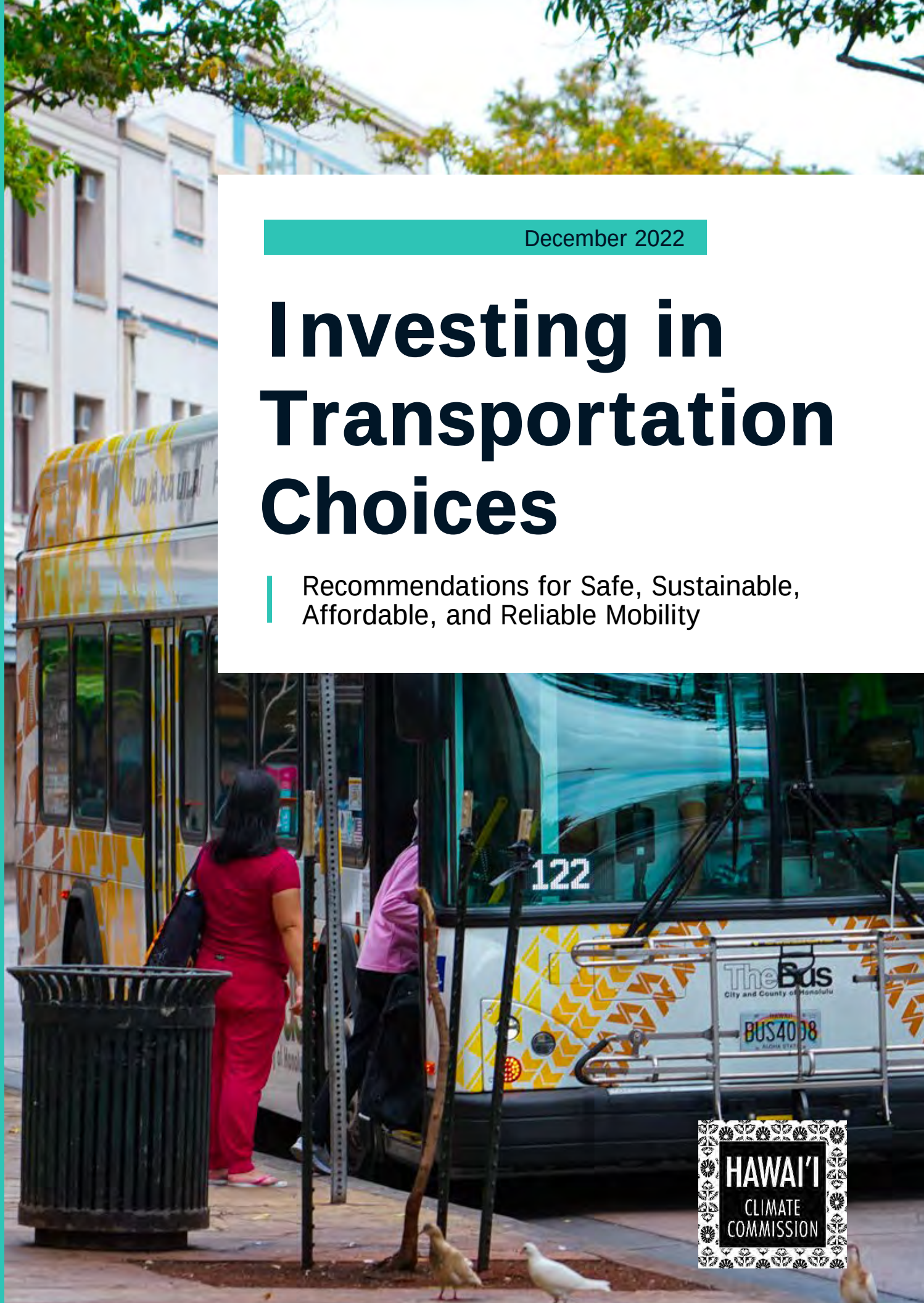

December 2022

Investing in Transportation Choices

Recommendations for Safe, Sustainable, Affordable, and Reliable Mobility

HAWAI'I CLIMATE COMMISSION

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Investing in Transportation Choices:

Recommendations for Safe, Sustainable, Affordable, and Reliable Mobility

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Disclaimer

This working paper is a living document, written collaboratively, and is subject to change. It is produced for discussion by the Hawai‘i Climate Change Mitigation and Adaptation Commission at its meetings. These documents inform strategies for a Climate Ready Hawai‘i. The information is provided on the condition that the State of Hawai‘i shall not be held liable for any damages resulting from the authorized or unauthorized use of the information.

The Climate Ready documents are available on the Hawai‘i Climate Portal on climate.hawaii.gov.

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Introduction

Hawai‘i declared a climate emergency.[1] Decreasing transportation related emissions is essential to achieving Hawai‘i’s established state greenhouse gas (GHG) reduction goals. Ground transportation is the largest source of transportation emissions. In order to reduce ground transportation emissions, Hawai‘i must invest in expanding safe, sustainable, affordable, and reliable transportation choices to support mobility that has low or no emissions. Non-vehicle transportation choices are limited and underdeveloped making driving alone the preferred choice for many residents and visitors.

A proxy for measuring ground transportation emissions and the robustness of transportation options is vehicle miles traveled (VMT). VMT is a measure of vehicle travel generated within an area over a given time period. In this way, VMT considers transportation and land use together. VMT in Hawai‘i has increased almost 40% over the last 25 years and is projected to continue to increase without intervention.

This document, the Hawai‘i Climate Change Mitigation and Adaptation Commission’s *Investing in Transportation Choices: Recommendations for Safe, Sustainable, Affordable, and Reliable Mobility*, intends to inform decision-makers, government staff, citizens, and developers about the benefits of creating communities that support multimodal mobility and accessibility and empower them to take actions to reduce VMT across the state in support of achieving the State’s GHG reduction goals by 2045. Throughout this document, investing in or expanding transportation choices will be used interchangeably with VMT reduction.

This Executive Summary contains an overview of the need for VMT reduction policies, strategies, and near-term actions to address this need, and a synthesis of the supporting research that served as the

[1] SCR 44 declared a “climate emergency” in the state and “requested statewide collaboration toward an immediate and just transition and emergency mobilization effort to restore a safe climate”. It recognizes the need to address climate change in order to protect citizen’s right to a to clean and healthful environment, highlights the need for a just transition to a decarbonized economy and the facilitation of projects and infrastructure that will aid this transition.

foundation for these recommendations. Details are contained in Appendices A, B, and C.

Why Must We Invest in Transportation Choices?

Hawai'i's 2018 Climate Change Mitigation and Adaptation Initiative pledged to make the State of Hawai'i carbon negative by 2045.[2] While the state is exceeding its statutory renewable energy targets to reduce GHG emissions from electricity generation and the number of electric cars on the road is increasing, transportation sector emissions remain high and are projected to continue to grow. Electrification of ground transportation is a key component of reaching the State's 2045 goal, yet it poses challenges for clean energy generation. Hawai'ian Electric's Power Supply Improvement Plan (PSIP) scenarios for O'ahu estimated between 6,000 to 13,000 acres of land would be required to generate enough renewable power to electrify half of the cars on the road. To reduce the number of acres needed, it is essential to reduce the amount of energy needed for all sectors, including transportation. The State identified reducing the energy intensity of mobility through VMT reduction as an effective strategy to achieve its climate action goals.

Reducing VMT improves health, environmental, and economic outcomes for everyone. VMT reduction is important as it serves multiple goals, including social equity, which is integral to Hawai'i's pursuit of a net-negative carbon economy. Vehicle dependency, congestion, collisions, and emissions burden communities with social, health, economic, and personal costs. On average, over 100 people per year are killed in collisions on Hawai'i's roads and highways.[3] In addition to the human toll, congestion costs the State of Hawai'i $693 million annually, primarily through lost time and productivity from hours spent in traffic.[4] The same study estimates the total public and private costs of the vehicle transportation system in Hawai'i to be $21.8 billion annually. The personal annual cost of owning and operating a vehicle ranges from $8,000 to $10,000 a year for most U.S. drivers. Places where people must own and maintain a vehicle to conveniently access jobs and opportunities weigh down individuals and households with high transportation costs, particularly low-income households who must spend a

[2] "§225P-5 Zero Emissions Clean Economy Target," Hawai'i State Legislature, accessed 2021, §225P-5 Zero emissions clean economy target.

[3] "Fewer Year-To-Date Traffic Fatalities Counterweighed By Fewer Vehicles On The Road," Hawai'i Department of Transportation, November 25, 2020: https://hidot.hawaii.gov/highways/fewer-year-to-date-traffic-fatalities-counterweighed-by-fewer-vehicles-on-the-road/.

[4] "The Costs of the Vehicle Economy in Hawai'i," IFC and Ulupono Initiative, January 26, 2021, https://ulupono.com/media/ingpfb23/final-report-costs-of-vehicle-economy-in-hawaii-03-9-21.pdf.

greater percentage of household income on mobility than higher-income households.

Recommended Actions and Strategies

Transportation, like energy, is an essential service that allows Hawai‘i’s communities and economy to thrive. Any transition of these sectors needs to ensure that consumer needs served by the existing system are maintained if not improved. However, the decarbonization of transportation is a significantly more complicated endeavor than the electric sector. Successful VMT reduction strategies require a coordinated effort and shared responsibility across a variety of policy areas, including land use, development, public health, transportation network planning, and more. State-level policy, cross-agency ownership, and inter-departmental coordination is essential to effectively implement specific VMT-reduction strategies and actions at any scale. Meeting the mobility needs of residents while reducing Hawai‘i's economic reliance on carbon requires many complex actions that cross state, county, and departmental jurisdictions. The following are near-term steps that Hawai‘i state departments can implement to initiate and sustain progress toward VMT reduction.

- **Articulate a Goal and Champion Investing in Transportation Choices**

  - **RECOMMENDATION #1: Develop and adopt a statewide VMT reduction target**

    Identifying and codifying a statewide VMT reduction goal establishes a shared vision to achieve GHG and climate goals. The development of a specific VMT reduction goal can provide the space and time for a conversation to build coalition around a shared vision. Next steps include collectively establishing a statewide goal and setting metrics and benchmarks to report on and evaluate progress.

  - **RECOMMENDATION #2: Identify key state and county agencies to collaborate and coordinate on the implementation of VMT reduction policies, strategies, and programs**

Land use and transportation play critical roles in enabling and addressing the state's VMT and associated GHG emission reduction goals. This requires partnership and collaboration with state and county leadership to ensure that interdepartmental decisions at the state and county levels are aligned to achieve desired outcomes. Next steps include identifying relevant state and county departments and developing a coordinated approach for implementation of VMT reduction and transportation demand management (TDM) strategies.

- **RECOMMENDATION #3: Ensure that state and county development plans associated with land use are designed to expand transportation choices**

  Most state, county, and development land use plans do not make direct reference to VMT but do reference GHG or air quality. Incorporating VMT targets and VMT reduction into all plans related to land-use, including functional plans, supports the objectives and actions of stakeholders. Next steps are to collaborate with departments across relevant jurisdictions to develop planning processes that integrate VMT reduction and the environmental impacts of transportation into land-use plans. Coordination will assist in the alignment of land-use planning processes and their transportation impacts with stated goals.

- **RECOMMENDATION #4: Develop and implement a strategy to integrate VMT into project-level analysis and decision-making for land use and transportation projects**

  Incorporating VMT and induced demand measures into project impact analyses aligns the land use approval process and transportation project funding decisions with climate action goals, Next steps include refining planning and prioritization processes to incorporate VMT reduction into project-level frameworks for funding. Aligning the development of land and the transportation system is a foundational element to achieving significant levels of VMT reduction.

- **Realign Funds and Spending to Support Policies, Programs and Projects that Reduce VMT and Support Mode Shift**

  - **RECOMMENDATION #5: Direct investments in transportation and land use towards projects that reduce the energy intensity of mobility through the expansion of transportation choices**

    Internalizing the full cost of GHG emissions into the assessment and implementation of land use and transportation projects locks in reductions in VMT and GHG emissions going forward. Next steps are to review the prioritization processes to integrate the full cost of emissions such that low-VMT, active transportation, and transit-oriented development (TOD) projects are prioritized. By prioritizing and investing in projects that reduce VMT and GHG emissions, using green infrastructure and nature-based solutions, Hawai'i can benefit in the near and long-term, and make progress towards its state goals.

  - **RECOMMENDATION #6: Give people in Hawai'i more safe, affordable, reliable, inviting and convenient choices to get around by funding the completion of our pedestrian, bicycle, transit and green networks**

    A robust, equitable, and interconnected active transportation network that includes greenways, where residents and visitors can safely and comfortably make the choice to walk, roll, ride a bike, or take transit for all or many of their daily needs is essential to achieving VMT reductions and making progress towards climate goals. Next steps are to refine project development and design guidelines, complete and fully fund historically underfunded active transportation networks, and address operational inefficiencies to align state agency VMT work. These will provide economic, public health, and environmental dividends for years to come and help Hawai'i meet its climate and clean energy goals in a resilient and equitable manner.

- **Engage Stakeholders in Support of VMT Reduction and Establish a Shared Understanding of Responsibilities for Supporting Change**

  – **RECOMMENDATION #7: Create outreach products for the community on why expanding transportation choices is essential, how to achieve it, and the relationship between VMT-reduction policies, desired community outcomes, and state climate goals.**

  Thoughtful communication that addresses specific questions and speaks to the range of values and priorities among advocates, policy makers, agency staff, and communities is essential to achieve VMT reduction because many of the necessary strategies will require a significant shift in mindset and investments. The next steps are to establish a shared understanding of responsibility for supporting change by engaging different stakeholders in a way that resonates with shared values and goals. This will help to communicate why VMT reduction is essential to meet state goals and translate policy recommendations into messages that resonate with Hawai‘i’s people and agencies, alike.

Supporting Research and Appendices

This VMT Reduction Toolkit is the outcome of a collaborative interagency effort initiated and guided by the Hawai‘i Climate Change Mitigation and Adaptation Commission. The above recommendations are informed by focused research, stakeholder conversations, practices in other states, and examination of local Hawai‘i policies, data resources and plans. This work is documented in more detail in the following:

- **Appendix A: VMT Policy Brief Outlining the Issues and Context of VMT Reduction Strategies**
- **Appendix B: VMT-Based Analysis Data Needs, Resources and Gaps Memo**
- **Appendix C: VMT Reduction Connections to Existing Plans and Policies Memo**

Key findings from each document are presented below.

Appendix A: VMT Policy Brief Outlining the Issues and Context of VMT Reduction Strategies

Hawai‘i became a climate action leader in 2018 when HRS §225P, the Hawai‘i Climate Change Mitigation and Adaptation Initiative became law, pledging to make the State of Hawai‘i carbon negative by 2045.[5] However, continued increases in VMT and the resulting GHG emissions is a barrier to Hawai‘i achieving its legislated climate action goals.

This section of the toolkit presents context for including VMT reduction policies in Hawai‘i, background research, and an overview of VMT as a transportation analysis and performance metric. **VMT and associated GHG emissions have grown, are projected to grow, and will be an obstacle to achieving state climate goals.** VMT from cars and light trucks accounts for over half of GHG emissions generated by transportation activities (51% in 2017) and has increased since

[5] “**§**225P**-5** Zero Emissions Clean Economy Target,” Hawai‘i State Legislature, accessed 2021, §225P-5 Zero emissions clean economy target.

2000.[6,7] VMT has continued to grow in the short-term from 2014-2019 and long-term since 2000 and future projections show that VMT will continue to grow without changes to plans, transportation networks, and land use.[8]

- **VMT-based analysis is suitable for measuring progress towards climate goals.** VMT is a metric that can be directly tied to GHG emissions from transportation and land use development projects, as it intrinsically considers the effects of land use on the transportation system. However, this metric is not consistently applied to Hawai'i's transportation or land use analysis and Hawai'i has not established quantitative reduction targets for total VMT or VMT per capita. Furthermore, planning, funding, and project review processes do not incorporate VMT analysis to ensure investments are aligned with statewide climate action.

- **VMT reduction can provide co-benefits to accomplish other state goals.** VMT per capita, the amount driven per person or household, is typically higher in areas where lower density, single-use development most accommodates longer vehicle trips while making public transit and other modes less effective. VMT per capita tends to be lower in areas where compact, mixed-use development supports shorter vehicle trips and more multimodal trips.[9] Therefore, in addition to representing transportation GHG emissions, VMT analysis can also represent:
  - Coverage of and access to multimodal transportation networks
  - Proximity and access to jobs, goods, services, education, and healthcare
  - Lower environmental impact of compact, mixed-use development
  - Improvements to health and safety

[6] "Hawai'i Clean Energy Initiative: Transportation Energy Analysis, Final Report," Hawai'i Department of Business, Economic Development & Tourism and Hawai'i State Energy Office, August 2015, https://energy.hawaii.gov/wp-content/uploads/2011/09/Final_TransEnergyAnalysis_8.19.15.pdf..

[7] "Hawai'i Greenhouse Gas Emissions Report for 2017, Final Report," Hawai'i State Department of Health April 2021, https://health.hawaii.gov/cab/files/2021/04/2017-Inventory_Final-Report_April-2021.pdf.

[8] https://budget.hawaii.gov/wp-content/uploads/2020/12/26.-Department-of-Transportation-FB21-23-PFP.8ag.pdf; O'ahu PDF page 115, Hawai'i PDF page 119, Maui PDF page 123, Kaua'i PDF page 127

[9] Fang, Kevin and Jamey Volker, "Cutting Greenhouse Gas Emissions is Only the Beginning: A Literature Review of the Co-Benefits of Reducing Vehicle Miles Traveled," National Center for Sustainable Transportation, March 2017, https://escholarship.org/uc/item/4h5494vr

  - Reduced public and private costs of building and maintaining vehicle infrastructure

- **Examples from other states illustrate the usefulness of VMT-based analysis for Hawai‘i.** California environmental review requirements incorporate VMT analysis for project review and impact mitigation to ensure that new development and infrastructure investments support VMT reduction goals. VMT estimates and other vehicle demand estimates are also used in cities outside of California to determine appropriate transportation demand management (TDM) triggers, parking requirements and restrictions, and impact fees.

Appendix B: VMT-based Analysis Data Needs, Resources, and Gaps Memo

This memo reviews available data resources, gaps in existing data, and data needs, to support the implementation of existing and future adopted plans, policies, and projects to reduce VMT. The summary includes a narrative synthesis and tabular summary of data needs, purposes, sources, gaps, and proposed proxy data sets. A review of available and potential VMT metrics and proxies highlights the following takeaways:

- **Current VMT monitoring data is sufficient for trends but not granular enough for project-level analysis.** The Department of Business, Economic Development, and Tourism (DBEDT) Data Book data can be used for monitoring annual VMT trends at the county and state levels; however, it does not provide sufficient location-specific information to inform project-level decisions.

- **VMT reduction goals and strategies are essential for meeting climate goals.** Past VMT modeling efforts from sources such as Hawai‘i Clean Energy Initiative (HCEI) and *Transcending Oil* can inform VMT reduction strategies and goals. These modeling efforts demonstrated that VMT reduction is necessary to meet climate commitments. However, they are not reliable sources of data for VMT analysis purposes.

- **VMT proxies such as multimodal accessibility analysis may prove useful in absence of VMT data.** Multimodal accessibility analysis provides a proxy to VMT for land use and transportation project planning, prioritization, and review where VMT data is unavailable or unreliable. It is particularly powerful at the project level or neighborhood level.

- **Data improvements for additional modeling are essential.** Additional state or local modeling/VMT data is needed for most types of VMT analysis. VMT estimates and projections from modeling should be validated with regular data collection.

- **Alignment between models is central but currently lacking.** Plans for state carbon reduction modeling should quantify the level of VMT reduction needed to achieve long-range climate goals and account for building electrification, fleet electrification, and grid decarbonization.

Appendix C: VMT Reduction Connections to Existing Plans and Policies Memo

This memo presents a review of State, County, and Metropolitan planning organization (MPO) plans, policies, and practices and targeted stakeholder discussions. It identifies opportunities for current plans, policies, and practices to support land use and transportation outcomes at various scales to contribute to reductions in statewide VMT, and highlights the following takeaways:

- **There is a tremendous opportunity for the State to lead goal setting and monitoring of implementation performance.** From land use district boundary amendments to special permits for landowners, State agency reviews of land use focus on project and site-specific development proposals and omit long-range integrated land use planning and coordinated plan implementation that guide land use decisions statewide. The 2015 Office of Planning and Sustainable Development (OPSD) report recommends the State shift its focus to developing and managing a system of accountability for land management at all levels of government statewide and provide State and local agencies with new tools to track and monitor the outcomes of the statewide land use system.

- **Land use and transportation planning and decision-making at the State and county levels need alignment to achieve climate action goals.** Currently, State and county agencies are not in alignment on what transportation outcomes are the highest priority and how to accommodate population growth, land use changes, and distribution in concert with transportation investments to promote sustainable transportation.

- **Incorporate the needs of people walking, biking, and using transit earlier in the prioritization and design process.** People walking, biking, and using transit have not been historically prioritized and have been left out of the design process of transportation facilities and yet they have the smallest climate impact. Interconnected networks of bikeways, walkways, and transit-priority facilities would provide people with attractive non-driving options to reach local and regional destinations. Most roads and highways in the state accommodate people traveling by car and omit a choice for people to comfortably, safely, and equitably bike, walk, or ride transit to get where they need to go. Current state and county transportation needs identification and project development processes tend to prioritize and design for vehicle movements while facility improvements for non-motorized modes tend to be considered in later phases of project development. Adjusting project development and scoping processes to consider all facility users earlier in the process would increase the number of transportation investments that would receive high scores within the Oʻahu and Maui MPO project evaluation processes to build Transportation Improvement Programs (TIPs) and the Statewide Transportation Improvement Program (STIP) that grow quality transportation options throughout the state.

The information, findings, and recommendations presented in this document are provided to help the State of Hawaiʻi undertake, identify, and implement actions to achieve its goals, and become Climate Ready.

RECOMMENDATION #1

DEVELOP AND ADOPT A STATEWIDE VMT REDUCTION TARGET

RECOMMENDATION #1. Develop and Adopt a Statewide VMT Reduction Target

It will be difficult for Hawai‘i to achieve state greenhouse gas (GHG) reduction goals without reducing the energy intensity of mobility. A key measure of the energy required for mobility is vehicle miles traveled (VMT). According to the Hawai‘i Department of Business, Economic Development, and Tourism, over the past 25 years, annual VMT in Hawai‘i has risen by over 39%, reaching just over 11.1 billion miles traveled in 2020.[10] This means that current strategies and efforts have not curbed VMT, and VMT will continue to increase in Hawai‘i without intervention.

One action to support the reduction of VMT is to codify a statewide VMT goal. VMT is a metric that can be directly tied to GHG emissions from transportation and land use development projects, as it intrinsically considers the effects of land use on the transportation system. A location’s VMT per capita is also a measure of transportation choice, diversity of destinations, trip lengths, and availability of quality multimodal options to get around. In areas with low VMT per capita, there are higher concentrations of trip destinations, people make shorter trips, and there are quality options to get around without driving. VMT analysis and VMT reduction goals can directly capture the value of benefits that are not considered in traditional vehicle Level of Service (LOS)[11] or travel time analysis. VMT analysis can capture:

- Improvements to multimodal transportation networks
- Proximity and access to jobs, goods, education, and healthcare
- Lower environmental impact of compact, mixed-use development, including air pollutants and GHG emissions[13]
- Improvements to health and safety
- Reduced public and private costs

[10] DBEDT Databook, Table 18.17 - Motor Vehicle Fuel Consumption and Vehicle Miles, 1996 To 2020, and By County, 2019 and 2020, accessed 2021, https://files.hawaii.gov/dbedt/economic/databook/db2020/section18.pdf.

[11] Vehicle Level of Service (LOS) is a measure of vehicle delay at intersections and is determined by the peak 15 minutes of delay within the peak hour. LOS is represented on a scale from A to F, with F representing the highest level of vehicle delay.

A VMT reduction goal would catalyze state leadership and support actions that lower GHG emissions and improve the quality of life in Hawai‘i by reducing the time and cost burden of driving. Such actions, if applied strategically, could also make Hawai‘i more resilient to current and future climate and economic shocks and stressors.

The Current Situation: Ambitious Goals but VMT Continues to Rise

Hawai‘i has a proven track record of energy efficiency and GHG emissions reduction in the electric sector.[12] While ambitious goals have been articulated

[12] In 2007, the state legislature passed Act 234 to reduce GHG emissions statewide to 1990 levels by 2020, and that goal was achieved. In 2015, Act 97 was enacted, requiring 100 percent of Hawai‘i’s electricity sales to come from renewable resources by 2045. Source: Hawai‘i’s Energy Facts and Figures 2020 Edition, Hawai‘i State Energy Office, https://energy.hawaii.gov/wp-content/uploads/2020/11/HSEO_FactsAndFigures-2020.pdf.

statewide for clean energy and clean transportation, similar strides have not been made in the transportation sector.[13]

Since the year 2000, total VMT in Hawai‘i has increased as shown in Figure 1 (the 2014 dip in total VMT and VMT per capita lines up with record high gas prices and the 2020 dip is associated with COVID stay-at-home orders which included restrictions to travel). To achieve Hawai‘i’s carbon net-negative goal by 2045, VMT cannot continue to grow.

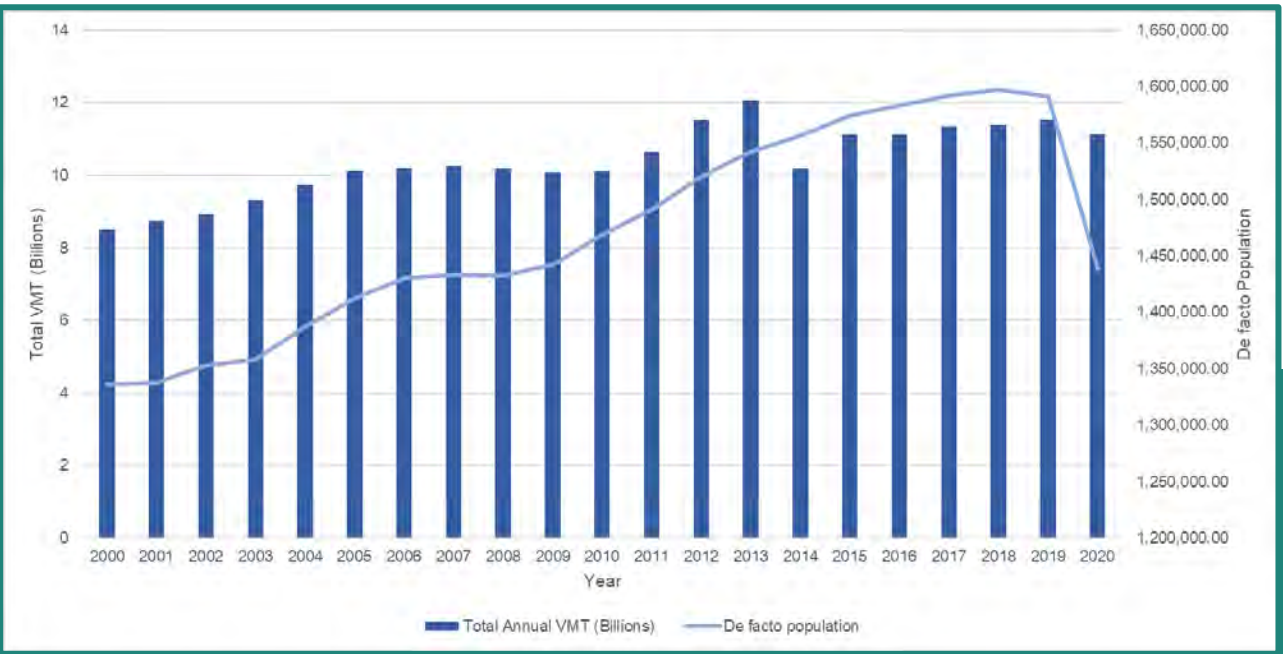


Figure 1. Total Annual VMT and De Facto Population, Hawai‘i, 2000-2020

Data source: 2020 State of Hawaii Databook[14]: https://dbedt.hawaii.gov/economic/databook/db2020/
Note: for de facto population, data sources for 2000-2009 from 2019 State of Hawaii Databook: https://dbedt.hawaii.gov/economic/databook/db2019

The drop in de facto population in 2020 is due to the drop in tourism. This may also be an additional factor in the drop in VMT in 2020.

[13] To address this policy gap, Governor Ige signed Act 131 in 2021, that requires the Department of Transportation to create motor vehicle, bicycle, and pedestrian highway and pathway networks, and creates annual reporting requirements on how the department implemented several goals, including their effort to reduce vehicle miles traveled, in each project planned.

Source: State of Hawai‘i State Legislature, S.B. No. 1402, https://www.capitol.hawaii.gov/session2021/bills/SB1402_CD1_.htm.

[14] “2020 State of Hawaii Databook,” Department of Business Economic Development and Tourism, accessed 2022, https://dbedt.hawaii.gov/economic/databook/db2020/.

Next Steps: Establish quantitative VMT reduction targets

The HCEI 2011 Road Map and 2015 Transportation Energy Analysis noted that transportation fleet electrification alone will not achieve state climate and energy independence goals and stated that a significant reduction of statewide VMT must be achieved. While the HCEI report mentions VMT reduction goals, Hawai‘i has not yet established quantitative reduction targets for total VMT or VMT per capita that account for projected increases in statewide population and variability across local land use and transportation contexts. For Hawai‘i to move from ambition to action, it needs to articulate a VMT reduction goal.

Next steps to establishing goals for VMT reduction include:

- **Engage relevant departments and build a coalition.** Setting a preliminary VMT reduction goal can start a conversation with stakeholders about what a goal means and how to achieve it. Through a preliminary goal, the State could demonstrate leadership, agency accountability, and commitment to reducing VMT per capita. Agencies may also look to recent accomplishments in the areas of complete streets, Vision Zero, Safe Routes to School, healthy community design, and active transportation in setting a VMT reduction goal.

- **Collectively establish a preliminary statewide goal.** To start this conversation, stakeholders could discuss a near-term goal, such as to hold VMT steady at 2019 levels through 2025, and discuss and agree upon a medium and long-term goal. Additional policy and data analysis may be necessary to define a target that is informed by climate action plans and established carbon reduction goals. The Hawai‘i Clean Energy Initiative Road Map 2011 Edition establishes quantitative goals to reduce the total VMT statewide compared to the year 2010, establishing a goal of a 10% decrease in VMT by 2030. This can be used as a starting point for discussing how the new goal should align with more ambitious international, federal, state, and county laws, pledges, etc. See Appendix B: VMT-based Analysis Data Needs, Resources, and Gaps Memo, for more detail about data resources.

- **Report to the Legislature.** Report to the Legislature the following year, and at specific intervals after that. Such a report would, ideally, incorporate various existing goals and plans, such as the Healthy Hawai‘i Strategic Plan, Hawai‘i Statewide Transportation Plan, O‘ahu Regional Transportation Plan, Hele Mai Maui, and others to identify initiatives and program changes that will support progress towards meeting state climate goals.

- **Establish and revisit benchmarks periodically.** Finalize the goal after engaging the public and stakeholders, including counties, MPOs, and through the Statewide Multimodal Transportation Plan (SMTP) process that will occur throughout 2022, and revisit the agreed-upon VMT reduction target periodically. See Appendix B: VMT-based Analysis Data Needs, Resources and Gaps Memo, for more detail about applying benchmarks and tracking progress.

- **Additional analysis and data sources.** To establish a statewide baseline and to support tracking VMT reductions and monitoring for accountability over time, additional analysis and data sources will be neccessary. The Hawai'i VMT reduction target should align with statewide emissions reduction goals, county-level goals for mode shift consistent with the Healthy Hawai'i Strategic Plan, and with other climate goals related to GHG and VMT reduction.

- **Update and formalize the methodology of the data available.** Implementing this policy will require data tools and resources to support local analysis needs and statewide tracking of progress. Currently, different numbers are being reported. For example, in the year 2020, DBEDT reported VMT at 11.1 billion[15] and HDOT estimated that VMT is around 8.2 billion[16]. Metadata to characterize what is being reported needs to be examined and a methodology for measuring and reporting on VMT needs to be established.

