparison, the average commuting bicycle costs $300 to $500, with

[15] "Commute Mode Share: 2015," Bureau of Transportation Statistics, accessed February 5, 2020, https://www.bts.gov/content/commute-mode-share-2015.
[16] Anisa Jibrell, "Study Shows Rise in U.S. Vehicle Ownership Per Person, Household," *Automotive News*, January 23, 2018, https://www.autonews.com/article/20180123/MOBILITY/180129900/study-shows-rise-in-u-s-vehicle-ownership-per-person-household.
[17] Ibid.
[18] "Each Country's Share of CO2 Emissions," Union of Concerned Scientists, updated October 10, 2019, https://www.ucsusa.org/resources/each-countrys-share-co2-emissions.
[19] Hannah Ritchie, "Where in the World Do People Emit the Most CO2?" Our World in Data, October 4, 2019, https://ourworldindata.org/per-capita-co2.
[20] "Consumer Expenditures: 2018," Bureau of Labor Statistics, September 10, 2019, https://www.bls.gov/news.release/pdf/cesan.pdf.

additional costs (helmets, lights, annual maintenance, etc.) ranging from $100 to $250.[21,22] Even assuming excess costs, cycling is over $8,000 cheaper than driving, increasing its accessibility to far more low-income individuals. Because minorities are disproportionately impoverished, cycling can also help destabilize racial inequality in transportation. In Los Angeles, California, cycling is the primary transportation mode for many immigrants as well as Latino and black men, largely due to its affordability.[23,24] These "invisible riders," so-called because they are often neglected by bicycle advocacy groups, demonstrate how cycling can increase accessibility for minorities who cannot afford a car and lack access to efficient public transit.[25] Proper infrastructure, outreach, representation, and inclusion can help encourage more minorities to ride. Bicycles cannot be the only solution; housing, gentrification, education, employment, and social safety remain concerns that cycling alone cannot cure. Nonetheless, if properly implemented, cycling can create more equitable transportation environments.

Given all cycling's associated benefits, one would expect the US to move swiftly towards cycling as an alternative, sustainable transportation mode. Unfortunately, the US has been slow and often unambitious in moving towards bicycle transportation. In 2015, bicycles made up only 0.6% of the national mode share, a small amount compared to those who carpool (9%), take public transit (5.2%), and walk

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[21] J. D. Roth, "The Costs and Savings of Bicycle Commuting," *Forbes*, June 15, 2011, https://www.forbes.com/sites/moneybuilder/2011/06/15/the-costs-and-savings-of-bicycle-commuting/#a43a69877bee.
[22] "How Much Does a Bike Cost?" CostHelper, accessed May 6, 2020, https://fitness.costhelper.com/bike.html.
[23] Mapes, 105.
[24] Tanvi Misra, "Bike Advocacy's Blind Spot," CityLab, July 19, 2018, https://www.citylab.com/equity/2018/07/is-bike-infrastructure-enough/565271/.
[25] Mapes, 105.

(2.8%).[26] Two years later, the National Household Travel Survey asked respondents what mode they would use if their car was not an option. Only 11.6% of respondents said they would cycle, ranking last among the six possible alternatives.[27] Cycling infrastructure is neglected across the country as cities prioritize space for vehicles and their storage. Meanwhile, land-use plans and urban development perpetuate urban sprawl, increasing American's reliance on the car for daily transit and making travel by other modes difficult. America has a bicycle problem, or rather a lack of bicycles problem.

It is surprising more US cities have not adopted cycling infrastructure, especially given 80% of Americans live in urban communities.[28] Urban areas are ideal for bicycle commuting. Across the US, 21% of car trips are under a mile, 46% are less than three miles, and 60% are under five miles.[29] These percentages rise even higher in urban areas, where dense communities prompt shorter trips. Cycling could fulfill many of these short interurban trips. Cycling is six times faster than walking given the same level of exertion, expanding cyclists spatial range dramatically compared to those who walk.[30] Yet a bicycle is far more spatially efficient than a car, particularly in a dense urban environment. When moving at approximately 30 miles per hour, the average car takes up 1500 square feet of space, and when parked it occupies 215 square feet. Comparatively, a bicycle occupies 53 square feet when moving (9.3 miles per hour) and

[26] "Commute Mode Share, 2015."
[27] "Transportation Statistics Annual Report," US Department of Transportation, Bureau of Transportation Statistics, 2018, https://www.bts.dot.gov/sites/bts.dot.gov/files/docs/browse-statistical-products-and-data/transportation-statistics-annual-reports/Preliminary-TSAR-Full-2018-a.pdf
[28] "New Census Data Show Differences Between Urban and Rural Populations," US Census Bureau, December 8, 2016, https://www.census.gov/newsroom/press-releases/2016/cb16-210.html
[29] Jason Henderson and Natalie Marie Gulsrud, *Street Fights in Copenhagen: Bicycle and Car Politics in a Green Mobility City* (New York: Routledge, 2019), 2.
[30] Ibid., 28.

21.5 square feet when parked.[31] Put differently, one car parking spot equates to ten spaces for bicycles.[32] The bicycle fits into a beautiful middle ground: fast enough to commute efficiently, yet small enough to preserve public space.

Moreover, Americans express support for dense communities that support cycling. A study from Atlanta, Georgia, one of the US's most sprawling cities, asked residents about their ability to walk to essential destinations and their travel preferences.[33] A majority of the survey respondents said they "would trade cul-de-sac subdivisions for a denser grid system" that would make walking and cycling to nearby destinations easier.[34] Cities across the country have revitalized urban centers as developers meet residents' demand for housing in dense, accessible downtowns. As urban regions become denser, cycling can occupy more short intra-urban trips. In Copenhagen, where cycling accounts for 62% of weekday trips to work and education, this is already the case.[35] The city's cyclists enjoy many of the economic, health, environmental, and equity benefits that bicycle transportation provides. Copenhagen's cycling network illustrates how cities can embrace the bicycle as a serious transportation mode for all commuters.

Addressing Copenhagen's Historical Precedents

In Copenhagen, the bicycle has been a primary transportation mode for nearly a century. Cycling's historical precedent stems from a unique set of political and policy factors that allowed cycling's continued success and expansion. However, historical precedent was not the sole contributor to Copenhagen's success today. While political

[31] Ibid., 32.
[32] Ibid., 32.
[33] Mapes, 236.
[34] Ibid.
[35] Henderson and Gulsrud, 6.

support for cycling came earlier in Copenhagen than in Portland, political pushback endures and resembles US discourse. This indicates that political pushback to cycling's growth is inevitable but surmountable. Additionally, while policies such as car restraint and separate infrastructure created a semi-established cycling network prior to the automobile's rise, they did not prevent cars from expanding in Copenhagen. Political battles continue in Copenhagen despite historical precedent, indicating that Portland's historical lack of cycling should not prevent it from following Copenhagen's lead.

Dominant Danish political philosophy supported cycling throughout the 20th century, as cycling neatly dovetailed with the rise of Danish social democracy. Social democracy is a social, political, and economic ideology which promotes strong democratic governance and market intervention in a capitalist economy to support social justice and redistributive wealth. Socially democratic ideals, such as "working-class identity, women's emancipation, and social levelling, undergirded and subsequently sustained cycling" throughout the 20th century as Danish social democracy continued to expand.[36] Cycling was and is seen as a means of transportation accessible to and utilized by all economic classes. As a result, the Danish national government generally supported cycling, and liberal-leaning urban areas like Copenhagen embraced it as a commuting mode.

Unlike the United States, Denmark lacks an automotive manufacturing industry. As a result, Denmark is not subject to political lobbying from large automobile manufacturers and their employees; Danish car owners comprise the bulk of Denmark's car lobby. Historically, this led to strong car-restraint policies in the form of high taxes on automobiles, which the socially democratic government viewed as luxury goods.

[36] Ibid., 48.

Additionally, the car tax was effectively an import tax, stimulating economic growth by promoting domestic good consumption. The Danish car tax was introduced in 1910 and increased throughout the 1920s, with revenues redistributed to the country's general fund and used to fund social welfare programs.[37] Following WWII, as the automobile industry expanded globally and cars became increasingly popular in Denmark, car taxes became a larger funding source for Danish social welfare. Even with increased car use, by 1960 Danish car ownership reached only 120 cars per 1000 persons, far lower than the 410 cars per 1000 persons in the US.[38,39] Thus, when automobile use increased in Copenhagen, the city stood well ahead of Portland (and the US) in terms of bicycle mode share. Moreover, Copenhagen did not have to battle a larger, more vocal automobile lobby.

Cycling also maintained a strong non-governmental advocacy network in Denmark since its emergence. The Danish Cycling Federation (DCF), established in 1905, promoted cycling during its infancy and advocated for safer infrastructure throughout the 20th century.[40] Surprisingly, the DCF partnered with the Federation of Danish Motorists in the 1920s to advocate for separate bicycle infrastructure.[41] The small Danish car lobby understood separate cycling facilities as integral to the free flow of car traffic and supported policies that moved cyclists to separate on-street

[37] Ibid., 50.
[38] Andres Felipe Valderrama Pineda and Nina Vogel, "Transitioning to a Low Carbon Society? The Case of Personal Transportation and Urban Form in Copenhagen: 1947 to the Present," *Transfers: Interdisciplinary Journal of Mobility Studies* 4, no. 2 (2014): 4-22.
[39] "Fact #962: January 30, 2017 Vehicles per Capita: Other Regions/Countries Compared to the United States," Office of Energy Efficiency and Renewable Energy, January 30, 2017, https://www.energy.gov/eere/vehicles/fact-962-january-30-2017-vehicles-capita-other-regionscountries-compared-united-states.
[40] "Danish Cyclists Federation," European Cyclists' Federation, January 13, 2014, https://web.archive.org/web/20140113220928/http://www.ecf.com/member-organisation/dansk-cyklist-forbund/#.
[41] A. T. Carstensen and A. K. Ebert, "Cycling Cultures in Northern Europe: From 'Golden Age' to 'Renaissance,'" *Transport and Sustainability* 1 (2012): 23-58.

infrastructure. Danish traffic law upheld the separation of modes, mandating cyclists use separated bike lanes while increasing restrictions on drivers, such as outlawing right turns at a red light and implementing rigid punitive laws against drivers in the event of a collision.[42] By 1939, Denmark "required that all counties and municipalities build cycle tracks and pedestrian paths on all roads funded by the national government."[43] As a result, a robust road network emerged for all users, not just drivers, by the mid-20th century. Given cyclists and drivers held effectively equal traffic rights under Danish law, this gave cyclists an effective street network and a strong voice in political debates for the foreseeable future.

Unfortunately, political support for cycling through policies like car restraint and separate infrastructure did not protect Denmark, and Copenhagen in particular, from automobile dominance in the mid- to late 20th century. The post-WWII economic boom fueled demand for cars in the early 1950s and continued through the following two decades. In Copenhagen, poor urban planning compounded increased car demand by failing to include cycling infrastructure. The 1947 Finger Plan, which regulated urbanization through green space inclusion and transit-oriented development, failed to include a bicycle network or pathway system.[44] Copenhagen's Municipal General Plan of 1954 "characterized cyclists as a traffic problem."[45] Nationwide, Denmark followed peer countries by building a substantial highway network, believing it would help promote economic growth. As cars proliferated in Copenhagen, the city planned structures and roads to accommodate them, in turn encouraging cyclists to transition to

[42] Henderson and Gulsrud, 52.
[43] Ibid.
[44] Ibid., 55.
[45] Ibid.

public transit in order to increase road space for cars.[46] Despite strong political precedents and seemingly high cycling rates, Copenhagen (and Denmark more broadly) embraced post-war auto-oriented trends in transportation planning and policy. Historical precedent did not prevent cycling's mode share from dipping to 17% in Copenhagen by 1967.[47] While historical precedent played a role in reviving cycling in later years, it was not essential to Copenhagen's cycling success.

Following the 1967 mode share low, cycling rates rebounded in Copenhagen due to various political and social movements as well as improved policies promoting cycling. Increased global awareness of environmental and equity concerns coincided with renewed pro-bicycle policies in the city. European student and labor movements spread to Copenhagen in 1968, confronting the growing car-dominant culture.[48] Progressive voters successfully opposed a new highway along Copenhagen's lakes and political leaders began promoting "better public transit, limiting car parking in the city center, and better traffic management..."[49] These policies aligned with voters' increased concern for the environment and equity. The introduction of car-free Sundays, a policy imported from Amsterdam which eliminated personal vehicles one day a week, helped reintroduce many residents to cycling and proved to them cycling's effectiveness. The city's existing infrastructure demonstrated that cycling could be a useful mode for many residents.