- **Track data over time.** The VMT reduction goal and progress tracking need to be documented in an annual report, and a designated State agency(ies) needs to identify specific goals for different geographic areas that are responsive to local geography, land use, and transportation networks.

[15] "The State of Hawaii Databook 2020," Section18, Department of Business Economic Development and Tourism, accessed 2021, https://files.hawaii.gov/dbedt/economic/databook/db2020/section18.pdf.
[16] "2021 Act 100 Report," HI DOT, accessed 2021, https://highways.hidot.hawaii.gov/stories/s/2021-Act-100-Report-Homepage/fujm-qxwq.

Best Practices

To accomplish the above activities, Hawai‘i would benefit from relevant lessons learned from other jurisdictions. To achieve success, there is an urgent need to address data gaps, as good data will inform strategies, policies, and practice.

- **The California Environmental Quality Act (CEQA)** requires analysis and documentation of environmental impacts for land use developments, transportation, and other projects. In 2013, California Senate Bill 743 (SB 743) was passed to require VMT-based analysis to measure the environmental impact of driving. Screening criteria was developed to quickly identify low-VMT land use and local transportation projects, and the California Office of Planning and Research set recommended thresholds for VMT per capita based on the VMT reductions necessary to achieve the state's GHG reduction goals according to the California Air Resources Board (CARB) model.[17]
- **Brookline, Massachusetts Recommendations for Transportation Demand Management (TDM)** requires TDM plans for new developments, which are categorized by size, location, and accessibility to create context-specific TDM plans with target trip-reduction scores.[18]
- **The Virginia SMART SCALE** was established by the Secretary of Transportation's Office of Intermodal Planning and Investment to provide a clear, objective process for transportation project evaluation that incorporates factors such as transportation-efficient land use, intermodal access and efficiency, and person throughout (rather than vehicle throughput).[19]

[17] "Technical Advisory on Evaluating Transportation Impacts in CEQA," California Governors Office of Planning and Research, December 2018, https://opr.ca.gov/docs/20190122-743_Technical_Advisory.pdf.
[18] "Recommendations for Transportation Demand Management," Town of Brookline, Massachusetts, January 9, 2018, https://brooklinema.gov/DocumentCenter/View/14360/Town--School-Employee-Transportation-Demand-Management-Final-Feasibility-Report-PDF.
[19] "The Virginia Transportation Smart Scale FY 2022," Virginia DOT, accessed 2021 http://smartscale.org/documents/fy2022-resource-documents/ss22-scorecardsred.pdf.

- **Kaua‘i’s Multimodal Land Transportation Plan,** adopted in 2013, outlines the steps necessary to achieve a sustainable multimodal transportation system through 2035. Transportation challenges identified in the plan include increasing demand for public transit, a lack of mobility options when traveling between urbanized areas, and a lack of safe active transportation facilities. The reduction of VMT per capita is listed as a means of achieving a more balanced, sustainable transportation system in this Hawai‘i example.

Concluding statement:

A statewide VMT reduction goal enables agencies to reduce VMT through a shared vision and achieve GHG and climate goals. Next steps are to collectively agree upon a methodology for measuring VMT for the purposes of a statewide goal, establish a statewide VMT reduction goal, and set benchmarks to report progress on a regular basis. By doing so, Hawai‘i will have unified targets to reduce VMT and expand transportation choices.

RECOMMENDATION #2

COORDINATE THE IMPLEMENTATION OF VMT REDUCTION POLICIES, STRATEGIES AND PROGRAMS AND IDENTIFY KEY STATE AGENCIES TO LEAD THIS WORK

RECOMMENDATION #2. Coordinate the Implementation of VMT Reduction Policies, Strategies, and Programs and Identify Key State Agencies to Lead this Work

A VMT Reduction Goal adopted by the State Legislature will facilitate the incorporation of VMT into the plans, processes, and operations of state agencies. Decarbonizing electricity generation and electrification of buildings, vehicles, and other sources of GHG emissions will only be successful if VMT decreases over time. Collaboration between state agencies on a shared mandate of VMT reduction through VMT-reduction strategies is needed to reach GHG emission goals.

The Current Situation: There is a critical gap in coordinated VMT reduction implementation

Hawai'i's state land use regulation provides an opportunity to implement VMT reduction at the state and county levels but this has been underutilized. Effective implementation of VMT reduction strategies at the state level requires transportation and state land use and planning agencies to coordinate a VMT reduction strategy. See *Appendix C: VMT Reduction Connections to Existing Plans and Policies* Memo for more detail about opportunities to coordinate across state agencies, MPOs, and county governments.

Next Steps: Establish coordinated multi-agency responsibility for VMT reduction policies, strategies, and programs

By implementing and coordinating VMT reduction strategies at the state level, Hawai‘i state agencies can facilitate coordinated efforts to maximize impact and consistency.

- **Establish a VMT reduction coalition across state agencies.** Share responsibility for reducing VMT across all key agencies, including, but not limited to HSEO, HDOT, county planning departments, MPOs, OPSD, HTA, DAGS, DHRD, PUC, DCCA, DOH, and DOE, to identify opportunities to address policy gaps.
- **Track progress.** Produce an annual multi-departmental report that measures the effectiveness of departmental VMT reduction policies and actions and acts as a living action plan for the following years.
- **Update and monitor data gathering tools.** Establish local VMT monitoring and data collection programs to track and document on-the-ground progress over time, check model results, and inform adjustments in local VMT reduction strategies and investments. This data collection may take the form of travel surveys, origin/destination information, and DBEDT data.
- **Measure VMT impacts.** Establish standards of performance for VMT impacts and identify opportunities to modify policies and projects to reduce impacts over time as data indicates changing needs.
- **Prioritize climate-smart investments.** Current national standards on transportation would make it exceedingly difficult for Hawai‘i to reach the Zero Emissions Clean Economy Target to be carbon negative by 2045. However new funding through the Bipartisan Infrastructure Law (BIL) supports transportation projects that reduce carbon. It is imperative to take advantage of this opportunity by implementing climate-smart infrastructure and other projects that prioritize designs that increase transportation choices and provide clear tools for local jurisdictions to design safe and inviting facilities for all modes.

- **Incorporate pricing incentives to support mode shift.** For example, promote a carbon cash back policy concurrently with the road user charge[20] to ensure that new transportation funding mechanisms don't inadvertently contribute to increasing VMT. Complete the congestion pricing study at DPP/DTS, funded by OahuMPO to explore the practical implementation of pricing incentives. Price incentives such as a carbon tax concept proposed by the Economic Research Organization at the University of Hawai'i (UHERO) can rebalance existing cost advantages of driving and shift away from reliance on fossil-fuel powered transportation.[21] Pricing state facilities, such as parking at beaches, trailheads, and other capital facilities to reflect market demand and over-use would also support mode shift.

Best Practices

To incentivize VMT reduction, strategies must be built into state policies across multiple departments. See *Appendix A: VMT Policy Brief outlining the issues and context of VMT reduction strategies* Memo for more detail about VMT reduction policy examples from other states, including the state-level policy examples noted below and additional examples that have been implemented by cities and counties.

Practices from Other Communities: Learning from other jurisdictions

- **California Environmental Quality Act (CEQA) requirements for assessing transportation impacts within California's environmental review process requires VMT mitigation** for all transportation and land use projects that would otherwise increase VMT. Mitigation measures include investments in multimodal network improvements, parking management and supply reduction, incentives to use modes other than driving alone, road pricing and other user fee schemes, and transportation demand management[22] (TDM) programs and policies.

[20] "Hawaii Road Usage Charge Demonstration," HI DOT, May 2016, https://hidot.hawaii.gov/administration/files/2016/09/Hawaii-FAST-Act-RUC-Project-Narrative_v12-Final_.pdf.
[21] "Is a Carbon Tax Viable for a Small Island Economy?," University of Hawai'i Economic research Organization, June 17, 2021, https://uhero.hawaii.edu/is-a-carbon-tax-viable-for-a-small-island-economy/.
[22] Transportation demand management (TDM), or simply demand management, is defined a set of strategies aimed at maximizing traveler choices. Traditionally, TDM has been narrowly defined as commuter ridesharing and its planning application restricted to air quality mitigation (conformity analysis), development mitigation (reducing trip generation rates and parking needs), or efforts to increase multi-modalism in transportation plans. A more contemporary definition of TDM consists of maximizing travel choices, as stated in the definition provided in an FHWA report on TDM:

- **MassDOT issues design directives for multimodal projects** that require compliance by every state-led or funded project. In January 2020, a new design directive was issued to update MassDOT design criteria for pedestrian, bicycle, transit, and vehicle facilities.[23] While projects can seek a design justification waiver, the process allows for tracking whether projects are meeting design requirements or seeking waivers. Design directives provide local transportation practitioners with tools to implement MassDOT policies, such as designing for all modes.

Concluding statement: Land use and transportation both play critical roles in enabling and addressing the state's VMT and associated GHG emissions. This requires partnership with the counties and state leadership to ensure that interdepartmental decisions at the state and county levels are consistent. Next steps are to develop a coordinated approach across agencies and their implementation of VMT reduction strategies. By doing so, Hawai'i state and county agencies can maximize their impact on VMT reduction.

Managing demand is about providing travelers, regardless of whether they drive alone, with travel choices, such as work location, route, time of travel and mode. In the broadest sense, demand management is defined as providing travelers with effective choices to improve travel reliability.

[23] "Controlling Criteria and Design Justification Process for MassDOT Highway Division Projects," Massachusetts Department of Transportation, January 2, 2020, https://www.mass.gov/doc/controlling-criteria-and-design-justification-process-for-massdot-highway-division-projects-e/download.

RECOMMENDATION #3

ENSURE THAT STATE AND COUNTY DEVELOPMENT PLANS ASSOCIATED WITH LAND USE ARE DESIGNED TO EXPAND TRANSPORTATION CHOICES

RECOMMENDATION #3. Ensure that state and county development plans associated with land use are designed to expand transportation choices

Vehicle miles traveled (VMT) is affected by several built environment factors including density of population and jobs, mix of land uses, accessibility of destinations, design of neighborhoods and streets, and distance to transit and shared mobility. Many of the community characteristics and development patterns that influence how far people must travel between their home, work, and other essential destinations are determined by land use plans and implementation. Land use plans and implementation processes designed to minimize or reduce VMT, also called "smart growth", could produce location-efficient, connected, and walkable communities and manage development to conserve agricultural lands and natural resources.

The Current Situation: Land use planning does not address comprehensive transportation impacts and can contribute to high VMT development patterns

Land use and development in Hawai'i is regulated by both the state and counties. The State Land Use Commission (LUC) sets standards for the four Land Use District (LUD) categories:

1. Urban Districts with "city-like" densities or people, structures, and services
2. Rural Districts with small farms, low-density residential uses, like subdivisions, and areas not suitable for development due to geological conditions
3. Agricultural Districts with lands for cultivation of crops, raising livestock, energy production, and agriculture supportive uses (e.g., employee housing, roadside stands, equipment storage), and open area recreational facilities
4. Conservation Districts with existing forest and water reserve zones, including areas needed to protect water sources, watersheds, scenic and historic areas, parks, and wildlife habitats

County governments develop General Plans to guide and justify state and county land use decisions and prepare Development Plans for sub-regions or communities within their jurisdiction. Most current General and Development

Plans are grounded in goals to accommodate population growth while preserving agricultural land and other natural resources by encouraging housing development near pre-existing urban cores, promoting densification, and creating more walkable places. However, State LUD districts and decisions are not always aligned with county land use plans or transportation plans and transportation-related environmental impacts of low-density development in Rural and Agricultural Districts are not considered. Land use planning needs to promote development in existing urban areas to increase density and place new development near existing resources and infrastructure (infill development), dense urban cores, and walkable communities and align with transportation plans to address air quality and GHG emissions goals.

Next Steps: Analyze VMT outcomes of land use plans and tie land use decision making processes to VMT goals.

The State of Hawai‘i’s land use planning focuses on project-level reviews rather than comprehensive land use planning and plan implementation tracking to measure progress towards state goals, such as VMT reduction. State of Hawai‘i codes and laws set detailed, enabling legislation for a statewide planning system and policy framework intended to coordinate state and county agencies to deliver on the State’s collective goals, objectives, and policies. The State has an opportunity to enact system-wide solutions to update processes and introduce new ways to track results from statewide planning to make progress toward reductions in statewide VMT – advancing the State’s goal to be carbon negative by 2045. To achieve VMT reduction goals and other state targets, land use planning processes must account for transportation impacts associated with low-density and decentralized communities and promote smart growth strategies to make progress toward reductions in statewide VMT. See *Appendix C: VMT Reduction Connections to Existing Plans and Policies* Memo for more details about opportunities to align land use decision-making to VMT reduction and established GHG reduction goals.

- **Account for VMT outcomes from the statewide planning system**. State agency reviews of land use focus on project and site-specific development proposals but not long-range integrated land use planning.[24] By shifting its focus from project-level petitions to assessing land use at all levels of government statewide, state and local agencies would have new tools to measure the transportation-related impacts of land use plans, such as household travel data and analyses, low-VMT development case studies, performance tracking tools, and technical assistance.

- **Audit land use plans and associated zoning for high-VMT development patterns.** State LUD standards coupled with county zoning allow for new low-density subdivisions in rural areas that are far from essential destinations and underserved by public transit and multimodal facilities, and lead to an increase in, VMT in those communities. Amending land use plans and zoning with a VMT critical lens would ensure that VMT impacts can be reduced or minimized.

- **Encourage development in low-VMT areas.** Long-term strategies such as updating state and county land use and zoning to allow and encourage development in low-VMT areas need to be implemented now. Low-VMT areas tend to be served by frequent transit, and have connected and safe multimodal facilities, a diversity of destinations, and are home to high densities of people and jobs. In contrast, the highest VMT per capita can be expected in rural areas, and any new development in these locations would require significant mitigation to reduce VMT per capita. Urban and rural locations present very different VMT reduction opportunities, TDM programs, and land use incentives.

- **Integrate environmental impacts of transportation into land use plans.** With its newly consolidated land use and environmental policy functions, the State is well positioned to integrate environmental protection and climate action strategies into land use planning and policy implementation. The Office of Planning and Sustainable Development (OPSD) review of how transportation-related environmental impacts of land use plans are currently analyzed would help identify land use planning guidance and technical assistance needed to support consistent integration of VMT reduction and other climate action strategies in land use plans.

- **Incorporate a list of transportation improvements to address challenges around accessibility and safety of active transportation modes in land use plans.** Plans need to include a list of prioritized pedestrian, bicycle, and transit improvements that benefit users, no matter their age and ability. Projects to address dangerous intersections such as Safe Routes to Schools and Parks, traffic calming, and shared-use paths are underfunded in Hawai'i. It isn't enough to accommodate roadway users, rather we need a more significant investment in pedestrian, bicycle, and transit facilities.

- **Explore the potential role of the State Land Use Commission to incorporate VMT as a consideration in the land-use application process.** This may be reflected in changes to the land-use application process and requirements and/or the revision of their decision-making criteria to include a VMT and/or GHG criterion.

- **Research how well the state's land use and transportation system provides people across the state with neighborhoods, streets, and transportation options that allow them to make fewer and shorter car trips.** OPSD expressed a desire for commission research papers to understand what conditions have changed and what the State needs to be prepared for, to inform functional policy directions. The HI Climate Commission and OPSD staff could work together to commission an in-depth research paper on how well the State's land use and transportation system provides people across the state with neighborhoods, streets, and transportation options that allow them to make fewer and shorter car trips. The research would inform specific land use and transportation policies with tactical implementation actions. Large sample size public surveys to test reactions to preliminary new priority actions could include questions on respondents' VMT and need for multimodal mobility.

- **Provide state and local agencies with new tools to track and monitor transportation outcomes from the statewide planning system.** Improvements to the state planning system could include tracking and monitoring results from planning activities at various levels of government. The HI Commission could collaborate with OPSD to determine how VMT per capita, GHG emissions, transportation expenditures by mode, multimodal mobility, and

[24] State Land Use System Review", State Office of Planning, Draft Report, May 2015. No longer available online.

other sustainable transportation outcomes could be reported, to whom, and how results would be used by decisionmakers. Eventually, transportation data across time can help state and local agencies understand the relationship between planning, implementation, and VMT reduction. Understanding the system-wide results of agency actions can help inform the work of state and local agencies, like land management, climate action, environmental impact assessments, and capital improvement programs (CIPs).

- **Analyze the impacts of Land Use District standards.** Currently, residential development projects in Rural Districts are restricted to no more than one dwelling unit per one-half acre in areas where no "city-like" concentration of people, structures, streets, and urban level of services exist. While likely intended to minimize the intensity of human activity and built environment in rural areas, state and county staff have shared that these standards may be resulting in new low-density subdivisions in rural areas that are far from essential destinations and underserved by public transit and multimodal facilities, subsequently increasing vehicle miles traveled (VMT) per household in those communities. Restrictions on development patterns in Rural Districts could be examined to be more aligned with VMT reduction goals while supporting the needs of local agriculture and workers more effectively.

- **Coordinate land use and environmental policy functions.** With the newly consolidated state's land use and environmental policy functions, the State is well positioned to integrate environmental protection, climate adaptation, and climate crisis mitigation into land use policy implementation. Environmental assessment requirements could include VMT per capita estimates and post-implementation monitoring of impacts that could help the state measure the transportation impacts of land use actions and enhance the State's understanding of the link between development and environmental impacts.

- **Track and monitor results from planning in each county**. The Honolulu and Kaua'i General Plans effectively identify relationships between land use, housing, and transportation network outcomes and include a variety of policies geared towards accommodating population and economic growth while mitigating vehicular congestion. By tracking implementation and follow-through on these policies measuring progress on mode shift and monitoring results of

multimodal mobility improvements, counties would ensure state and county decision-making are supporting these goals. Measuring progress may include analyzing the number of development projects that conform with the county's General Plan policies compared to the number that secure amendments, and comparing the number of walk, bike, and transit trips before and after multimodal mobility improvements, like physically separated bikeways, new sidewalk construction, or dedicated transit lanes. Tracking these results would help counties better understand what types of land use decisions and transportation investments produce the types of outcomes envisioned in countywide and community plans.

- **Address unmet transportation priorities of communities**. Several Community and Development Plans mention each community's desire to reduce reliance on private passenger vehicles and seek investments in transportation facilities and services that improve mobility between communities, shopping, and recreation centers. Public input on Sustainable Community Plans reveal the need for enhanced transit, pedestrian, bicycle, and other forms of mobility, as well as adesire to reduce conflicts between pedestrian travel and vehicular travel to improve pedestrian safety. Communities would like to see greater connectivity in the design of new or existing roadway networks. State, MPO, and county transportation planning should orient transportation investments to address current gaps in multimodal mobility within sub-regions and prioritize delivering investments in communities most burdened by the lack of safe, affordable, and reliable non-driving transportation choices.

- **Evaluate regional VMT impacts of land reclassification petitions.** Select petitions for land reclassification fall within the jurisdiction of county government, yet explicit review guidelines are not expressed in land use plans. Counties should consider using VMT-based analysis to evaluate petitions for land reclassification within their jurisdiction, especially for when proposed redistricting would result in increased residential population in areas underserved by multimodal access to essential destinations.

Best Practices

Integrated land use planning aligned with transportation goals such as VMT reduction is a key strategy in many state climate action plans.

Practices from Other Communities: Learning from other states

- **State of Oregon Climate-Friendly and Equitable Communities rulemaking:** Oregon's Land Conservation and Development Commission (LCDC) sets greenhouse gas emissions (GHG) reduction targets, from light vehicle travel, for each of Oregon's eight metropolitan areas[25]. Local land use planning must evaluate what changes to local and regional land use and transportation plans would be needed to reduce vehicle travel per capita by 2040. Oregon's Departments of Land Conservation and Development (DLCD) and Transportation (ODOT) provide guidance, technical assistance, and grant funding for metropolitan planning agencies and monitor implementation.

- **State of California's Sustainable Communities and Climate Protection Program:** Under the 2008 Senate Bill 375, the California Air Resources Board (CARB) sets GHG reduction targets for passenger vehicle use for each of the 18 metropolitan planning organization regions[26]. Each region must prepare a Sustainable Communities Strategy (SCS) that contains land use, housing, and transportation strategies that, if implemented, would allow the region to meet CARB's targets. Developers can get relief from certain environmental review requirements under the California Environmental Quality Act (CEQA) if their new residential and mixed-use projects are consistent with a region's SCS.

[25] "Land Use and Transportation Planning for Climate Change," Oregon Department of Land Conservation and Development, accessed 2021, https://www.oregon.gov/lcd/CL/Pages/Land-Use.aspx.
[26] "Sustainable Communities & Climate Protection Program," California Air Resources Board, accessed 2021, https://ww2.arb.ca.gov/our-work/programs/sustainable-communities-climate-protection-program/about

Existing Hawai‘i practices

- **The Kaua‘i General Plan** sets ambitious VMT reduction targets and refers to the 2012 Kaua‘i Multimodal Land Transportation Plan (MLTP) "preferred scenario" to maintain total island-wide VMT at 2010 levels (771,500 VMT) through 2035 with a projected increase in population by providing non-driving options that allow people to shift some single occupancy vehicle trips to transit, bicycling, or walking.

- **The State Strategic Plan for Transit-Oriented Development (State TOD Plan)** addresses challenges to accommodating growth including increasing development costs, aging infrastructure, and a shortage of affordable and rental housing. The State TOD Plan promotes shifting growth to dense, mixed-use development, densification, and facilitating connections between transit and housing within dense urban cores to create more walkable, sustainable communities.

Concluding statement: All plans dealing with land-use, including functional plans, would benefit from the incorporation of VMT targets and VMT reductions to more comprehensively analyze transportation impacts. Next steps are to coordinate across departments and jurisdictions to develop plans that result in low VMT and integrate environmental impacts of transportation into land-use plans. Such coordination will align land-use planning processes and their transportation impacts with our stated goals.

RECOMMENDATION #4

DEVELOP AND IMPLEMENT A STRATEGY TO INTEGRATE VMT ANALYSIS INTO PROJECT-LEVEL ANALYSIS AND DECISION-MAKING FOR LAND USE AND TRANSPORTATION PROJECTS

RECOMMENDATION #4. Develop and implement a strategy to integrate VMT analysis into project-level analysis and decision-making for land use and transportation projects

Plans and policies for land use and transportation are implemented through two discrete processes. Land use projects undergo development review, the process by which landowners and developers seek approval to build subdivisions, buildings, and to use land for specific activities. Transportation projects go through a development and implementation process by which state, MPOs, and county agencies identify transportation needs, identify solutions, and determine what projects to build. When a proposed land use or transportation project is anticipated to create significant impacts based on local policies and thresholds, project-level impact analyses are prepared to disclose how the project will affect various aspects of its surrounding built and natural environment, including how much vehicle travel the project will attract and create.

The Current Situation: Transportation-related environmental impacts are not consistently defined and analyzed

Like land use planning, the review and approval of proposed land use and transportation projects in Hawai‘i typically involve both state and county decision-making. The Hawai‘i Environmental Protection Act (HEPA) enacted in 1974 was created to protect the natural environment by requiring review of discretionary actions approved by all state agencies. HEPA directs the Environmental Advisory Council (EAC) to lead rulemaking for the Environmental Assessment (EA) and Environmental Impact Statement (EIS) process as well as review the concurrence of state agency exemptions. This environmental review framework could be expanded to include climate impacts such as VMT within the existing review policy, but the application of HEPA needs to be expanded. Currently, only state and county agency actions trigger the initiation of the HEPA process, and climate and transportation-related environmental impacts are not included in the list of significant environmental effects. Private petitions are not required to prepare EAs or EISs. Since the State of Hawai‘i has passed a law expressing a clear environmental goal of making the state carbon negative by 2045, drawing a stronger connection between EAs and EISs and specific performance measures, such as VMT, would better align the HEPA process with state goals. See *Appendix A: VMT Policy Brief outlining the issues and context of*

VMT reduction strategies for more detail about opportunities to align project review policy with VMT reduction.

County planning agencies may require transportation impact assessments (TIAs) based on land use policy implementing ordinances, such as zoning codes and development review processes. However, not all county planning agencies consistently require TIAs for major land use projects, which have either been approved and entitled in the past or are allowable by right. State and metropolitan planning organizations use project benefit evaluations within capital improvement programming to inform decisions on what transportation projects advance regional goals, support community needs, and merit funding. Currently, state, MPO, and county agencies prioritize different transportation outcomes and do not consistently analyze induced vehicle travel and VMT impacts of transportation projects.

Next Steps: Refine planning and prioritization processes to incorporate VMT into project-level frameworks for funding

Updating project review, prioritization, and funding frameworks to rebalance investments are essential to selecting projects that optimize transportation choices. To incentivize more investment in transit and active transportation infrastructure, transportation and land-use planning and prioritization processes need to be revised to incorporate induced demand and VMT analyses.

- **Require VMT and/or accessibility analysis for land use development projects.** Introduce and integrate land use efficiency evaluation and incentives to focus development, activity centers, employment hubs, and residential development in locations that are well served by a mix of land uses and support travel with fewer and shorter car trips. The environmental assessment process enabled by HEPA for transportation evaluation and prioritization frameworks can be improved by incorporating VMT reduction in the analysis, and more consistently reviewing land use and transportation project proposals. Consider updating HEPA to expand triggers to include land use and transportation projects and incorporate VMT or proxy measures for VMT into EAs and EISs. Use an expanded HEPA-style process for private petitions that include VMT analyses. Require county development review processes to support VMT reduction goals. If VMT model outputs are not available to identify low-VMT locations and areas that require VMT reduction, use accessibility analysis tools as a proxy for VMT model outputs.

- **Shift from level of service (LOS) and other performance metrics centered on car mobility in investment prioritization frameworks to metrics focused on increasing transportation choices.** Many commonly used transportation measures focus on the direct performance of vehicles, such as vehicle capacity, delay or congestion, throughput, and safety. While these tools are commonly used for evaluating transportation projects, many of them fail to capture the full impacts of transportation such as GHG emissions, induced demand for vehicle travel, and changes to land use. These measures are commonly used in decisions about project funding and prioritization. Land use projects are typically required to study and mitigate vehicle level of service (LOS)[27] impacts from new development, particularly mixed-use and infill projects in built-out areas. Because LOS focuses on measuring the convenience of traveling in an automobile and does not reflect a project's environmental impacts, it is not a useful measure for reviewing progress towards climate goals. More pertinent to the discussion, projects designed to improve LOS, such as intersection and road widenings, induce additional VMT and ultimately increase congestion over time. LOS only measures vehicle travel and does not typically account for other modes, often resulting in extensive analysis requirements and delays for multimodal transportation projects that may reduce vehicle lanes or speeds.[28] LOS is better suited to local operational constraints and small-scale improvements such as signal coordination and transit priority, and less so as a comprehensive decision-making metric about investments. Performance metrics addressing pedestrian comfort, transit access, and bicycle level of stress are better suited for investment prioritization frameworks as they would support climate smart investments with the potential to expand transportation choices and reduce GHGs.

[27] Vehicle Level of Service (LOS) is a measure of vehicle delay at intersections and is determined by the peak 15 minutes of delay within the peak hour. LOS is represented on a scale from A to F, with F representing the highest level of vehicle delay.
[28] De Robertis, Michelle, et. al., Changing the Paradigm of Traffic Impact Studies: How Typical Traffic Studies Inhibit Sustainable Transportation, May 2014.

- **Create a statewide framework for impact assessments and include VMT-based analyses.** The scope of impact assessments needs to be expanded beyond just those developments in a TOD or TRD zone. The statewide framework could mirror the City and County of Honolulu's Transportation Impact Assessment Guide, published in 2020, which provides direction on the scope of study required when evaluating transportation impacts of a proposed City or County project with a focus on promoting multimodal development. The guide lays out City-preferred methods of evaluating transportation impacts, of which VMT analysis is one. A consistent statewide framework would assist counties without more robust multimodal-focused impact assessments to make the case for the development of more multimodal infrastructure. The statewide framework would ideally also include private developments, as the City and County of Honolulu's framework only includes City or County projects.

- **Require induced demand and VMT analysis for transportation projects.** Update prioritization and funding frameworks to include a project's VMT impacts, thereby prioritizing and funding projects that reduce VMT. This will help to rebalance transportation investments by moving away from vehicle capacity projects to projects that support active transportation, expand transit networks, and present practical and appealing alternatives to driving.

Best Practices

To align transportation project delivery with climate goals, Hawai'i can learn relevant lessons from other states.

Practices from Other Communities: Learning from other states

- **City of San José VMT Evaluation Tool:** In 2013, the State of California passed Senate Bill 743 (SB 743), which updated the California Environmental Protection Act (CEQA) and directed that all jurisdictions replace automobile delay – commonly measured by "level of service" – with VMT when doing transportation analysis[29] San José developed an excel-based VMT evaluation tool that evaluates whether proposed land use projects in the City of San José

[29] Vehicle Miles Traveled Metric, City of San Jose, accessed 2021, https://www.sanjoseca.gov/your-government/departments-offices/transportation/planning-policies/vehicle-miles-traveled-metric.

would generate VMT impacts. The starting point for each land use project is the per capita and per employee VMT for the half-mile radius surrounding the project site, calculated using the City's travel demand model and adjusted to the parcel level.

- **Virginia Department of Transportation (VDOT) SMART SCALE:** The SMART SCALE project prioritization process evaluates projects using key factors, including improvements to safety, congestion reduction, accessibility, land use, economic development, and the environment. Highway improvements, transit and rail capacity expansion, bicycle and pedestrian improvements, and transportation demand management projects are considered within the SMART SCALE process. The SMART SCALE analysis weighs measures like VMT, such as access to jobs and multimodal access. Additionally, the use of person throughput instead of vehicle throughput allows for the process to consider the efficiencies of transit and active transportation modes.[30] The SMART SCALE analysis also incorporates land use analysis for areas with more than 200,000 people. See Appendix A for more information about VDOT's SMART SCALE.

- **SHIFT Calculator:** The Rocky Mountain Institute (RMI) SHIFT calculator allows users to estimate the induced VMT and emissions impacts from road expansion projects in Metropolitan Statistical Areas (MSAs) or urbanized counties, based on existing lane mileage and vehicle miles traveled data from the Federal Highway Administration (FHWA).[31] This planning-level tool offers rough order of magnitude estimates for the potential cumulative (i.e., after 5 to 10 years) impacts of road capacity projects.

Existing Hawai'i practices

- **The City and County of Honolulu Transportation Impact Assessment (TIA) Guide** requires sponsors of proposed public and county development projects that "will generate additional passenger trips, propose changes to land use, and/or impact the existing circulation and access" to scope and prepare a TIA.[32] On O'ahu, TIAs for public and county projects may require a proposed

[30] Smart Scale, Virginia Department of Transportation, accessed 2021, https://smartscale.org/.
[31] State Highway Induced Frequency of Travel Calculator, Rocky Mountain Institute, accessed 2021, https://shift.rmi.org/.
[32] Transportation Impact Assessment Guide, City and County of Honolulu, November 2020, http://www4.honolulu.gov/docushare/dsweb/Get/Document-281537/Honolulu_TIA_Guide.pdf.

development project to prepare a pedestrian environmental quality index (PEQI), Bicycle Level of Traffic Stress (LTS), Transit Capacity and Quality of Service Manual (TCQSM), Highway Capacity Manual (HCM), Multimodal Radar Tool, Parking Demand Assessment, Traffic Safety Assessment, and/or a VMT analysis. However, these analyses are not triggered for all development projects.

Concluding statement:

Hawai‘i would benefit from incorporating VMT and induced demand measures into project impact analyses to help align the land use approval process and transportation project funding with climate goals. Next steps are to refine planning and prioritization processes to incorporate VMT into project-level frameworks for funding. Through the integrated decision making of land use and transportation agencies, funding would then shift to projects that reduce VMT and expand transportation choices.

RECOMMENDATION #5

DIRECT INVESTMENTS IN TRANSPORTATION AND LAND USE TOWARDS PROJECTS THAT REDUCE THE ENERGY INTENSITY OF MOBILITY THROUGH THE EXPANSION OF TRANSPORTATION CHOICES

RECOMMENDATION #5. Direct investments in transportation and land use towards projects that reduce the energy intensity of mobility through the expansion of transportation choices

The State's Climate Commission issued guidance on infrastructure investment and emphasized the importance of using green infrastructure and nature-based solutions to address the climate emergency and build resilience.[33] The Commission highlighted the need for land use and transportation investments to meet clean energy and climate goals. Any investments made today will have future impacts on carbon emissions and VMT based on their location, design, and connection to multimodal transportation networks. Mixed-use neighborhoods connected by safe and convenient multimodal transportation networks produce less VMT than single land use and auto-oriented development. To achieve state and local climate goals, all transportation and land use projects must be built to expand transportation choices. By building mixed-use, comfortable, equitable, green neighborhoods and safe, convenient, and reliable multimodal transportation networks, Hawai'i can achieve lower VMT and a healthier, more resilient future.[34]

The Current Situation: Transportation investments and land use plans increase VMT

The Hawai'i Statewide Transportation Improvement Program (STIP) provides a multi-year listing of the state and county transportation projects and identifies those projects slated for federal funding, or those that are regionally significant. The STIP is a multimodal transportation improvement program that is developed based on existing transportation plans and policies, and current highway, transit, and transportation programming processes. The STIP delineates the funding categories and the federal and local share for each project, and projects are prioritized according to the Highways Division Project Prioritization Guidelines. The next STIP is scheduled for approval by 2025, providing a key opportunity to ensure the new list of projects does not

[33] "Final Statement On Decision Making & Investment Guidance To Address The Climate Emergency In Hawai'i," Hawai'i Climate Change Mitigation and Adaptation Commission, July 19, 2021, https://climate.hawaii.gov/wp-content/uploads/2021/07/FINAL-statement-on-decision-making-and-investment-guidance-Jul-19-2021.pdf.
[34] "CARB 2017 Scoping Plan-Identified VMT Reductions And Relationship To State Climate Goals," California Air Resources Board, January 2019, https://ww2.arb.ca.gov/sites/default/files/2019-01/2017_sp_vmt_reductions_jan19.pdf.

induce increases in VMT and expands transportation choices.

Land use development decisions also present an opportunity to shape long-term investments, support VMT reduction, and expand transportation choices. For example, infill development in established urban neighborhoods, expansion of walkable mixed-use neighborhoods, and new transit-oriented development all support low VMT development patterns. When residents and commuters can get where they need to go with shorter and fewer vehicle trips, VMT per capita decreases even as economic activity remains high. See *Appendix C: VMT Reduction Connections to Existing Plans and Policies Memo* for more details about opportunities for land use planning to support VMT reduction.

Next Steps: Align state, local, federal, and developer funding with federal, state, and local climate goals

- **Align STIP funding decisions with VMT reduction.** Hawai‘i has an opportunity to be a leader in creating more transportation choices for its communities. The next opportunity to strategically direct transportation funding toward VMT-reducing projects will start with the next STIP cycle. A focus on aligning transportation funding with established climate goals and GHG reduction targets will allow for subsequent phasing of planned capacity projects to be revisited with integrated transportation demand management strategies. This timeline recognizes that projects in the current proposed FFYs 2022-2025 STIP are already developed and does not force immediate project changes. Projects not yet built that are currently included in the STIP that will increase VMT must be considered for revision or removal in future versions of the STIP if Hawai‘i is to reach state and county climate goals. As Hawai‘i prepares to meet new annual reporting requirements on how planned transportation projects implement the goals established in HI SB1402, including VMT reduction, Hawai‘i needs to incorporate VMT analysis and monitoring into its planning process. Prioritizing investments in projects that improve the safety of people walking and biking is needed to see a reduction in single occupancy vehicles and VMT. By taking a proactive approach to increase transportation choices by making active transportation safer, easier, and more enjoyable, Hawai‘i can be a leader and showcase our progressing transportation system to the nation and the world.

- **Incorporate VMT impacts analysis in land use decisions and approvals.** Revisit tools such as Land Use District boundary amendments. See Appendix C: VMT Reduction Connections to Existing Plans and Policies Memo for more

details about opportunities for land use planning to support VMT reduction.

- **Align development review, local ordinances, and project approvals process with VMT reduction goals.** Integrate VMT reduction targets and apply multi-agency VMT analysis standards and evaluation metrics to all major transportation and land use projects and policies to determine their relative VMT impact. Promote the rightsizing of parking supply and management policies at the county levels for both on and off-street parking. See Appendix C: VMT Reduction Connections to Existing Plans and Policies Memo for more details about opportunities for land use planning to support VMT reduction, and for examples of evaluating parking supply.

- **Develop a consistent framework to identify investment priorities and mitigation requirements.** Use a VMT or GHG screen to identify project funding priorities and projects that call for mitigation or fundamental changes to avoid VMT impacts or increases in GHG emissions. For example, the social cost of GHGs can be incorporated in a project cost-benefit analysis to comprehensively internalize the damage caused by GHGs. See Appendix A: VMT Policy Brief outlining the issues and context of VMT reduction strategies Memo for more details about how VMT screens have been applied in California.

- **Work with MPOs to figure out how to set GHG targets that align with state goals and how MPO plans can help meet the state law that pledges to make Hawai‘i carbon negative by 2045.** GHG targets can be set in MPO long-range plans and would include strategies and a plan that addresses how they will meet GHG targets, including VMT reductions.

Best Practices

To align transportation project delivery with climate goals, Hawai‘i can learn relevant lessons from other states. To achieve success, there is urgent need to ensure future STIPs achieve a total and per capita VMT reduction that contributes to achieving adopted climate goals.

Practices from Other Communities: Learning from other states

- **California: SB743 requires VMT mitigation** on transportation investments and development projects that would increase VMT.[35] See Appendix A: VMT Policy Brief outlining the issues and context of VMT reduction strategies Memo for more details about how the California Environmental Quality Act updates provide a consistent framework to identify VMT mitigation requirements as part of the project review process for both transportation infrastructure and land use development projects.

- **California: SB375 requires MPO transportation and land use plans to model VMT** impacts and reduce VMT to meet state GHG reduction targets.[36] MPO VMT modeling incorporates local land use and transportation network inputs that are a factor in local and regional driving patterns and provides location-specific data to enable VMT screening in support of consistent frameworks described above. See Appendix B: VMT-based Analysis Data Needs, Resources and Gaps Memo for more details about how regional travel models and location-specific VMT data can inform VMT reduction policies.

- **Colorado: a proposed law, 2 CCR 601-22, would require the STIP and regional TIPs to fall within certain GHG thresholds**.[37] This proposed law holds spending plans accountable to GHG reduction goals.

[35] “Rethinking How We Build So Californians Can Drive Less,” Caltrans, accessed 2021, https://dot.ca.gov/programs/sustainability/sb-743.
[36] “CARB 2017 Scoping Plan-Identified VMT Reductions And Relationship To State Climate Goals,” California Air Resources Board, January 2019, https://ww2.arb.ca.gov/sites/default/files/2019-01/2017_sp_vmt_reductions_jan19.pdf.
[37] “Rules Governing Statewide Transportation Planning Process and Transportation Planning Regions 2 CCR 601-22,” Colorado Department of Transportation, December 16, 2021, https://www.codot.gov/business/rules/documents/ghg-pollution-standard-rule.pdf.

Concluding statement: Strategic investments in land use and transportation projects today can lock in reductions in VMT and GHG emissions tomorrow. Next steps are to prioritize low-VMT, active transportation, and TOD projects and establish frameworks that internalize the full cost of GHG emissions. By prioritizing and investing in projects that reduce VMT and GHG emissions, and using green infrastructure and nature-based solutions, Hawai‘i can benefit in the near and long-term and make progress towards state goals.

RECOMMENDATION #6

GIVE PEOPLE IN HAWAIʻI MORE SAFE, AFFORDABLE, RELIABLE, INVITING AND CONVENIENT CHOICES TO GET AROUND BY FUNDING THE COMPLETION OF OUR PEDESTRIAN, BICYCLE, TRANSIT, AND GREEN NETWORKS

RECOMMENDATION #6. Give people in Hawai‘i more safe, affordable, reliable, inviting, and convenient choices to get around by funding the completion of our pedestrian, bicycle, transit, and green networks

Completing state and county pedestrian and bicycle networks is essential to achieving local transportation mode-split goals, reducing statewide VMT, and expanding transportation choices. Interconnected networks of bikeways and walkways, along with trees and green spaces, across the state, would support active transportation for many types of daily trips and improve equitable, safe access to public transit. Hawai‘i has many policies and plans in place that support these efforts but needs to see the implementation of both large catalyst projects and small projects to see people shift modes and a reduction in VMT. Green infrastructure such as these would also address heat island effects that are becoming increasingly evident in Hawai‘i.[38]

The Current Situation: There are inadequate multimodal networks to support mode shift

The State's Climate Commission compiles and updates a list of such projects on its Grants-to-Projects Bridge. These projects, compiled from county and state plans, illustrate unmet community needs for multimodal infrastructure in Hawai‘i, which currently total just under $1 billion.[39]

As an example, many projects identified in the Statewide Bike Plan and the Statewide Pedestrian Master Plan (2003) remain unbuilt.[40] As of 2020, only an additional 55 miles of bikeways have been built since 2003, much less than envisioned in the Statewide Bike Plan.[41] HDOT is currently refreshing the 2003 Bike Plan and will update the existing inventory of bikeways, update project lists and maps, re-analyze the bicycle

[38]Josh McDaniel, Turning Down the Temperature on Urban Heat Islands, page 13, accessed 2022, https://seagrant.soest.hawaii.edu/urban-heat-islands/.
[39] Grants-to-Projects Bridge, Hawai'i Climate Change Mitigation and Adaptation Commission, accessed 2021, https://climate.hawaii.gov/grants-to-projects-bridge/.
[40] In 2003, HDOT prepared the Hawai'i Master Plan (Bike Plan) with the overarching goal of establishing bicycling as a safe and convenient mode of transportation for residents and visitors throughout the State. In 2013, HDOT developed the Statewide Pedestrian Master Plan with interdepartmental coordination and involvement of community members across the State.
[41] Bicycle Planning webpage, HDOT, accessed 2021, https://highways.hidot.hawaii.gov/stories/s/Bicycle-Planning/v4zn-nbn4#performance-measure-statewide-bikeway-miles.

network, and re-evaluate proposed projects to set priorities and assess feasibility for implementation. To increase sustainable modes of travel, projects that make it easier to walk, bike, and take transit need to be funded and built.

Moving forward, Hawai'i can build off of pedestrian, bicycle, and transit improvements made recently and ramp up efforts by funding recommended projects in recently completed plans such as Complete Streets improvements, multimodal transportation plans, Hawai'i Physical Activity and Nutrition Plan, etc., and work that is currently being done on Vision Zero efforts and other county plans.

Next Steps: Build staff capacity at all levels and fund sustainable transportation improvements

Identifying and removing barriers for public agencies to implement active transportation and transit improvement projects is essential to providing safe and convenient mobility options. The following actions address identifying and removing barriers for public agencies to implement multimodal projects:

- **Refine project development and design guidelines to identify, plan, and design for the construction of pedestrian, bicycle, and transit networks:**
  - Prioritize projects that enhance active transportation networks over new roadway capacity projects, and within multimodal roadway projects, prioritize pedestrian, bicycle, and transit elements over vehicle elements.
  - Partner with road agencies to implement the Practical Solutions Action Plan[42] to support design and project-level improvements.
  - Adopt and document existing ad hoc multimodal investment policies and procedures to ensure they are applied more consistently and uniformly. Identify multimodal investment best practices, including funding transit operations, that are already in place in local, county, and state practices and formalize these practices as a shared statewide resource.

[42] According to this report, "practical solutions" is an outcome-focused approach to decision making for transportation project development and delivery. The goal is to precisely identify a transportation problem and then finely tune the scope of the solution to address it. This report is a guide for HDOT on how to identify and implement practical solutions and provides references for best practice examples of such solutions. Hawaii Highways Climate Adaptation Action Plan: https://hidot.hawaii.gov/wp-content/uploads/2021/07/HDOT-Climate-Resilience-Action-Plan-and-Appendices-May-2021.pdf (page B-3).

- Establish a shared definition of "multimodal projects." State, MPOs, and county agencies would benefit from developing common definitions for transportation project types and elements that support VMT reduction. This would clarify the types of transportation projects that advance shared goals and prevent projects that conflict with VMT reduction targets from being misclassified as environmentally beneficial. For example, travel time reduction for SOVs cannot be counted as a multimodal improvement.

- Use the Complete Streets Toolkit developed by HDOT as design guidance when developing projects to more consistently include pedestrian, bicycle, and transit elements in projects.

- Consider all user needs on state and county facilities and prioritize people walking, biking, and taking transit early in project development. Interconnected networks of bikeways, walkways, and transit-priority facilities across the state and within the counties would provide people with attractive non-driving options to reach local and regional destinations. While most roads and highways in the state safely and comfortably accommodate people traveling in a car, there exist significant gaps and deficiencies in transportation infrastructure networks that comfortably, safely, and equitably connect people who bike, walk, roll, or ride transit to get where they need to go. Current state and county transportation needs identification and project development processes tend to prioritize and design for vehicle movements while facility improvements for non-motorized modes tend to be considered in later phases of project development. Adjusting project development and scoping processes to consider all facility users early would increase the number of transportation investments that would receive high scores within the Oʻahu and Maui MPO project evaluation processes to build TIPs and the STIP that grow quality transportation options throughout the state.

- Analyze a scenario with mode shift in the 2045 Hawaiʻi Statewide Transportation Plan (HSTP). The draft 2045 HSTP acknowledges that past land use decisions and zoning measures tended to separate the places where people live and work by creating numerous "bedroom communities" and subsequently producing considerable distances between housing, jobs, essential destinations, and other opportunities. Additionally, resort areas were similarly constructed without employee housing or facilities to support commute travel, requiring resort employees, especially those on Neighbor Islands, to commute long distances for work. Growing tourist and shopping travel continues to add motor vehicles to the highway system. Without safe,

affordable, and reliable transportation choices, all or a majority of trips, resident, worker, and visitor travel will generate congestion, accelerate road asset degradation, and disadvantage people with no or limited access to a car. The 2045 HSTP scenario evaluation process could model needed inputs to result in a shift by residents and visitors from driving alone to walking, bicycling, public transit, and shared modes, and make a strong case for investing in more infrastructure that supports non-vehicle transportation choices that are safe, sustainable, affordable, and reliable.

- **Address funding gaps and dedicate state budgets to building multimodal infrastructure:**

  - Fund existing multimodal projects that are already identified and prioritized in local, county, and state plans. See the Grants-to-Projects Bridge project list.[43]

  - Secure state support and funding to establish a future pipeline of multimodal and VMT reducing infrastructure improvements that encourage non-SOV travel.

  - Increase funding for transit to achieve higher levels of transit service and improved rider experience.

- **Address operational inefficiencies and opportunities to align state agency work with VMT reduction goals:**

  - Establish or reinforce a fully staffed state program that is dedicated to funding and implementing bicycle and pedestrian projects.

  - Establish an interdepartmental group with the responsibility of accelerating the implementation of connected and comfortable transit, walking, and bicycling networks and implement Act 131 (2021)[44]. Coordinate with the Climate Commission and/or the HSEO's new VMT Specialist, to identify and

[43] Grants-to-Projects Bridge, Hawai'i Climate Change Mitigation and Adaptation Commission, accessed 2021, https://climate.hawaii.gov/grants-to-projects-bridge/.
[44] 2021 legislative session was productive in advancing Hawaii's sustainability and resilience goals, Ulupono Initiative, accessed 2021, https://ulupono.com/news-listing/2021-legislative-session-was-productive-in-advancing-hawaii-s-sustainability-and-resilience-goals/.

remove barriers to better multimodal networks across the state.

- Prioritize and fund low-carbon mobility in Hawai‘i to advance multimodal system development, policy implementation, and accountability efforts. It is essential that Hawai‘i dedicates key staff and funding resources to implement programs, infrastructure, and systems beyond highways and vehicle operations emulating the successful efforts of Washington DOT, Oregon DOT, and Caltrans.

- Identify a state agency to fund and provide comprehensive support for bikeshare and other shared micromobility systems, capital expansion of current systems, and expansion to neighboring islands.

- Track and monitor results from transportation planning and implementation. As Hawai‘i prepares to meet new annual reporting requirements on how planned transportation projects implement the goals and outcomes established in HI SB1402, including VMT reduction, Hawai‘i can create tools and technical guidance for how state and county staff can calculate the VMT reduction benefits of specific projects. Hawai‘i may also consider establishing and maintaining a statewide transportation data clearinghouse to support consistent estimation of project benefits. A statewide transportation data clearinghouse could help record and track project-specific mitigation and evaluation commitments, including strategies integrated into capacity projects that support single-occupant vehicle travel.

- Build facilities and support development that reduces auto-dependent mobility. State and county agencies should coordinate land use and transportation decisions to support dense, mixed-use development patterns and deliver transportation facilities that make public transit, walking, and biking more attractive. From the 1991 Functional Plan to the draft HSTP, HDOT acknowledges that "people's proximity to jobs, housing, and other land uses impacts how far they travel, how frequently they travel, and what modes they choose. Likewise, transportation investments can impact the type, location, and density of development." Today, the highway system statewide provides people with about 157 miles of bikeways, 153 miles of

sidewalks, and approximately 9,800 miles of vehicular travel lanes – signaling that vehicle accessibility outpaces multimodal accessibility.

Best Practices

To build a comprehensive network of pedestrian, bicycle and transit facilities, Hawai'i can model approaches to project prioritization, funding, and implementation adopted in other states. There are significant network gaps that can be addressed by adopting strategies similar to other states that dedicate funding to building and improving bicycle and pedestrian networks.

Practices from Other Communities: Learning from other jurisdictions

- California: The Caltrans Active Transportation Planning grant program is a statewide program that prioritizes funding for active modes and supports network improvements for alternatives to driving.[45]
- Washington: WSDOT includes many active transportation projects in the STIP, lists priority projects in their STIP, and includes many bike projects along with more typical DOT highway maintenance projects, for example.[46]

[45] Active Transportation Program, Caltrans, accessed 2021, https://dot.ca.gov/programs/local-assistance/fed-and-state-programs/active-transportation-program.
[46] Statewide Transportation Improvement Program, Washing State Department of Transportation, accessed 2021, https://wsdot.wa.gov/business-wsdot/support-local-programs/delivering-your-project/statewide-transportation-improvement-program-stip.

Concluding statement: A robust, equitable, and interconnected active transportation network that includes greenways, where residents and visitors can safely and comfortably walk, roll, ride a bike, or take transit for all or many of their daily needs is essential to achieving the expansion of transportation choices, VMT reductions, and progressing towards climate goals. Next steps are to refine project development and design guidelines, complete and fully fund historically underfunded active transportation networks, and address operational inefficiencies to align state agency VMT reduction work. More choices will provide economic, public health, and environmental dividends for years to come—and help Hawai'i meet its climate and clean energy goals in a resilient and equitable manner.

RECOMMENDATION #7

CREATE OUTREACH PRODUCTS FOR THE COMMUNITY ON WHY EXPANDING TRANSPORTATION CHOICES IS ESSENTIAL, HOW TO ACHIEVE IT, AND THE RELATIONSHIP BETWEEN VMT-REDUCTION POLICIES, DESIRED COMMUNITY OUTCOMES, AND STATE CLIMATE GOALS

RECOMMENDATION #7. Create outreach products for the community on why expanding transportation choices is essential, how to achieve it, and the relationship between VMT-reduction policies, desired community outcomes, and state climate goals

As shown by climate action plans, state goals, and local environmental advocacy, Hawai'i residents care about the environment and climate change. To leverage this widespread public support and state government commitment to address climate change, messages about the importance of expanding transportation choices and VMT reduction must be tailored to a variety of audiences.

The Current Situation: VMT and its impacts are not commonly understood

Climate change and VMT reduction strategies matter to a wide variety of decision-makers, agencies, and stakeholders, and messaging can be framed with a focus on different strategies and audiences to address a range of concerns, responsibilities, and opportunities for leadership and advocacy. The *Investing in Transportation Choices: Recommendations for Safe, Sustainable, Affordable, and Reliable Mobility* document is meant to establish a better understanding of VMT's negative impacts on climate, energy, and cost of living, as this is something that is rarely discussed in those contexts.

Next Steps: Establish a shared understanding of responsibility for supporting change

VMT reduction policy is a new topic to many – members of the public and state policy-makers alike – The connection between well-established climate action plan goals and VMT may not be intuitive to some. A clear understanding of why expanding transportation choices and reducing VMT is essential to meet GHG emission reduction goals. This understanding must be established to build a strong coalition of support for a policy shift of this magnitude. Hawai'i's

state agency leaders and advocates will have to address specific interests and concerns among different groups. Outreach materials that identify content to support effective communication, build ownership among responsible parties, and engage stakeholders about the various co-benefits and outcomes of VMT reduction, are critical.

Hawai‘i must translate policy recommendations into simple, straightforward messages that resonate with a variety of stakeholders. The following outreach materials should be developed to address key questions likely to be raised by each of these interest groups:

- **For advocates of vehicle speed and free-flowing traffic:** Why can't we build our way out of congestion? Wouldn’t highway expansion projects reduce VMT and GHG emissions? What is “induced demand”? How can we support economic growth without increasing VMT?
- **For the electric vehicle (EV) advocates:** Why does a full transition to EVs not solve the GHG emissions problem? What are the space constraints and impacts on land use associated with solar and other renewable electricity production and distribution projects, on a scale that powers all private vehicle travel? How long would a full fleet transition take and how much would it cost to accelerate?
- **For land use regulators:** What is the role of development patterns in increasing or reducing VMT? How can we build incentives for low-VMT land use development into regulations, review, and approvals processes? How can we disincentivize high-VMT land use development patterns and capture more of the external costs associated with single-use, low-density development?
- **For surface transportation practitioners:** What is the role of transportation system conditions in increasing or reducing VMT? What is getting in the way of mode shift today, and how can we build safe, inviting, and well-connected multimodal networks that give people comfortable choices to travel without a single-occupancy vehicle? How can we measure the success and impact of multimodal networks? How can we invest more in multimodal networks and less in expanding vehicle capacity?
- **For planners and advocates:** What are the characteristics of low-VMT places? What are the conditions and results of planning activities that reduce VMT per capita? What are the social and economic benefits associated with compact, mixed-use, infill development, and accessible, connected multimodal networks?

- **For public health advocates:** How do VMT reduction strategies support public health goals and outcomes, especially related to traffic safety, air quality, and physical health impacts of driving vs. multimodal mobility? Are our keiki and kūpuna and other vulnerable users such as people walking, rolling, and biking, and people with disabilities, disproportionately impacted by these public health concerns?

- **For equity advocates:** How do VMT reduction strategies support climate goals, better access to safe, affordable mobility and economic opportunities, and improve air quality ? How does access to transportation choices support access to education and housing security? How do VMT reduction strategies address disproportionate burdens affecting people in our chronically exploited communities?

Best Practices

Hawai‘i must communicate effectively and translate policy recommendations into simple, straightforward messages that resonate with a variety of stakeholders.

Practices from Other Communities: Learning from other jurisdictions

- **Minnesota Department of Transportation (MnDOT) 2020 Sustainable Transportation Advisory Council (STAC):** MnDOT developed a response to the STAC recommendations for decarbonizing transportation. According to MnDOT, “The recommendations and responses in this report are a starting point and will lead to many future conversations and actions. This is one important step on our journey to a low-carbon transportation future ... We look forward to continued engagement and collaboration between the STAC, MnDOT, and the communities we all serve in the years to come. While the work of addressing climate change is not limited to the transportation sector, we believe that transportation must lead the way.” The summaries about why each recommendation is important, how they can move forward, and considerations for success present an excellent example of tone and level of detail to communicate with broad audiences: **http://www.dot.state.mn.us/sustainability/docs/advisory%20council/stac-recommendations-response-2020.pdf**

Concluding statement:

Thoughtful communication that addresses specific questions about expanding transportation choices and speaks to the range of values and priorities among advocates, policy makers, agency staff, and the general public is essential to shift mindsets and investments. Next steps are to establish a shared understanding of responsibility for supporting change by engaging different stakeholders in a way that resonates with shared values and goals. This will help us to communicate why VMT reduction is essential to meet state goals and translate policy recommendations into messages that resonate with Hawai‘i’s people and agencies, alike.

APPENDIX A

POLICY BRIEF OUTLINING THE ISSUES AND CONTEXT OF VEHICLE MILES TRAVELED REDUCTION STRATEGIES

Appendix A: Policy Brief outlining the issues and context of Vehicle Miles Traveled reduction strategies

Introduction

This policy brief presents an overview of VMT as a transportation analysis and performance metric, background research, and the context for considering vehicle miles traveled (VMT) for use in Hawai'i. The brief is organized into the following sections:

I. **Key Findings**
II. **Problem Definition and Metrics Overview: VMT versus other metrics**
III. **State of the Practice: Lessons from other jurisdictions**
IV. **Hawai'i's Existing Conditions and further research questions**
V. **Conclusions: Key Challenges**

I. Key Findings

- **VMT is a suitable metric for measuring progress towards climate goals.** VMT is a metric that can be directly tied to greenhouse (GHG) emissions from transportation and land use development projects, as it intrinsically considers the effects of land use on the transportation system. It is a means to measure energy efficiency and travel choices. Currently, this metric is inconsistently applied in Hawai'i's transportation and land use planning. Hawai'i has not established quantitative reduction targets for total VMT or VMT per capita. Planning, funding, and project review processes do not incorporate VMT analysis to better align investments with statewide climate action.

- **VMT emissions have grown and are projected to grow and will be an obstacle to achieving state climate goals.** In Hawai'i, VMT from cars and light trucks accounts for over half of GHG emissions generated by transportation activities (51% in 2017)[47,48] and has increased since 2000. VMT has continued to grow in the short-term from 2014-2019 and long-term since 2000 and future projections show that VMT will continue to grow without changes to plans, transportation networks, and land use.

- **VMT reduction can provide co-benefits to accomplish other state goals.** VMT per capita, the amount driven per person or household, is typically higher in areas where lower density, single-use development most accommodates longer vehicle trips, while making public transit and other modes less effective. VMT per capita tends to be lower in areas where compact, mixed-use development supports shorter vehicle trips and more multimodal trips. Therefore, in addition to representing transportation GHG emissions, VMT analysis can also represent:

  - Coverage of and access to multimodal transportation networks
  - Proximity and access to jobs, goods, services, education, and healthcare
  - Lower environmental impact of compact, mixed-use development[49]
  - Improvements to health and safety
  - Reduced public and private costs of building and maintaining vehicle infrastructure

- **Examples from other states illustrate the usefulness of VMT-based analysis.** California environmental review requirements incorporate VMT analysis for project review and impact mitigation to ensure that new development and infrastructure investments support VMT reduction goals. VMT estimates and other vehicle demand estimates are also used in cities outside of California to determine appropriate transportation demand management (TDM) opportunities, parking requirements and restrictions, and impact fees.

[47] Hawai'i Clean Energy Initiative: Transportation Energy Analysis, Final Report, 2015.
[48] Hawai'i Greenhouse Gas Emissions Report for 2017, Final Report, 2021.
[49] Fang, Kevin and Jamey Volker, Cutting Greenhouse Gas Emissions is Only the Beginning: A Literature Review of the Co-Benefits of Reducing Vehicle Miles Traveled, Link

II. Problem Definition and Metrics Overview

Hawai‘i is a leader in climate change action even though emissions from transportation have risen. In response to rising energy prices and import reliance, the State of Hawai‘i and the U.S. Department of Energy launched the 2008 Hawai‘i Clean Energy Initiative (HCEI). In 2015, Hawai‘i established the first 100% renewable portfolio standard (RPS) for electricity in the U.S. Since the creation of the 100% RPS, Hawai‘i has doubled renewable energy for electricity from about 20% in 2014 to about 40% in 2022. In transitioning the electricity sector to renewable energy, GHG emissions have correspondingly decreased. While the state has had success in reducing GHG emissions from electricity generation since 2008, transportation sector emissions reductions have not been achieved.

Hawai‘i further became a climate action leader in 2018 when the Hawai‘i Climate Change Mitigation and Adaptation Initiative became law, codified as Chapter 225P, Hawai‘i Revised Statutes (HRS). The law established the Zero Emissions Clean Economy Target, pledging to make the State of Hawai‘i carbon negative no later than 2045.[50]

State goals will not be achieved without a reduction in ground transportation emissions. Ground transportation emissions from cars and light trucks account for slightly over half of GHG emissions generated by transportation activities (51% in 2017).[51] [52] The HCEI 2011 Road Map and 2015 Transportation Energy Analysis note that transportation fleet electrification alone will not achieve state climate and energy independence goals and that a significant reduction of statewide VMT must be achieved. While the HCEI reports mention VMT reduction goals, Hawai‘i has not yet established quantitative reduction targets for total VMT or VMT per capita that account for projected increases in statewide population and variability across local land use and transportation contexts. Additionally, existing planning, funding, or review processes for land use or transportation at the state and municipal levels do not incorporate VMT analysis to ensure investments are aligned with statewide climate action.

Since the year 2000, total VMT, as well as VMT per capita in Hawai‘i, have increased (see Figure 1 and Figure 2). The 2014 dip in total VMT and VMT per capita lines up with record high gas

[50] §225P-5 Zero emissions clean economy target. In relevant part, “a statewide target is hereby established to sequester more atmospheric carbon and greenhouse gases than emitted within the State as quickly as practicable, but no later than 2045.”
[51] Hawai‘i Clean Energy Initiative: Transportation Energy Analysis, Final Report, 2015.
[52] “Hawaii Greenhouse Gas Emissions Report for 2017,” Hawai‘i State Department of Health, April 2021, https://health.hawaii.gov/cab/files/2021/04/2017-Inventory_Final-Report_April-2021.pdf

This is the latest available greenhouse gas emissions data available.

prices that temporarily reduced VMT. Additionally, the Hawai'i Department of Transportation (HDOT) forecasts a 10% increase in VMT on state roads and highways over the next eight years in their latest budget.[53] To achieve Hawai'i's negative carbon emissions goal by 2045, VMT cannot continue to grow.