Ultimately, global economic forces were integral to reducing car use and shifting many residents to the bicycle. Oil crises throughout the 1970s undermined Danish reliance on petroleum. Up to that decade, oil supported 90% of Danish energy

[46] Ibid., 57.
[47] Ibid.
[48] Pineda and Vogel, "Transitioning to a Low Carbon Society?"
[49] Henderson and Gulsrud, 57.

production, including vehicles, heating, and electricity.[50] The decade's various oil crises, including the 1973 Arab and 1979 Iranian embargos, convinced progressive leaders that Denmark needed to diversify their energy sources. Progressive leaders "promoted energy conservation and better urban planning" which included bicycle infrastructure, while working to reduce car use and oil consumption through national vehicle and value-added taxes.[51] City efforts to reduce consumption coincided with national efforts to change energy sources. Today, 71.4% of Danish energy comes from renewable sources, a reflection of the drastic changes made during from the 1970s onward.

On a municipal scale, economic declines related to deindustrialization also brought more cyclists to Copenhagen's network. During the oil crises of the 1970s, most of Copenhagen's industries moved out of the city, including textiles, furniture, woodworking, food processing, and shipbuilding. The associated economic decline decreased Copenhagen's tax revenue and in turn its transportation funding. Rather than invest in debt-financed roads and vehicle parking, Copenhagen elected to expand its cost-effective bicycle infrastructure.[52] Bicycle infrastructure also catered to the city's increasingly young and low-income population. Low-income residents who could not afford a car and its associated costs found efficient transportation in cycling. Cycling's mode share increased past 20% in the mid-1980s and continued to grow.[53] While cycling infrastructure alone did not cure Copenhagen's economic downturn, it proved to be an effective transportation source compared to more expensive personal vehicles.

[50] Ibid., 58.
[51] Ibid.
[52] Ibid., 60.
[53] Ibid.

By 1990, Copenhagen's economy bottomed out. Unemployment held at 15% and the population continued to drop, dipping under 500,000 by 1990.[54] Copenhagen turned to neoliberal urban policies to help stimulate redevelopment and economic growth. Neoliberal political leaders promoted redeveloping the deindustrialized harbor to create upscale inner-city housing, thereby increasing the tax base and corresponding city revenues. In turn, Copenhagen sold redeveloped land to private developers to finance the construction of the Metro, its new public transit system.[55] These policies increased municipal land values and drew in middle- to high-income creative class members. Beginning in the 2000s, Copenhagen began catering cycling to these new residents. Both neoliberal and progressive party figures "invoked creative class discourses... citing the need for cycling as a way to lure highly educated but youthful knowledge workers back to the city center."[56] The city emphasized cycling as a utilitarian transportation mode rather than a recreational activity. Additionally, updated technology allowed Copenhagen to plan bicycle routes more effectively; the city used data-driven analysis to place lanes where cyclists desired them, "not where traffic engineers thought they should go to be out of the way of cars."[57] Neoliberal policies and data-driven planning led to a cohesive cycling network and increased bicycle mode share. By 2011, overall bicycle mode share rose to 33%.[58]

However, neoliberal strategies also created problematic trends that continue today. Neoliberal leaders initially endorsed market solutions for space allocation. Over

[54] Hans Thor Andersen and Lars Winther, "Crisis in the Resurgent City? The Rise of Copenhagen," *International Journal of Urban and Regional Research*, 34: 693-700.
[55] Henderson and Gulsrud, 61.
[56] Ibid., 62.
[57] Ibid.
[58] "Danish National Travel Survey," Technical University of Denmark Institute of Transport, 2015, http://www.cycling-embassy.dk/wp-content/uploads/2015/01/2011-2013-Fact-sheet-cycling-in-DK-1.pdf.

time, it became clear that they were endorsing a specific market: middle- to upper-class, car-owning taxpayers. As Copenhagen's redevelopment grew and began to thrive, neoliberal politicians began to "oppose parking removal and demand more car parking," believing increased parking would help better market new housing developments.[59] Neoliberal political leaders also scuttled city plans for a congestion pricing toll ring despite initially supporting the plan and holding the necessary national parliament majority to pass legislation.[60] In recent months, neoliberal leaders have endorsed a tunnel underneath the eastern portion of the city's harbor that would effectively create a ring road around the city and incentivize more driving.[61] Each of these neoliberal stances runs counter to the ideology's support of urban livability and prevention of climate change.

Neoliberals pursued these car-friendly policies despite revelations in Copenhagen's 2018 Parking Report that undermined the supposed benefits of increased car parking and use. Drivers entering the city from the suburbs are the primary reason for Copenhagen's rise in personal vehicles. The Parking Report indicated that increasing car parking invites more cars from suburbia to the city center, thereby increasing car trips and undermining mobility goals.[62] As of 2018, Copenhagen issued more parking permits than its available street parking could support. The Parking Report also confirmed that the city lacks adequate space to build necessary off-street parking that would replace removed street parking.[63] These combined factors indicate that Copenhagen should not increase parking, as it incentivizes more driving. Moreover,

[59] Henderson and Gulsrud, 132.
[60] Ibid., 118.
[61] Ibid., 166.
[62] City of Copenhagen, "Parking Report 2018," Copenhagen Technical and Environment Administration, 2018.
[63] Ibid.

the city lacks proper space to accommodate vehicles even if it wanted to. Instead, Copenhagen should focus on allocating space for other modes like bicycles, pedestrians, and public transit, while introducing more restrictions for personal vehicles. Unfortunately, the city's ongoing political conflicts prevent it from taking strong, pro-bicycle policy action.

As in Portland, Copenhagen politicians today frequently battle over allocating space for bicycles. Copenhagen's mobility politics are fractured along three political ideologies: progressive politics, neoliberal politics, and conservative politics. Progressive parties, such as the Red-Green alliance and the Socialist People's Party, advocate for government promotion of bicycle space and car restraint. Neoliberal parties, such as the dominant Social Democrats, advocate for government promotion of bicycle space while working to accommodate increased urban car use. Conservative parties, such as the Danish People's Party, advocate against car restraint and promote accommodating cars at the expense of cycling and other sustainable transportation modes. These three ideologies conflict frequently in city politics. In recent years, a neoliberal-conservative political alliance has prevented improvements and expansions to cycling infrastructure. Instead, today's debates revolve around car restraint, focusing on issues like a toll ring, parking, and an urban ring road.

As car use in Copenhagen rises with each passing year, car restraint increasingly becomes the focal point of mobility politics. Copenhagen reported a 31% increase in car ownership between 2014 and 2018, and in some suburbs "rates of car ownership even approach 600-700 cars per 1000 persons, resembling car ownership rates in US metropolitan areas."[64] While Copenhagen's strong cycling history suggests a

[64] Henderson and Gulsrud, 79-80.

progressive response to increased car use, the city presently embraces neoliberal mobility policies. This shift stems from Social Democrats recent move towards neoliberal politics and alignment with neoliberal and conservative parties on mobility issues. Given Social Democrats make up the largest plurality in both the Copenhagen city council and the national parliament, their mobility policy has an outsized effect on the city.[65,66] While their name suggests an emphasis on social democracy, Social Democrats instead "promote neoliberal economic and urban development policies... that undercut social democracy."[67] The Social Democrats current party platform emphasizes investments in the road network, highlighting new motorways and emphasizing the importance of "a fair balance between investments in the road network and public transport."[68] The party hesitates to increase car restraint in Copenhagen, fearing retribution from their increasingly wealthy middle-class voting base. The party's policies increase cars in Copenhagen and create a more hostile environment for cyclists. Instead of continued leadership in cycling infrastructure development, Copenhagen finds itself in a political gridlock between cars and bicycles.

The Portland Perspective

For Portland's urban planners, political gridlock is so common it appears benign. In Portland, each parking spot removed and bicycle lane installed is a potential source for political contention. This battle largely stems from Portlanders' (and Americans' more broadly) love affair with the personal vehicle. Since the personal

[65] Municipality of Copenhagen, "The City of Copenhagen Government: 2018-2021," https://international.kk.dk/sites/international.kk.dk/files/uploaded-files/the_city_of_copenhagen_government_2018_-_2021.pdf.
[66] "Members in Each Party Group," The Danish Parliament, accessed March 27, 2020, https://www.thedanishparliament.dk/en/members/members-in-party-groups.
[67] Henderson and Gulsrud, 94.
[68] "Transport," Social Democratic Party, accessed March 27, 2020, https://www.socialdemokratiet.dk/da/politik/transport/.

vehicle's emergence in the early 20th century, the US has been among the global leaders in both automobile production and vehicles per capita. Strong political support from politicians, lobbyists, and voters helps the personal vehicle endure despite dissuading factors like economic downturns, environmental impacts, and accessibility issues. Portland seeks to push back on the automobile's dominance by embracing bicycle infrastructure. However, familiar political battles over car restraint, societal acceptance, and equity among others prevent cycling from becoming a more dominant transportation mode in Portland. While Portland continues its steady progress towards bicycle friendliness, it fails to overcome the US's historical trends and approach Copenhagen's levels of success.

At the onset of the 20th century, US transportation mode share looked much like its counterparts around the globe: Americans used some combination of horse-drawn carriages, trains, streetcars, bicycles, and even electric vehicles. However, by the mid-1910s, the gas-powered automobile grew dominant in the US. Mass-produced, affordable vehicles, combined with effective political lobbying from automobile and oil companies, led to government support via the 1916 Federal Road Aid Act.[69] The outbreak of WWI also played a large role in establishing automobile hegemony, as the US government saw gas-powered vehicles as "well-suited for military applications, especially as trucks."[70] Following the war's end, the military redistributed its reserves to American manufacturers. A vicious cycle emerged: Americans demanded more personal vehicles, and the American government obliged by expanding the road

[69] "A Journey Through American Transportation: 1776 – 2016," US Department of Transportation, accessed March 27, 2020, https://www.transportation.gov/50/timeline/accessible.
[70] Benjamin K. Sovacool, "Early Modes of Transport in the United States: Lessons for Modern Energy Policymakers," *Policy and Society* 27, no. 4 (March 1, 2009): 411–27, https://doi.org/10.1016/j.polsoc.2009.01.006.

network. By the late 1920s, one in every five Americans drove an automobile.[71] More Americans took to cars in economically prosperous years following WWII, and with the Federal-Aid Highway Act of 1956, the personal automobile became the sole mode of transportation for most Americans.

Unlike Denmark, the US maintains large automobile manufacturing and petroleum industries, whose strong political lobbies push for auto-friendly policies. The US is the world's second largest market for vehicle sales and production, as well as the world's top crude oil producer.[72,73] This gives Americans access to cheap vehicles and gas, incentivizing personal automobile use. US subsidies on these goods (particularly fuel) make them even cheaper, contributing to Americans' perception of the automobile as an essential good rather than a luxury one. Political and economic support for the automobile informs US policy. Key policy players, including the American Association of State Highway Transportation Officials (AASHTO) and the Federal Highway Administration (FHWY), have been slow to adopt alternative transportation modes.[74] In particular, the FHWY's Manual on Uniform Traffic Control Devices (MUTCD) informs all traffic engineers across the country yet remains auto-oriented.[75] Engineers (and in turn, the cities they work for) that deviate from the MUTCD risk increased liability and lost federal funding. These outdated standards prevent cities and towns from innovating out of fear of legal and financial retribution. From the federal

[71] "History and Politics of Transportation in the United States," Safe Routes to School, accessed March 27, 2020, http://www.saferoutestoschools.org/documents/Transportation_History.pdf.
[72] "Automotive Industry Spotlight," International Trade Administration, accessed March 30, 2020, https://www.selectusa.gov/automotive-industry-united-states.
[73] "Oil: Crude and Petroleum Products Explained," US Energy Information Administration, March 30, 2020, https://www.eia.gov/energyexplained/oil-and-petroleum-products/where-our-oil-comes-from.php.
[74] Mapes, 220.
[75] Mia Birk, *Joyride: Pedaling Toward a Healthier Planet* (Portland: Cadence Press, 2010), 60.

government to small municipalities, the US continues to embrace the personal automobile.

A distinct lack of political, economic, or policy support has not prevented cities like Portland from pushing the boundaries and investing in cycling infrastructure. Beginning in the mid-1970s, Portland tried to reduce urban vehicle travel and increase alternative transportation use. That decade, the city demolished what was previously a four-lane highway and installed Governor Tom McCall Waterfront Park, increasing greenspace in the urban core.[76] Additionally, Portland city council, Multnomah county commissioners, and grassroots legal opposition blocked the planned construction of the Mount Hood Freeway through southeast Portland.[77] The city used $180 million in federal money associated with that project to construct Portland's first MAX light rail line. Today, the MAX is the fourth-largest light rail system in the US by passenger volume.[78] These measures were the first in a series of shifts towards sustainable transportation in the latter half of the 20th century.