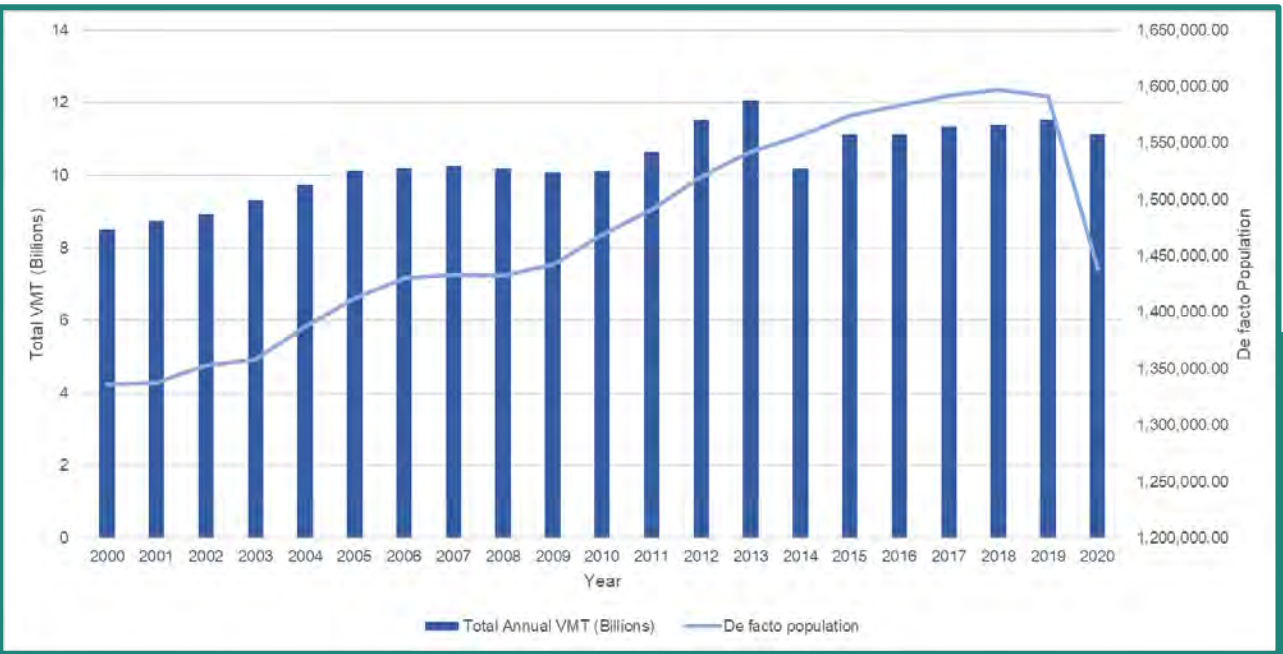


Figure 1. Total Annual VMT and De Facto Population, Hawai'i, 2000-2020[54]

[53] Hawai'i Department of Transportation FB 2021-2023 Operating Budget
[54] 2020 State of Hawai'i Databook: https://dbedt.hawaii.gov/economic/databook/db2020/

Note: for de facto population, data sources for 2000-2009 from 2019 State of Hawaii Databook: https://dbedt.hawaii.gov/economic/databook/db2019

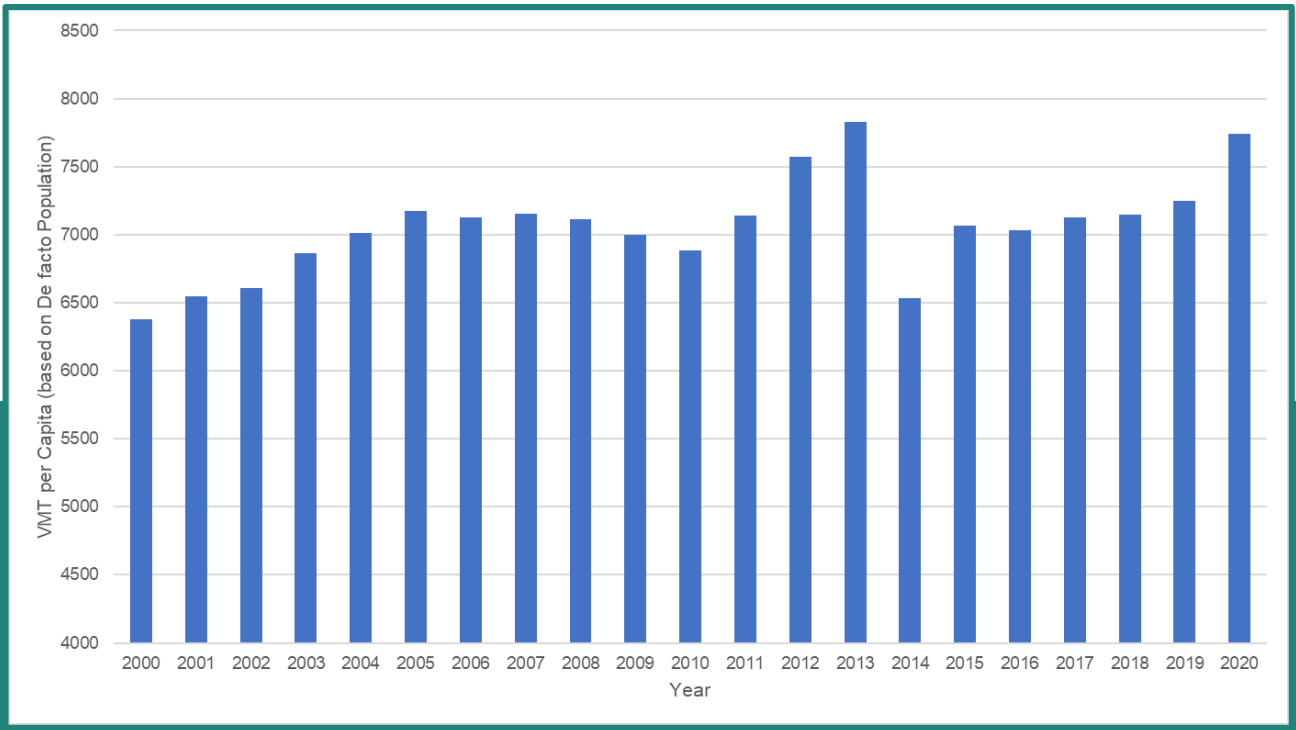


Figure 1. Annual VMT per Capita Using De Facto Population, Hawai'i, 2000-2020 [55]

Common Transportation Measures: Inadequate for Climate Change Goals

Many commonly used transportation measures focus on direct performance such as vehicle capacity, delay or congestion, throughput, and safety. While these tools are commonly used for evaluating transportation projects, many of them fail to capture the full impacts of transportation such as GHG emissions, induced demand for vehicle travel, and changes to land use. Common measures include:

- Travel Time Index (TTI), which is a ratio of the travel time during peak periods (6-9 am and 4-7 pm) to the time required to make the same trip at free-flow speeds and is ultimately a measure of congestion. Higher ratios represent higher levels of congestion.

[55] Ibid.

- Vehicle Level of Service (LOS) is a measure of vehicle delay at intersections and is determined by the peak 15 minutes of delay within the peak hour. LOS is represented on a scale from A to F, with F representing the highest level of vehicle delay.

- Level of Travel Time Reliability (LOTTR) is a measure of the consistency or dependability of travel time in a trip, or the time required to cover a particular road segment.

- Annual Average Daily Traffic (AADT) measures the usage of facilities by calculating the total volume of vehicle traffic divided by 365 days.

These measures, while not a comprehensive list, are commonly used in decisions about project funding and prioritization. For example, transportation projects estimated to improve LOS and operational performance of the ground transportation network are traditionally prioritized for funding and implementation.[56] Land use projects are typically required to study and mitigate LOS impacts from new development, particularly mixed-use and infill projects in built-out areas.

However, LOS serves as a subjective proxy measure for congestion by examining delays at specific locations during peak travel times. Because it focuses on measuring the convenience of traveling in an automobile and does not reflect a project's environmental impacts, it is not a useful measure for reviewing progress towards climate goals. More pertinent to the discussion, projects designed to improve LOS, such as intersection and road widenings, induce additional VMT and ultimately increase congestion over time. LOS only measures vehicle travel and does not typically account for other modes, often resulting in extensive analysis requirements and delays for multimodal transportation projects that may reduce vehicle lanes or speeds.[57]

[56] Highways Division Project Prioritization Guideline, Link

[57] De Robertis, Michelle, et. al., Changing the Paradigm of Traffic Impact Studies: How Typical Traffic Studies Inhibit Sustainable Transportation, May 2014.

Vehicle Miles Traveled: A more relevant metric for climate goals

VMT is a measure of vehicle travel generated within a particular geography over a set period. VMT is a metric that can be directly tied to GHG emissions from transportation and land use development projects, as it intrinsically considers the effects of land use on the transportation system. VMT per capita, the amount driven per person or household, is typically higher in areas where lower density, single-use development most accommodates longer vehicle trips while making public transit and other modes less effective. VMT per capita tends to be lower in areas where compact, mixed-use development supports shorter vehicle trips and more multimodal trips.

VMT analysis and VMT reduction goals can directly capture the value of benefits that are not considered in traditional LOS or travel time analysis. VMT analysis can capture:

- Improvements to multimodal transportation networks
- Proximity and access to jobs, goods, education, and healthcare
- Lower environmental impact of compact, mixed-use development, including air pollutants and GHG emissions from building energy use and water pollution[58]
- Improvements to health and safety
- Reduced public and private costs

The Federal Highway Administration (FHWA) maintains the Highway Performance Monitoring System (HPMS), which uses AADT figures from sample road segments to calculate rough average VMT estimates, with consideration of various factors such as day of the week.[59] However, states and regions have developed more refined VMT calculation methods. In many places, VMT data can be derived from travel demand forecasting models based on socioeconomic data projections and is typically used in long-range transportation and land use planning. Typically, VMT estimates from forecasting models are validated using current data on existing travel patterns and other data sources.

VMT can be measured in different ways depending on the project or scenario requiring analysis. Different VMT calculations are shown in Figure 3. VMT per capita and VMT per employee can be used to analyze the transportation impacts associated with residential and employment (e.g. office) land use projects

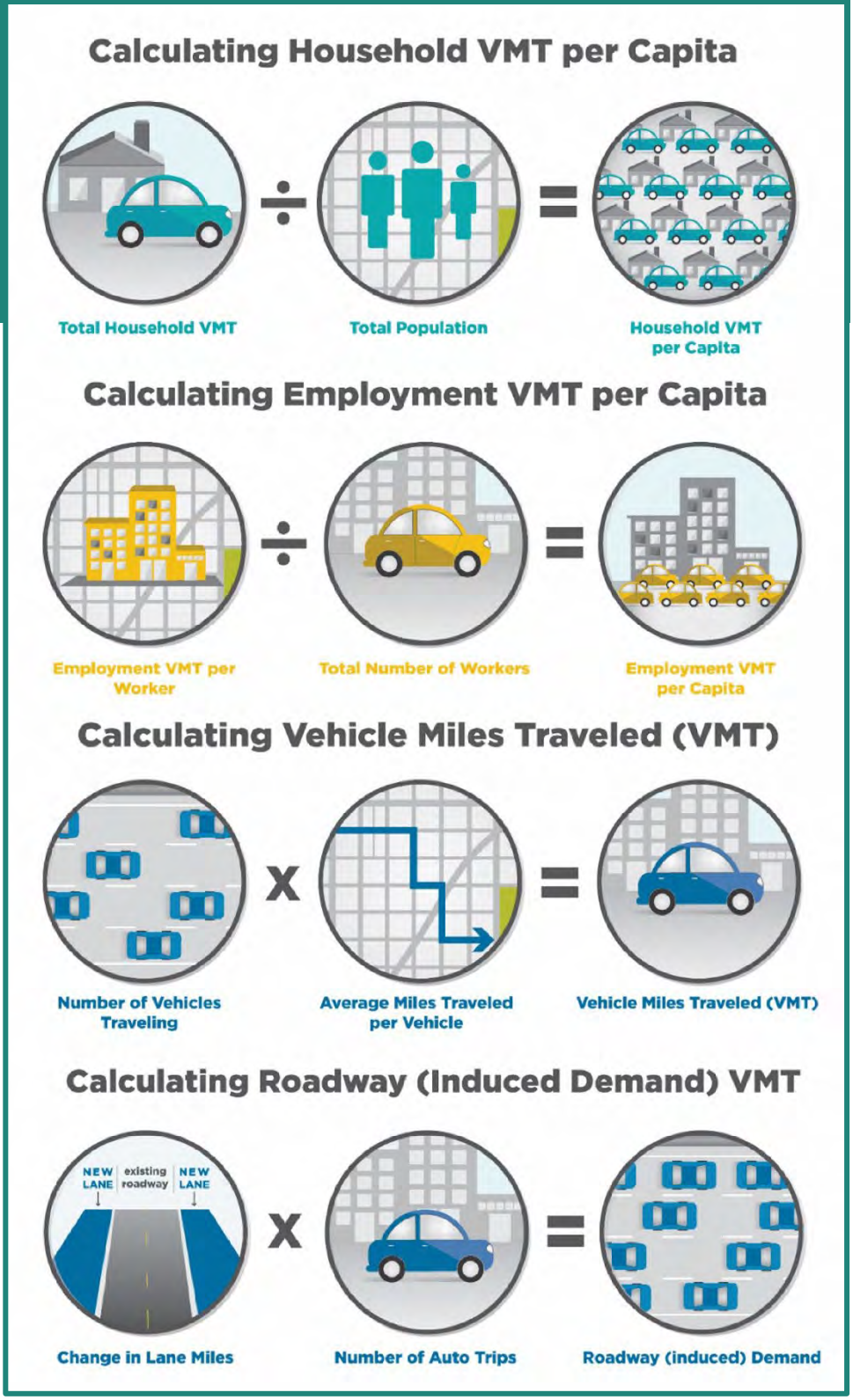
[58] Fang, Kevin and Jamey Volker, Cutting Greenhouse Gas Emissions is Only the Beginning: A Literature Review of the Co-Benefits of Reducing Vehicle Miles Traveled, Link
[59] Transportation Policy Research Center, Texas A&M Transportation Institute, Methodologies Used to Estimate and Forecast Vehicle Miles Traveled (VMT), Link

respectively. The VMT per capita and VMT per employee data can be mapped to show the location efficiency[60] (when likely trip destinations are more convenient, especially by non-automobile trips) of various geographies and projects. A location's VMT per capita is also a measure of transportation choice, diversity of destinations, trip lengths, and availability of quality multimodal options to get around. In areas with low VMT per capita, there are higher concentrations of trip destinations, people make shorter trips, and there are quality options to get around without driving. Measuring change in total VMT and estimating induced demand across a specific geographic region requires running travel demand models for each analysis to calculate the total VMT associated with different development scenarios. Induced demand is the increase in vehicle travel and resulting congestion that is caused after road capacity increases or time-saving improvements influence short-term changes in travel behavior and long-term changes in land use that accommodate and encourage driving.[61]

[60] Holtzclaw, John, et al. "Location efficiency: Neighborhood and socio-economic characteristics determine auto ownership and use-studies in Chicago, Los Angeles and San Francisco." Link

[61] Litman, Todd, "Generated Traffic and Induced Travel," Victoria Transport Policy Institute, Link

Figure 3.
VMT Calculations



High Costs of High VMT or, Why it is important to reduce VMT

Vehicle dependency, congestion, collisions, and emissions burden communities with social, economic, and personal costs. On average, over 100 people per year are killed in collisions on Hawai'i's roads and highways[62] and Hawai'i has the sixth highest pedestrian fatality rate in the nation.[63] In addition to the human toll, congestion costs the State of Hawai'i $693 million annually, primarily through lost time and productivity from hours spent in traffic.[64] The same study estimates the total public and private costs of the vehicle transportation system in Hawai'i are $21.8 billion annually. The annual cost of driving ranges averages $8,000-$10,000 a year, as shown in Figure 4. When vehicle ownership is the only option available to conveniently access jobs and opportunities, low-income households end up spending a greater percentage of household income on mobility. Reducing VMT can improve health, environmental, and economic outcomes for everyone.

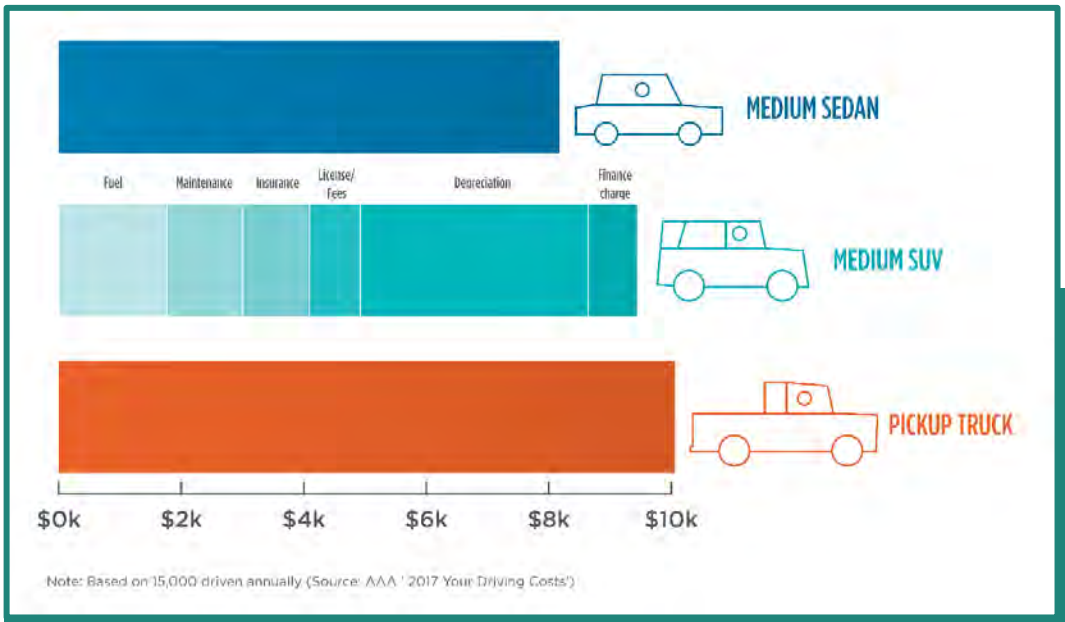


Figure 4. Annual Cost of Driving

[62] Hawai'i Department of Transportation: https://hidot.hawaii.gov/highways/fewer-year-to-date-traffic-fatalities-counterweighed-by-fewer-vehicles-on-the-road/
[63] https://www-fars.nhtsa.dot.gov/States/StatesPedestrians.aspx
[64] The Costs of the Vehicle Economy in Hawai'i, IFC and Ulupono Initiative, January 2021, Link

III. State of the Practice

1. California's Use of VMT for Land Use and Transportation Analysis

Background

In 2013, California Senate Bill 743 (SB 743) was passed to change the focus of transportation impact analysis in CEQA from measuring impacts on drivers to measuring the environmental impacts of driving. The California Environmental Quality Act (CEQA) requires analysis and documentation of environmental impacts for land use developments, transportation, and other projects. Transportation is one of 18 environmental resources studied in environmental review documents and historically vehicle LOS was used to measure transportation impacts. The transition from LOS to VMT required coordination across state and local agencies, research and data analysis, new methodologies and tools, and years of engagement and compromise.

Recognizing that LOS supported project impact mitigation measures in conflict with climate action and environmental goals, such as highway widening, or promoted sprawl by pricing out infill development, SB 743 sought to address environmental impacts of land use and transportation decisions and incentivize the benefits of compact development through the environmental review process. CEQA served as the appropriate vehicle to implement the change, owing to its environmental focus and long-term emphasis for planning projects. The intent of SB 743 and California's adoption of VMT-based analysis is to:

- Reduce GHG emissions,
- Develop multimodal transportation networks, and
- Encourage infill development and a greater diversity of land uses.

The law went into effect in 2020 and VMT thresholds and policies have been adopted by state agencies, counties, and cities.[65] [66] Examples of how this analysis is applied to different project types and CEQA analysis are described below.

[65] City of San José Vehicle Miles Traveled Policy Documents, VMT Evaluation Tool, and Transportation Analysis Handbook Link
[66] City of Los Angeles Required Transportation Assessment for Developers webpage, including Transportation Assessment Guidelines, VMT Calculator, and supporting documents, Link

VMT Analysis of Projects and Plan

Screening

Screening criteria quickly identify low-VMT land use and local transportation projects that do not need further analysis. Projects that promote positive environmental outcomes, based on research and data supporting these project types, bypass the VMT analysis requirement. The California Office of Planning and Research (OPR) has an extensive list of transportation projects that evidence-based research has found do not increase VMT.[67] Examples of land use screening criteria include:

- Affordable housing projects
- Land use developments in low VMT areas
- Land use development within a half mile of frequent transit (every 15 minutes at peak)
- Small, infill projects

Land use projects must meet minimum criteria established by local jurisdictions for density, low parking supply, and other features that ensure projects will be low VMT.

VMT Thresholds

Thresholds in CEQA are objective, quantifiable measures to determine if a proposed project will have a significant environmental impact or not. The California Air Resources Board (CARB) has modeled the VMT reductions needed to achieve the state's GHG reduction goals, and OPR provides local jurisdictions with guidance to set thresholds that align local project decisions with meeting statewide targets. The following thresholds are recommended by OPR for specific project types:

Residential land use: 15% below existing average VMT per capita for a city or region

Employment (office) land use: 15% below existing average VMT per employee for a region

Retail land use: No net increase in regional VMT

[67] California Governor's Office of Planning and Research, Technical Advisory on Evaluating Transportation Impacts in CEQA, 2018, Link

Transportation: study and potential mitigation required for projects not eligible for a categorical exemption and induce net new VMT

Thresholds are defined relative to reference averages. For land use, thresholds can be set to the local (city) average. The local reference average enables all communities to grow while prioritizing low VMT-development patterns and investments within every community's unique context, ensuring that local VMT is reduced over time and achieving state GHG reduction goals.

VMT Mitigation

If projects are assessed to have a significant impact, CEQA requires project mitigation and monitoring program. There is a growing body of research on approaches to reduce VMT at different scales, from individual land use projects to citywide plans. Mitigation measures include investments in multimodal network improvements, parking management and supply reduction, incentives to use modes other than driving alone, road pricing and other user fee schemes, and Transportation Demand Management (TDM) programs and policies. TDM is a general term for strategies that aim for more efficient use of transportation resources through improved information, incentives for efficient travel, and disincentives for travel that increases VMT.[68]

Examples of mitigation measures include:

- **Land use strategies: Strategies that modify the location or characteristics of development projects to reduce auto travel and/or shorten auto trips.**
- **Neighborhood enhancements: Community-level investments that improve or encourage neighborhood-level bicycle, pedestrian, and other multimodal travel options.**
- **Transit strategies: Community-level measures that improve transit service and increase ridership.**
- **Parking management: Measures that discourage auto travel by modifying the price or supply of vehicle parking.**

[68] Victoria Transport Policy Institute, Online TDM Encyclopedia

- **Employer commute programs: Measures that encourage people to commute by modes other than auto. Some of these programs, such as transit passes, can also be applied to residential projects.**

2. Other Examples of Land Use Analysis

Outside of California's implementation of SB 743, land use development and transportation project review in several cities aim to reduce vehicle trips, VMT, and/or parking demand associated with new development or transportation projects. VMT estimates and other vehicle demand estimates are used variously to determine appropriate TDM triggers, parking requirements and restrictions, and impact fees. Many of these jurisdictions still use LOS or conventional trip generation for part of their traffic impact and TDM analysis, and only the best practice elements of their analysis and mitigation are highlighted in this document. Examples are shown in Figure 5, and more detailed descriptions of Virginia and Massachusetts follow.

Figure 5.
Example Transportation Review Metrics, Applications, and Outcomes

Jurisdiction	Review Metric	Application	Outcome
Cambridge, MA[69]	Parking thresholds	TDM strategies are required, increasing with the number of parking spaces.	Encourages TDM and reduced parking supply (and managed demand) in new developments.
Rockville, MD[70]	Vehicle trip generation	Analysis and mitigation strategies vary depending on trip generation estimates. Large projects require trip reduction plans, tracking, and fees.	Requires reduction of vehicle trips in new, large developments.
Alexandria, VA[71]	Development size	TDM requirements are based on where a development falls within the tiered size categories, based on number of units for residential, and square feet for commercial.	Requires TDM for new developments. TDM requirements range from contributing to a fund for area TDM strategies, teaming with adjacent transportation management plans, and enacting and monitoring a new TDM plan
Brookline, MA[72]	Development size	Developments are categorized by size, location and accessibility to create context-specific TDM plans with target trip-reduction scores.	Requires TDM plans for new developments.
Yolo County, CA[73,74]	Variable LOS	LOS policy allows for LOS E and F in growth areas while requiring LOS C in rural and agricultural areas.	Allows for multimodal plans and projects, even where LOS is low. Encourages compact, mixed-use growth in urbanized and discourages growth in rural and agricultural areas.

[69] City of Cambridge, Traffic, Parking and Transportation, Transportation Impact Study Guidelines, Link
[70] City of Rockville, Comprehensive Transportation Review, Link
[71] City of Alexandria, Transportation Management Plans Website, Link
[72] Town of Brookline, Recommendations for Transportation Demand Management, Link
[73] Yolo County, Transportation Impact Study Guidelines, Link
[74] Yolo County, 2030 General Plan Circulation Element, Link

3. Virginia SMART SCALE - Transportation Project Review and Prioritization

Background

Virginia House Bill 2 (HB 2) transportation legislation, effective in 2015, mandated the development of a data-driven scoring process to prioritize and select transportation projects for funding. The Secretary of Transportation's Office of Intermodal Planning and Investment (OIPI) implements the SMART SCALE process to provide a clear, objective process for decision-making. Prior to HB 2, funding decisions were made by the Commonwealth Transportation Board (Board of Commissioners) without a consistent and transparent process for project evaluation and review.

Regional entities, public transit agencies, counties, cities, and towns that operate and maintain transportation facilities in Virginia are eligible to apply for funding. Each project funding application must demonstrate consistency with the mid-term needs and investment priorities in Virginia's Transportation Plan (VTrans). After initial screening, the planned projects are ranked using a six-factor weighted scoring system. After scoring and prioritization, the Transportation Board selects projects to fund.

Screening

A self-screening process allows potential applicants to determine eligibility before preparing a project funding application based on whether the proposed project meets one or more of the VTrans mid-term identified needs. Most transportation projects are eligible including highways, active transportation, transit capacity improvements, and TDM. Some projects excluded from SMART SCALE include standalone studies, asset management, and transit maintenance facilities without capacity expansion.[75]

[75] Virginia Department of Transportation, SMART SCALE, Link

Metrics and Analysis

The SMART SCALE system measures a total of 5 factors, with a 6th, land use, required if the project area population is larger than 200,000. The five factors are shown in Figure 6.

Figure 6.
Virginia SMART SCALE Factors

Factor Area	Measure	Measure Weight
Safety	Equivalent property damage only of Fatal Injury Crashes	70%
	Equivalent property damage rate of Fatal and Injury Crashes	30%
Congestion Mitigation	Person Throughput	50%
	Person Hours of Delay	50%
Accessibility	Access to jobs	60%
	Access to jobs for disadvantaged persons	20%
	Access to multimodal choices	20%
Environmental Quality	Air quality and environmental effect	95%-100%
	Impact to natural and cultural resources	0%-5%
Economic Development	Project support for economic development	60%
	Intermodal access and efficiency	20%
	Travel time reliability	20%
Land Use	Transportation-efficient land use	50%
	Increase in transportation-efficient land use	50%

Each factor is calculated and then weighted based on project type and location. Area weighting typologies are created to evaluate project benefits relative to the needs of the area. Some locations have been determined to be a higher priority due to statewide significance and receive alternative weighting. The scoring team collects data necessary for evaluation, then measures values calculated and weighted based on area type. Factor totals are then summed, and the final score is determined by dividing the total score by SMART SCALE cost.[76]

The SMART SCALE analysis weighs measures like VMT, such as access to jobs and multimodal access. Additionally, the use of person throughput instead of

[76] Virginia Department of Transportation, SMART SCALE Scorecard Example Link

vehicle throughput allows for the process to consider the efficiencies of transit and active transportation modes. The SMART SCALE analysis also incorporates land use analysis for areas with more than 200,000 people.

4. MassDOT's Holistic Approach to Improving Transportation

Massachusetts' Department of Transportation (MassDOT) was created in 2009 by the Transportation Reform Act, combining several existing agencies and authorities into an umbrella organization responsible for state transportation. Since its formation, the agency has updated and improved many of its key processes including budgeting, project evaluation, and data reporting, integrating land use planning, and designing transportation for all modes. This integrated approach has been supported by agency leadership, agency partners eager to make changes, and supportive staff. The approach builds on existing successes by meeting people where they are.

Capital Investment Plan

When MassDOT was formed, the new agency inherited legacy plans and projects from the predecessor agencies. The process of capital project selection and prioritization for design, engineering, and funding was unclear and uncertain. In 2015-2017, the process was overhauled based around three goals: reliability, expansion, and modernization. Underneath each goal are several programs with individual projects receiving funds within each program.[77] This process ensures similar project types compete for funding and that the budgeting centers on funding specific programs rather than individual projects.

Design Directives

MassDOT's Chief Engineer issues design directives that require compliance by every state-led or funded project. In January 2020, a new design directive was issued to update MassDOT design criteria for pedestrian, bicycle, transit, and vehicle facilities.[78] While projects can seek a design justification waiver, the process allows for tracking whether projects are meeting design requirements or seeking waivers. Design directives provide local transportation practitioners

[77] MassDOT Capital Investment Plans, Link

[78] MassDOT Design Directive E-20-001, January 2020 Link

with tools to implement MassDOT policies, such as designing for all modes.

Data Tracking and Reporting

MassDOT issues an annual performance management report called Tracker.[79] Reflecting a department culture that is investing in outcomes, the department tracks inputs (funds budgeted), outputs (how funds were spent), and outcomes (the performance of what is delivered). Tracker reports both outputs of projects delivered and the outcomes, or performance of the system.

In addition to Tracker, the MassDOT has built and maintains dashboards to provide current information on a variety of transportation metrics to the public. These include a transportation safety dashboard (Impact) that allows users to engage with crash-related data through prebuilt reports and conduct self-driven analysis of crash and injury data.[80] MassDOT launched their Mobility Dashboard during the COVID-19 pandemic to provide travel information and is updated as often as possible, typically weekly.[81] Metrics tracked include traffic volumes on major roadways, vehicle miles traveled, and transit ridership.

Efforts to Reduce VMT

While MassDOT tracks VMT per capita, the agency does not have a VMT reduction goal. Instead, MassDOT aims to provide options for all modes and reduce barriers to transit and active transportation. For example, in the 2021 Statewide Bicycle and Pedestrian Plan Update, the agency applied a methodology to estimate the potential for everyday walking and biking. This methodology helps prioritize projects with the highest potential to shift trips to active modes, thereby reducing VMT from short trips.[82]

[79] MassDOT Tracker, Link
[80] MassDOT Impact Dashboard, Link
[81] MassDOT Mobility Dashboard, Link
[82] Massachusetts Statewide Bicycle and Pedestrian Plan Update, 2021 Link

5. Other Examples of Transportation Review Metrics

In addition to Virginia's SMART SCALE and MassDOT, there are several examples of transportation metrics and tools that are used to determine beneficial outcomes of transportation investments. These examples are shown in Figure 6.

Figure 7.
Examples of Transportation Review Metrics

Jurisdiction	Review Metric	Application	Outcome
Detroit, MI[83]	Access to Core Services	SEMCOG, the Detroit-area MPO calculates travel time to 7 different core services across four modes to measure access across the region.	Identification of gaps in access to core services across the region help to inform policy and actions to be implemented by localities.
Boston, MA[84]	Local Access Score	The Local Access Score is used to measure level of accessibility provided by the transportation network in the area and determine ease of travel to key destinations.	This process is used to provide a quantitative estimate of roadway utility for cyclists and pedestrians, inform the decision-making process, and promote Complete Streets policies.
Salt Lake City, UT[85]	Access to Opportunities	Access to Opportunities (ATO) uses Travel Demand Modeling and GIS analysis to measure access to basic needs and amenities at the regional and local scale.	ATO metrics are incorporated into scenario evaluation and transportation project prioritization and used across the region to guide economic development strategy.
United States (EPA)[86]	Smart Location Mapping	The Smart Location Database summarizes over 90 different indicators of the built environment and access throughout the United States.	This nationwide geographic data resource is available publicly and to inform regional and local planning

States' efforts to reduce VMT are relatively recent. Data on the exact carbon reduction of these best practices have not been collected or published. There remain challenges around measuring the impacts of these best

[83] Access to Core Services in Southeast Michigan, Southeast Michigan Council of Governments, 2016, Link
[84] Metropolitan Area Planning Council, Local Access Score, Link
[85] Wasatch Front Regional Council, Access To Opportunities, 2017, Link
[86] United States Environmental Protection Agency, Smart Location Mapping, Link

practices, as impacts are seen longer term. However, like other climate-smart actions, implementation of these best practices should begin as soon as possible in order to reach Hawai‘i’s climate goals.

IV. Hawai‘i’s Existing Conditions

Although VMT reduction is not currently required for state and local environmental review for the State of Hawai‘i, it is regularly referenced in planning documents, along with objectives to reduce GHG emissions and promote sustainable transportation options. Given the emphasis placed on climate change mitigation in many of the state and county planning documents, Hawai‘i appears to be well positioned to incorporate VMT-based analysis into development review processes and the prioritization of transportation projects. The following plans have been reviewed for goals, objectives, policies, and/or actions that directly reference VMT and GHG reductions, or that would be supported by VMT-based analysis.

1. State Plans and Policies

- The *Hawai‘i Statewide Transportation Plan (HSTP)*, which is currently being updated, is a policy document that establishes the framework to be used in the planning of Hawai‘i’s transportation system. Some of the draft goals in the plan include:
  - Improve and preserve the quality of air, water, land, and other natural resources.
  - Reduce transportation-related impacts on natural, historic, and cultural resources.
  - Reduce transportation GHG emissions, including shipping and aviation-related GHG **to support the statewide goal of carbon negative by 2045**.
  - Support the statewide goal of achieving 100% clean energy by 2045.
- Goal 6 in the previous HSTP published in 2011 references the importance of supporting the State’s energy goals, and a key objective is to “Support the

national goal to reduce transportation-related GHG emissions and reliance on foreign oil."