Portland passed its first Bicycle Master Plan in 1973, establishing baseline infrastructure and ridership standards.[79] The city also established the Office of Transportation's Bicycle Program to help implement the plan. The Bicycle Program "produced route maps, installed bike racks, wrote bike parking codes, and began organizing bicycle encouragement events and programs."[80] By 1996, Portland's bike

[76] Portland Parks and Recreation, "Waterfront Park," City of Portland, accessed March 30, 2020, https://www.portlandoregon.gov/parks/finder/index.cfm?action=viewpark&propertyid=156.
[77] Val Ballestrem, "Mount Hood Freeway," The Oregon Encyclopedia, March 1, 2019, https://oregonencyclopedia.org/articles/mt__hood_freeway/#.XoLQcohKg2w.
[78] MacPherson Hughes-Cromwick, "2018 Public Transportation Fact Book," American Public Transportation Association, December 2018, https://www.apta.com/wp-content/uploads/Resources/resources/statistics/Documents/FactBook/2018-APTA-Fact-Book.pdf.
[79] "The Portland Bicycle Story," Initiative for Bicycle and Pedestrian Innovation, accessed March 27, 2020, https://www.pdx.edu/ibpi/sites/www.pdx.edu.ibpi/files/portlandbikestory_1.pdf.
[80] Ibid.

network stretched over 150 miles, connected to bus and MAX lines, and included 1400 public bike parking stations.[81] However, the city sought to expand cycling's mode share, which hovered at around two percent. Portland's updated 1996 Bicycle Master Plan was published following two years of public input and called for a 445-mile expansion to the existing system, increased bike parking spaces, and improved transit connections.[82] Additionally, the plan established other benchmarks to demonstrate improvement, including a twenty-year bicycle mode share increase of 10%. The city enacted its plan in earnest, expanding its bicycle network 125 miles by 2008.[83] That same year, Portland's bicycle mode share increased to 6.4%, the highest of any major US city.[84]

Since 2008, however, Portland has failed to increase its bicycle mode share. In 2016, when the city's 20-year benchmarks demanded a mode share of 10%, actual bicycle mode share hovered at 6.3%.[85] Since then, bicycle mode share has continued to fall, with results from the 2018 American Community Survey indicating a mode share of just 5.3%.[86] This fall comes despite the city's Bicycle Plan for 2030, which called for a minimum 25% bicycle commute share by 2030.[87] Moreover, the 1996 Plan called for a 630-mile total bicycle network by 2016, yet in 2019 Portland's network was only 388.2 miles.[88] The Plan for 2030 called for an additional 681 bikeway miles to create a

[81] Office of Transportation, "Bicycle Master Plan," City of Portland, 1996, https://www.portlandonline.com/shared/cfm/image.cfm?id=40414.
[82] Ibid.
[83] "The Portland Bicycle Story."
[84] Ibid.
[85] "Analysis of Bicycle Commuting in American Cities," League of American Bicyclists, 2016, https://bikeleague.org/sites/default/files/LAB_Where_We_Ride_2016.pdf.
[86] American Community Survey, "Means of Transportation to Work," US Census Bureau, 2018, https://data.census.gov/cedsci/table?q=&lastDisplayedRow=20&table=B08301&tid=ACSDT1Y2018.B08301&g=1600000US4159000&t=Commuting&hidePreview=true&y=2018.
[87] Portland Bureau of Transportation, "Portland Bicycle Plan for 2030" (City of Portland, February 11, 2010), https://www.portlandoregon.gov/transportation/article/289122.
[88] Portland Bureau of Transportation, "Portland Bicycle Plan for 2030: 2019 Progress Report" (City of Portland, 2019), https://www.portlandmercury.com/images/blogimages/2020/02/11/1581448938-bike_plan_2019_progress_report_final_draft_wappendix_draft.pdf.

"world-class system." Through September 2019, Portland built only 99 additional bikeway miles, putting them well behind schedule.[89] Accordingly, the city moved its goals back from 2030 to 2035, but the timeline still appears crunched. Between 2019 and 2035, the city hopes to increase bike mode share from 5.3% to 25%, transit mode share from 12.6% to 25%, and decrease driving mode share from 65.3% to 42.5%.[90] Using its pace for new bikeways as an indicator, these ambitious goals will not be achieved in that amount of time. Portland is falling short of its 2030 goals.

Mobility politics prevent Portland from reaching its bicycle infrastructure goals. However, such politics are more nuanced than traditional two-party American politics. Liberals tend to support bicycle infrastructure more than conservatives, who view cycling as "wasteful spending.... [b]ecause of the relatively small number of riders, particularly in the suburbs..."[91] However, some Portlanders support cycling regardless of political party. Sho Dozono, a 2008 mayoral candidate who ran on an economically conservative platform and was endorsed by the Multnomah County Republican Party, stated that Portland "ought to be equal" to peer cycling cities like Amsterdam.[92] Moreover, the progressive politics that dominate city politics largely support cycling's growth. Instead, automobile users are the biggest impediment to increased bicycle infrastructure.

Drivers see bicycle infrastructure as a threat to their preferred mode share. In their eyes, bicycle infrastructure increases traffic and inconvenience by reducing vehicle lanes and parking spaces. This frequently makes city installation of new bicycle infrastructure a long and arduous process. Some drivers view bicycle projects as "pet

[89] Ibid.
[90] Ibid.
[91] Mapes, 164.
[92] Ibid., 145.

projects" of the city administration, ignoring their environmental, economic, and physiological benefits.[93] State legislators recognize drivers' complaints. In 2018, the state passed HB 2017, which included a $15 bicycle excise tax on any bike over $200.[94] The tax raises less than half of what Oregon legislators anticipated when it was passed; ODOT revealed the tax brought in $900,000 of an anticipated $2.1 million over its first biennium.[95] With such paltry results, the tax disincentivizes cycling while adding little to state coffers, representing a win for drivers who oppose cycling. While the political will for cycling exists, the driving majority frequently crowds it out.

Equity concerns also cause political pushback. Portland, the least diverse city in the US, faces ongoing gentrification concerns amid increased development.[96] Much like cities across the US, development in Portland's urban core pushes minority residents out to the city's fringes. With 77% of its population white, Portland's gentrification stands out.[97] Development swallows the city's few surviving minority neighborhoods. Residents of shrinking minority neighborhoods view bicycles "as a symbol of the gentrification taking place in the neighborhood," and oppose bicycle infrastructure accordingly.[98] Conversely, developers and business owners embrace the bicycle as a marketing and economic tool, catering to their young, bicycle-using clientele.

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[93] Ryan Frank, "Portland Mayor Sam Adams' Bike Plan, Derailed by Politics and Bungled Sales Pitch, Rides through Controversy," *The Oregonian*, January 17, 2011, https://www.oregonlive.com/portland/2011/01/portland_mayor_sam_adams_bike.html.
[94] "Oregon's Bicycle Excise Tax," Oregon Department of Revenue, accessed May 6, 2020, https://www.oregon.gov/dor/programs/businesses/Pages/Bicycle-excise-tax.aspx.
[95] Dick VanderHart, "Oregon's Unique Bike Tax is Pulling In Far Less Than Expected," OPB, December 12, 2018, https://www.opb.org/news/article/bike-tax-oregon-revenue-projection-2018/.
[96] Rosie Cima, "How Diverse Is Your City?," Priceonomics, accessed April 1, 2020, http://priceonomics.com/how-diverse-is-your-city/.
[97] "U.S. Census Bureau QuickFacts: Portland, Oregon," US Census Bureau, July 1, 2018, https://www.census.gov/quickfacts/fact/table/portlandcityoregon/PST045218.
[98] Linda Baker, "Developers Cater to Two-Wheeled Traffic in Portland, Ore.," *The New York Times*, September 20, 2011, https://www.nytimes.com/2011/09/21/business/portland-ore-developments-cater-to-bicycle-riders.html.

Business aims for Portland's bicycle culture mirror the neoliberal politics of Copenhagen. Increasingly, the city promotes bicycle infrastructure to spur development, rather than as a legitimate transportation mode.[99] Portland's stagnating bicycle numbers suggest its priorities lie elsewhere. A 2018 study analyzed discourse in the city's central bicycle plans, analyses, reports, and promotional materials to determine Portland's rationale for cycling.[100] The study concluded that Portland's bicycle promotion "is rooted in a neoliberal ideology of urban development and economic growth" despite cycling's environmental and equity benefits.[101] Like Copenhagen, Portland promotes cycling's image to convey the city's progressive and sustainable attributes primarily to attract creative class workers. Portland's mobility goals appear to be goals in name only. Instead, its policy ambitions lie in economic development and growth, with bicycle policy serving those ends.

[99] Ibid.
[100] Mikkel Ibsen and Kristian Olsen, "Bicycle Urbanism as a Competitive Advantage in the Neoliberal Age: The Case of Bicycle Promotion in Portland," *International Planning Studies* 23, no. 2 (2018): 210-224.
[101] Ibid.

Deconstructing Differences Between Portland and Copenhagen

The Power of Design

Design plays an influential role in creating a safe, comfortable, and accessible cycling environment. Specifically, studies show that separate, protected bicycle infrastructure can drastically increase the number and frequency of cyclists. This is largely due to increases in safety and the perception of safety. Protected bike lanes make riders feel safer, inspiring more people to ride and increasing others' awareness of cyclists in the process. This "safety in numbers" theory shows positive results in Copenhagen, as increased cyclists have led to decreased traffic injuries and fatalities. While Portland cannot yet rival Copenhagen's cohesive bike network design, the city is taking steps to improve bicycle infrastructure design and bring more riders to the streets. In doing so, Portland demonstrates how to successfully implement Copenhagen's model.

Separate infrastructure's effectiveness at bringing riders to the streets has been well established for decades. As far back as 1996, a report from the US surgeon general indicated that "53 percent of people who had cycled in the previous year said they would commute to work by bike if they could do so on 'safe, separated designated paths.'"[102] Separate bike paths are a common refrain in US polling; Americans' overwhelming concern is ironically their personal safety from cars. In the National Association of City Transportation Officials' (NACTO) 2016 report, 60% of the surveyed population indicated they were "interested but concerned" in cycling as a

[102] Mapes, 196.

commuting mode.[103] Of that 60%, 81% said they would comfortably cycle on streets with separated infrastructure.[104] Separated infrastructure includes measures like elevated bike paths, plastic bollards, and parking protected lanes among others. In a country as committed to the personal vehicle as the US, separate infrastructure is the only effective way to ensure riders' perception of safety.

This perception of safety is crucial to creating a safe cycling environment. Afterall, plastic bollards or three-inch curbs do little to stop a two-ton vehicle traveling at speed. The knowledge that cars can still pose a threat should not dissuade cyclists, however, as research indicates that separate lanes create a safer cycling environment than any other form of bicycle infrastructure. According to the NACTO study, the combination of better bike networks and more cyclists leads to dramatic safety increases across the board.[105] Data from seven US cities indicates that the risk per individual cyclist decreases as ridership increases, with "the rate of growth in cycling far [outstripping] the rate of cyclist injuries or fatalities."[106] Essentially, the data underscores the 'safety in numbers' theory, which indicates that the more cyclists in a bicycle network, the safer that network becomes. Greg Raisman, a former Portland traffic safety expert, suggested that increased cyclists not only create a safer bicycle network, but also "[play] a role in calming traffic and [help] drive down the city's overall crash rate."[107] As drivers become more accustomed to a larger cycling presence, the thinking goes, they respond accordingly, slowing their speeds, increasing awareness

[103] "NACTO Bike Share Equity Practitioners' Paper #3," National Association of Transportation Officials, July 2016, https://nacto.org/wp-content/uploads/2016/07/NACTO_Equitable_Bikeshare_Means_Bike_Lanes.pdf.
[104] Ibid.
[105] Ibid.
[106] Ibid., 3.
[107] Mapes, 162.

when turning, and yielding to cyclists and pedestrians. All these positive safety outcomes stem from better design that draws more cyclists to the streets, namely separated bike lanes.

Copenhagen serves as an excellent case study for separated bike infrastructure, as the city consciously chooses separated bike lanes for nearly its entire bicycle network. Results from safety studies in Copenhagen show positive results, albeit with room for improvement. A 2006 study found new separate bike lane construction resulted in a 10% drop in the total number of collisions across transportation modes.[108] However, collisions at intersections rose 18% following new construction.[109] These increased collision numbers stem from an 18-20% increase in overall bicycle traffic and corresponding 9-10% decrease in vehicle traffic. The study's breakdown of collision types underscores changes in transportation mode share. Collisions in which cyclists were rear-ended, hit while turning left, and hit by parking cars all decreased over the study period.[110] Instead, collision increases came between two cyclists, cyclists and pedestrians, cyclists and transit passengers, and cyclists and right-turning cars.[111] These numbers indicate separated bike lanes increased cycling numbers and caused different kinds of collisions, shifting from primarily vehicle-bicycle collisions to bicycle-pedestrian collisions. However, they remain somewhat dated; Copenhagen's more recent 2013-2020 Traffic Safety Plan showed better numbers. Between 2005 and 2012, injuries and deaths decreased 21% for cyclists, 27% for pedestrians, and 58% for

[108] Soren Underlien Jensen, Claus Rosenkilde, and Niels Jensen, "Road Safety and Perceived Risk of Cycle Facilities in Copenhagen," January 2006, https://nacto.org/wp-content/uploads/2010/08/Cycle_Tracks_Copenhagen.pdf.
[109] Ibid., 2.
[110] Ibid.
[111] Ibid.

drivers.[112] Copenhagen continues to decrease its traffic injuries and deaths through multimodal infrastructure and planning, approaching its goal of zero traffic deaths. Separated bicycle infrastructure goes a long way toward helping the city achieve its goals.