- The *Hawai'i Statewide Transportation Improvement Program (STIP)* provides a multi-year listing of the State and County projects and identifies those projects slated for federal funding. STIP is a multimodal transportation improvement program that is developed based on existing transportation plans and policies, and current highway, transit, and transportation programming processes. The STIP delineates the funding categories and the federal and local share required for each project, and projects are prioritized according to the Highways Division Project Prioritization Guidelines.

- Per federal requirements, a STIP should include "a discussion of the anticipated effect of the STIP toward **achieving the performance targets identified by the State in the statewide transportation plan** or other State performance-based plan(s), linking investment priorities to those targets." The current Hawai'i project prioritization guidelines identify access, safety, maintenance, congestion relief, and capacity improvements as the top five priorities. Informing project prioritization with VMT-based analysis could help better align the STIP with established GHG reduction goals.

- The *Statewide Complete Streets Policy (State of Hawai'i Act 54 of 2009)* was passed in 2009 and requires the State DOT and all county transportation agencies to adopt and implement a Complete Streets policy to ensure roads accommodate all users, regardless of their age, ability, or preferred mode of transportation. Additionally, Act 54 created the statewide Complete Streets Task Force (CSTF) to set a statewide complete streets vision and values and provide guidance to state and county transportation agencies for implementing complete streets. The CSTF established 10 complete streets principles for Hawai'i, including:

  – **"Energy efficiency – Plan, design, and construct a transportation system that offers transportation choices for residents and visitors and reduces reliance on single-occupant vehicles to improve energy efficiency in travel, and mitigates vehicle emissions."** VMT-based analysis can help scope and prioritize complete streets transportation projects with statewide complete streets principles.

2. MPO Plans and Policies

- *OahuMPO's 2045 Regional Transportation Plan,* adopted in 2021, includes Goal 7 to "Improve air quality and protect environmental and cultural assets" and one of the associated performance measures is particulate matter (PM2.5) emissions related to ground transportation (7.1.3). The plan performance also includes estimates for VMT, VHT, vehicle hours of delay, and transit boardings under build/no-build scenarios. **The measurement of PM 2.5 emissions from transportation could be supported by VMT-based analysis.**

- *Maui MPO's Hele Mai Maui: Long-Range Transportation Plan 2040,* adopted in 2019, includes Goal 2 to "Enhance cultural and natural resources, climate resilience, and sustainability" and an associated objective is to reduce transportation-related air emissions. **The performance metric is total GHGs from transportation, which would be supported by VMT-based analysis.**

3. County Plans and Policies

- In 2018, the Mayors of Honolulu, Hawai'i County, Maui County, and Kaua'i County collectively committed to *100% Renewable Ground Transportation by 2045*[87]. While converting to renewable energy sources for ground transportation is critical, **this goal could be further supported by VMT-based analysis** since it can be used to promote multimodal ' transportation networks and reduce auto dependency.

- *Kaua'i County's Kākou General Plan*, adopted in 2018, establishes priorities for managing growth over 20 years. Under the section on Energy Sustainability and Climate Change Mitigation, **the reduction of GHG is listed as a key objective** to achieve an 80% reduction by 2050 based on a 2010 baseline. One of the suggested actions to support this objective is to "Promote higher density residential development near job centers and amenities, while strongly discouraging development that will require residents to commute via automobile to jobs in other areas of the island." **Using VMT as a metric in transportation impact analyses would support this objective.**

[87] Office of Climate Change, Sustainability and Resiliency, Climate Mayors Congressional Letter, Link

- *Kaua'i Multimodal Land Transportation Plan,* adopted in 2013, outlines the steps necessary to achieve a sustainable multimodal transportation system through 2035. Transportation challenges identified in the plan include an increasing demand for public transit, and a lack of mobility options when traveling between urbanized areas, and a lack of safe active transportation facilities. **The reduction of VMT per capita is listed as a means of achieving a more balanced, sustainable transportation system.**

- *Hawai'i County's Draft General Plan 2040* **directly references reductions in VMT and GHG emissions**. Under Section 1 on Natural Resources Planning, one of the sustainability objectives outlined is to "Partner with community stewardship groups, local stakeholders, and intergovernmental agencies to reduce island-wide GHG emissions by at least 80 percent from 2005 levels by 2050." Under Section 2 on Infrastructure Planning, a sustainability objective is to "Reduce individual VMT by 3%." **Given the explicit references to VMT reduction, these goals and objectives would be directly supported by VMT-based analysis.**

- *O'ahu's General Plan for the City and County*, revised in 2017, prioritizes sustainability in its 11 core areas of concern. Objectives and policies identified in the sections on Housing and Communities, Transportation and Utilities, and Energy reference the need to reduce reliance on fossil fuels and minimize greenhouse gas emissions. For example, a key objective under Transportation and Utilities is: "To create a multi-modal transportation system which moves people and goods safely, efficiently, and at a reasonable cost and **minimizes fossil fuel consumption and greenhouse gas emissions."** Under the section on Energy, one of the key objectives includes: "To conserve energy through the more efficient management of its use and through more energy-efficient technologies," and a related policy to support the objective is to **promote the development of a multi-modal transportation system**. While this plan does not explicitly reference any performance measures, **VMT-based analysis would support these important sustainability objectives**.

- The *One Climate, One O'ahu Plan (O'ahu's Climate Action Plan 2020-2025),* recommends nine City strategies and 47 related actions that the City and County should take five years to help ensure that O'ahu can meet its 2045 goal of being carbon negative. The Climate Action Plan (CAP) set an intermediary goal of a 45% reduction in GHG emissions by 2025 relative to 2015. The plan notes: **"Major changes to GHG emissions result from actions affecting vehicle miles traveled (VMT), federal fuel efficiency**

standards, and the further adoption of EVs." The plan outlines four potential pathways for passenger cars and trucks to meet GHG targets, all of which include a reduction in VMT in tandem with increasing levels of EV adoption. **VMT-based analysis would help track progress towards these goals** and support the recommendations included in this plan.

- The *City and County of Honolulu's Transportation Impact Assessment Guide*, published in 2020, provides direction on the scope of study required when evaluating the transportation impacts of a proposed City or County project with a focus on promoting multimodal development. The guide lays out City-preferred methods of evaluating transportation impacts, of which VMT analysis is one. Projects that may be subject to VMT analysis include those within a TOD or Transit Ready Development (TRD) zone with set thresholds of significance. **Moving towards a statewide framework of VMT-based analysis could expand the scope of impact assessment requirements beyond just those developments in a TOD or TRD zone.**

- *City and County of Honolulu Complete Streets*. The City and County of Honolulu adopted its own Complete Streets Ordinance in 2012, and in 2016 finalized a Complete Streets Design Manual. Since then, Honolulu has hired a Complete Streets Administrator to manage project implementation, update policies and procedures, and guide active transportation planning to promote safer, multimodal roadways. **Investments in multimodal transportation networks provide people with more transportation options, reducing reliance on driving and VMT per capita.**

- The *Central Oʻahu Sustainable Communities Plan*, adopted in 2021 and a subsidiary of the *General Plan*, provides an example of a recently adopted community plan. The Plan lays out a vision for what the area should look like in 2035. One element of the vision is to "**Design communities to reduce automobile usage**...and guiding development to encourage people to walk and bike." The plan discusses how zoning changes or proposed developments in the Central Oʻahu area may be subject to environmental assessments "to help the Department determine whether the project involves a significant environmental impact and if the project supports the vision for Central Oʻahu's development." **Moving towards VMT-based analysis would support goals related to reducing automobile usage.**

4. Other Plans and Policies

The Hawai'i Environmental Policy Act (HEPA) was passed in 1974 requiring state agencies to consider the impact of governmental actions on the environment. The Environmental Review Program, under the Office of Planning and Sustainable Development, oversees the HEPA process according to Chapter 343 of Hawai'i's Revised Statutes. Under HEPA, an agency proposing an action that meets one of nine conditions, such as developing a project on land classified as a conservation district, may be required to prepare an environmental assessment (EA), as well as an environmental impact statement (EIS). Neither the EA nor the EIS requires applicants to specifically reference any performance measure, but applicants must assess the direct, indirect, and cumulative impacts that the action could have on the environmental setting.

To complete an EIS, which is significantly more involved than an EA, applicants must reference population and growth characteristics, identify which data sources were used to quantify or evaluate potential environmental impacts, and address consequences adverse to environmental goals and guidelines, among other requirements. Since the State of Hawai'i has passed a law expressing a clear environmental goal of making the state carbon negative by 2045, **drawing a stronger connection between EAs and EISs and specific performance measures, such as VMT, would better align the HEPA process with State goals.**

It is also worth noting that the State's Public Utilities Commission (PUC) recently updated the portfolio of metrics they use to regulate and evaluate Hawai'i Electric Companies. The PUC has adopted a Performance Based Regulation (PBR) approach with performance-based oversight mechanisms they can use to provide incentives and/or issue penalties to companies based on their performance in meeting the **State's clean energy goals.[88] With this advancement, the State has set a precedent for applying a performance-based approach to support climate goals more aggressively.**

[88] State of Hawai'i Public Utilities Performance Based Regulation, Link

Further Research Questions

- **Past outcomes of the HEPA process.** Are there any key HEPA rulings or determinations that would be useful to review? Projects that were approved but have had greater environmental impacts than were anticipated? What kind of transportation-related mitigations are typically required? Have project mitigation measures led to increases in VMT?

- **Implementing HCEI Road Map.** Was a discussion had after this report was published about the possibility of adopting VMT as a performance measure? If so, what barriers to implementing VMT were identified?

- **Factors influencing land use development**. What is leading to vehicle-centric development patterns? Are there barriers to infill, mixed-use, and transit-oriented development? How do cities and counties monitor changes to transportation conditions after the construction of developments?

- **Factors influencing transportation projects.** What is leading to new roadway or capacity expansion projects that induce VMT? Are LOS requirements a barrier to funding or implementing multimodal transportation projects such as transit priority or bicycle networks?

- **Eligibility and conditions for funding.** Are there existing constraints on transportation funds that commit them to roadway capacity expansion? Are multimodal projects less competitive for funding requests compared to new road or widening projects? If so, why?

- **Pricing congestion or vehicle travel.** What is the potential for Hawai‘i to pass a carbon tax? Is Honolulu ready to study congestion pricing? Are counties considering decreasing or eliminating minimum parking requirements and requiring paid parking? Increasing the cost of driving by charging for parking, congestion pricing, and/or road tolls, and a fuel or carbon tax will reduce VMT by increasing the cost of vehicle travel.[89] Offsetting the impacts of increased costs, particularly for low-income households is critical and could be accomplished in several ways including reinvesting pricing revenue in multimodal transportation.

[89] Transcending Oil, Hawaii's Path to a Clean Energy Economy calculated VMT reductions from several strategies including pricing parking, building more compact infill, and congestion pricing or tolling, April 2018.

V. Conclusions: Key Challenges for addressing climate goals

- **Lack of quantitative VMT reduction targets.** In the 2011 HCEI Roadmap, a target of a 2% reduction in VMT by 2015 and a 4% reduction by 2020 was set compared to a 2010 baseline. The HCEI Transportation Energy Analysis report from 2015 found that VMT had, in fact, increased by 14% between 2010-2014. One of the strategies laid out in the 2015 report was to consider replacing LOS with VMT, which the authors rated as "medium" both in terms of social acceptability and feasibility.

- **Incomplete data gathering, analysis, and capacity**. Providing data for baselining, methodology and tools for analysis, and training/increased capacity for implementation of analysis and mitigation methods is key to achieving sustainability objectives and monitoring compliance.

- **Determining the appropriate policy vehicle.** Requirements, incentives, and disincentives are necessary vehicles for the implementation of policy. This can be included in planning requirements, environmental requirements such as HEPA analysis, or new regulations. Guidance and goal setting without "carrots" and "sticks" may not be effective.

- **Missing HEPA connection to VMT.** The 2012 Guide to the Implementation and Practice of HEPA does not specify performance thresholds or required analysis to determine a significant environmental impact of a project. Further investigation of existing HEPA processes for analyzing and reviewing transportation-related environmental impacts could lead to additional opportunities.

- **Uncertain political will and buy-in.** California's shift to VMT was difficult, despite the abundance of data and research supporting the need. Ultimately, language and requirements around transportation projects were minimized, due to push-back from state and local DOTs, reducing the overall impact of the legislation. Rethinking messaging, especially to transportation practitioners, may improve buy-in and roll-out.

- **Establishing outcome monitoring and accountability.** Beyond adopting a new metric and setting targets, Hawai'i agencies having jurisdiction over land use and transportation projects must establish clear responsibilities around VMT

outcome monitoring and reporting. Effective use of VMT requires investment in data resources and agency capacity, such as interagency cooperative agreements, regional data procurements, and reporting.

APPENDIX B

VMT-BASED ANALYSIS DATA NEEDS, RESOURCES AND GAPS

Appendix B: VMT-Based Analysis Data Needs, Resources and Gaps

Introduction

Continued increases in vehicle miles traveled (VMT) will prevent Hawai‘i from achieving its adopted carbon net negative by 2045 climate action goal, which was noted in the Vehicle Miles Traveled Policy Brief (Task 2 deliverable).[90] VMT has continued to grow in the short-term from 2014-2019 and long-term since 2000. Future projections show that VMT will continue to grow without changes to plans, transportation networks, and land use. In addition to greenhouse gas (GHG) emissions from VMT, there are other social, health, and economic costs of higher amounts of VMT. To support the implementation of existing and future adopted plans, policies, and projects to reduce VMT, this memorandum reviews data needs, available data resources, and gaps in existing data.

This report is organized into the following sections:

I. **Key Findings**
II. **Data Considerations and Recommendations**
III. **Applied Uses of VMT Metrics**
IV. **Available Data for Hawai‘i**
V. **Additional Data Sources**

[90] §225P-5 Zero emissions clean economy target

I. Key Findings

This section documents key takeaways from a review of available and potential VMT metrics and proxies. More detailed information and supporting research is provided in the following sections.

- **Current VMT monitoring data is sufficient for trends but not granular enough for project-level analysis.** The Department of Business, Economic Development, and Tourism (DBEDT) Data Book data is imperfect but sufficient for monitoring annual VMT trends at the county and state levels; however, it does not provide enough location-specific information to inform project-level decisions.

- **VMT reduction goals and strategies are essential for meeting climate goals.** Past VMT modeling efforts from sources such as Hawai'i Clean Energy Initiative (HCEI) and Transcending Oil do demonstrate that VMT reduction is essential for meeting our climate commitments and can inform VMT reduction strategies and goals, but are not reliable sources of VMT data for VMT analysis purposes.

- **VMT proxies such as Multimodal accessibility analysis may prove useful in absence of VMT data.** Multimodal accessibility analysis provides a proxy to VMT for land use and transportation project planning, prioritization, and review where VMT data is unavailable or unreliable.

- **Data improvements for additional modeling are essential.** Additional state or local modeling/VMT data is needed for most types of VMT analysis. VMT estimates and projections from modeling should be validated with regular data collection.

- **Alignment between models is crucial but currently non-existent.** Plans for state carbon reduction modeling should quantify the level of VMT reduction needed to achieve long-range climate goals and accounts for building electrification, fleet electrification, and grid decarbonization.

II. Data Considerations and Recommendations

VMT data considerations and recommendations are presented in this section at a summary level to highlight key findings and takeaways. Additional detail on VMT metrics, forecasting tools, and data sources is provided in the later sections.

- Adopt VMT reduction goals starting with the HCEI 2015 VMT reduction goals and updating as future modeling refines the VMT reductions needed.
- Invest in improved VMT data collection and modeling. For example, ensure existing and future travel demand forecasting models provide VMT estimates. Invest in developing VMT proxies such as accessibility analysis or other approaches to inform land use and transportation project evaluation.
- Regularly monitor VMT based on collected data to ensure on-the-ground progress is documented and VMT reduction goals and strategies are fine-tuned in response to data (not only based on models and forecasts).

Data Gaps

Annually reported DBEDT Data Book data on total VMT by county and population are sufficient to establish a baseline and monitor total VMT and VMT per capita trends for the state and each county. However, many types of VMT analysis require detailed geography-specific VMT data that is not currently available for Hawai‘i.

VMT studies such as the HCEI Roadmap and Transcending Oil study provide valuable scenario planning resources and demonstrate the need for VMT reduction to achieve GHG reduction goals. The HCEI analysis and Transcending Oil study are useful references; however, their scenario analyses do not provide VMT data with sufficient accuracy from which to develop further VMT analysis such as for land use development review.

OahuMPO and MauiMPO have travel demand forecasting models that will be capable of producing VMT estimates in the near term (2022 and Fall 2021, respectively). Travel demand forecasting models have several limitations, including relatively large analysis zones that limit the ability to account for walking, biking, and some trip types; however, they are a useful tool for producing VMT estimates. The models can produce estimates for VMT per capita

and VMT per employee at the transportation analysis zone (TAZ) level. The lack of travel demand forecasting models for Kaua‘i and Hawai‘i counties creates a data gap. For Kaua‘i and Hawai‘i counties, a state-level investment in VMT data, an alternative local approach using VMT proxies, or a simpler VMT estimation method will be necessary in the long term.

Quantifying Baselines and Establishing Goals

The HCEI 2011 Road Map and 2015 Transportation Energy Analysis reports identified VMT reduction goals needed to reduce GHGs. However, Hawai‘i has not formally adopted these goals or accountability mechanisms to ensure progress is made. The HCEI quantitative VMT reduction goals are established in relation to a 2010 baseline. The incremental goals for total statewide VMT call for a reduction of 2% by 2015, 4% by 2020, and 10% by 2030. The per capita VMT reduction necessary to achieve the 2030 goal is a 29% reduction of 2010 VMT per capita based on projected population growth of 14%.[91] The HCEI Road Map's VMT reduction goals account for improved vehicle efficiencies, increased renewable fuels, and accelerated adoption of electric vehicles (EVs). Fleet electrification is not sufficient to decarbonize ground transportation, which requires reducing VMT per capita, decreasing trip lengths, and increasing sustainable transportation mode shares. While the HCEI analysis and reports are useful references, their analysis extrapolates VMT from sources that do not have sufficient detail from which to develop reference baselines or state goals. Improved VMT modeling can quantify the additional VMT reductions needed in the ground transportation sector to achieve the State's goal to be carbon negative by 2045.[92]

Measuring Progress

Trends in total VMT and VMT per capita of the de facto population (residents and visitors) can be monitored at the county and state level using DBEDT annual data, even without a formally adopted VMT goal. As the state evaluates progress towards achieving a net negative carbon economy, changes in total VMT and VMT per capita should be factored into the analysis, and VMT targets revised to support reductions over time and adjust policies in response to evolving conditions.

[91] Hawai‘i Clean Energy Initiative: Transportation Energy Analysis, Final Report, 2015.

[92] §225P-5 Zero emissions clean economy target

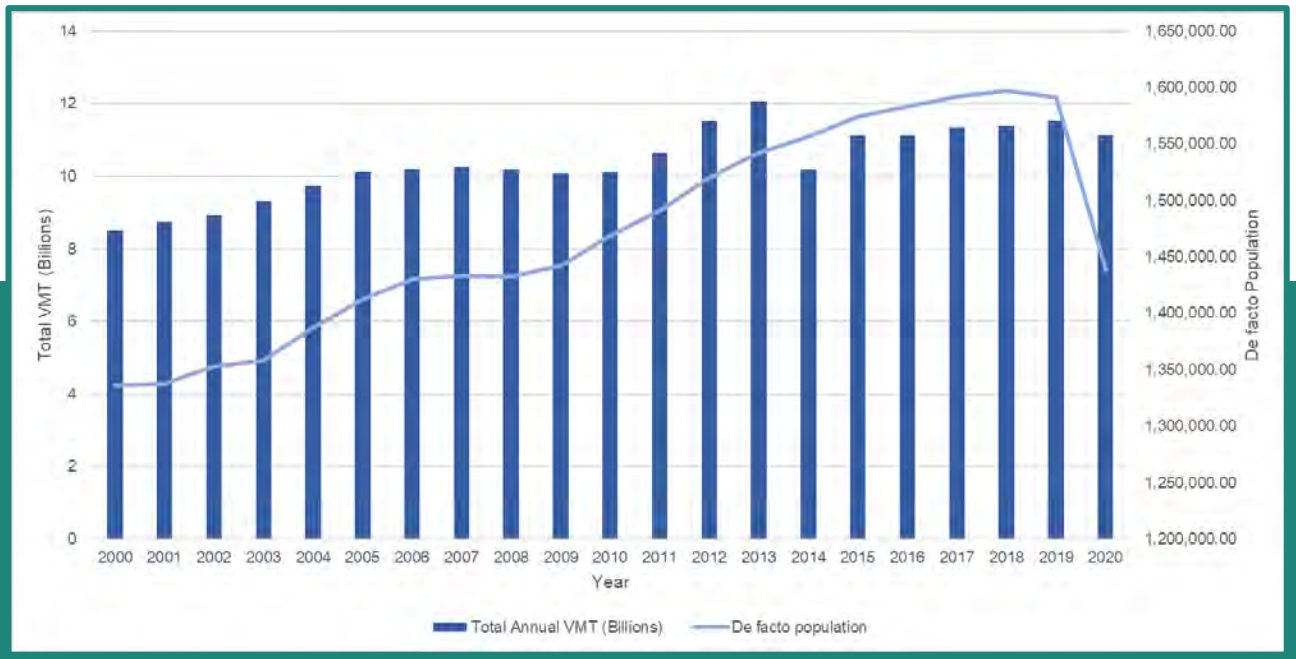


Figure 1. Total Annual VMT and De Facto Population, Hawai'i, 2000-2020[93]

[93] 2020 State of Hawai'i Databook: https://dbedt.hawaii.gov/economic/databook/db2020/
Note: for de facto population, data sources for 2000-2009 from 2019 State of Hawaii Databook: https://dbedt.hawaii.gov/economic/databook/db2019

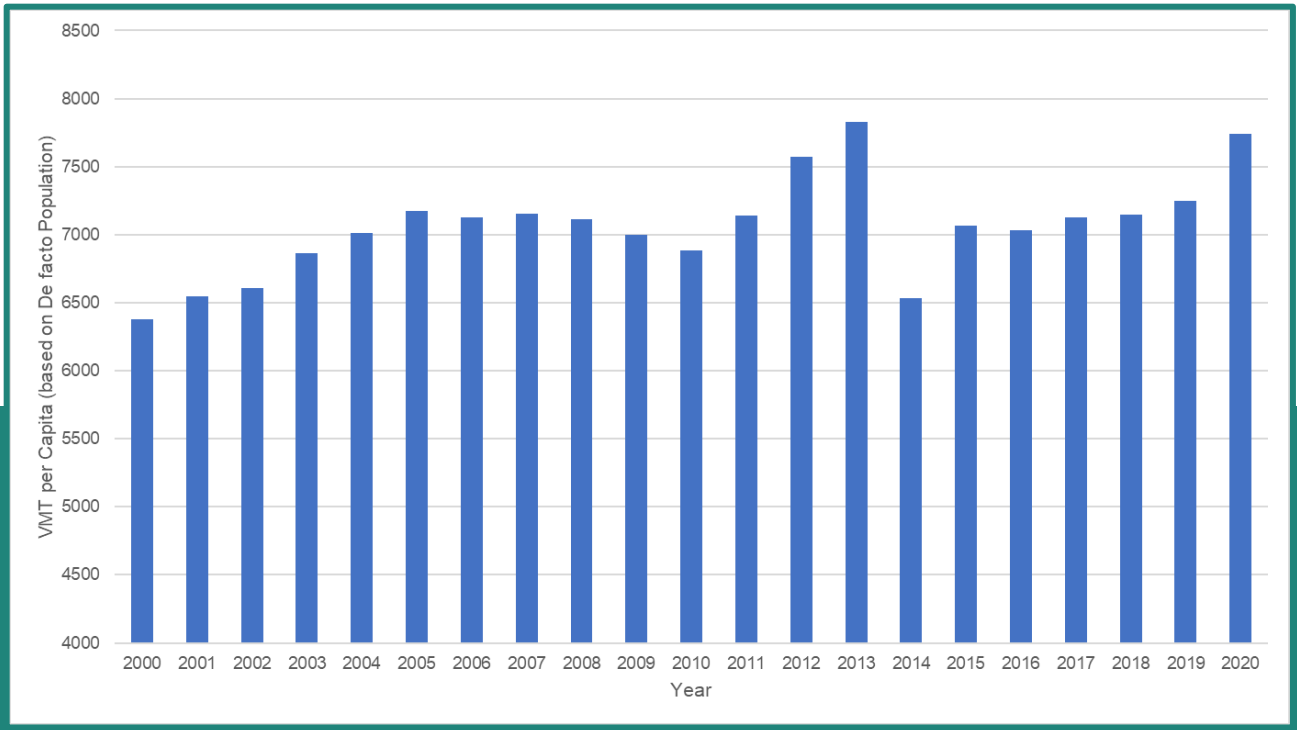


Figure 2. Annual VMT per Capita Using De Facto Population, Hawai‘i, 2000-2020[94]

Recommendations

Robust VMT data is an essential element to developing VMT-based goals, policies, metrics, and analysis. VMT can be linked directly to GHG as well as health, air quality, access to services, and other important outcomes for land use and transportation project development, review, planning, and prioritization.

Our review of available VMT data and estimates in Hawai‘i informs the following recommendations:

- Invest in improved VMT data collection and estimation modeling to provide more granular detail about specific geographies that can inform project-level

[94] Ibid.

analysis

- Establish VMT reduction targets to meet state GHG reduction goals (a variety of targets are applicable, and specific metrics such as VMT per capita or total statewide VMT can be used for different analysis purposes).

- Utilize VMT analysis for land use and transportation projects where possible and VMT proxies where VMT data is unavailable

There are multiple VMT metrics and data sources from which to develop VMT analysis processes. As of the writing of this memo, VMT at a geographic detail finer than at the county level is not being collected or modeled for all of Hawai‘i. Current and recent model updates for the MauiMPO and OahuMPO travel demand forecasting models may provide the granular, location-specific data to support VMT analysis described above.

An alternative approach will still be needed for Hawai‘i and Kaua‘i counties, as they do not currently have travel demand forecasting models or other tools to measure VMT. Other sources of VMT estimates, such as big data, are explored in detail in the final section of this memo. VMT proxies such as multimodal accessibility analysis can be a lower cost and easier to complete alternative or complement existing VMT analysis.

III. Applied Uses of VMT Metrics

The following section presents a review of how different metrics have been used in land use and transportation analysis outside of Hawai‘i to inform the assessment of data needs and review of existing data for Hawai‘i. VMT metrics can be used in both land use and transportation analysis.

VMT Metrics for Land Use Analysis

Accessibility

Areas or neighborhoods with low VMT have relatively better accessibility than areas with higher VMT. **Accessibility**, or multimodal accessibility, is a strong proxy for VMT and a more understandable term to the general public. Accessibility has many meanings; in this context, accessibility describes the ease with which people may reach destinations such as jobs, stores, parks, schools, and healthcare.[95] Unlike mobility, which measures *how far* one can move in a given amount of time, accessibility is a measure of *how many destinations* one can reach within that same amount of time. VMT is also a measure of transportation choices, and areas with more transportation options tend to have lower VMT.[96] On average, people drive less in neighborhoods where there are many safe, affordable, and convenient transportation options and destinations close by.

VMT per Capita & VMT per Employee

VMT per capita is a useful metric for measuring the VMT impacts of land use development projects as well as long-range or scenario plans. **VMT per capita** is the total household VMT divided by the number of residents or population of an area. Similarly, **VMT per employee** (commute VMT) can be used to evaluate the VMT impacts of office land uses. Heat mapping VMT per capita at a fine-grained geographical scale, such as census tract, parcel, or transportation analysis zone (TAZ), provides a baseline estimate of VMT per capita likely to be generated by new land use development. Travel demand forecasting models and sketch modeling tools such as CNT's Housing + Transportation tool can be used to estimate VMT heat maps. New projects will have similar VMT to existing development around them due to the

[95] State Smart Transportation Initiative, Measuring Accessibility: A guide for Transportation and Land Use Planners, 2021.

[96] Transform, Measuring the Promise of Transit-Oriented Development: A Proposed Methodology for BART, 2021, Link.

similar mix of uses, level of walkability, and transportation network.[97] An example of a VMT per capita heat map from a city in California is shown in Figure 1. Land use projects located in high VMT areas are required to reduce their VMT to mitigate VMT impacts. VMT per capita or per employee maps can be used to inform transportation and land use planning and to assess the transportation impacts of land use developments.

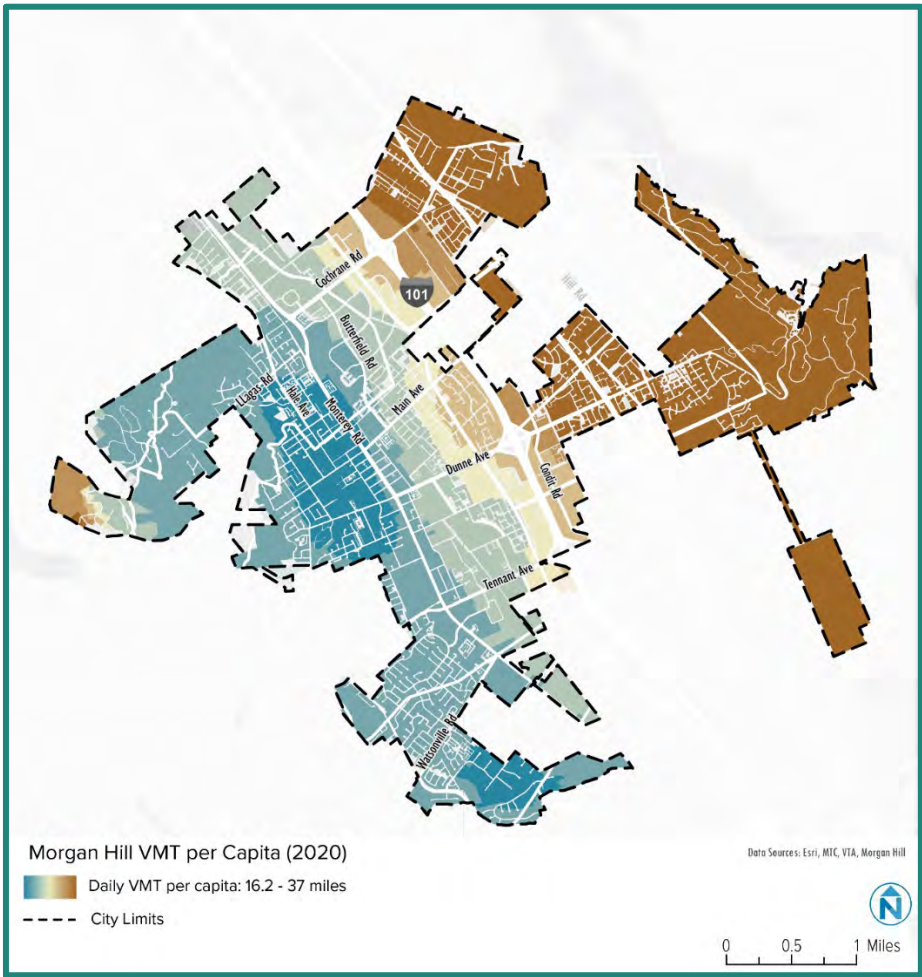


Figure 8.
Example of a VMT per Capita Map Used in Residential Land Use Review

[97] Ibid.

VMT Metrics for Transportation Analysis

Total VMT

VMT analysis of transportation projects can involve varying levels of complexity. At the planning level, the transportation system as a whole can be measured using **total VMT,** the sum of all vehicle miles traveled in a typical day or over the course of a year. If the VMT is estimated to increase, the plan is not aligned with state climate goals.