In Copenhagen, design means more than simply adding bicycle infrastructure where possible. Copenhagen designs every aspect of its bicycle network with riders in mind. Elevated bike lanes separate riders from vehicle traffic, encouraging more riders. Flat lanes with proper drainage prevent water from pooling in bike paths, giving cyclists a cleaner ride in a city where it rains over 25 inches annually.[113] Lanes are wide enough for cyclists riding two-abreast to be passed by faster riders. “Door zones” prevent parked cars from swinging doors into oncoming cyclists. Elbow- and foot-level bars along bike lanes at intersections allow cyclists to rest their feet at lights without dismounting their bikes. Signals prioritize cyclists by allowing them to cross intersections first and give cyclists faster commutes via a “green wave” of traffic lights. Transit stations, tourist attractions, businesses, parks, and other venues hold ample bike parking for Copenhagen’s cyclists. Bicycle theft is included in Danish home insurance, and each Danish bike comes with a unique vehicle identification number (VIN) that allows police to track stolen bicycles (similar to vehicles in the US). These designs and policies, among others, grant Copenhagen cyclists a stress-free ride throughout every corner of the city. Copenhagen maintains its incredibly high ridership rates by fully embracing the bicycle in every design aspect.

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[112] Copenhagen Technical and Environmental Administration, “Copenhagen 2013-2020 Traffic Safety Plan,” City of Copenhagen, November 2013, https://kk.sites.itera.dk/apps/kk_pub2/pdf/1154_iGUpXeTKoQ.pdf.
[113] John Cappelen, “Climatological Standard Normals 1981-2010 - Denmark, The Faroe Islands and Greenland,” Danish Meteorological Institute, 2019, https://www.dmi.dk/index.php?id=15&L=0.

Portland should model its bicycle infrastructure design after Copenhagen's example. Portland is already working to improve infrastructure design and increase protected bike lanes. In 2016, voters passed Measure 26-173 creating ten-cent fuel and heavy vehicle use taxes.[114] Revenue from these taxes is divided between street maintenance and safety improvements, some of which include protected bike lanes. However, progress is slow: money from Measure 26-173 amounts to only $3.2 million for protected lanes, and as of 2019 Portland held only five miles of them.[115,116] The city plans to expedite this progress through increased funding and a new design guide. New funding will help install 29 miles of new protected lanes, primarily in Downtown and East Portland where network connectivity breaks down.[117] The design guide will solve long-term bureaucratic issues that often come with protected bike lanes. Protected lanes are rare in the US, and as a result do not appear in the MUTCD.[118] When Portland began designing its protected bikeways, engineers, planners, and project managers all relied on different information and lacked a uniform design guideline. The city sought to end this bureaucratic headache through its Protected Bicycle Lane Design Guide, releasing a draft version in June 2018.[119] The guide outlines six basic designs ranging from basic plastic barriers to sidewalk-level elevated lanes and identifies 460 miles of streets that are suitable for protected lanes.[120] Parking protected designs include door zones to

[114] "Fixing Our Streets FAQ," City of Portland, accessed April 15, 2020, https://www.portlandoregon.gov/transportation/71589.
[115] Ibid.
[116] Rachel Monahan, "Portland's Infrastructure Has Fallen Behind Its Reputation as a Bike Town. Here's How the City Is Attempting to Change That," Willamette Week, April 10, 2019, accessed April 15, 2020, https://www.wweek.com/culture/2019/04/10/portlands-infrastructure-has-fallen-behind-its-reputation-as-a-bike-town-heres-how-the-city-is-attempt-to-change-that/.
[117] Ibid.
[118] Birk, 60.
[119] Jonathan Maus, "Here's How We Build It: PBOT Releases Draft Version of Protected Bike Lane Design Guide," *BikePortland* (blog), June 26, 2018, https://bikeportland.org/2018/06/26/heres-how-we-build-it-pbot-releases-draft-version-of-protected-bike-lane-design-guide-284675.
[120] Ibid.

prevent collisions between parked cars and cyclists. Bike lanes range from five to eight feet wide, wide enough to allow two riders abreast. While these design changes do not guarantee the all-encompassing infrastructure of Copenhagen, they will create a more cohesive and user-friendly network that is moving in the right direction. By expanding its protected bicycle infrastructure, Portland demonstrates how to follow Copenhagen's design model.

Portland's current path to increased protected bike lanes illustrates how the city can design its infrastructure in Copenhagen's image. Portland must continue to expand protected infrastructure to attract new riders and establish a larger contingent of bicycle commuters. Copenhagen illustrates Portland's room for improvement regarding its infrastructure design. Door zones, priority signals, wider lanes, and ample bicycle parking are commonplace in Copenhagen. These features are rare in Portland yet essential to creating a well-connected, well-trafficked cycling network. Portland is in the early stages of adopting design lessons learned from Copenhagen. The city must continue to follow Copenhagen's lead to match its bicycle success.

Municipal Control of Infrastructure

Though there are key differences between Danish and US government structures, municipal-state politics play out similarly between Copenhagen and Portland. Both cities grapple with powerful state bureaucracies that restrict bicycle infrastructure and protect vehicle infrastructure. In Copenhagen, a more conservative national leadership prevents the city from enacting car-restrictive policies that would decrease municipal car use and leave more room for bicycle infrastructure. In recent years, state prevention of congestion pricing and increased parking prices has allowed

cars to proliferate in Copenhagen's urban core. In Portland, the Oregon Department of Transportation (ODOT) and its car-centric policies prevent a more unified municipal bicycle network. The city and ODOT frequently reach give-and-take agreements that neglect cycling's importance as a transportation mode. Both Copenhagen and Portland encounter jurisdictional issues that prevent the cities from changing highway and freeway infrastructure despite evident pedestrian and bicycle needs. These similarities underscore mobility politics' divisive nature regardless of government structure, particularly regarding vehicle restriction.

While Denmark's overall political ideology is socialist, its government structures are not far from those of the US. Denmark operates a unicameral parliament (the Folketing) that forms the country's legislative branch. Thirteen political parties, ranging politically from progressive to conservative, form political alliances to create a leading coalition government. The prime minister, selected by the parliament's largest political coalition, runs Denmark's executive branch and its affiliated departments (known as ministries). Discrepancies between municipal, regional, and national governments create political tensions like those between cities, states, and the federal government in the United States. Tensions between Copenhagen and the Danish national government resemble those between Portland and its state and federal agencies, underscoring the similarities between the two cities.

Denmark's government structures prevent Copenhagen from further expanding its bicycle infrastructure and programming, particularly in recent years. Copenhagen lacks many of the powers one would expect of it as a key municipal and regional planning resource. While Copenhagen maintains road building power for local roads

and streets, the national government controls highway construction and maintenance.[121] As a result, the national government can approve highway construction which undermines municipal bicycle transportation goals, like a proposed tunnel under Copenhagen's eastern harbor. Meanwhile, the regional administrative branch (referred to as the Capital Region) lacks any road building authority and must coordinate with local and national administrations when it wants to alter road design. The Capital Region is the primary planning administration behind the greater Copenhagen region's cycle superhighways, making a cohesive regional bicycle network that much harder to implement.[122] These administrative discrepancies create a longer bureaucratic pathway to change.

On a national level, Copenhagen frequently lacks the political support to enact policies that would help improve its bicycle infrastructure. The Danish national government often blocks or fails to support policies that receive strong support within Copenhagen. Beginning in 2006, Copenhagen aggressively pursued congestion pricing to help reduce municipal car congestion, despite no support from the national government.[123] Following a year of research, the city released a report which recommended congestion pricing with revenue sharing between Copenhagen and its suburbs. Political support for the measure was high; polling showed 65-75% support for congestion pricing, and the plan aligned well with the city's green mobility goals.[124] Nonetheless, the national government refused to back Copenhagen's proposal and conducted its own study, which "omitted the local consensus and agreement created by

[121] Henderson and Gulsrud, 78.
[122] Ibid.
[123] Ibid., 114.
[124] Ibid., 115.

Copenhagen and the suburbs."[125] Social Democrats, the largest party in the Folketing's coalition government, abandoned congestion pricing, effectively killing the plan.

Even regarding smaller measures like increasing parking costs, the conservative-leaning national government tends to intervene with Copenhagen's progressive plans. National leaders indirectly control parking policy in Copenhagen, as 70% of Copenhagen's parking revenue is redirected to the national treasury rather than the city.[126] The national government considers parking costs a form of taxation which it alone can impose. As a result, Copenhagen loses valuable revenue from parking and cannot, in turn, "develop a redistributive parking policy by using parking revenue to fund green mobility."[127] Neoliberal and conservative national coalitions also characterize parking as a form of congestion pricing (which only the national government can impose) in an attempt to further control Copenhagen's municipal parking plans. While Copenhagen is free to increase its parking costs, national pushback intensifies with each passing year of increased car use in the city. Recently, neoliberal and conservative national leaders argued that by law municipalities could only use parking revenue for parking management purposes, meaning parking revenues could not be redistributed for bicycle infrastructure.[128] Due to national pushback against increased parking costs and affiliated budget shortfalls, Copenhagen delayed some bicycle projects. Thus, though Copenhagen controls parking policy, national interference prevents parking from becoming a more useful tool in car restriction and bicycle promotion.

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[125] Ibid., 117.
[126] City of Copenhagen, "2015 First Annual Parking Report," Copenhagen Technical and Environmental Administration, 2015.
[127] Henderson and Gulsrud, 132.
[128] Ibid., 142.

Copenhagen's struggles with the Danish national government mirror those between Portland and the Oregon state government. Like the Danish national government, ODOT controls freeway and highway construction and maintenance while the city of Portland controls local streets.[129] However, many of Portland's main thoroughfares (including SE 82nd Avenue and Powell, Martin Luther King, and Barbur Boulevards) are designated state highways, remnants from before the city expanded to its current size. This means many of Portland's largest, most trafficked streets are subject to state, not local, transportation planning authorities. This planning discrepancy creates conflicts between Portland and ODOT, particularly as the city increases its investment in bicycle infrastructure. In 2013, following a cyclist's death in a hit-and-run, local bicycle advocates strongly encouraged city commissioners to examine installing protected bike lanes along Barbur Boulevard.[130] ODOT pushed back on the plan, saying the boulevard carried an essential amount of traffic during peak times that helped alleviate traffic on area freeways.[131] City officials could do little, as ODOT controlled the road and any alterations to it. It ultimately took three years, a safety audit, and pressure from state and federal legislators for ODOT to recommend changes to the corridor.[132] Such struggles underscore the bureaucratic gridlock that often occurs between Portland, ODOT, and local bicycle advocates.

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[129] Blair Stenvick, "Will New Legislation Solve 82nd Ave's Growing Pains?" *Portland Mercury*, February 4, 2019, https://www.portlandmercury.com/blogtown/2019/02/04/25757012/will-new-legislation-solve-82nd-aves-growing-pains.
[130] Joseph Rose, "Portland Bicycle Advocates, ODOT Spar Over Removing a Traffic Lane on Southwest Barbur Boulevard," *The Oregonian*, October 3, 2013, https://www.oregonlive.com/commuting/2013/10/portland_bicycle_advocates_odo.html.
[131] Ibid.
[132] Jonathan Maus, "Finally! ODOT Acknowledges Need for a Road Diet on SW Barbur Blvd," *BikePortland* (blog), March 16, 2016, https://bikeportland.org/2016/03/16/finally-odot-acknowledges-need-for-a-road-diet-on-sw-barbur-blvd-177892.

Portland's municipal efforts to improve and expand bicycle infrastructure often conflict with ODOT regulations and policies. In 2018, the city restriped North Rosa Parks Way with bicycle lanes, creating a new route on the important east-west connector and improving overall network connectivity.[133] However, a portion of the new route passed over the I-5 freeway, making it ODOT jurisdiction. Within ten months, ODOT restriped that portion from a 6.5 foot wide bike lane to a 5 foot wide lane, a narrowing that prevents cyclists from riding side by side.[134] While ODOT is legally obligated to maintain narrower bike lanes on roads it controls, the agency openly acknowledged its preference for cars in a statement regarding the lane change. ODOT Public Information Officer Don Hamilton stated: "We follow ODOT standards set for freeways that will make the road safer for people who choose to drive."[135] Hamilton invoked ODOT's car-centric freeway authority despite the bike lane's location on an overpass, which does not directly affect freeway traffic. ODOT followed its standards while ignoring the positive safety and accessibility effects a wider bike lane creates for cyclists.