At the individual project level, transportation projects can be evaluated based on whether they induce new VMT, and thereby contribute to increasing total VMT. Road capacity expansion projects induce new VMT by making it easier to drive more, whereas pedestrian, bicycle, and transit projects reduce VMT by making it easier to drive less.

Multimodal Accessibility

Multimodal accessibility analysis can be used for both transportation and land use analysis to quantify the multimodal accessibility benefits of a project. Multimodal accessibility analysis is often shown through travelsheds or "isochrones." Travelsheds are often time-based, for example, showing the number of jobs that are accessible within a 30-minute trip on different modes. Multimodal accessibility analysis allows for a comparison of transportation networks by mode and of alternatives for the same mode.

VMT Metrics Summary

Figure 9 provides a summary of metrics discussed in this section, how they are calculated, and potential uses and examples.

Figure 9.
Summary of VMT Metrics

Metric	Methodology	Potential Applied Uses	Example
Total VMT	Sum of all VMT in an area (state, county, other levels of geography), often derived from travel demand models.	Establishing reduction goals, aligning policies with climate targets, and measuring transportation system performance.	California uses net change in total VMT to estimate environmental impacts of arterial and highway projects.
VMT per capita, household, or population	Sum of total VMT divided by the number of residents, households, or de facto population.	Can be used to evaluate the impacts of new land use development, and as a complementary performance metric to total VMT. When available at a geographic size of a census tract or smaller, a heat-map can be generated to inform land use planning.	California uses VMT per capita to measure VMT impacts of new residential developments. Development located in areas where VMT per capita is 86%[98] of the jurisdiction's average or higher must mitigate VMT.
VMT per employee or job	Sum of all work-based VMT divided by the number of jobs or employees.	Can be used to evaluate the impacts of new land use development and as a complementary performance metric to total VMT. When available at a geographic size of a census tract or smaller, a heat-map can be generated to inform land use planning.	California uses VMT per employee to measure VMT impacts of new office development. Development located in areas where VMT per employee is 86%[99] of the region's average or higher must mitigate VMT.
Multimodal accessibility	Various methods to quantify, though often the number of jobs reachable within 45 minutes via transit, walking, or biking. Can consider other destinations such as education and daily needs.	Can be used to inform land use and transportation planning. Allows for comparison between various multimodal projects and project design alternatives.	Used in Detroit region, Boston, and Salt Lake City to estimate accessibility and inform investments to improve accessibility.

[98] California Governor's Office of Planning and Research, Technical Advisory on Evaluating Transportation Impacts in CEQA, Link. State guidance provides the legal and scientific evidence to support this threshold within California's legal framework and state GHG reduction goals. Local jurisdictions can set their own threshold and not every jurisdiction has adopted thresholds.
[99] Ibid.

IV. Available VMT Data For Hawai‘i

VMT has been quantified, estimated, and tracked for several purposes, which may affect each data source's potential application for this project. Figure 3 provides a summary of VMT data sources available for Hawai‘i, their availability, the methodology used to estimate VMT, and the potential applications of the VMT data.

Figure 10.
Summary of Existing VMT Data

Source	Data	Year	Data Continuation	VMT Estimate Methodology	Potential Application for VMT analysis
DBEDT Data Book	• Total VMT by county • Population • De Facto Population • Other potential indicators such as licenses, gasoline sales, etc.	2020	Published annually with at least 6 months of delay and many years of historical records	Calculated based on vehicle registrations and average VMT per vehicle. The average is determined based on vehicle type and travel surveys. The exact methodology was unavailable to our team for review.	Establishing baselines and measuring trends by county and state
DOT VMT Estimates	VMT on federal aid eligible roads	2017	Produced every year from AADT counts and reported to FHWA's HPMS	Uses AADT to estimate VMT	None
Transcending Oil	Total VMT and future scenario VMT projections based on various strategies	2019	Not maintained	Allocated DBEDT VMT data to census blocks, using population and Center for Neighborhood Technology Housing and Transportation Index.	None

Source	Data	Year	Data Continuation	VMT Estimate Methodology	Potential Application for VMT analysis
Hawai'i Clean Energy Initiative (HCEI)	VMT reduction goals	2015	2011, 2015, not regularly updated	Authors (ICCT) used a proprietary model	Establishing state goals
O'ahu Climate Action Plan	VMT reductions achieved by different scenarios to reduce GHGs from ground transportation	2021	Updated every five years with annual progress reports published.	Weighted combination of population and gross state product (GSP)	Establishing additional goals and informing VMT reporting for City and County of Honolulu
Honolulu Transportation Impact Assessment Guide	• Level of service (LOS) • Vehicle miles traveled (VMT) analysis • Other analysis including quality of service by mode that produces or uses multimodal data	Ongoing	Ongoing annual reporting by approved projects.	Varies by project, determined in the pre-submittal meeting.	• Example of applied VMT analysis for large land use projects • Over time will collect data that can inform VMT modeling for Honolulu
MPO travel demand forecasts	Forecast total VMT, system level impacts of VMT per project, VMT per capita, and VMT per employee	Base year and future years	Regularly updated on a five-year cycle	Complex computer model using specialized software that forecasts travel on the transportation network, based on land-use and transportation inputs.	• Only available for City and County of Honolulu and Maui County • May take model recalibration and adjustment to produce VMT estimates • Not typically fine-grained enough to capture pedestrian and bike projects

Existing Data Sources: Key Findings

This section provides a summary of potential benefits and application of existing data sources for Hawai‘i as summarized in Figure 3. This is followed by a more in-depth description, context, and methodology for each data source.

Key Findings

- DBEDT data on total VMT by county and population can be used to establish a baseline and monitor the total VMT and VMT per capita trends for the state and each county. However, many types of VMT analysis require additional data sources that provide finer grain geographic detail that is not currently available.

- VMT analysis in studies and plans such as the HCEI Roadmap, Transcending Oil study, and O‘ahu Climate Action Plan provide valuable scenario planning resources and demonstrate the need for VMT reduction to achieve GHG reduction goals. Their scenario analyses are useful references but do not provide VMT data at a fine-grained geographic scale with sufficient accuracy from which to develop further VMT analysis.

- Over time, HDOT VMT Estimates and City and County of Honolulu data collection can be used to inform county-wide VMT estimates and trends in Honolulu. Other counties could use the Honolulu Transportation Impact Assessment Guide as a resource for multimodal project evaluation and data collection.

- OahuMPO and Maui MPO have travel demand forecasting models that will be capable of producing VMT estimates in the near to medium term (2022 and Fall 2021, respectively). Travel demand forecasting models have several limitations, including relatively large analysis zones that limit the ability to account for walking, biking, and some trip types; however, they are a useful tool for producing VMT estimates. The models can produce VMT per capita and VMT per employee at the transportation analysis zone (TAZ) level. The lack of travel demand forecasting models for Kaua‘i and Hawai‘i counties creates a data gap. For Kaua‘i and Hawai‘i counties, a state-level investment in VMT data or an alternative local approach using VMT proxies, or a simpler VMT estimation method will be necessary long term.

1. DBEDT Data Book

The Department of Business, Economic Development & Tourism (DBEDT) annually publishes the State of Hawai‘i Data Book. Section 18 provides transportation data including vehicle registrations, transit ridership, drivers' licenses, and VMT. HDOT's Highways Division Planning Branch provides VMT data to the DBEDT. The annual total VMT is calculated from vehicle registrations by counties multiplied by a unique rate of VMT by county. Vehicle registration data may introduce inaccuracy to the VMT estimates due to unregistered vehicles or other miscounts. The VMT rate is based on past travel surveys and other data that may not account for all factors that cause variations in VMT. The exact methodology for estimating VMT was unavailable to our team for review. DBEDT data is published using a standardized methodology and on a regular schedule making it a useful method of identifying trends and looking at historical changes despite potential flaws in the VMT calculations.

2. DOT VMT Estimates

The Hawai‘i Department of Transportation calculates Annual Average Daily Traffic (AADT) for the state road network. VMT for each roadway segment is inferred from the AADT for the state roadway network, accounting for approximately 60% of VMT. The methodology used to calculate VMT from AADT was not provided to our team. AADT is typically calculated from loop counters embedded in roads, cameras, and other data sources. Origins and destinations or other critical VMT data is unattainable from this VMT data source, limiting the usefulness of the data for land use analysis. HDOT currently uses total VMT from AADT to measure the use of state roads and highways, and to evaluate the future road network.

3. Transcending Oil

Transcending Oil is a scenario planning analysis to identify if existing plans and investments would achieve VMT reduction and measure reductions from additional strategies. The study authors used the DBEDT VMT data and then assigned VMT per household to block groups based on research from the Center

for Neighborhood Technologies (CNT) VMT estimates. Although the use of block groups provides granular detail, the usefulness of the data analysis in Transcending Oil is limited to scenario planning. However, the report models several VMT reduction strategies and shows that policy changes are needed to reduce VMT.

4. Hawai'i Clean Energy Initiative

Hawai'i Clean Energy Initiative (HCEI) started in 2008 and has produced two analyses of transportation emissions (2011 Road Map and 2015 Transportation Energy Analysis). The modeling developed for the 2015 report is focused on GHG emission and oil usage and therefore does not provide accurate estimates of VMT. The methodology is not widely available, and parts of the analysis are proprietary to the authors, limiting its usefulness outside of the scenarios modeled in the Transportation Energy Analysis. However, the report models several VMT reduction strategies and shows the role VMT reduction plays in reducing GHG emissions even with fleet electrification.

5. Oʻahu Climate Action Plan

The Oʻahu Climate Action Plan adopted in 2021 analyzed multiple ground transportation scenarios for achieving climate goals. The scenarios included different rates of fleet electrification and all assumed VMT reduction necessary to reduce GHG emissions. The analysis used proxies for VMT and therefore is not a useful VMT data source. Like HCEI analysis and Transcending Oil, the Oʻahu Climate Action Plan informs assumptions, provides scenario analysis, and confirms the need to reduce VMT to achieve county and state climate goals.

6. Honolulu Transportation Impact Assessment Guide

Completed in November 2020, the Honolulu Transportation Impact Assessment (TIA) Guide describes the processes required to evaluate the transportation impacts of large, City-managed proposed projects. If the project will generate passenger trips, propose land use changes, or impact existing traffic in the area, it is subject to a range of analyses which includes all modes as part of the Multimodal Transportation Impact Analysis Narrative component. The level of analysis is determined at the scoping stage based on the project size and potential impacts. Depending on the project, the City may require one or many of the proposed analysis methods, which include LOS and VMT. Approximately 50 Transportation Impact Assessment Reports (TIAR)s are reviewed each year. TIARs are required to monitor performance annually. This annual reporting can provide useful transportation data, including VMT or inputs that can inform VMT modeling. Although the Honolulu TIA Guide is only applicable to the City and County of Honolulu, it could be used as a model for other islands.

7. Travel Demand Forecasting Models

Metropolitan Planning Organizations (MPOs) maintain travel demand models to inform transportation project planning, evaluation, and prioritization. Travel demand forecasting models have traditionally been used to prioritize capacity expansions to roadway systems to accommodate long-term land use and transportation network changes. Over time, the sophistication and factors considered in the model have improved to account for congestion, multiple modes, trip purposes, trip chaining, and more fine-grained land uses. In California, travel demand models are used to calculate VMT for travel analysis zones (TAZs) to produce VMT per capita and VMT per employee heat maps. This data informs policies for better-informed land use planning that streamlines development in low VMT areas and requires development in high VMT areas to reduce VMT. A similar approach could be used for Maui and Honolulu counties. Travel demand models may also provide useful data for the Hawai‘i State Energy Office’s (HSEO) energy demand modeling.

- OahuMPO and Maui MPO models may address this data need for each of those counties, but since both models were being updated at the time of this research,

specific VMT estimates produced by either travel demand forecasting model have not been reviewed as part of this project.

- Because Kauaʻi and Hawaiʻi counties do not have travel demand models, the available MPO travel demand models still leave a gap for VMT data on other islands and there is no existing model that provides the granular, location-specific VMT data necessary to identify local VMT per capita across the whole state.

Maui MPO's Model

Maui MPO will have an updated travel demand forecasting model in September 2021. The model update includes changes to the TAZ structure to align with census geography (block groups) and other factors; the total number of TAZs did not change. As a traditional four-step model, the model assigns trip purposes that can be used to estimate VMT for different land use (home-based work, home-based non-work, and non-home-based). One data gap in the model is the lack of ability to assign trips to bicycles and walking in the modal assignment step. The model can therefore not be used to analyze VMT reductions of multimodal transportation projects.

OahuMPO's Model

As of the time of this research, the OahuMPO was in the process of updating their travel demand forecasting model or VMT data outputs were otherwise not available. The latest model update is expected to provide VMT estimates by TAZ for the County and this format may support location-specific VMT analysis.

V. Additional Resources: Data, VMT Estimation, and Proxies

This section explores potential alternative sources for VMT or VMT proxies that will require some additional expense or work to adapt them for use in Hawai‘i. Figure 4 provides a summary of different types of sources and analysis platforms reviewed in this section.

Figure 11.
Summary of Additional Data Sources

Data Source	Description	Potential Application	Availability / Challenges
Cube Access (Previously Sugar Access)	A subscription software that operates in GIS and allows users to model accessibility from land use and transportation network changes.	Calculate accessibility as a proxy for VMT for land use and transportation projects	• Most ready “out-of-the-box” accessibility product • Cost for software license • Requires a GIS analyst to run • Does not measure VMT directly
Conveyal	A subscription software platform that allows users to model accessibility from land use and transportation network changes.	Calculate accessibility as a proxy for VMT for land use and transportation projects	• Does not require a GIS analysis to run but requires some data cleaning and inputting to set up • Cost for software license • Has strong tools for testing accessibility benefits of multimodal projects • Does not measure VMT directly
Accessibility Toolbox with ArcGIS Network Analyst	A free toolbox that operates in ArcMap that allows users to model accessibility from land use and transportation network changes.	Calculate accessibility as a proxy for VMT for land use and transportation projects	• Least ready “out-of-the-box” tool. Requires a GIS analyst to set up and run • Requires robust existing GIS data • Does not measure VMT directly

Data Source	Description	Potential Application	Availability / Challenges
H+T Affordability Index	A free web-based platform that generates multiple transportation, affordability, and other data points.	Calculate location efficiency as a proxy for VMT for land use projects. Shows where transportation investments would have the highest benefit on reducing transportation costs.	• Free to use but to get the most benefit would take additional work with CNT to update and adapt for Hawai'i • Most useful for land use projects or prioritizing transportation investments • Benefits of transportation projects must be measured outside the tool
Urban Footprint	Urban Footprint is a web-based software platform that provides data and scenario building tools with different modules and customizations available.	Calculate VMT impacts of long-range land use plans and as a supplement to travel demand modeling.	• Useful for long-range and scenario planning • Can provide VMT and VMT per household estimates of land use plans • Cost for subscription
UrbanLogiq	A subscription data service and web-based platform that provides multiple transportation data points to supplement existing data sources.	Calculate VMT impacts of transportation and land use projects and as a supplement to travel demand modeling.	• Currently being used by HDOT and City and County of Honolulu • Can provide VMT data • Cost for subscription
StreetLight Data	A subscription data service and software platform that provides multiple transportation data points using big data.	Can be used to measure VMT for land use projects and to test or as an input for travel demand modeling.	• Might become available as a custom product for Hawai'i, but further investigation is needed. • Cost for custom product
Replica	A subscription data service and software platform that provides multiple transportation data points using big data.	Can be used to measure daily vehicle trips, trips per capita, trip purpose, and changes over time.	• Does not provide multimodal transportation metrics • Does not provide trip distance (VMT) • Could be used to monitor travel patterns over time • Cost for subscription

Accessibility Analysis Platforms

There are several platforms and tools that can be used to measure multimodal accessibility. Accessibility analysis platforms can quantify accessibility benefits of transportation and infill land use projects, and like VMT analysis, provide a measure of the land use and mobility efficiency. The most accessible locations are a proxy for locations with the lowest VMT per population, meaning improving accessibility can reduce VMT. More in-depth information on accessibility analysis is available from the State Smart Transportation Initiative.[100]

Key Findings

- Multimodal accessibility analysis platforms can be used as an alternative to VMT analysis where there is a lack of VMT data available. Multimodal accessibility analysis is a beneficial and useful analysis in addition to VMT analysis and can provide a better measure of impacts from individual transportation projects.

- **This review does not have a specific recommendation for a multimodal accessibility analysis platform** between CUBE Access, Conveyal, and the Accessibility Toolbox. Each platform has benefits and challenges to consider. HDOT has previously used CUBE Access by Bentley but had challenges operationalizing the tool and has discontinued its subscription. There is significant cost and staff time investment in using any of these platforms.

- **H+T provides rough VMT per household estimates by block groups.** This can be used to identify low VMT areas that are location-efficient and where new land use development would have low VMT. The tool has other built-in metrics that may be useful in Hawai‘i. For example, H+T calculates household transportation costs, which can be used to prioritize investments in walking, biking, and transit infrastructure and service in areas where transportation cost is a higher burden on households.

- Urban Footprint can provide integrated data and scenario modeling into a single platform for long-range, scenario, and other analysis. There is significant cost and staff time investment in using the tool.

[100] https://ssti.us/accessibility-analysis/

CUBE Access by Bentley

CUBE Access[101] (previously called Sugar Access) is a paid ArcMap add-on that requires an Esri license and GIS analyst to run. The CUBE Access software license includes built-in data for transportation networks and points of interest from HERE Technologies[102], General Transit Feed Specification (GTFS) for transit, and U.S. Census employment and population data. Networks are pre-built based on the available data. Users can edit networks using tools within ArcMap or add their own network data to the CUBE format. Accessibility analysis is run on cloud-based servers, allowing users to run multiple scenarios quickly and simultaneously.

HDOT had previously contracted with CUBE Access to use as a tool for multimodal accessibility analysis. Operationalizing CUBE Access, training staff, and integrating into existing processes was challenging and the tool is no longer being used. Due to this experience, CUBE Access may not be the right multimodal accessibility analysis platform for use in Hawai‘i.

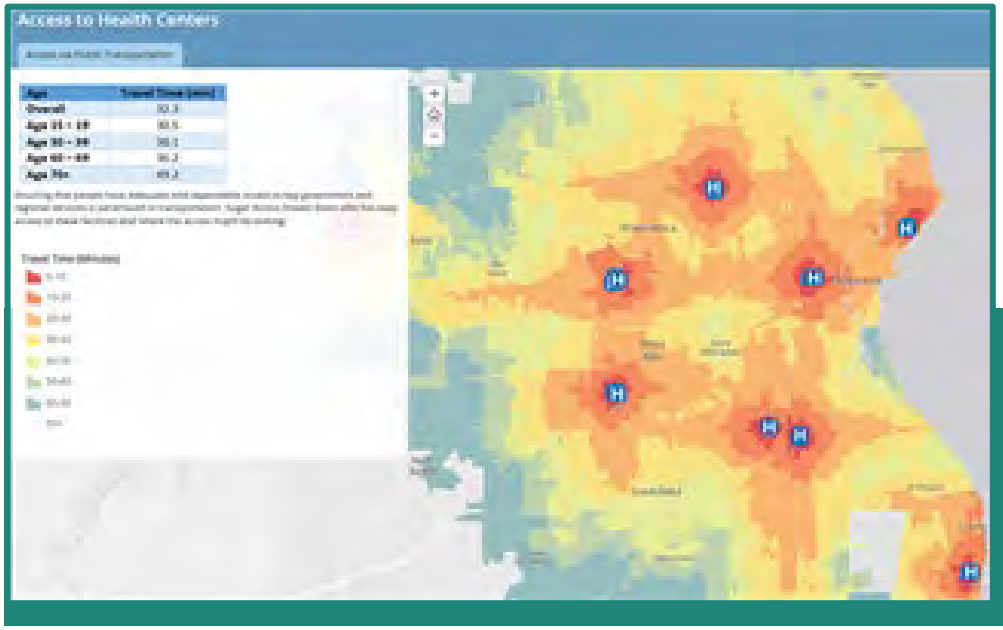


Figure 12. CUBE Access Example of Hospital Access in Milwaukee

[101] See more at, https://www.bentley.com/en/products/brands/cube

[102] HERE Technologies provides locational data for purchase. See more at, https://www.here.com/

Conveyal

Conveyal[103] is a web-based accessibility platform. The Conveyal software license includes built-in data for transportation networks from OpenStreetMap, GTFS for transit, and Census employment and population data. The quality of the data in OpenStreetMap varies by location and may need cleaning and updating before use. Users must upload land use data and new GTFS or transportation data using the OpenStreetMap format (OSM.PBF). Users can also edit networks directly on the Conveyal Analysis online platform.

Conveyal could be a useful tool for agencies to create multimodal accessibility analysis metrics and project review processes as a proxy for VMT analysis. The tool can be adapted for each county's context. This approach is most applicable to counties without VMT data from travel demand forecasting models or other sources.

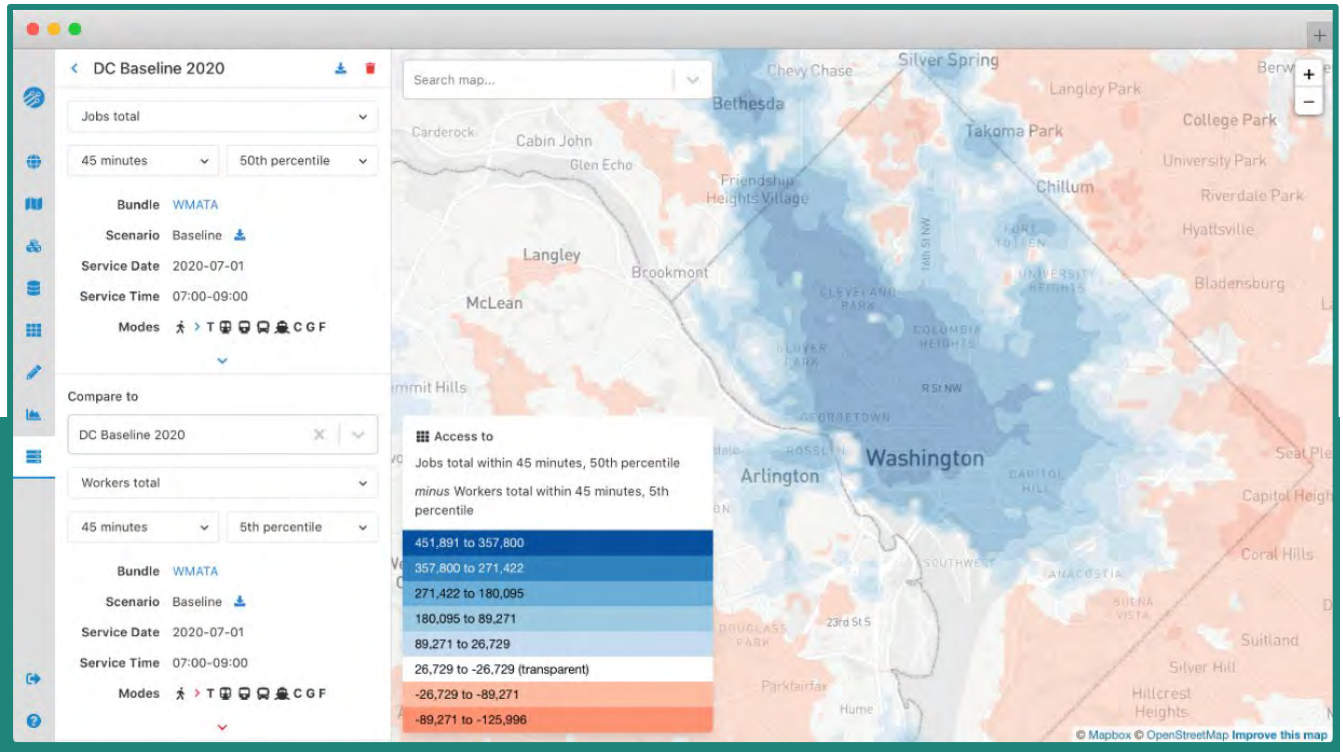


Figure 13.
Conveyal Example of Job Access by Transit Travel Time

[103] See more at, https://conveyal.com/

Accessibility Toolbox with ArcGIS Network Analyst

The Accessibility Toolbox for R and ArcGIS[104] uses ArcGIS Network Analysis, requiring an Esri license and GIS analyst to run. The tool is an add-on to ArcGIS allowing users to work with familiar Esri data formats, but runs locally, limiting its computing power.

The Accessibility Toolbox could be a useful and low-cost tool for agencies with sufficient GIS analysis capacity to develop multimodal accessibility analysis metrics and project review processes as a proxy for VMT analysis. The Toolbox can be adapted for each county's context. This approach is most applicable to counties without VMT data from travel demand forecasting models or other sources.

Household and Transportation (H+T) Affordability Index

Center for Neighborhood Technology created the H+T tool[105] to quantify affordability that includes both the cost of housing and transportation. The tool provides measures of location efficiency, a measure of the cost and access to jobs and transportation options at the neighborhood level. The tool produces several metrics, including VMT per household estimates. The tool has been used to identify potential bus rapid transit (BRT) alignments, in regional planning, affordable housing investments, and setting affordability determinations that include transportation costs. H+T could be used to identify low VMT areas for land use development and areas where multimodal transportation investments would have the highest potential of reducing transportation costs for families.

[104] See more at, https://github.com/higgicd/Accessibility_Toolbox

[105] See more at, https://htaindex.cnt.org/

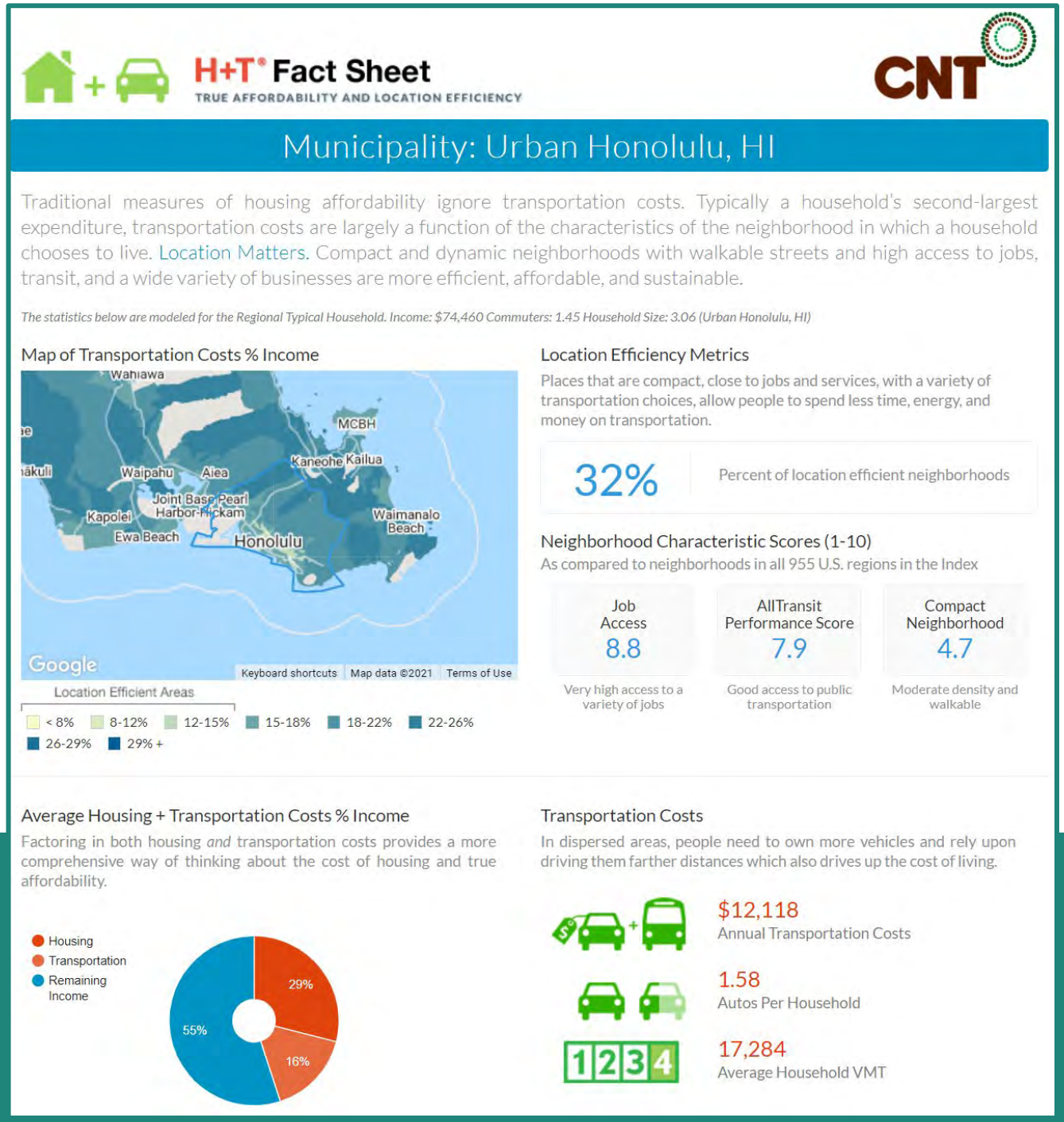


Figure 14.
Example of an H+T Fact Sheet Output for Honolulu

Urban Footprint

Urban Footprint is a web-based software platform that integrates multiple sources of urban, environmental, and economic data to assist in the planning process. The platform offers various subscriptions and services tailored to subscriber needs, including parcel data, advanced scenario-building tools, and a variety of modules that users can use for technical analysis.

The Transportation Module is particularly useful for long-range transportation planning, as it provides estimates for annual VMT and VMT per household. The Urban Footprint platform subscription could be used to inform long-range and scenario planning in Hawai‘i.

Big Data

Big data is a term that describes the use of large data sets beyond the ability of traditional data processing software. Data sources include vehicle GPS, cellphone, and other location-based sources. Several companies offer subscription platforms that provide data and analysis such as vehicle volumes, mode split, origin-destination pairs, and other metrics that can be used to calculate VMT. The data is typically continuously available in near real-time, allowing for insight into trends and data volatility. Not all data platforms are currently available in Hawai‘i.

Key Findings

- HDOT and the City and County of Honolulu should explore the potential to use UrbanLogiq as a way of developing VMT estimates. A near-term pilot for Honolulu could be adapted to support other counties.

- **Monitor Streetlight and Replica for future developments** that make more data and functionality available for Hawai‘i.

UrbanLogiq

UrbanLogiq[106] is a web-based platform that analyzes urban environmental data to inform the planning and decision-making process. The primary function of the platform is to transform data added by users, supplement the data with various big data sources provided by UrbanLogic, and create an easily navigable dashboard with visualization outputs. The platform specializes in data for transportation and economic development and can be used for a

[106] See more at https://urbanlogiq.com/

variety of analyses including vision zero collision analysis, travel time analysis, and intersection and road segment counts. UrbanLogic may be able to calculate total daily VMT by multiplying the daily volume on every roadway segment by the length of every roadway segment within a given area. The City and County of Honolulu are using UrbanLogiq and sharing the platform with HDOT. Currently, HDOT uses UrbanLogiq as a data source as part of their Transportation Impact Assessment.[107]

Streetlight

StreetLight Data uses big data from vehicle GPS, cellphones, and other data sources to measure transportation. Their product is available as a dashboard and provides existing and historical counts, origin-destination pairs, and other metrics including VMT. StreetLight Data is not currently offered for Hawai‘i, but this might be available as a custom product. Further investigation is needed to confirm.

Replica

Replica is a data platform that uses big data and proprietary algorithms to provide continuously updated data and metrics.[108] Replica offers multiple products, however, only the Replica Trends product is available for Hawai‘i. Trends provides average daily vehicle and transit trips, trips per capita, trip start time, and trip purpose. Trips of all modes within a census tract are not well captured, so the data is only reliable for longer trips which tend to be vehicle and transit trips. This data is available for 2020 and 2021 with weekly updates at state, county, and census tract levels. The primary use case for this tool is observing changes in travel behavior over time (e.g., what's permanent and what's a temporary shift). Replica does not allow batch exporting of data, limiting its usefulness as a data source.