As a result of these regulatory differences, Portland and ODOT frequently come to agreements that invoke compromises and tradeoffs between agencies. When requiring state funding or approval for improved bicycle infrastructure, Portland is frequently asked to make sacrifices in return. In order to gain state approval for a new bicycle signal on 28th Avenue and Powell Boulevard (which ODOT controls as an urban

[133] Jonathan Maus, "Striping Complete, Concrete Protection Still to Come for North Rosa Parks Way," *BikePortland* (blog), August 29, 2018, https://bikeportland.org/2018/08/29/striping-complete-concrete-protection-still-to-come-for-north-rosa-parks-way-288179.
[134] Jonathan Maus, "ODOT Will Shrink Bike Lanes on North Rosa Parks Way," *BikePortland* (blog), June 18, 2019, https://bikeportland.org/2019/06/18/odot-is-shrinking-the-bike-lanes-on-north-rosa-parks-way-301382.
[135] Ibid.

highway), the city agreed to remove bike lanes on 26th Avenue within two years.[136] Portland was reluctant to remove the lanes, which were relatively popular and carried bicycle traffic to and from a local high school. ODOT argued the street's crash history indicated it would be safer without cyclists, despite ample evidence that even narrow bike lanes improve traffic safety.[137] ODOT also believed that removing the 26th Avenue bike lanes would force riders to use the 28th Avenue crossing, reserving 26th Avenue for cars alone and emphasizing the Department's car-focused attitudes. The city countered that cyclists would likely use 26th Avenue with or without the bike lanes. Ultimately, the two parties compromised on a striped space for biking on 26th Avenue after pushback from residents and advocacy groups.

To prevent further impediments to a successful infrastructure network, Portland seeks to wrestle control of urban highways from ODOT. A bill introduced in 2019 could help transition urban highways like those in Portland to municipal control. Oregon HB 2864 would begin the process of transferring outdated state highways to city and county ownership.[138] Jurisdictional changes would allow communities statewide (including Portland) to add safe sidewalks, crosswalks, and bike lanes to main thoroughfares, none of which are priorities for ODOT. However, the bill is still in committee and must overcome several budgetary and political hurdles before it

[136] Michael Andersen, "City Has Two Years to Make the Case to Save 26th Avenue Bike Lanes, It Says," *BikePortland* (blog), January 7, 2016, https://bikeportland.org/2016/01/07/city-says-it-will-use-2016-to-make-the-case-to-save-26th-avenue-bike-lanes-172073.
[137] Michael Andersen, "State Says There's Not Enough Proof That Bike Lanes Boost Safety, so 26th Ave Lanes Should Go," *BikePortland* (blog), August 26, 2015, https://bikeportland.org/2015/08/26/state-says-theres-not-enough-proof-bike-lanes-boost-safety-26th-ave-lanes-go-156292.
[138] Stenvick, "Will New Legislation Solve 82nd Ave's Growing Pains?"

becomes law.[139] Municipal control of outdated urban highways remains several years away for Portland.

Portland's political battles with ODOT underscore its similarities with Copenhagen. Both municipalities frequently come into conflict with larger overriding powers at the state or (in Copenhagen's case) national level. These larger actors wield bureaucratic and political power to prevent their respective municipalities from implementing more bicycle-friendly infrastructure. In Copenhagen's case, bicycle pushback comes when the city attempts to restrict cars. The Danish national government scuttled municipal proposals for congestion pricing and increased parking rates, allowing and supporting increased car use. For Portland, efforts to expand bicycle infrastructure frequently become give-and-take affairs with the state transportation agency. ODOT's priorities do not include bicycle infrastructure and the agency prioritizes cars throughout its policies, forcing Portland into unfair infrastructure tradeoffs. Both cities lack jurisdictional control of highways and freeways, creating gridlock in their efforts to design more cohesive bicycle networks. Higher-level government infringement in municipal bicycle projects occurs in both Copenhagen and Portland, despite the seemingly vast differences between the two cities.

Social Democracy as a Value System

If their government structures are surprisingly similar, then the biggest difference between Copenhagen and Portland are their value structures: social democracy and capitalism, respectively. Socially democratic values incentivize bicycle use in Copenhagen and across Denmark. The bicycle aligns well with social

[139] "HB 2846," Oregon State Legislature, 2019, https://olis.leg.state.or.us/liz/2019R1/Measures/Overview/HB2846.

democracy's egalitarian values, and as a result social democracy embraces bicycle transportation. The same cannot be said for capitalism and its effects in the United States. Capitalism actively pushes for business growth and profits, regardless of any associated value or lack thereof. Capitalism spurred the development of the car and promoted its continued growth throughout the 20th century. Capitalist structures, like political lobbying and free markets, encourage car use today despite negative social and environmental impacts. To shift away from car culture and towards multi-modal transportation, Portland political leadership must change their approach to capitalism and embrace socially democratic values.

Societal differences between the US and Denmark help explain how the automobile dominated the US across the twentieth century. As a capitalist society, the US embraces private ownership of goods, with prices and production of goods determined by the free market. Americans associate automobiles with values of individualism and privacy, subliminally aligning the bicycle, public transit, and other modes with "values of cooperation, community, and commitment to the public good."[140] These community-centered values, while important to Americans, fall secondary to societal emphasis on the individual. A 2016 poll found 58% of Americans believe individual liberty is more important than the state guaranteeing no one is in need.[141] Additionally, Americans hold the automobile up as a symbol of upward mobility along with home ownership, education, family, and financial wealth. For Americans, the automobile is more than a transportation mode: it is a status symbol.

[140] Sovacool.
[141] Richard Wike, "Five Ways Americans and Europeans are Different," Pew Research Center, April 19, 2016, https://www.pewresearch.org/fact-tank/2016/04/19/5-ways-americans-and-europeans-are-different/.

As a socially democratic society, Copenhagen (and Denmark as a whole) maintains a specific perception in the eyes of most Americans. According to Pew Research Center, 55% of Americans view socialism as a negative term, primarily due to its implications on the US government and overall ideological reasons.[142] Among the top reasons for this negative viewpoint are: "undermines work ethic/increases reliance on government," "historical and comparative failure," and "undermines democracy/not right for the U.S."[143] Most Americans point to countries such as Venezuela and Russia as examples of socialism's failures. Conversely, 42% of Americans view socialism positively, associating the term with a "fairer, more generous system" which "builds upon and improves capitalism."[144] These Americans, generally falling on the political left, view Denmark as an ideal society. In fact, political leaders on the American left point to Denmark and its Scandinavian counterparts as examples the US should follow. During the 2016 presidential primary, US Senator Bernie Sanders said the US should "learn from what [Scandinavian countries] have accomplished for their working people."[145] In the US's most recent Democratic presidential debates, former candidate Pete Buttigieg called Denmark "the number one place to live out the 'American Dream' right now."[146] The US's harsh political dichotomies divide Denmark into one of two things: an oppressive, nightmarish government or an equitable social paradise.

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[142] "Americans' Views of 'Socialism' and 'Capitalism' In Their Own Words," *Pew Research Center - U.S. Politics & Policy*, October 7, 2019, https://www.people-press.org/2019/10/07/in-their-own-words-behind-americans-views-of-socialism-and-capitalism/.
[143] Ibid.
[144] Ibid.
[145] "What Can the U.S. Learn from Denmark?" PBS NewsHour, October 15, 2015, https://www.pbs.org/newshour/world/can-u-s-learn-denmark.
[146] Chantal Da Silva, "Pete Buttigieg Praises Denmark as Best Place to Live the American Dream During Debate—The Country Has Universal Healthcare," *Newsweek*, February 20, 2020, https://www.newsweek.com/pete-buttigieg-democratic-debate-denmark-american-dream-healthcare-1488215.

Neither of these characterizations is fully true to Copenhagen. In fact, social democracy's associated pros and cons closely resemble capitalism. Both societies utilize a capitalist economic system; social democracy simply promotes state economic and social intervention to promote social justice and equity. Regarding bicycle infrastructure, social democracy helped guide Copenhagen's initial pro-bicycle policies and encourage bicycle infrastructure's continued expansion. Socially democratic equity ideals fueled government support for bicycle infrastructure. Today, the government views the bicycle as an ideal transportation mode to promote "social solidarity, cooperation, and egalitarianism."[147] Copenhagen's high taxes and fees, along with already high associated costs, make owning a personal vehicle far more expensive than owning a bicycle. In turn, the bicycle acts as a "social leveler," accessible to anyone physically fit enough to use one.[148] Social democracy also allows efficient and effective top-down policies in the name of wealth redistribution. Historically, these redistributive policies promote cycling and restrict car use. High national tax rates on cars, for instance, help disincentivize car-ownership across Denmark and make it relatively easier for Copenhagen to implement car-restrictive policies. Socially democratic ideology and its affiliated policies help sustain Copenhagen's high-quality bicycle infrastructure.

Like socially democratic ideology, capitalist ideology spurred initial bicycle infrastructure investments. Throughout the 1870s, bicycles gained broader popularity in the US. However, they faced difficult travel conditions in the form of rutted gravel and dirt roads, as well as streets crowded with horses, wagons, and pedestrians.[149] The

[147] Henderson and Gulsrud, 48.
[148] Ibid., 49.
[149] "Mission and History," League of American Bicyclists, May 17, 2013, https://www.bikeleague.org/content/mission-and-history.

League of American Wheelmen (LAW), a lobby group for cyclists, formed in 1880 and began advocating for a system of paved roads. The Good Roads Movement, as the movement became known, gained a national following by the mid-1890s through a magazine of over a million subscribers and several pamphlets.[150] In 1893, the US government opened the Office of Road Inquiry to research new road building techniques that would create smooth, paved surfaces for cyclists.[151] However, LAW's limited political influence prevented swift changes from occurring.[152] New road construction did not begin in earnest until the American Automobile Association (AAA) emerged as LAW's more influential successor. Once the automobile industry began pushing for better roads, road construction began in earnest. Ironically, bicycle activists helped create initial road networks for vehicles.

Stronger industrial connectivity and economic outcomes explain the AAA's success. While many bicycle companies were profitable, they lacked the overall economic output of the automobile industry.[153] A small, two-wheeled, man-powered machine uses far fewer input materials than a large, four-wheeled, machine powered one. When the automobile emerged, industrialists in "'glass, rubber, steel, concrete, and their end products'" found a quickly growing market that demanded their inputs.[154] As a result, these associated industries joined the AAA in pushing for a cohesive network of high-quality roads. Today, the automobile carries far more economic weight than any other transportation mode, including bicycles. The US bicycle market's cumulative size

[150] Susan Croce Kelly, "Good Roads Movement," Encyclopedia Britannica, September 4, 2017, https://www.britannica.com/event/Good-Roads-movement.
[151] Ibid.
[152] Yves Engler, "Cars and Capitalism," *Magazine of Green Social Thought* 56 (2011), http://greensocialthought.org/archive/wp-content/uploads/2012/12/Pages-35-36-merged.pdf.
[153] Ibid.
[154] Ibid.

hit $6.2 billion in 2015, a ten year high.[155] This number is paltry compared to the US automotive industry, which contributed $545.4 billion to the US GDP (equivalent to 2.7%) in 2019.[156] Yet only one in three dollars the automotive industry creates "is generated directly from carmakers."[157] The auto industry also provides valuable support to a number of related industries, including petroleum, banking (auto loans), insurance, rental companies, mechanics, and other tangential businesses. These adjacent industries make the personal vehicle an immensely profitable enterprise, creating broad support for cars across the economic spectrum.

In contributing critical economic profits to multiple billion-dollar industries, automobiles fit excellently in the US's capitalist society. To counter capitalism's support for automobiles, Portland can institute policies and promote values that run counter to capitalism's focus on economic success and free-market dominance. Among the most effective policy changes to counter economic emphasis on automobiles are policies which restrict car use. Parking restrictions, including higher parking costs, parking space removal, and decreasing or eliminating parking requirements for new developments, prove effective at lowering urban car use in cities that pursue such policies. Portland policies already support parking restriction to some degree. The city's "Central City in Motion" plan will remove 1,000 parking spaces in favor of bicycle infrastructure, dedicated transit lanes, or both, increasing the percentage of city land dedicated to these modes from four to six percent.[158] However, Portland still requires

[155] "U.S. Bicycle Industry: Market Size 2004-2015," Statista, July 31, 2015, https://www.statista.com/statistics/255614/size-of-the-bicycle-market-in-the-united-states/.
[156] Kimberly Amadeo, "The Economic Impact of the Automotive Industry," The Balance, September 30, 2019, https://www.thebalance.com/economic-impact-of-automotive-industry-4771831.
[157] Engler, "Cars and Capitalism."
[158] Portland Bureau of Transportation, "Transportation for Everyone: Central City in Motion Implementation Plan," City of Portland, 2018, https://sightline-wpengine.netdna-ssl.com/wp-content/uploads/2018/11/Final_CCIM-Final-

parking minimums for new large-scale developments, even those within close proximity to frequent-service transit stations.[159] While minimums represent government intervention, they also overwhelmingly benefit private enterprises like automobile manufacturers. Bicycle parking can substitute for up to 25% of required parking, but parking decisions are ultimately up to developers.[160] Portland will need to become more serious about its car restriction policies to see real change. This could include eliminating parking minimums, replacing more parking with bicycle and transit infrastructure, reallocating more street space for bicycles, and congestion pricing or a vehicle-miles-traveled tax. Portland must provide economic incentives to move residents out of their cars and onto a bicycle.