[107] Transportation Impact Assessment Guide, Hawai'i Department of Transportation, 2020 - Link

[108] See more at https://replicahq.com/

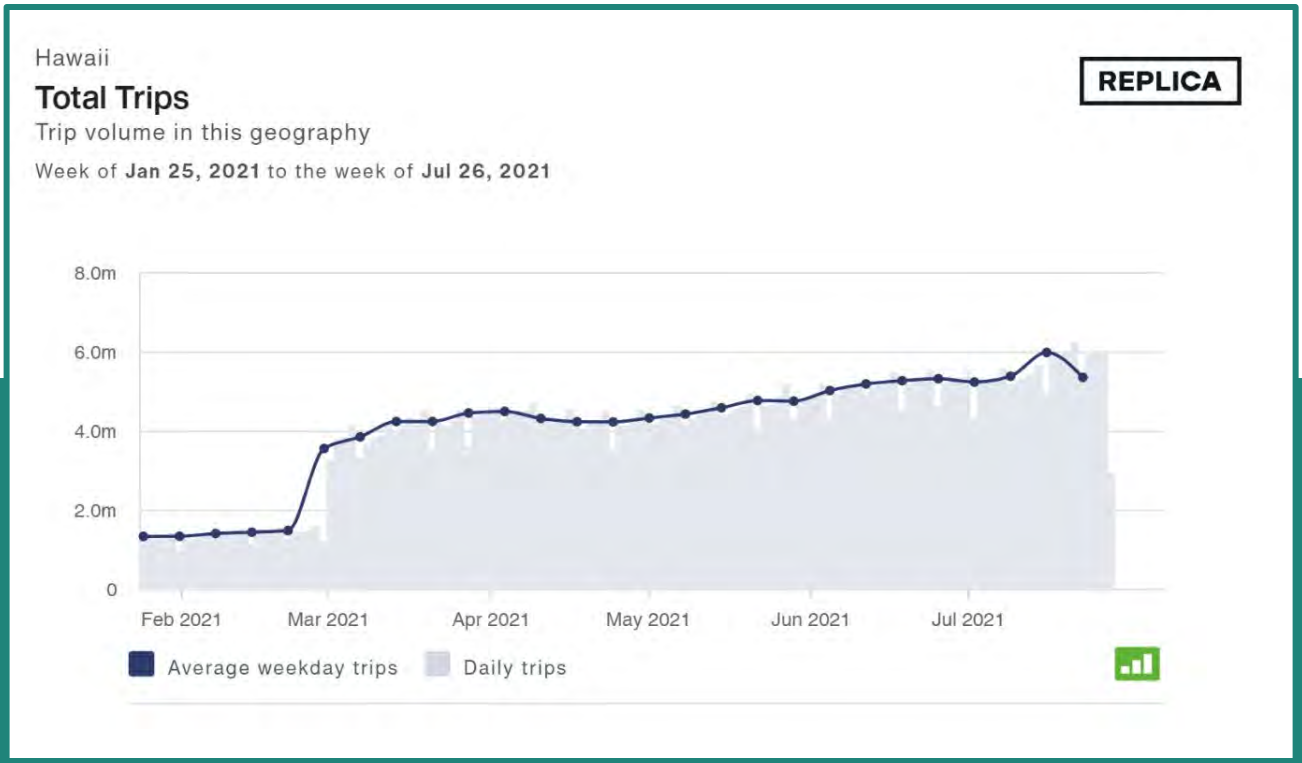


Figure 15.
Replica Dashboard Graph Example

APPENDIX C

VMT REDUCTION CONNECTIONS TO EXISTING PLANS AND POLICIES

Appendix C: VMT Reduction Connections to Existing Plans and Policies

Introduction

As presented in the Vehicle Miles Traveled Policy Brief, meeting the State of Hawai‘i’s (State) adopted carbon negative by 2045 climate action goal will require significant reductions to vehicle miles traveled (VMT) per capita. The State’s VMT growth trend has negative implications for the health of Hawai‘i’s people, the natural environment, and social and economic mobility.[109] High VMT means that people are having to make many and longer trips in a personal vehicle to travel between their home, work, and other essential destinations.

This memo is organized into the following:

I. **Key Findings**
II. **State Land Use Planning and Implementation**
III. **Opportunities For the State Land Use Planning System to Support VMT Reductions**
IV. **County Land Use Planning and Implementation**
V. **Opportunities For County Land Use Planning to Support VMT Reductions**
VI. **Transportation Planning and Implementation**
VII. **Opportunities For Transportation Planning to Support VMT Reductions**

[109] Fang, K., & Volker, J. (2017). Cutting greenhouse gas emissions is only the beginning: a literature review of the co-benefits of reducing vehicle miles traveled, Link

I. Key Findings

Current transportation and land use systems in Hawai‘i have been shaped by past State and local agency activities, programs, and decisions guided by plans, policies, and practices.

This memo presents a review of state, county, and metropolitan planning organization (MPO) plans, policies, and practices and targeted stakeholder discussions. It identifies opportunities for current plans, policies, and practices to support land use and transportation outcomes at various scales to contribute to reductions in statewide VMT and highlights the following takeaways.

- **There is a tremendous opportunity for the State to lead goal-setting and monitoring of implementation performance.** From land use district boundary amendments to special permits for landowners, State agency reviews of land use focus on project and site-specific development proposals rather than long-range integrated land use planning and coordinated plan implementation that guide land use decisions statewide. The 2015 OPSD report broadly recommends the State shift its focus to developing and managing a system of accountability for land management at all levels of government statewide and provide state and local agencies with new tools to track and monitor the outcomes of the statewide land use system.

- Land use and transportation planning and decision-making at the State, MPO, and county levels need to be integrated under shared climate action goals. Currently, state, MPO, and county agencies do not agree on what transportation outcomes are the highest priority and how to accommodate population growth and distribution in concert with transportation investments to promote sustainable transportation.

- **Incorporate the needs of people walking, biking, and using transit earlier in the prioritization and design process.** Interconnected networks of bikeways, walkways, and transit-priority facilities across the State and within counties would provide people with attractive non-driving options to reach local and regional destinations. While most roads and highways in the state safely and comfortably accommodate people traveling in a car, there exist significant gaps and deficiencies in transportation infrastructure networks that comfortably, safely, and equitably connect people who bike, walk, and/or ride transit to get where they need to go. Current state and county transportation needs identification and project development processes tend to prioritize and design

for vehicle movements while facility improvements for non-motorized modes tend to be considered in later phases of project development. Adjusting project development and scoping processes to consider all facility users early would increase the number of transportation investments that would receive high scores within the Oʻahu and Maui MPO project evaluation processes to build TIPs and the STIP that grow quality transportation options throughout the state.

II. State Land Use Planning and Implementation

The following section presents key legislation, plan documents, policies, and practices of the State's land use planning system.

State Planning Act

The 1978 State Constitutional Convention ushered major changes to State of Hawai'i (State) governance. State legislators sought to improve coordination among different agencies and levels of government and their planning processes. To this end, the Legislature adopted Chapter 226, Hawai'i Revised Statutes (HRS), the State Planning Act to "establish a statewide planning system to coordinate and guide all major state and county activities and to implement the overall theme, goals, objectives, policies, and priority guidelines."[110] Figure 1 represents the scope of the state's planning system.

Figure 16.
Diagram of the Hawai'i State Planning System

[110] Hawai'i Revised Statutes, Section 226-1, Link

The Hawai‘i State Plan sets the overall theme, goals, objectives, and policies for all State and local agencies to address within their plans, policies, and decision-making. The current State Plan is based on an overall theme of self-sufficiency, which involves allowing “individuals and families [to] express and maintain their own self-interest so long as that self-interest does not adversely affect the general welfare. Individual freedom and individual achievement are possible only by reason of other people in society, the institutions, arrangements, and customs that they maintain, and the rights and responsibilities that they sanction.”[111]

Chapter 226 also establishes a statewide planning system that is intended to coordinate state and county general and development plans as well as various areas of state functional operations and procedures, including “Functional Plans” prepared by state agencies and state programs like budget preparation and proceedings of the Land Use Commission (LUC) and Board of Land and Natural Resources. The State Functional Plan areas set out in the Hawai‘i State Plan include agriculture, conservation lands, education, energy, higher education, health, historic preservation, housing, recreation, tourism, and transportation. State Functional Plan agencies must prepare and periodically update a Functional Plan that: considers applicable federal laws, policies, or programs; is in conformance with the State Plan’s theme, goals, objectives, policies, and priority guidelines; and aligns with all relevant state mandates. Functional Plans create the opportunity for state agencies to conduct comprehensive research and convene advisory groups to identify priority issues in a specific policy and functional area and to set clear objectives, policies, and implementing actions to address those priority issues. Distinct from other state plans geared toward delivering infrastructure and services, Functional Plans may include initiatives to support organizational development, modernize management approaches, and propose legislative proposals.

State Plan Updates

The last State Plan update process took place over a period of eight years between 1983 to 1991. The process involved extensive technical reviews and advisory group discussions to identify goals, policies, and objectives; develop priority guidelines for the State Functional Plans; and update the State Functional Plans. State agencies prepared Functional Plans to establish the objectives, policies, and implementing actions the agency will execute to advance the State Plan.

In 2018, the OPSD undertook an assessment of the State Plan and completed a review of state agency plans

[111] Hawai‘i Revised Statutes, Section 226-3, Link

to identify common themes and policy directions to be considered in any update to the Hawai‘i State Plan and its implementation. The 2018 Report set out a set of recommendations to update the State Plan and the statewide planning system set forth in the Plan. Update of the State Plan creates the opportunity for the State to clarify values and inform standards for the Functional Plans of State agencies, which coordinate state and county activities and programs beyond short-term planning periods.

State Land Use Law

Hawai‘i’s Land Use Law was enacted in 1961 to manage urban growth and protect agricultural and resource lands for Hawai‘i. The State Land Use Law, Chapter 205, HRS, requires that all Hawai‘i lands be assigned as one of four Land Use District types. The State Land Use Commission (LUC) sets standards for the Land Use Districts and administers quasi-judicial proceedings to hear land use petitions for district boundary amendments. The LUC is tasked with ensuring the orderly growth of the State by protecting and encouraging the use of lands for long-term public benefit. Figure 2 summarizes the distribution of land acres by Land Use District type for every island in Hawai‘i.

Figure 17.
Summary of Hawai’i Land Area (in Acres) by District and by Island in 2013[112]

Land Use District Type	Kaua‘i	O‘ahu	Molokai	Maui	Hawai‘i	Total Acres	% of Total State Land
Agricultural	144,317	120,790	110,791	235,280	1,183,339	1,794,517	45.4%
Conservation	194,459	158,669	52,511	204,149	1,343,125	1,952,913	49.4%
Rural	1,374	-	1,798	4,200	1,618	8,990	0.2%
Urban	14,865	104,232	2,287	22,870	56,340	200,594	5.1%
Total Land	355,015	383,691	167,387	466,499	2,584,422	3,957,014	100.0%

[112] State Land Use Districts: State Land Use Commission, February 2013

Land Use District boundaries are important because they help determine whether the State or the county has authority to determine allowable uses, development intensity, and activities on lands as follows:[113,114]

1. Urban Districts include lands with "city-like" densities or people, structures, and services. Allowable land use, activities, and development requirements are mostly governed by county ordinances and regulations. **In Urban Districts, county governments are authorized to make district boundary amendments for less than 15 acres of land, while the LUC makes decisions on petitions for district boundary amendments for more than 15 acres of land and for lands designated as important agricultural lands.**

2. Rural Districts include lands restricted to small farms, low-density residential uses, like subdivisions, small farms, golf courses, and golf-related facilities, and areas not suitable for residential or small farms due to topography, soil, or other geological conditions. Rural Districts are governed by both the LUC and counties. **LUC guidelines limit residential development projects in Rural Districts to densities no greater than one dwelling unit per one-half acre in areas where no "city-like" concentration of people, structures, streets, and urban level of services exist.** In Rural Districts, counties are authorized to make district boundary amendments for less than 15 acres of land, while the LUC makes decisions on petitions for district boundary amendments for more than 15 acres of land.

3. Agricultural Districts include lands for cultivation of crops, aquaculture, raising livestock, wind energy production, biofuel production, agriculture supportive activities (e.g., farm dwellings, employee housing, processing and storage facilities, vehicle and equipment storage, roadside stands), and open area recreational facilities. **The LUC decides on district boundary amendment petitions involving more than 15 acres of land in Agricultural Districts and any lands designated or to be designated Important Agricultural Lands (IAL).**

4. Conservation Districts are lands of existing forest and water reserve zones, including areas needed to protect water sources, watersheds, scenic and historic areas, parks, and wildlife habitats, and are administered by the Board of Land and Natural Resources and regulated by the Department of Land and Natural

[113] Hawai'i Revised Statutes, Chapter 205-3, Link
[114] *A Short History of the State Land Use District 5-Year Boundary Reviews*, State Office of Planning, July 2006, Link

Resources. **The LUC makes decisions on all district boundary amendment petitions for land in Conservation Districts.**

Property owners, including private developers and government agencies, submit district boundary amendments and special permit petitions to the LUC, referred to as "dockets." OPSD staff coordinate and present the State's position during LUC proceedings for district boundary petitions, declaratory rulings, and special permits. OPSD is responsible for ensuring that the LUC's decisions on individual land reclassification petitions consider adopted state goals and priorities as well as the following criteria:

- Consistency with applicable goals, objectives, and policies of the state plan and adopted Functional Plans;
- Conforms with applicable district standards;
- Considers impacts of the proposed reclassification on (a) preservation of natural systems or habitats, (b) maintenance of valued cultural, historical, or natural resources, (d) natural resources relevant to Hawai'i's economy, (e) commitment of state funds and resources, (f) employment opportunities and economic development, and (f) housing opportunities for all income levels;
- Considers criteria for reclassification of important agricultural lands; and
- Weighs representations and commitments made by the petitioner in securing a boundary change.

Petitions to the LUC frequently require an assessment of the possible environmental impacts of their proposed land use action pursuant to Chapter 343, Environmental Impact Statements. An environmental assessment or environmental impact statement is required for the following types of projects:

- the use of state or county lands or funds;
- any use within or reclassification of Conservation Districts;
- any use within a shoreline area;
- any use within the National or Hawai'i Register of historic sites;

- any use within the Waikiki Special District area;
- any proposed construction of new or expanded helicopter facilities that affects Conservation Districts, shoreline areas, or historic sites; and
- any proposal to build new facilities for wastewater treatment, waste-to-energy, landfill, oil refining, or power generation.[115]

Counties can require an environmental assessment as a condition to any petition to the State for an agricultural tourism use and activity. Currently, the State requires that environmental assessments be made available for public comment for a period of at least 30 days. Environmental assessment documents for projects before the LUC are posted at the OPSD Environmental Review Program's website. The LUC is working on making environmental assessments associated with dockets available at the docket webpages.[116]

In 2014, the OPSD conducted a review of the State land use system, including the LUC district boundary amendment process. A year later, the OPSD released a report that summarized " deficiencies and system-wide weaknesses" in the State's land use process.[117] From land use district boundary amendments to special permits for landowners, State agency reviews of land use focus on project and site-specific development proposals rather than long-range integrated land use planning and coordinated plan implementation that guide land use decisions statewide. The 2015 OPSD report broadly recommends the State shift its focus on managing a system of accountability for land management at all levels of government statewide and provide State and local agencies with new tools to track and monitor the outcomes of the statewide land use system. The 2015 OPSD report includes two types of recommendations: (1) fixes to the system that can be implemented in the near term or can be made with little or no changes to existing law; and (2) system redesign proposals that seek fundamental reforms to how the state land use system operates.

State Five-Year Boundary Review Process

Under the State Land Use Law, the OPSD is authorized to conduct a review of land classification and district boundaries every five years from 1985 – this process is known as the five-year district boundary review. Legislation enacted in the 2021 legislative session now directs OPSD to conduct a comprehensive review

[115] Hawai'i Revised Statute Chapter 343: Environmental Impact Statements, Link
[116] State of Hawai'i Land Use Commission, Pending Dockets webpage, Accessed in July 2021, Link
[117] "State Land Use System Review", State Office of Planning, Draft Report, May 2015. No longer available online.

of the State land use district boundaries on a periodic basis. The boundary review process must take into account the Hawai'i State Plan, county general, community, and development plans in reviewing the district boundaries. OPSD must present its findings and recommendations to the LUC, the Governor, legislators, and other key decision-makers.[118] [119] OPSD is authorized to initiate district boundary amendments that it deems is important to conform to state and county plans.

However, it is important to note that the OPSD's influence over statewide land use planning through the periodic boundary review process is limited. Since the 1974 *Town v. Land Use Commission* decision, OPSD is not able to use the review process to enact broad land reclassification recommendations, as this would require meeting due process protections and resource-intensive studies and legal proceeding requirements the agency is not resourced to meet.

State Strategic Plan for Transit-Oriented Development

In 2016, legislation was enacted to establish the Hawai'i Interagency Council for Transit-Oriented Development (TOD Council), an advisory group comprised of state and county members and community representatives. The State TOD Council is charged with coordinating and facilitating state and county transit-oriented development (TOD) efforts statewide. OPSD and the Hawai'i Housing Development and Financing Corporation (HHFDC) serve as co-chairs of the TOD Council. OPSD is the lead State agency for smart growth and TOD, and coordinates State and county agency TOD planning and implementation in Hawai'i.[120] Its enabling legislation required the TOD Council to prepare a strategic plan for TOD. In 2017, OPSD released the **State Strategic Plan for Transit-Oriented Development**[121] (State TOD Plan), later revised in 2018, to identify projects and actions needed to support TOD statewide and coordinate TOD planning statewide. The State TOD Plan seeks to guide State investments in livable communities based on the following seven principles:

1. Locate or redevelop facilities first in existing town and growth centers, aligned with county plans, at transportation nodes served by public transportation;

2. Maximize the co-location of state facilities and services in higher density, compact, mixed-use developments, and communities;

[118] Hawai'i Revised Statutes, Chapter 205-18, Link
[119] *A Short History of the State Land Use District 5-Year Boundary Reviews*, State Office of Planning, July 2006, Link
[120] Hawai'i Act 130, SLH 2016 (SB 3077), Link
[121] State of Hawai'i Strategic Plan for Transit-Oriented Development, 2018 - Link

3. Invest in the critical infrastructure necessary to successfully implement town/growth center development;

4. Partner more through creative, cost-effective partnerships with other public and private partners;

5. Look to develop more affordable housing wherever feasible to do so;

6. Use green building and sustainable development practices as much as possible; and

7. Engage in equitable development that promotes and supports community well-being and active healthy lifestyles.

The State TOD Plan addresses challenges to accommodating growth including increasing development costs, aging infrastructure, and a shortage of affordable and rental housing. Relevant strategies and recommendations in the State TOD Plan that support VMT reduction include:

- Shifting growth to dense, mixed-use development
- Co-location of state facilities and services in mixed-use center
- Densification and facilitating a connection between transit and housing within dense urban cores can assist in creating more walkable, sustainable communities.
- Implementation of multi-modal transportation options and Complete Streets guidelines to further support TOD goals while supporting a mode-shift away from individual vehicle trips and providing a more balanced suite of mobility options for residents.

The State TOD Plan provides an initial assessment of opportunities for TOD and identifies key initiatives in each county to guide the implementation of TOD projects as well as supportive investments. The State TOD Plan aims to foster sustainable land use patterns and improvements to multimodal mobility to reduce the need to expand roads and highways. The Plan identifies major road and bus transit improvements needed to increase connectivity and accommodate increased urban density and TOD in areas slated for major TOD growth, such as efforts to widen Farrington Highway in East Kapolei, which will become a major urban boulevard/thoroughfare that will

enhance connectivity within the planned growth area of East Kapolei.

III. Opportunities for the State land use planning system to support VMT reductions

State of Hawai‘i codes and laws set detailed, enabling legislation for a statewide planning system and policy framework intended to coordinate state and county agencies to deliver on the State's collective goals, objectives, and policies. The State has an opportunity to enact systemwide solutions to update processes and introduce new ways to track results from statewide planning to make progress towards reductions in statewide VMT – advancing the State's goal to be carbon negative by 2045. The following list presents specific opportunities for plans, policies, and practices that make up the State's planning system to support outcomes at various scales.

1. **Coordinate land use and transportation in State planning.** OPSD expressed a desire for commission research papers to understand what conditions have changed and what the State needs to be prepared for, to inform functional policy directions. The HI Commission could align with OPSD staff to work together to commission an in-depth research paper on how well the State's land use and transportation system provides people across the state with neighborhoods, streets, and transportation options that allow them to make fewer and shorter car trips. The research would inform specific land use and transportation policy directions to address with tactical implementation actions. Large sample size public surveys to test reactions to preliminary new priority directions could include questions on respondents' VMT and need for multimodal mobility.

2. **Track transportation results from the statewide planning system.** Improvements to the state planning system could include tracking and monitoring of results from planning activities at various levels of government. The HI Commission could collaborate with OPSD to determine how VMT per capita, GHG emissions, transportation expenditures by mode, multimodal mobility, and other sustainable transportation outcomes could be reported, to whom, and how data on results would be used by decision-makers. Eventually, transportation data across time can help state and local agencies understand the relationship between planning, implementation, and VMT reduction. Understanding the system-wide results of agency actions can help inform the work of State and local agencies, which could serve land management, climate action, environmental impact assessments, and capital improvement programs

(CIPs).

3. **Analyze the impacts of Land Use District standards.** Currently, residential development projects in Rural Districts are restricted to no more than one dwelling unit per one-half acre in areas where no "city-like" concentration of people, structures, streets, and urban level of services exist. While likely intended to minimize the intensity of human activity and built environment in rural areas, state and county staff have shared that these standards may be resulting in new low-density subdivisions in rural areas that are far from essential destinations and underserved by public transit and multimodal facilities, subsequently increasing vehicle miles traveled (VMT) per household in those communities. Restrictions on development patterns in Rural Districts could be examined to be more aligned with VMT reduction goals while supporting the needs of local agriculture and workers more effectively.

4. **Coordinate land use and environmental policy functions.** With the newly consolidated State's land use and environmental policy functions, the State is well-positioned to integrate environmental protection, climate adaptation, and climate crisis mitigation into land-use policy implementation. Environmental assessment requirements could include VMT per capita estimates and post-implementation monitoring of impacts that could help the State measure the transportation impacts of land use actions and enhance the State's understanding of the link between development and environmental impacts.

IV. County Land Use Planning and Implementation

The following section presents a sample of some of county general and development plan documents, policies, and practices, and identifies opportunities for county level land use planning to support reductions in statewide VMT.

County General Plans

State law requires county governments to maintain a tiered planning system, of which the General Plan establishes the first tier and serves as a guiding policy document instituted to guide county government decision-making. General Plans identify the desired population and physical development patterns for each county. Preparation of General Plans, amendments, and implementation must consider state objectives, policies, and programs, as presented in State Functional Plans, and involve public input.

County General Plans set goals, objectives, policies, and actions to achieve desired population density, land use, siting of transportation facilities, public and community facility locations, water and sewage system locations, visitor destinations, urban design, and all other topics necessary for coordinated county development. For instance, counties must demonstrate consistency with the General Plan when granting district boundary amendments to property owners and public agencies for less than 15 acres of land in Urban, Rural, and Agricultural Districts not designated as Important Agricultural Land by the Department of Agriculture (DOA).

The State includes four counties responsible for planning, policy development and implementation, and provides public services to the communities within its jurisdiction. As a sampling of the current county General Plans in the State, the following section summarizes the General Plans for the most populous and one of the least populated counties in the State:

- Accounting for 70% of the State's total population at nearly 1 million residents, the island of Oʻahu is the most populous, developed, and visited island in the State. The City and County of Honolulu Department of Planning and Permitting (DPP) prepared the 2017 Proposed Revised General Plan for Oʻahu (Oʻahu General Plan) to establish long-range goals for the island of Oʻahu and policy guidance and necessary actions to achieve them. [13] The Oʻahu General Plan

identifies 11 areas of concern, including population, economy, housing and communities, and transportation, to serve as the focus of policies expressed. **The Oʻahu General Plan emphasizes the need to contain growth and concentrate economic activity in the Primary Urban Center as well as the secondary center in ʻEwa. Multiple objectives speak to the need for a balanced, multimodal system and the need for density and a mosaic of land uses in the urban core to support walkability.**

- The Oʻahu General Plan sets countywide guidelines, values, and principles for subsequent community-level and countywide functional plans, programs, and legislation to set specific targets and determine implementing actions. Specific Oʻahu General Plan transportation policy goals that support VMT reduction include:

  – Discourage speculation in lands outside of areas planned for urban use;

  – Support the development of transportation plans, programs, and facilities that are based on Complete Streets features;

  – Maintain and improve roads, bicycle, and pedestrian facilities in existing communities to eliminate unsafe conditions;

  – Enhance pedestrian-friendly and bicycle-friendly travel via public and private programs and improvements;

  – Reduce traffic congestion and maximize the efficient use of transportation resources by pursuing transportation demand management strategies such as carpooling, telecommuting, flexible work schedules, and incentives to use alternative travel modes; and

  – Consider environmental, social, cultural, and climate change and natural hazard impacts, as well as construction and operating costs, as important factors in planning transportation system improvements.

- From 2000 to 2015, the island of Kauaʻi grew from 58,463 to 71,000 residents – making Kauaʻi the least populated county that prepares its own General Plan. The Kauaʻi Kākou 2018 General Plan (Kauaʻi General Plan) identifies community development and growth management priorities for the island over a 20-year planning horizon. The Kauaʻi General Plan covers six planning districts on the island and guides land use and development decisions,

reinvestment, and capital improvements based on the community's vision for Kauaʻi's future.

- The Kauaʻi General Plan sets ambitious VMT reduction targets and refers to the 2012 Kauaʻi Multimodal Land Transportation Plan (MLTP) "preferred scenario" to maintain total island-wide VMT at 2010 levels (771,500 VMT) through 2035 with increased population by providing non-driving options that allow people to shift some single occupancy vehicle trips to transit, bicycling, or walking. The Kauaʻi General Plan adopts MLTP transportation goals to increase the share of walk, bicycle, and transit trips from 7% in 2010 to 13% in 2020, then to 23% by 2035; as well as decreases vehicle miles traveled to reduce carbon emissions, as well as a more connected, safe network of pedestrian and bicycle routes to support mode shift targets.[122]

- The Kauaʻi General Plan includes a Future Land Use Map for the State LUC to consider in their reclassification decisions within the island as well as to guide future action by elected officials and developers. The boundaries are generalized and require regulatory action to be implemented. The Kauaʻi General Plan **aims to meet housing needs while preserving agricultural land and other natural resources, encouraging housing development near pre-existing urban cores** to promote densification to allow for more walkable places and "increase overall community health through design that supports safe and accessible spaces." The Kauaʻi General Plan mentions two permitting code changes in the County of Kauaʻi that would support context-sensitive VMT reduction requirements for proposed land use projects:

  - Build upon place types in future Community Plans and update zoning and development standards to be place-based

  - Support State Land Use Boundary Amendment Petitions for new Urban District consistent with the Future Land Use Map

Community Development Plans

With County General Plans serving as the first tier, the State requires county governments to prepare Development Plans for sub-regions or communities within their jurisdiction to serve as the second tier of the county planning systems in the State. Though four out of five counties prepare Development Plans for sub-regions within their jurisdiction, with the County of Maui providing this

[122] County of Kauaʻi Kakou General Plan 2018, Link

function to the County of Kalawao, this section focuses on the City and County of Honolulu's (Honolulu) approach to sub-area planning.

In Honolulu, the Oʻahu General Plan provides a broad statement of objectives and policies to guide Honolulu's future and designates the role of each of the eight geographic planning regions on Oʻahu to support the envisioned county population and economic growth. Then, two Development Plans and six Sustainable Communities Plans respond to the specific conditions and community values of each sub-region on Oʻahu. Since the county is focusing on major population and economic growth in ʻEwa and the Primary Urban Center of Oʻahu over the next 20 years and beyond, development decisions and actions required to support growth in these regions are guided by policies and guidelines in "Development Plans."

Since Honolulu envisions population and economic growth will remain relatively stable beyond the ʻEwa and Primary Urban Center regions, the county prepared "Sustainable Communities Plans" for the following six regions:

1. **North Shore**
2. **Waiʻanae**
3. **Koʻolau Loa**
4. **Central Oʻahu**
5. **Koʻolau Poko**
6. **East Honolulu**

Across Oʻahu Development and Sustainable Community Plans, regions express overarching support for more complete, livable neighborhoods with a broad mix of land uses in proximity, including agricultural sites, commercial uses and businesses, civic districts, parks, and places for people to gather, and connected by transportation facilities that facilitate bicycle and pedestrian travel, to increase transit use, and to reduce dependence on automobile travel. More specifically, community input within the eight community planning regions calls for more state and county planning, funding, and improvement of non-driving options instead of continued investment in highway capacity.

County Land Use Policy Implementing Ordinances

The third tier of county planning systems consist of implementing ordinances. In Honolulu, this third tier includes the county's zoning code, development review requirements, and capital improvement program. Honolulu's Department of Planning and Permitting (DPP) leads efforts to develop the Oʻahu

General Plan as well as community-focused planning processes within each of the island's eight community planning regions. The Honolulu Department of Transportation Services (DTS) and Hawai‘i Department of Transportation (HDOT) lead operations, delivery, and maintenance of supportive transportation facilities, programs, and services.

The following section summarizes county implementing ordinances and land use review practices that support VMT reduction at the project-level:

- The **City and County of Honolulu (Honolulu) Transportation Impact Assessment (TIA) Guide** requires sponsors of proposed development projects that "will generate additional passenger trips, propose changes to land use, and/or impact the existing circulation and access of any" to scope and prepare a TIA.[123] Project sponsors must meet with Honolulu Department of Transportation Services, Transportation Planning Division (DTS-TPD), and Traffic Engineering Division (DTS-TED) staff to discuss the project's TIA study area and analysis requirements.

- The preparation and review process for a project TIA study in Honolulu generally involves the following elements:

  – Project background, description, and study area including applicant information, site location, and existing and proposed square footage/number of units by land use, plans for public rights-of-way, access and circulation, and existing transportation conditions;

  – Multimodal transportation impact analysis narrative describing existing traffic conditions and forecasted future conditions determined during the TIA scoping meeting and project-specific trip generation estimates, assignment, distribution assumptions (including transit, bicycle, and pedestrian mode split), analysis of mode-specific quality of service using City-preferred methods, results of the Complete Streets Modal Priority Analysis, a summary of traffic safety in the study area, and other evaluations requested by City staff;

    - During TIA scoping, the City may require one or many of the following analysis methods for a proposed project:

      - Level of service (LOS) and quality of service by mode are determined using the Pedestrian Environmental Quality

[123] City and County of Honolulu Transportation Impact Assessment Guide, November 2020, Link.

Index (PEQI), Bicycle Level of Traffic Stress (LTS), Transit Capacity and Quality of Service Manual (TCQSM), and/or Highway Capacity Manual (HCM).

- Complete streets modal priority analysis using the City's Excel-based Honolulu Multimodal Radar Tool, which ingests a uniform multimodal score (scaled from 1 to 4) for every study street segment by mode.

- Parking supply and demand assessment to evaluate existing and forecasted corridor-level parking occupancy for projects proposing significant parking removal or, in TOD areas, where parking exceeds estimated vehicle trips.

- Traffic safety and access management based on trends within the study area

- Vehicle miles traveled (VMT) analysis

- Induced traffic analysis

- Neighborhood traffic analysis

– Project mitigation program of transportation demand management (TDM) and transportation improvement strategies the project applicant proposes to implement to minimize the project's transportation impacts;

– Conclusions and recommendations section that summarizes the impacts and mitigation program to be funded by the project applicant, describes multimodal traffic conditions before and after proposed mitigation, offers a matrix of proposed mitigation strategies and their consistency with City adopted principles and/or objectives, cost estimates, and an implementation plan; and

– Appendices that, at a minimum, include a summary of data used and sources, analysis methods and assumptions, modal level and quality of service worksheets used, and other sources and documents referenced in the analysis.