Policy changes will beget values changes from residents. If Portland makes driving more difficult while continuing to build up bicycle infrastructure, more people will choose to bike. In a liberal, urban environment with well-established cycling infrastructure, convincing more people to take sustainable transportation should be easier relative to the greater US. Portland residents already demonstrate their passion for cycling through the city's Sunday Parkways program and the annual Bridge Pedal. From May to September, the Sunday Parkways program closes a 7-10 mile course of neighborhood streets to cars, allowing cyclists of all ages and abilities to roam Portland's streets.[161] During the Bridge Pedal, Portland closes all bridges spanning the Willamette River to traffic, allowing cyclists and pedestrians to cross the iconic bridges

Report_Digital_LowRes.pdf.

[159] Portland, Oregon Municipal Zoning Code § 33.266.110.

[160] Ibid.

[161] Portland Bureau of Transportation, "Sunday Parkways," City of Portland, accessed April 4, 2020, https://beta.portland.gov/sunday-parkways.

without fear.[162] These iconic rides draw hundreds of thousands of cyclists each year, demonstrating Portland residents' underlying passion for cycling. Portland could further foster cycling values through improved cycling infrastructure, public outreach campaigns, cycling-transit connections, and bikeshare access. Each of these options would improve public access, encouraging existing riders while attracting new ones. Implementing these changes while restricting car access would demonstrate to residents Portland's commitment to cycling as a primary transportation mode. While values changes cannot occur overnight, over time it is possible to change perceptions on cycling and encourage more cyclists.

Changing Portlander's values is an ambitious goal, but Copenhagen shows that with the right incentives, values changes are feasible. Social democracy's support for bicycle infrastructure stems from its embrace of egalitarian ideals. State economic intervention to support social justice extends to Copenhagen's bicycle infrastructure. Portland must counter established capitalist structures by embracing socially democratic values. By increasing economic pressure on vehicles and improving bicycle access, the city can shift economic incentives to cycling rather than driving. In turn, continued expansion of bicycle infrastructure will demonstrate Portland's commitment to cycling over driving. As more Portland residents begin cycling, more will recognize its economic, environmental, and social benefits, leading to a gradual change in values. Copenhagen's socially democratic values illustrate how Portland must change its residents' perception of cycling to encourage more riders.

[162] "Providence Bridge Pedal and Stride," accessed April 4, 2020, https://www.providence.org/lp/bridge-pedal.

Political Lessons from the Present

To some degree, Portland's current and future bicycle policies show how US cities can build their networks the Copenhagen way. However, Portland must do more than simply increase ridership to create a more successful bicycle network. As Copenhagen illustrates, it is not enough to simply expand the network and invite more riders to the streets. Despite being the global leader in bicycle mode share, Copenhagen now struggles with overcrowded bike lanes, insufficient bike parking, and increased vehicles in its city center. Coupled with ongoing political battles and policy stagnation, Copenhagen demonstrates what can go wrong when bike infrastructure reaches capacity and the political will for change is tested. Portland must anticipate Copenhagen's existing troubles in its plans through unified progressive policies that support cycling across the board.

Copenhagen's consolidated efforts to expand its bicycle network led to drastic and impressive results, as the city saw high and growing ridership. In 2016, cyclists represented 29% of all trips made in the city, higher than any other city globally excluding Amsterdam (32%).[163] Bicycles represented 41% of commuters to school or work, and more bicycles crossed the city center that year than cars.[164] However, new problems emerged. As economic growth returned to the city, so did car ownership, which increased 29% between 2000 and 2014.[165] Today, car owners, still representing the majority of trips, continue to demand space that might otherwise be used for cyclists and other sustainable transportation modes. Additionally, neoliberal political leaders

[163] Henderson and Gulsrud, 21.
[164] Copenhagen Technical and Environmental Administration, "Copenhagen City of Cyclists: Facts and Figures 2017," City of Copenhagen, 2017, http://www.cycling-embassy.dk/wp-content/uploads/2017/07/Velo-city_handout.pdf.
[165] Henderson and Gulsrud, 69.

who might otherwise support progressive mobility policies avoid taking tough stances against cars, fearing political retribution from car-owning voters. As a result, policies like congestion pricing and car parking removal fail to pass, and Copenhagen's bicycle infrastructure remains stagnant. Without continued progress, Copenhagen will fail to meet its goal of a 50% bicycle mode share for commuting.[166]

Stagnant bicycle infrastructure results in a plateaued cycling rate. In 2016, Copenhagen's bicycle commuting mode share fell to 41%, four percentage points lower than two years prior.[167,168] Prior to 2016, construction of new subway lines and renovations to the district heating system placed construction throughout the city. Construction slowed down or blocked car traffic while allowing bicycles constant passage, artificially inflating bicycle counts from preceding years by incentivizing drivers to cycle who otherwise would not.[169] When construction ended, many of the new cyclists continued to ride, but cycling infrastructure remained the same. Meanwhile, cars returned to urban streets, creating a more trafficked and hostile cycling environment. This sudden spike in cyclists led to overcrowding on many major bike lanes throughout Copenhagen that continues today. Crowding disincentivizes other commuters from becoming cyclists themselves. Survey data from 2016 revealed that 44% of residents would cycle more if there were more bike lanes and 33% would if bike lanes were wider.[170] Unfortunately, Copenhagen's political climate prevents further car restraint that would create room for more bicycle infrastructure. Neoliberal and conservative political parties promise to "preserve street parking, provide less expensive

[166] Ibid.
[167] "City of Cyclists 2017"
[168] Henderson and Gulsrud, 72.
[169] Ibid., 73.
[170] "City of Cyclists 2017."

parking, and endorse new private off-street parking."[171] Social Democrats, the largest and most dominant party, compromise with other neoliberal parties on parking issues in the name of economic growth. Additionally, such parties oppose using the car tax as a redistributive tax for other transportation modes, preferring the tax only if it benefits car users. Neoliberal and conservative endorsement of said policies form a political majority that prevents additional road reallocation for cycling, leading to crowded cycling lanes and stagnant ridership.

Neoliberal parking support also undermines national climate policy, which neoliberal parties vocally endorse. Copenhagen's Climate Plan, adopted in 2012, calls for the city to become carbon neutral by 2025. The plan declares a shift towards renewable energy sources, mandates green building codes, and sets a goal of 75% of all trips to be made via green mobility modes.[172] Unfortunately, mobility politics have thus far undermined Copenhagen's climate goals. Transportation emissions rose between 2010 and 2015 from 24% to 34% of total city emissions.[173] The Climate Plan devotes an entire chapter to mobility emissions reductions, calls for expanded cycling infrastructure, and celebrates cycling and public transit as critical to reducing overall emissions.[174] Yet the plan ignores car restraint policies including congestion pricing and parking restriction as part of its emissions reduction plan. Instead, the Climate Plan focuses on green energy production to offset Copenhagen's carbon emissions. Green energy production represents 80% of the city's planned carbon "reduction" according to

[171] Henderson and Gulsrud, 94.
[172] Copenhagen Technical and Environmental Administration, "Copenhagen Climate Plan," City of Copenhagen, August 2009, https://www.energycommunity.org/documents/copenhagen.pdf.
[173] Copenhagen Technical and Environmental Administration, "Copenhagen 2025 Climate Plan: Roadmap 2017-2020," City of Copenhagen, June 2016, https://cdn.locomotive.works/sites/5ab410c8a2f42204838f797e/content_entry5c8ab5851647e100801756a3/5cab5f148ee1a4007fe44c9f/files/CPH_2025_Climate_Plan.pdf?1554734868.
[174] "Copenhagen Climate Plan."

the plan.[175] The plan implies that Copenhagen will build excess renewable energy sources, selling surplus energy on the global market to cover for its carbon emissions. Effectively, this allows emissions to rise, eliminating any climate-related incentives for car restraint and bicycle infrastructure expansion. The Climate Plan finds its roots in neoliberal policies that support environmentalism only as a balancing mechanism for continued economic growth. This renders the bicycle moot as a sustainable transportation mode, as cars can still propagate under the plan. In supporting sustainability but avoiding car restriction, Copenhagen's neoliberal mobility policies are hypocritical and ineffective.

Portland must keep lessons learned from Copenhagen in mind when planning its expanded bicycle infrastructure. Portland's 2015 Climate Action Plan highlights the city's plans to reduce transportation-related carbon emissions, namely by reducing vehicle mode share from 67% to 42.5% by 2030.[176] To do so, the plan emphasizes making it easier to bike by expanding and improving bicycle infrastructure. The plan references street design, separate bicycle facilities, transit connectivity, and increased density as effective ways to shift users to active transportation. Unlike Copenhagen, Portland's plan directly references parking as a strategy for reducing vehicle mode share, stating: "Link parking requirements to mode share targets; [d]evelop parking management policies and programs, including shared parking, that reduce vehicle miles traveled and promote successful density within centers and along corridors." While the language lacks specific references to parking restriction or car restraint, it leaves room for such efforts within Portland's larger parking plan. Much of Portland's climate plan

[175] "Copenhagen 2025 Climate Plan."
[176] "Climate Action Plan," City of Portland, Multnomah County, June 2015, https://beta.portland.gov/sites/default/files/2019-07/cap-2015_june30-2015_web_0.pdf.

allows vehicle restriction through flexible policies and language. As the city's bicycle network continues to grow, it may consider tightening those policies and language to more effectively restrain vehicles and reallocate space for bicycles.

Currently, Portland's bicycle network is not large enough to experience the overcrowding of Copenhagen's network. However, as Portland continues to invest in cycling infrastructure and ridership numbers increase, it may reach similar results without proactive action. In fact, infrastructure plateaus like Copenhagen's occur in Portland today. The city's 2019 update on its 2030 Bicycle Master Plan indicated it completed only 59 of the original 223 action items (26%), despite being ten years into the plan and nearly halfway to its original end date.[177] Moreover, cyclists' commute mode share fell nearly 15% between 2017 and 2019, dropping from 6.3% to 5.3% of overall commuters.[178] This fall represents nearly 4,000 fewer commuting cyclists. Portland's lack of completed action items and corresponding fall in cyclists indicate the city is not doing enough to encourage existing cyclists or attract new ones. If the city hopes to increase its ridership numbers, it must expand cycling infrastructure and enforce car restraint. To do so, it must overcome the political constraints that prevent even cities like Copenhagen from fully embracing the bicycle.

Political factors impede Portland's bicycle infrastructure in more direct ways than Copenhagen. All three of Copenhagen's political branches (progressive, neoliberal, and conservative) recognize the importance of bicycle infrastructure, thus cycling politics frequently enter the political lexicon in mobility debates. In Portland, despite the city's decidedly liberal political leanings, neoliberal and conservative political

[177] "2019 Progress Report."
[178] Jonathan Maus, "US Census: Portland Bike Commuting Hits Lowest Rate in 12 Years," *BikePortland* (blog), September 26, 2019, https://bikeportland.org/2019/09/26/us-census-portland-bike-commuting-hits-lowest-rate-in-12-years-305326.

parties do not embrace cycling infrastructure like their Danish counterparts. Moreover, divisions persist among Portland progressives on how to best implement bicycle infrastructure. City leaders, like Mayor Ted Wheeler, pride themselves on efforts to make Portland a more bikeable city. Wheeler claims Portland is "working hard to make biking, walking, and transit the easiest, fastest, and most effective way to get around in our community."[179] Bicycle advocates and environmentalists, however, believe the city's progressive leaders are not doing enough to change the way average citizens commute, particularly new residents. Portland's population grew 11.9% between 2010 and 2018, representing nearly 70,000 new residents.[180] This rise in population corresponds with Portland's plateaued and now decreasing bicycle mode share. Jonathan Maus, writer for Bike Portland, believes the city is not adequately incentivizing new residents to shift modes and is instead "trying to mitigate the impact of the cars [new residents are] bringing in."[181] Portland's political leadership and its community advocates see the city's bicycle infrastructure efforts in very different lights.

Portland's divided bicycle politics are reflected in its paradoxical policies. In July of 2019, the city created the Pricing for Equitable Mobility task force, intended to study ways to charge drivers for road use, including strategies like cordon pricing, demand-based parking fees, and a vehicle-miles-traveled tax.[182] Additionally, the state applied for federal tolling approval for the I-5 and I-205 freeways as they travel through

[179] Britany Robinson, "The Green Dream of Portland," *Curbed* (blog), April 1, 2020, https://www.curbed.com/2020/4/1/21202051/portland-oregon-sustainability-history.
[180] "U.S. Census Bureau QuickFacts."
[181] Robinson, "The Green Dream of Portland."
[182] Andrew Theen, "Portland to Create 'Equitable Mobility' Task Force to Investigate How to Charge People to Use Local Roads," *The Oregonian*, July 10, 2019, https://www.oregonlive.com/business/2019/07/portland-to-create-equitable-mobility-task-force-to-investigate-how-to-charge-people-to-use-local-roads.html.

Portland.[183] At the same time, an I-5 expansion in the central city will continue without an additional environmental review after city officials backed off initial calls for further environmental studies.[184] Metro, Portland's regional planning agency, expressed concern with an initial environmental assessment that posited increased freeway capacity, increased emissions due to induced demand, and a lack of true need for the project.[185] Less than a year later, Metro approved $129 million in additional funding for the now nearly-$800 million project while political leaders withdrew demands for a more extensive Environmental Impact Statement (EIS).[186,187] The project will draw more drivers to area freeways and in turn incentivize personal vehicle use over cycling. Like Copenhagen, Portland appears to want its progressive, sustainable politics both ways. Progressive leaders want to increase car restraint and promote more cycling. At the same time, they support expensive freeway expansion plans that incentivize cars over bicycles. Portland leaders must take strong political stances in favor of cycling at all levels, not just when it is politically convenient, to see ridership increases and a more balanced mode share.

Copenhagen's existing political battles over bicycle infrastructure demonstrate how Portland can better approach its bicycle and mobility politics. Dominant neoliberal

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[183] Andrew Theen, "Tolls on I-5, I-205 'Likely Eligible' for Approval, Feds Say," *The Oregonian*, January 10, 2019, https://www.oregonlive.com/commuting/2019/01/feds-say-tolls-on-i-5-i-205-likely-eligible-for-approval.html.
[184] Brian Kosciesza, "I-5 Rose Quarter Expansion Will Move Forward," KGW, April 2, 2020, https://www.kgw.com/article/news/local/i5-rose-quarter-expansion-will-move-forward/283-9a819ebe-3ba9-44a6-b479-da440b77c2f7.
[185] Elisa Gertler, letter to Megan Channel and Emily Cline, April 1, 2019, https://bikeportland.org/wp-content/uploads/2019/04/EA-Review-Comment-Letter-040119.pdf.
[186] Jonathan Maus, "Concerns Aside, Metro Council Gives ODOT $129 Million for I-5 Rose Quarter Project," *BikePortland* (blog), April 3, 2020, https://bikeportland.org/2020/04/03/concerns-aside-metro-council-gives-odot-129-million-for-i-5-rose-quarter-project-313257.
[187] Andrew Theen, "As Rose Quarter Freeway Project Heads to Key Vote, Portland Area Politicians and Opponents Offer Olive Branch," *The Oregonian*, March 31, 2020, https://www.oregonlive.com/washingtoncounty/2020/03/as-rose-quarter-freeway-project-heads-to-key-vote-portland-area-politicians-and-opponents-offer-olive-branch.html.

politics prevent Copenhagen from expanding its cycling network, leading to overcrowding on existing infrastructure and disincentivizing cycling as a transportation mode. Moreover, Copenhagen's mobility policies run counter to its declared cycling and larger climate-related goals, suggesting city politics run counter to its policies. Like Copenhagen, Portland's politics conflict with its stated bicycle and climate-related goals, indicating Portland struggles with similar problems as its Danish counterpart despite its far less-established bicycle network. Common problems suggest Portland will fail to reach its cycling-related goals unless it avoids Copenhagen's faults by embracing car restraint and aligning all city policies with climate goals. Portland can continue to invest in cycling infrastructure, but unless it addresses larger vehicle- and climate-related points of political contention, it will likely find itself in Copenhagen's current position: overcrowded bike lanes, misaligned climate policies, and strong contention over street space between modes.

Upholding Equity

The bicycle can serve as a powerful tool towards a more equitable society. Copenhagen's history as an egalitarian, cycling-based urban region implies the mode's universal accessibility across race, gender, and class differences. Portland, a city disparaged for its lack of diversity, struggles to balance equitable bicycle infrastructure against its ongoing negative gentrification concerns. Portland's related affordable housing shortage keeps minority and low-income residents out of the city center and farther from beneficial bike infrastructure. Copenhagen's existing social safety net helps provide a more equitable society for all residents and maintain more diverse riders. However, the city's urban renewal efforts have spurred negative gentrification

throughout the region, creating similar equity problems to its American counterpart. In both cities, public officials must ensure bicycle infrastructure does not come at the expense of affordable housing and prevent negative gentrification from ensuring the car's dominance.

Portland is not known for its diversity; the city is frequently cited as the whitest large metropolitan area in the US.[188,189] Portland has taken a number of measures to retain what diversity it does have and help improve overall equity. In 2011, the city established the Office of Equity and Human Rights to help "promote equity and inclusion in Portland and throughout the region."[190] The office works with elected officials and all branches of city government to ensure policies create equitable opportunities, resources, and access for all residents. This office worked with the Portland Bureau of Transportation (PBOT) to help create their 5-Year Racial Equity Plan.[191] The plan addresses racial bias in past transportation projects, like the I-5 corridor through North Portland, while establishing a broad framework for equitable transportation projects in the present and future. While the plan references the importance of public transportation and transit-oriented development in building an equitable city, it neglects cycling's importance in achieving the same end. Luckily, Portland's Bicycle Plan for 2030 addresses cycling's importance as a more equitable transportation mode for the city's minority and low-income residents.[192] The plan

[188] Emily Badger, "How the Whitest City in America Appears through the Eyes of Its Black Residents," *The Washington Post*, March 24, 2015, https://www.washingtonpost.com/news/wonk/wp/2015/03/24/how-the-whitest-city-in-america-appears-through-the-eyes-of-its-black-residents/.
[189] Alana Semeuls, "The Racist History of Portland, the Whitest City in America," *The Atlantic*, July 22, 2016, https://www.theatlantic.com/business/archive/2016/07/racist-history-portland/492035/.
[190] City of Portland, "About OEHR," accessed April 21, 2020, https://www.portlandoregon.gov/oehr/62229.
[191] Ibid.
[192] "2019 Progress Report."

encourages outreach efforts to minority communities whose cycling numbers are lower on average, establishes equity performance measures to determine project success, and utilizes equity gap analyses to identify which regions are underserved and require extra attention. On the surface, Portland appears to be doing what it can to address equity through bicycle infrastructure planning.

Unfortunately, bicycle infrastructure development, affiliated affordable housing concerns, and existing community outreach efforts indicate Portland is not living up to its stated policy ambitions. When the city sought approval to replace a traffic lane with a bicycle lane in a historically black neighborhood, minority community members pushed back vocally. Community members believed the city's process for creating new cycling infrastructure was "not inclusive of the people who live there."[193] Additionally, due to private residential and commercial development associated with new bike lanes, minority residents viewed new bicycle infrastructure as the city promoting further negative gentrification in their neighborhood. Gentrification is negative to the degree that it forces poor, minority residents out of an existing neighborhood to make room for wealthy, white residents. More recent studies found minority support for bicycles and specifically bike share.[194] In a 2017 study, 74% of minority survey respondents believed bike share useful to them.[195] However, those surveyed overwhelmingly cited "a lack of information on discount programs, access to safe streets and protective gear, and reassurance about liability and hidden fees" as reasons they chose not to bike.[196] Over

[193] Baker, "Developers Cater to Two-Wheeled Traffic."
[194] Benjamin Schneider, "What Keeps Bike Share White," CityLab, July 14, 2017, https://www.citylab.com/equity/2017/07/what-keeps-bike-share-white/533412/.
[195] Ibid.
[196] Ibid.

time, gentrification has become less of a concern for minority and low-income residents, but accessibility to sufficient resources and infrastructure remains lacking.

While negative gentrification may be less of a concern for residents, it still plays a role in cycling infrastructure development. A 2016 study assessed the relationship between cycling infrastructure and gentrification in Portland, correlating gentrification with populations of privilege to determine if privileged populations correspond to greater levels of bicycle infrastructure investment.[197] The authors found disparities in Portland's infrastructure distribution due to gentrification driving Portland's investment choices, even when existing low-capital neighborhoods would benefit from cycling infrastructure.[198] These results held even when controlling for distance from downtown Portland and population density, indicating marginalized communities attract less infrastructure investment even when they are just as dense and close to the urban core as privileged neighborhoods. As a result, Portland's cyclists are predominately white.

Portland's biased infrastructure allocation is based on an economic rationale for cycling infrastructure. Like Copenhagen, Portland now uses bicycle infrastructure to attract middle- to upper-class creative class workers and their associated economic output.[199] While the city cites environmental and social concerns throughout its bicycle planning documents, economic factors are Portland's top incentive for bicycle infrastructure. A 2018 study examined the city's various bicycle documents including planning documents and promotional materials, assessing which benefits the city emphasized when promoting its cycling infrastructure.[200] Though Portland stresses

[197] Elizabeth Flanagan, Ugo Lachapelle, and Ahmed El-Geneidy, "Riding Tandem: Does Cycling Infrastructure Investment Mirror Gentrification and Privilege in Portland, OR and Chicago, IL?" *Research in Transportation Economics* 60 (December 2016): 14-24.
[198] Flanagan, Lachapelle, and El-Geneidy.
[199] Ibsen and Olesen.
[200] Ibid.

socio-economic and environmental benefits, "more often, the focus is on regional and local economic benefits" of bicycle promotion.[201] These include local business growth, job creation, livable neighborhoods, and density, all of which undergird the city's primary goal of a more competitive urban environment.[202] Urban competition takes priority over Portland's other goals and leads to neoliberal policy approaches, similar to Copenhagen's neoliberal approach to redevelopment. Neoliberal policies help explain Portland's inequitable distribution of infrastructure. As a result, the city prevents cycling from serving as a tool to achieve a more equitable urban environment. While cycling infrastructure itself does not cause negative gentrification, its allocation and representation throughout Portland is a symptom of ongoing gentrification issues.

The studies' results are disheartening for Portland's equity concerns. As Copenhagen indicates, cycling can promote a more equitable, egalitarian society. Cycling is an inexpensive transportation mode and bicycles can serve all able users, regardless of economic or racial background. Yet bicycle infrastructure driven by gentrification creates intra-urban competition, leading to "demand-led infrastructure provision" that reinforces inequality between neighborhoods.[203] As a result, some see cycling as a signal of negative gentrification and therefore something to be fought, particularly in low-income and minority neighborhoods. While Portland's allocation of cycling infrastructure may be biased against marginalized communities, bicycle infrastructure itself is equitable, and the city has taken some steps to address equity issues. Portland's bike share system eliminated overage time fees for low-income users,

[201] Ibid.
[202] Ibid.
[203] John Stehlin, "Cycling the New Frontier: The Politics of the Bicycle in the Neoliberal City in Portland," (presentation, Portland State University, February 15, 2018).

helping assuage concerns about hidden costs.[204] The city's Vision Zero program, previously critiqued for targeting minority residents, now emphasizes educational diversion programs for drivers instead of fines or jail time.[205] Though these policies help assuage fears of discrimination and inclusiveness, they do not solve accessibility issues for communities in need. If infrastructure allocation depends on economic demand rather than residential need, equitable cycling access will elude Portland.

Inequitable bicycle infrastructure is a symptom of Portland's negative gentrification issues. An ongoing housing crisis drives the city's gentrification, which also prevents equitable access to bicycle infrastructure. As of 2018, Portland faced a housing shortage upwards of 48,000 units.[206] This housing shortage stems from zoning issues: low-density residential zones comprise 75% of the city's residential land and are off-limits to duplexes, apartments, and other multi-unit construction.[207] Portland's affordable housing is concentrated in the urban core and along freeways and urban highways, where property values remain low. Those that cannot find affordable housing can only afford housing in city outskirts or suburbs, where commutes are longer and bicycle infrastructure is less developed. If Portland changes its zoning to allow more high-density residential development, it could kill two birds with one stone: provide more affordable housing, and create a denser, bicycle-friendly urban environment.

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[204] Schneider.
[205] Laura Bliss, "Vision Zero's Troubling Blind Spot," CityLab, September 1, 2016, https://www.citylab.com/transportation/2016/09/black-lives-matter-and-vision-zero/497495/.
[206] Rebecca Small, "You Are Here: A Snapshot of Greater Portland's Need for Affordable Homes," Metro, April 24, 2018, https://www.oregonmetro.gov/news/you-are-here-snapshot-greater-portlands-need-affordable-housing.
[207] Michael Andersen, "Do Portland's Low-Density Zones Need a 'Deeper Affordability' Option?" *Sightline Institute*, January 11, 2020, https://www.sightline.org/2020/01/10/do-portlands-low-density-zones-need-a-deeper-affordability-option/.

Yet the bicycle is seen as an obstacle to affordable housing, rather than a fellow beneficiary of the density affordable housing creates. When the city passed an ordinance requiring new developments to provide separate space for residents' bicycles, affordable housing advocates spoke out in opposition, arguing the ordinance would deprive affordable housing developments of needed units.[208] Portland exempted 18 affordable housing developments from the ordinance, exacerbating low-income residents' poor accessibility to bike infrastructure. The storage space example indicates the two-fold nature of Portland's problem. The city lacks affordable housing due to zoning issues, creating a housing shortage that disproportionately affects minorities and low-income residents. Portland simultaneously allocates newer bicycle infrastructure in neighborhoods of privilege, despite the benefits low-income residents would receive with improved access to affordable bicycle transportation. Portland must combat both issues to create a successful and equitable cycling environment. By providing more housing, the city would lower housing costs while improving urban density. In turn, constructing bicycle infrastructure equitably would allow all residents to enjoy the benefits of a more affordable transportation mode.

While housing and equitable infrastructure allocation are Portland's primary equity concern, community outreach is critical in encouraging cycling among minority groups. Two groups, minorities and women, are underrepresented among Portland cyclists; women made up only 35% of riders in 2017, while national ridership diversity

[208] Rebecca Ellis, "Portland Adopts Sweeping Changes To Rules Regarding Bike Parking," OPB, December 4, 2019, accessed April 24, 2020, https://www.opb.org/news/article/bike-parking-new-construction-portland-rules/.

lags behind minorities' overall share of the population.[209,210] Both groups expressed concern toward bicycling in Portland in a 2017 study. Women worried about safety, gender harassment, gendered appearance expectations, and parenting/household labor as barriers and disincentives to riding.[211] Minorities worried about race-based violence, racial microaggressions, and a lack of representation in bicycle media as similar barriers and disincentives.[212] Both groups' responses reflect broader social issues at play. However, both groups may benefit from similar policies, including community outreach programs, increased representation, training and resource assistance, and protected, visible bicycle infrastructure.

Portland offers some of these resources already. Guided bike rides instruct residents on safe and confident riding, while city-sponsored classes teach cycling essentials, teach adults how to ride, and provide basic bike maintenance skills.[213] Portland offers several online pamphlets and booklets that provide additional cycling resources to new riders, families, and women.[214] Additionally, the city's website includes links to community organizations that help women and minorities become more active riders. However, as the 2017 study indicates, Portland can improve minority representation in its cycling promotional materials and advertisements. The city may opt to partner with local nonprofits to help these organizations create more representative materials as well. Moreover, Portland's expansion of protected bike lanes

[209] City of Portland, "Bicycles in Portland Fact Sheet," April 2019, https://www.portlandoregon.gov/transportation/article/407660.
[210] "Statistics Library / Participation Statistics," People for Bikes, accessed April 24, 2020, https://peopleforbikes.org/our-work/statistics/statistics-category/.
[211] Amy Lubitow, "Narratives of Marginalized Cyclists: Understanding Obstacles to Utilitarian Cycling Among Women and Minorities in Portland, OR," Transportation Research and Education Center (TREC), 2017, https://pdxscholar.library.pdx.edu/cgi/viewcontent.cgi?article=1135&context=trec_reports.
[212] Ibid.
[213] Portland Bureau of Transportation, "Portland by Cycle Rides and Classes," City of Portland, accessed April 22, 2020, https://www.portlandoregon.gov/transportation/44099.
[214] Ibid.

will help encourage more women and minority riders, particularly if the lanes are well-lit and highly visible. The city could also install emergency call boxes connected to Portland Police along popular routes. This would increase riders' perception of safety and ensure access to emergency services, in turn disincentivizing potential criminals. As a whole, Portland's community outreach efforts are adequate, with room for improvement among less represented riders like women and minorities.

Copenhagen shares some equity concerns with Portland. Like Portland, Copenhagen is predominantly white (76% of residents are of Danish origin).[215] Some residents fear incoming migrants will upset cultural customs and the balanced social welfare system.[216] Nevertheless, Copenhagen attempts to facilitate increased diversity through various diversity and inclusion plans. The city's Integration Plan 2011-2014 lays out goals for achieving greater inclusion in schools, the workplace, and in public places.[217] When the Integration Plan was published in 2011, Copenhagen sought to become the most inclusive major European city by 2015.[218] The plan established eight objectives to facilitate inclusion, including more diverse municipal workers and leadership, increased beneficiaries from municipal services, improved safety for all residents, and reduced discrimination and exclusionary poverty. Copenhagen's bicycle strategy likewise recognizes integration's importance, emphasizing the bicycle as "as a

[215] "Population at the First Day of the Quarter by Region, Sex, Age (5 Years Age Groups), Ancestry and Country of Origin," Statistics Denmark, accessed May 1, 2020, https://www.statbank.dk/statbank5a/SelectVarVal/Define.asp?MainTable=FOLK1C&TabStrip=Select&PLanguage=1&FF=20.
[216] David Zucchino, "'I've Become a Racist': Migrant Wave Unleashes Danish Tensions Over Identity," *The New York Times*, September 5, 2016, https://www.nytimes.com/2016/09/06/world/europe/denmark-migrants-refugees-racism.html.
[217] Copenhagen Employment and Integration Administration, "Integration Policy 2011-2014," City of Copenhagen, 2011.
[218] "City of Copenhagen Intercultural Profile," Council of Europe, accessed April 22, 2020, https://rm.coe.int/CoERMPublicCommonSearchServices/DisplayDCTMContent?documentId=09000016804828f9.

way to improve integration."[219] To that end, the municipality sponsors courses for first- and second-generation Danes who never learned to cycle, particularly women and immigrants.[220] Coupled with Denmark's strong social safety net, these measures help promote diversity and equity within Copenhagen. Stronger social safety policies and a more established network give Copenhagen a leg up over Portland in terms of promoting and maintaining equity through bicycle infrastructure.

Unfortunately, Copenhagen struggles to fully meet its bicycle equity goals, largely due to negative gentrification concerns. As the city reinvented itself as a green, livable city in the 1990s, it attracted more new residents each year. Between 1990 and 2020, the metro population grew by nearly 350,000 residents, representing a 25% population increase.[221] These new residents place immense pressure on the city's housing market, with housing costs reaching their highest recorded level in 2019.[222] Between 2010 and 2017, housing prices increased 45% for houses and 70% for apartments.[223] Many of these new residents are attracted by job growth, industry change, and the city's livability, seeking housing near Copenhagen's superb bicycle infrastructure. Corresponding increased housing costs push out lower- and working-class residents, as well as immigrants, gentrifying the city proper and moving those most likely to bike further from bicycle infrastructure.[224] In turn, new affluent residents bring their cars and demand space for them, creating larger political demand for car

[219] Copenhagen Technical and Environmental Administration, "Good, Better, Best: City of Copenhagen's Bicycle Strategy 2011-2025," City of Copenhagen, 2011.
[220] Henderson and Gulsrud, 192.
[221] "Copenhagen, Denmark Metro Area Population 1950-2020," Macrotrends, accessed April 27, 2020, https://www.macrotrends.net/cities/20894/copenhagen/population.
[222] "Danish House Prices Reach Highest Ever Level, Beating 11-Year Record," *The Local*, March 18, 2019, https://www.thelocal.dk/20190318/danish-house-prices-reach-highest-ever-level-beating-11-year-record.
[223] Peter Stanners, "Copenhagen: Is the Future Taller, Denser, and Darker?" *The Murmur*, October 9, 2017, accessed April 27, 2020, http://murmur.dk/copenhagen-is-the-future-taller-denser-and-darker/.
[224] Henderson and Gulsrud, 91.

infrastructure. Like Portland, Copenhagen's economic growth and corresponding negative gentrification led to a more inequitable bicycle network.

While city policy indicates Copenhagen is working to alleviate negative gentrification, actual results are mixed. Beginning in the 1990s, the city began promoting economic sustainability, subtly implying that existing low- and working-class residents were "unsustainable" economically.[225] Copenhagen's overall sustainability efforts masked clear examples of gentrification. In the early 1990s, the city embarked on a large urban renewal project in the inner Vesterbro district, a neighborhood composed of immigrants, the unemployed, and low- and working-class residents. City officials sought to include these residents in the renewal process and prevent their replacement by more affluent newcomers.[226] However, ambiguous city plans to combat renewal's socioeconomic impact coupled with the city's desire to stimulate economic growth through private investment inevitably increased housing costs. In turn, the renewed Vesterbro attracted wealthier residents and their automobiles, and with them "the smell of suburbia."[227] It is no coincidence that Vesterbro's renewal also coincided with numerous new bicycle projects in the neighborhood, including Copenhagen's infamous "bicycle snake." This "commodification of bikeable neighborhoods" underscores neoliberal bicycle policy that prioritizes economic growth, promoting bicycle infrastructure as a means to attract wealth rather than an egalitarian transportation mode.[228] While historically the bicycle was a tool towards Danish egalitarianism, it has more recently become a symbol of economic progress at the

[225] Henrik Gutzon Larsen and Anders Lund Hansen, "Gentrification: Gentle or Traumatic? Urban Renewal Policies and Socioeconomic Transformations in Copenhagen," *Urban Studies* 45, no. 12 (November 2008): 2429-2448.
[226] Ibid.
[227] Ibid.
[228] Henderson and Gulsrud, 94.

expense of immigrants, the impoverished, and the low- and working-classes. In present-day Copenhagen, much like Portland, bicycles are primarily a tool for economic development rather than a tool for equitable transportation.

Both Portland and Copenhagen indicate how the bicycle can become a symbol for negative gentrification instead of a tool for a more equitable society. In Portland, city outreach efforts to minority residents lag behind gentrification's effects and an ongoing housing crisis. The city places bicycle infrastructure in disproportionately well-off neighborhoods, indicating that gentrification, rather than need, drives infrastructure allocation. While Copenhagen's equity and outreach efforts are more successful than Portland's overall, Copenhagen also struggles to balance its ambitious cycling goals against pressing negative gentrification and housing concerns. Both cities' incoming affluent, white populations bring cars into their cities and push minority residents out, creating more demand for vehicle infrastructure while moving groups who benefit most from bicycle infrastructure further from it. To address these equity concerns, both cities need a holistic approach to equity that unites transportation equity with ongoing housing, gentrification, and affordability concerns. Addressing equity concerns holistically allows cities to tackle multiple equity issues simultaneously. Providing equitable housing combats gentrification's inequitable effects while improving minority access to bicycle infrastructure, in turn increasing minority representation and encouraging others to cycle. In both cases, policies and actions must promote the bicycle as a tool for equity, rather than a tool for economic development and gentrification, for Portland and Copenhagen to meet their bicycle goals.

Conclusion

While not yet the urban paradise it is often made out to be, Copenhagen's excellent cycling infrastructure illustrates how far Portland must go to achieve robust cycling mode share. Copenhagen's bicycle infrastructure design, among the best globally, gives riders a safe, convenient, and accessible cycling network. However, design alone does not guarantee successful infrastructure implementation. Successful collaboration between municipal, regional, and national level government ensures a unified approach to cycling policy. Copenhagen and Portland conflict with national and state governments, respectively, regarding their municipal bicycle policies, preventing cycling's further growth and underscoring mobility politics' divisive nature. Government structure ultimately reflects societal values, and in this regard, Copenhagen's values support its cycling infrastructure far more than Portland. Social democracy's egalitarian values help drive enthusiasm for cycling across political lines, giving Copenhagen's network broad support. Portland can emphasize and emulate such values through its transportation policies to help grow support for cycling and encourage new riders.

Even socially democratic values cannot prevent ongoing political battles. Today, Copenhagen struggles with overcrowded bike lanes and plateaued ridership numbers. Policy stagnation and a lack of car restraint prevent the city from increasing its bicycle mode share and reaching its cycling goals. Copenhagen's ongoing political battles mirror Portland's and provide a sobering endorsement for unified policy and political support behind cycling. Yet embracing the bicycle is not enough. Portland must recognize economically driven infrastructure allocation, lack of representation, and

gentrification in its bicycle network. If left unaddressed, these aspects will perpetuate an inequitable cycling network. Copenhagen confronts ongoing equity issues stemming from gentrification, despite its socially democratic values and larger social safety net. Copenhagen's continued struggles surrounding politics and equity illustrate future problems Portland can expect if it does not alter its approach to cycling.

Ultimately, Copenhagen provides Portland with an attainable set of cycling policy dos and don'ts. Copenhagen serves as a comparable role model for Portland given their common municipal power structures, neoliberal mobility policies, and gentrifying neighborhoods, among others. However, Portland should keep its own unique constraints in mind when crafting policies in Copenhagen's image. Portland should align its policies with its cycling goals across the board, adopting Copenhagen's egalitarian cycling values and policies while avoiding pitfalls like stagnating or inequitable policy. Through robust cycling infrastructure, Portland can achieve its mobility and sustainability goals while supporting the local economy and building a more equitable community. Creating a bicycle network in Copenhagen's image is a critical step along the path to successful cycling mode share and sustainable mobility.

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