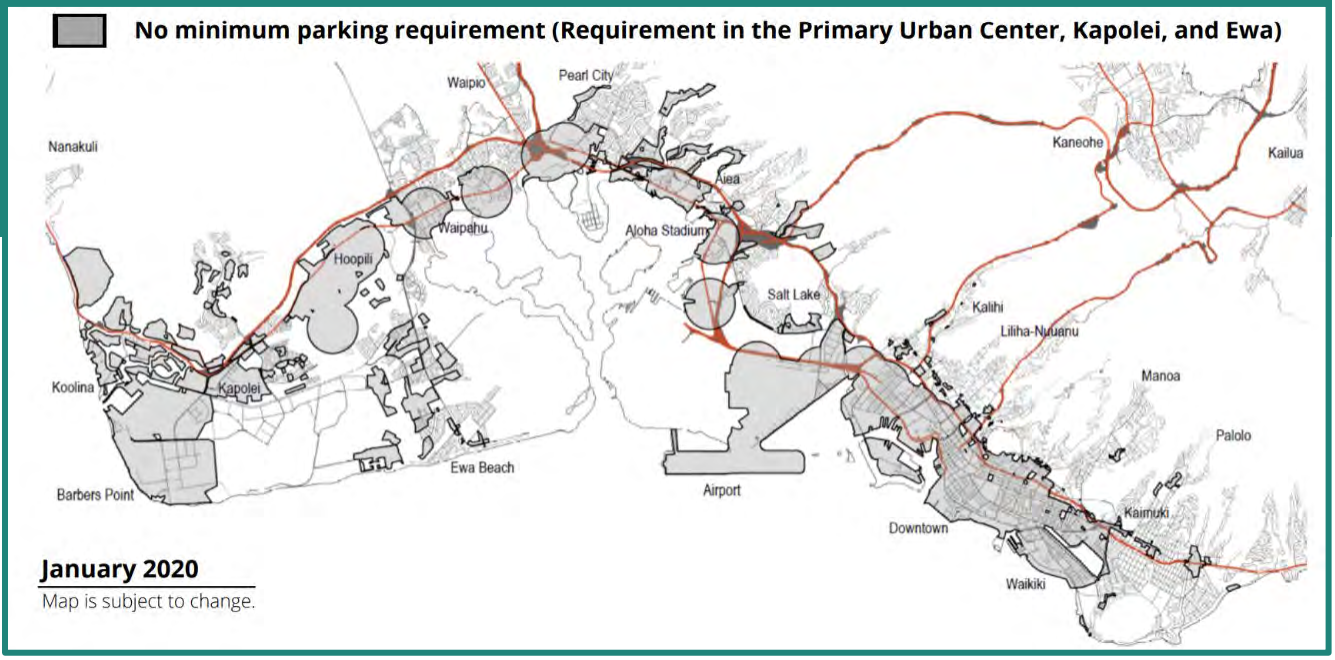
- The **City and County of Honolulu's revised Article 6. Off-street Parking and Loading of its Land Use Ordinance** streamlined off-street parking regulations across the island by consolidating and reducing permit requirements. The Land Use Ordinance updates are intended to reduce the costs associated with parking mandates by eliminating minimums in dense, urbanized areas of the county and reducing off-street parking requirements for land use proposals in the non-urban, residential areas. Additionally, Honolulu's updated parking regulations provide developers and residents with greater flexibility to decide how much parking to build, how much to use, and prepares for future curbside uses by requiring fewer and more flexible commercial loading zones, promoting unbundling parking costs from consumer costs as an incentive to promote multimodal mobility, and allows more shared, joint-use parking solutions[124].

- Specifically, there are no minimum parking requirements for land use proposals located in the Primary Urban Center and 'Ewa Development Plan areas (except in residential, agricultural, and preservation zoning districts) as well as any zoning district within one-half mile of an existing or future Honolulu Rail Transit station.[125] Figure 3 shows a map of areas with no minimum parking requirements in Honolulu.

[124] Per comment from the project management team, the City and County of Honolulu frame the approach to parking as follows: 1) simplify off-street parking regulations across the island through consolidation and fewer permit requirements; 2) reduce and right size costly parking mandates through no minimums in the urban core and reductions in the non-urban/residential area uses; 3) create flexibility for developers and residents to decide how much to build and how much to use, and 4) prepare for the future through fewer and more flexible loading zones, promotes unbundling as an incentive, and allows more shared, joint-us parking solutions.

[125] City and County of Honolulu Ordinance 20-41, January 5, 2021, Link.

Figure 18.
Areas in Honolulu with no parking requirements



V. Opportunities for County Land Use Planning and Implementation to Support VMT Reduction

County General, Community, and Development Plans provide overarching countywide policy frameworks to guide each county's management of land use, development, and transportation systems. When considering new residential and commercial development, DPP, DTS, and HDOT should report if existing transportation facilities and services provide adequate access. If not, agencies should recommend conditions that should be included as part of the zoning change approval to assure adequacy, including the timing of any necessary improvements, design circulation systems to increase transit service and prioritize transit facilities on streets and in new neighborhood developments, and develop planned bikeways.

The following list presents specific opportunities in county plans and practices based on current county land use planning and implementation mechanisms:

1. **Track and monitor results from planning in each county.** The Honolulu and Kaua'i General Plans effectively identify relationships between land use, housing, and the transportation network outcomes and include a variety of policies geared towards accommodating population and economic growth while mitigating vehicular congestions. Counties could track implementation and follow-through on these policies by tracking progress on mode shift and monitoring results of multimodal mobility improvements to ensure state and county decision-making are supporting these goals. Tracking progress may include analyzing the number of development projects that conform with the county's General Plan policies compared to the number that secure amendments, and comparing the number of walk, bike, and transit trips before and after multimodal mobility improvements, like physically separated bikeways, new sidewalk construction, or dedicated transit lanes. Tracking these results would help counties better understand what types of land use decisions and transportation investments produce the types of outcomes envisioned in countywide and community plans.

2. **Address unmet transportation priorities of communities.** Several Community and Development Plans mention each community's desire to reduce reliance on private passenger vehicles and seek investments in transportation facilities and services that improve mobility between communities, shopping, and recreation centers. Public input on Sustainable Community Plans reveals needs for

enhanced transit, pedestrian, bicycle, and other forms of personal mobility vehicle modes of travel, as well as desires to reduce conflicts between pedestrian travel and vehicular travel to improve pedestrian safety. Communities would like to see greater connectivity in the design of new or enhancement of existing roadway networks. State, MPO, and county transportation planning should orient transportation investments to address current gaps in multimodal mobility within sub-regions and prioritize delivering investments in communities most burdened by a lack of safe, affordable, and reliable non-driving transportation.

3. **Evaluate regional VMT impacts of land reclassification petitions.** Select petitions for land reclassification fall within the jurisdiction of county government, yet explicit review guidelines are not expressed in land use plans. Counties should consider using VMT-based analysis to evaluate petitions for land reclassification within their jurisdiction, especially when proposed redistricting would result in increased residential population in areas underserved by multimodal access to essential destinations.

VI. Transportation Planning and Implementation

The following section presents key legislation, plan documents, policies, and practices part of state and county transportation planning and implementation.

State Transportation Functional Plan

The Hawai'i Department of Transportation (HDOT) is unique amongst other U.S. state departments of transportation in that the agency is responsible for the State's air, water, and land transportation systems. HDOT must prepare and apply its Functional Plan "to guide the allocation of resources for the implementation of state policies adopted by the legislature."[126] Last adopted in 1991, HDOT's current Functional Plan was prepared with input from an advisory group of representatives from the OPSD, Department of Agriculture, Department of Business, Economic Development and Tourism, county transportation and public works departments, and members of the public. To ensure transportation resources address local community needs, HDOT consulted county general plans and development plans when preparing and revising its Functional Plan.

The 1991 HDOT Plan geared HDOT to execute priority actions within the next two to six years, aligning with the Biennial State Budget and Capital Improvement Program budgetary cycles.[127] The top four critical issues for transportation in Hawai'i identified in the 1991 HDOT Plan include:

1. **Congestion**
2. **Economic Development**
3. **Funding**
4. **Education**

The 1991 HDOT Plan finds that HDOT will address these issues through seven underlying strategies, which were to be supported by specific policy directions and near-term implementing actions as summarized below:

1. **Construct facility and infrastructure improvements in support of Hawai'i's thriving economy and growing population base.** To achieve this, HDOT

[126] Hawai'i Revised Statutes, Section 226-52, Link

[127] Transportation State Functional Plan, Hawai'i State Department of Transportation, 1991, Link

planned to build new roads, piers, yards, widen several existing highways, replace bridges, build new ferry terminals, and support public transit.

2. **Develop a transportation system balanced with an array of new alternatives.** To achieve this, HDOT planned to promote public transportation systems statewide and promote greater use of motor coach transportation between airports and resort areas. HDOT recognized "the need to redirect the [agency's] land transportation focus from the private automobile to transit" through a network of rapid transit, ferries, commuter buses, airport shuttles, and retail district shuttles, which would reduce costs associated with car-dependency for people and manage vehicle travel times for all road users as the population grows.

3. **Implement Transportation Systems Management to maximize the use of existing facilities and systems.** To achieve this, HDOT planned to promote alternative modes of public transportation and transportation safety through public relations and marketing programs, implement statewide rideshare programs and a network of rideshare coordinators, develop park and ride facilities, provide incentives for ridesharing, and provide a viable bikeway program.

4. **Foster innovation and use of new technology in transportation.** To achieve this, HDOT planned to train agency staff to use computers and software to support teleworking and promote ridesharing, bicycling, and public transit with the public.

5. **Maximize joint efforts with the private sector.** To achieve this, HDOT planned to support the development of non-urbanized areas by building piers, yards, highway widenings, establishing international air travel ways from Asia and Europe to Hawai‘i, building airport improvements, and seeking private sector funding for transportation.

6. **Pursue land use initiatives that help reduce travel demand.** To achieve this, HDOT proposed closing the gap between where people live and work through decentralization, mixed zoning, and related initiatives. HDOT planned to promote development of the 'Ewa Second City to create state offices for workers near their homes, expand their pilot of the nation's first telework center/satellite office to bring state offices to workers and the public, and promote the development of homes near jobs.

7. **Encourage resident quality of life improvements through improved mobility opportunities and travel reduction.** To achieve this, HDOT planned to design and construct transportation facilities so that they are accessible to people with disabilities and provide staff development opportunities.

Like the Hawai‘i State Plan, HDOT and other state agencies have not updated its Functional Plan. The 2015 OPSD report includes a recommendation that an update to the Hawai‘i State Plan and Functional Plans is needed to guide state and local agencies implementation processes to deliver on a coordinated vision for growth, protection of agricultural and conservation resources, and climate action.

Hawai‘i Statewide Transportation Plan

Predating the Functional Plan, 1975 State legislation requires HDOT to prepare a comprehensive, multimodal Hawai‘i Statewide Transportation Plan through a process that involves all levels of government.[128] During the Statewide Transportation Plan update process, HDOT consults a Statewide Transportation Council made up of State agency and county representatives to coordinate the State's responsibilities for inter-island and major highway transportation with counties' responsibilities for intra-island surface transportation and development. According to HDOT staff interviewed, the Hawai‘i Statewide Transportation Plan process establishes the system-level framework to be used in planning for air, water, and land transportation systems, as well as the connections between these modal systems.

Currently, HDOT is preparing the 2045 Hawai‘i Statewide Transportation Plan (2045 HSTP) to serve as an update to the 2011 HSTP.[129] In the 2045 HSTP, HDOT will establish the systemwide goals and priorities for system-level and master plans of the air, water, and land transportation systems. The following seven goals are included in the draft 2045 HSTP:

1. Ensure safe and secure air, land, and water transportation systems,
2. Provide a high-quality, well-maintained multimodal transportation system,
3. Improve mobility and enhance access to destinations for people and goods,

[128] Hawai‘i Revised Statutes, Chapter 279A, Link

[129] 2045 Hawai‘i Statewide Transportation Plan (HSTP) website, HDOT, 2021, Link

4. Ensure that the transportation system supports a vibrant and changing economy,

5. Provide a resilient transportation system that anticipates and adapts to climate change, and is responsive to storms, pandemics, and other disruptions,

6. Promote a transportation system that supports public health, equity, and quality of life,

7. Support a transportation system that protects and enhances Hawai'i's unique natural and cultural resources.

The 2045 HSTP is being developed through a scenario planning process that will assess five alternatives for the future of transportation in Hawai'i, including:

1. Business as Usual: in which the state's travel demands return to pre-COVID pandemic trends;

2. Global Health Crisis: in which demands for work-from-home, high-speed internet, and deliveries continue to grow;

3. Power in Paradise: in which energy independence is achieved through a full transition to electric cars and smart grid technology;

4. Climate Emergency: in which catastrophic climate crisis-related events affect low-income and vulnerable communities and tourism fluctuations destabilize the economy; and

5. Technology Revolution: in which a state technology sector boom attracts professional workers and households, and cars are autonomous.

Statewide Federal-Aid Highways 2035 Transportation Plan

The HDOT Highways Division developed the Statewide Federal-Aid Highways 2035 Transportation Plan (2035 LRTP) in 2014 to guide land transportation decisions for the federal-aid highways throughout the state and for each county through 2035. The 2035 LRTP serves as the long-range transportation plan for the Highways Division's programs (System Preservation, Capacity, Congestion, and Safety) and District plans of Maui (including Molokai and Lāna'i Islands), Hawai'i, Kaua'i, and O'ahu. The 2035 LRTP applies to the federal-aid highway system under both state and county jurisdiction classified as principal, major,

minor arterials, and collectors within each island's roadway network, except those federally classified as local roads or rural minor collectors.

Figure 19.
Lane Miles of Functionally Classified Roadways, HDOT 2009

Classification	Maui / Molokai / Lāna'i	Hawai'i	Kaua'i	O'ahu	State Total	Percent
Principal/Major Arterials	211	292	50	979	1532	32%
Minor Arterials	50	364	109	318	841	18%
Collectors	706	972	233	456	2367	50%
Total Lane Miles	967	1628	392	1753	4740	100%

Based on the MAP-21 (Moving Ahead for Progress in the 21st Century) federal legislation performance goals, the 2035 LRTP centers the following eight federal planning factors and four additional goals:

1. Safety – Increase traveler safety through engineering, education, and enforcement programs and campaigns, and improve regulations and research efforts.

2. Environment and Sustainability – Develop solutions that meet our transportation needs without compromising the ability of future generations to meet their own needs; develop solutions that promote energy conservation, improve the quality of life, and address climate change.

3. Modal Integration – Expand transportation options and make connections between modes such as public transit, automobile, bicycle, and pedestrian.

4. System Preservation – Maintain a regular schedule of rehabilitation, reconstruction, and replacement to keep the multimodal system operating safely and efficiently.

5. Security – Ensure the secure operation of the land transportation system by involving multiple agencies to work together to achieve common goals of risk management, incident detection, response, clearance, and preparation for and recovery from disasters.

6. Economic Vitality – Support industry, tourism, cultural, and recreational opportunities by reducing travel time, operating costs, travel distance, crashes and logistics inefficiencies.

7. System Efficiency Management and Operations – Optimize the performance of existing infrastructure; provide reliability and predictability within the transportation system and between modal choices.

8. Transportation Access Mobility – Enhance both infrastructure and services to improve mobility, consistency, and equity.

9. Additional Goals – Obtain sufficient and specific transportation funding. Optimize project delivery. Provide ongoing planning to assess and address statewide needs. Coordinate use of public right-of-way with other public service providers.

The 2035 LRTP identifies high-level needs and priorities for federal-aid highways over the period between 2015 and 2035 based on forecasted future statewide transportation needs and deficiencies. To forecast travel demands and system needs, HDOT assumes vehicle volumes and miles traveled will grow on all islands at pace with land area developed, population growth, and employment increases, while the mode split between driving and non-driving trips remains the same. The 2035 LRTP also forecasts that by 2035 highway capital needs will be a total of $23.4 billion greater than available statewide funding. As future funding strategies, the LRTP identifies 13 unique new revenue sources to fund transportation capital needs, including per-mile usage fees and carbon tax or fee that could be imposed on generators of major emissions, as well as advises HDOT to consider reducing vehicular demand on highways to reduce funding needs. Specifically, the HDOT Highways Division could reduce the potential capital funding needs of the land transportation system by supporting two key strategies:

1. Reducing the demand for auto-based travel through denser, mixed-use development, and

2. Shifting trips from single-occupant vehicle travel to bicycle, walking, transit, shared ride trips with transportation demand management (TDM) investments.

State Modal Plans

The HDOT Highways Division also prepares and implements distinct modal plans and studies to inform and develop investment strategies to address statewide programmatic needs, including pedestrian and bicycle transportation needs. HDOT prepared the State's 2003 Bike Plan Hawai'i Master Plan (2003 Bike Plan) with the overarching goal to establish bicycling as a safe and convenient mode of transportation for residents and visitors throughout the State. The 2003 Bike Plan process involved intensive public involvement including community workshops and in-person and online surveys. Survey responses revealed that bicycling is an important transportation mode for running errands and commuting in Kaua'i and Maui, and for recreation across all islands. Survey respondents identified their top three barriers to bicycling as the following:

1. Lack of dedicated bikeways on roads and highways,
2. Heavy vehicle traffic volumes, and
3. Lack of off-road bicycle path facilities that offer direct and comfortable access to people on bicycles.

The 2003 Bike Plan identifies a list of bikeway projects and investments to increase the availability of bikeways and bike-supportive treatments along the state highway system. HDOT planned to deliver 438 total miles of new bikeways on all islands, including 82 total miles of bike lanes, 99 total miles of shared-use paths, and 257 total miles of signed shared routes as shown in Figure 4. As of 2020, just over 157 total miles of bikeways have been implemented on the State highway system – representing 53% of the statewide bikeways system envisioned in the 2003 Bike Plan.[130]

[130] Bicycle Planning webpage, HDOT, 2021, Link

Figure 20.
Summary of Planned Bikeway Facilities by Island

Total Planned Miles of Bikeways by Island	Bicycle Lanes	Shared Use Paths	Signed Shared Roads	All Facilities
Hawai'i	29	44	70	143
Kaua'i	5	8	28	41
Lāna'i	0	0	4	4
Maui	14	17	58	89
Molokai	0	0	8	8
O'ahu	34	30	89	153
Statewide Total	82	99	257	438

HDOT Highways Division staff interviewed explained that after completing the 2003 Bike Plan, the Division worked with bicycle advocacy groups and community groups across the islands to identify the highest priority projects in their community to develop by preparing preliminary engineering reports and advance into delivery. Preliminary engineering assessments for each island's highest priority bikeway projects were intended to assess different bikeway design alternatives and define the level of effort needed to deliver each project. Ultimately, however, HDOT Highways Division staff determined that the bicycle facilities envisioned by stakeholders were not feasible for two main reasons (1) HDOT highway design guidance and (2) limited capital funding made available. Since existing HDOT Highway Divisions project design guidance discouraged reducing highway lane widths or number or lanes, many of the bicycle facility designs supported by public stakeholders would require HDOT to conduct costly right-of-way acquisitions and bridge and culvert reconstructions.

Currently, HDOT is refreshing the analysis of the 2003 Bike Plan, including developing an updated inventory of existing bikeways, updating project lists and maps, re-analyzing the bicycle network, and re-evaluating proposed projects to determine feasibility for implementation. It is also worth noting that since the 2003 Bike Plan was completed, the national state of practice for bikeway facility design has evolved to promote physically separated facilities for people traveling on bicycles and other micromobility devices as a broader segment of people are more likely to make trips using bicycles when they do not have to interact or interface with

moving cars.

In 2013, HDOT developed the Statewide Pedestrian Master Plan through interdepartmental coordination and involvement of community members across the State. HDOT prepared the 2013 Pedestrian Plan based on seven goals, all of which support reductions in service population's VMT:

1. Improve pedestrian mobility and accessibility
2. Improve pedestrian safety
3. Improve connectivity of the pedestrian network
4. Promote environmental benefits of walking
5. Encourage walking to foster healthy lifestyles
6. Enhance communities and economic development by creating pedestrian-oriented areas and positive pedestrian experiences
7. Promote and support walking as an important transportation mode that reduces overall energy use

The 2013 Pedestrian Plan identified 31 areas of concern across the State with the greatest concentrations of pedestrian safety, connectivity, and vulnerable pedestrian group issues. Working alongside local HDOT District staff and community stakeholders, HDOT Highways Planning staff developed area-specific pedestrian improvement recommendations for each area of concern. Like with bicycle travel, however, HDOT pedestrian user needs are not considered early in the highway project scoping phase of HDOT's project development process. Thus, HDOT Highways Planning staff must constantly monitor the agency's project delivery pipeline to request that HDOT Highways staff managing active projects in pre-construction phases consider including critical active transportation network elements that would support non-drivers on that highway segment. HDOT Highways Planning staff also regularly consult with District Operations staff to find opportunities to deliver highway improvements that benefit non-driving modes through their repaving and repair activities. HDOT staff that were interviewed expressed pedestrian and bicycle-oriented components are more likely to be included in highway expansion projects because "these [type of projects] create space for new facilities" while non-expansion projects

introduce the need for right-of-way acquisition.

State Mid-Range Transportation Plan

The HDOT Highways Division is currently conducting a Mid-Range Transportation Plan (MRTP) process to align the projects and programs the Division identifies for funding and implementation in the 4-year Statewide Transportation Improvement Program (STIP) period with the long-term outlook of priorities and needs set by the 2035 LRTP. The MRTP process is based on a new project evaluation framework intended to link the highway project delivery pipeline and improvement programs to transportation goals. HDOT's draft project evaluation framework is called Multi-Objective Decision Analysis (MODA) and uses project attributes to assign an overall score based on how it advances 2035 LRTP priorities.

Though inspired by the Smart Transportation Rank Choice (Smart TRAC) project evaluation process HDOT developed with support from the State Smart Transportation Institute (SSTI) in 2018, the MODA framework significantly deviates from the approach used in Smart TRAC to assess the degree to which a transportation project funding request addresses the 2035 LRTP priorities. Figure 5 compares what project attributes the Smart TRAC and MODA project evaluation frameworks use to identify the highest priority projects for HDOT capital dollars. Under the drafted MODA framework, HDOT projects that address crash hot spots, maintain personal and freight vehicular access, reduce vehicle delays, and preserve existing highway configurations are most likely to be prioritized for funding and implementation than other project proposals.

Figure 21.
Summary of HDOT Smart TRAC and MODA project scoring methods

2035 LRTP Priority	HDOT Smart TRAC Framework (2018)	HDOT MODA Framework (2021)
Scoring Criterion	**Highest Scoring Project Attributes**	
Improving safety	• Highest score (8 pts) for projects anticipated to reduce crashes at a high crash location • Highest score (8 pts) for projects anticipated to greatly improve safety and access for vulnerable users (non-motorized travelers) • Bonus 4 points for projects that reduce crashes resulting in fatalities	• Highest score (# of crashes * crash reduction factor * 2) for projects that address multiple crash hot spots • Highest score (2 pts) for projects that address multiple pedestrian or bicycle hot-spot areas • Bonus 1 point for projects that deliver added safety improvements (i.e., protection from rockfall, shoreline boundaries, geometric improvements)
Preserving the transportation system	• Highest score (8 pts) for projects that address “poor” or “fair” rated pavement conditions • Highest score (4 pts) for projects that address “poor” on National Bridge Inspection rating scale • Highest score (4 pts) for projects that address transit assets rated in “poor” conditions • Bonus 4 points for projects that score 2-4 AND benefit a low-income community • Bonus 4 points for projects that score 2-4 greatly AND reduce an asset’s vulnerability to climate related events • Only for projects scored 2-4 pts for pavement and bridge repair, highest score (4 pts) for projects that serve highway segment with > 20,000 AADT	• Highest score (# lane miles * 2) for projects improving more lane lanes on the National Highway System • Highest score (NBI rating * 2) for projects with greatest bridge asset improvement based on National Bridge Inspection rating scale • Highest score (5 pts) for projects that preserve five other asset categories (e.g., streetlights, guard rail, traffic signals, drainage)

2035 LRTP Priority	HDOT Smart TRAC Framework (2018)	HDOT MODA Framework (2021)
Providing access to jobs and necessities	• Highest score (4 pts) for projects that improve access to jobs by more than one mode • Highest score (4 pts) for projects that improve access to non-work necessities by more than one mode • Bonus 4 points for projects that score 2-4 AND benefit a low-income community	• Highest score (4 pts) for projects that have more than one bicycle/pedestrian and/or intermodal connection identified in the Statewide Bike Plan or Pedestrian Master Plan
Reducing traffic congestion	• Highest score (4 pts) for projects that are anticipated to significantly reduce the hours of delay per person • Bonus 4 points for projects with a 2-4 score AND on a high priority freight route	• Highest score (2 pts) for projects within one mile of the island's major employment center (according to the LRLTP) • Highest score (8 pts) for projects anticipated to improve truck travel time reliability on the Primary Highway Freight System (PHFS)
Protecting the environment and cultural assets	• Highest score (4 pts) for projects likely to significantly reduce long-term carbon emissions or NAAQS • Highest score (4 pts) for projects that improve cultural or environmental resources • Highest score (4 pts) for projects that improve asset's resilience to natural weather events or sea-level rise	• Highest score (2 pts * AADT) for projects anticipated to reduce vehicle travel times by more than 10% on high-volume highways
Improve resiliency	Not included	• Highest score (2 pts) for projects that improve highway resilience to extreme weather or other environment hazards • Highest score (1 pt) for projects that establish new routes or alternate routes
Other overriding considerations	Not included	• Highest score (1 pt) for projects that benefits an environmental justice/Title VI areas • Highest score (2 pts) for projects that enhance the performance of the transportation system and the natural environment • Highest score (2 pts) for projects that qualifies HDOT for grant funding

On the islands of Oʻahu and Maui, the metropolitan planning organizations (MPO) facilitate a long-term regional transportation planning process every five years to forecast transportation needs and deficiencies, forecast funding, and gather input from state and county transportation staff and communities. Regional transportation plans guide the preparation of fiscally constrained regional transportation improvement programs (TIPs) that stipulate transportation projects and programs that will receive federal and state transportation funding in the near term.

For state transportation projects on these islands, HDOT submits funding requests to the Oʻahu and Maui MPOs. Since the islands of Hawaiʻi, Kauaʻi, Molokai, and Lānaʻi are not served by an MPO, county staff work with HDOT Highways Division staff to prepare county transportation plans and make funding requests through the STIP.

The following section presents some county transportation plans, regional transportation plans, transportation improvement programs, and progress monitoring in the State:

- The **Federal-Aid Highways 2035 Transportation Plan for the District of Kauaʻi** (2035 LRTP for Kauaʻi) was prepared by the HDOT Highways Division in 2014 based on forecasted total island-wide VMT growth at pace with population and employment growth, assuming mode split will remain constant through 2035. The 2035 LRTP for Kauaʻi process involved community, local agencies, and state agencies input to define Kauaʻi's priority goals for highways and arterials, including:
  - (1) System preservation and maintenance projects such as pavement resurfacing, rehabilitation, or reconstruction; bridge replacement or rehabilitation; guardrail repairs; sidewalk repairs; and bus stops, signs, and transit fleet maintenance,
  - (2) Safety projects such as lighting and intersection improvements,
  - (3) Complete streets and modal integration projects such as new bicycle lanes, new shared paths exclusively meant for nonmotorized modes, safer connections between modes, and preservation of existing facilities,
  - (4) Capacity projects such as additional lanes on existing highways, constructing new highways, and realigning or improving facilities for nonmotorized modes on shared roadway,

  - (5) Security and resiliency projects to enhance roadways to provide reliable operations during threats or emergencies, and
  - (6) Transit projects to support riders such as improved sidewalk and bicycle connections to transit stops, park-and-ride locations, upgraded bus stops, new bus shelters, major hubs from residential and commercial areas, and improved amenities or signage for transit users.

- The 2035 LRTP for Kauaʻi identifies roadway infrastructure projects for the next 20 years estimated to cost a total of $3.1 billion, including system preservation projects totaling roughly $315 million, safety-related projects for all modes totaling $595 million, fiscally unconstrained capacity projects including facilities for bicycle and pedestrian travel totaling $2.1 billion, and congestion projects totaling $57 million, and $10 million for circulation studies and landscaping projects. With an estimated cost of $600 million, the costliest project involves HDOT Highways Division building a Kapaʻa Relief Route between Kapule Highway and Kapaʻa Stream.

- **County of Hawaiʻi Transit and Multi-Modal Transportation Master Plan**[131], released in 2018, is a plan to create a high-quality multi-modal transportation system that is safe, reliable, and meets the needs of the community. This comprehensive plan expresses goals that support ongoing VMT reduction through the development of a people-centered mobility network. The plan identifies immediate, near-term, mid-term, and long-term priorities to move toward a more robust network. A dependable and efficient transit network is a key element in promoting mode shift. Returning to this plan to consider how the identified goals can be carried out within the context of the COVID-19 pandemic will allow for greater support for VMT reduction. Immediate and near term (2018 to 2025) include:
  - Investment in transit vehicle fleet
  - Creation of new service routes
  - Partnering with vendors to provide bicycle, vanpool, and transit services
  - Increase transit service

[131] County of Hawai'i Transit and Multi-Modal Transportation Plan, 2018 - Link

  - Investment in wayfinding and bus stop facilities

- Oʻahu Regional Transportation Plan 2045 (ORTP 2045) was prepared in 2021 by OahuMPO with input from its working group, committees, the community, and Policy Board and centers the following seven goals:
  - Improve the safety of the transportation system;
  - Support active and public transportation;
  - Promote an equitable transportation system;
  - Improve the resiliency of the transportation system;
  - Preserve and maintain the transportation system;
  - Support a reliable and efficient transportation system; and
  - Improve air quality and protect environmental and cultural assets.

- The ORTP 2045 identifies a list of 105 projects that would cost a total of $33.97 billion to deliver over the next 20 years, including highway and road capacity expansions, safety improvements, bicycle and pedestrian projects, road and bridge maintenance and replacements, and intelligent transportation system (ITS) operation.

- The ORTP 2045 establishes a two-step project evaluation framework to help assess plan consistency and evaluate projects for funding in the Oʻahu TIP:
  - Step 1 checks for consistency with the ORTP 2045 to identify projects consistent with the ORTP vision and with at least one plan goal,
  - Step 2 uses geographic criteria to score projects to identify transportation projects (for all modes) across the island that address high crash zones, improve the safety of people walking and biking in areas with a high concentration of mobility-constrained populations, add or enhance pedestrian facilities, add protected bikeways or improves bikeways, add pedestrian and/or bicycle facilities near an elementary or middle school, planned rail station, and on high stress connections, improve transit quality, expected to decrease the share of people driving alone, provide redundant access for communities with one connection, reduce long-term vulnerability of transportation facilities, improve transportation asset condition, improves the reliability of interstate highways, improve efficiency consistent with the

Congestion Management Process, expected to improve air quality and reduce emissions, and avoids cultural and natural resources.

- Hele Mai Maui Long Range Transportation Plan 2040 (Maui LRTP 2040) was prepared in 2019 by the Maui MPO and county staff based on five goals that reflect current needs and goal outcomes for the next 20 years:
  - Improve safety and promote health,
  - Enhance cultural and natural resources, climate resilience and sustainability,
  - Expand mobility choices to reduce traffic congestion,
  - Connect and strengthen communities to improve quality of life, and
  - Maintain assets and invest strategically for economic vitality.

- The Maui LRTP 2040 identifies a list of 88 projects, including complete streets, multi-use paths, intersection improvements, safety projects, transit improvements, and new connections, and 13 capital maintenance and repair programs that would cost an estimated $2.08 billion over the next two decades. Based on forecasted federal, state and county funding, the Maui LRTP 2040 anticipates an $800 million funding gap to deliver envisioned improvements.

- The Maui LRTP 2040 establishes a three-tiered project evaluation framework to help screen, score, and prioritize projects for funding in the Maui TIP:
  - Screening filters a very large number of project and program recommendations from past plans and community outreach to identify those on regionally significant state or county federal aid roads appropriate for long-range plan scoring and prioritization/recommendation,
  - Scoring uses geographic criteria to score projects to identify transportation projects (for all modes) across the island that address high crash locations, reduce vulnerability to climate related events, protect cultural or natural resources, improve freight and transit movement, connect to existing networks, increase travel options, provide access to opportunities, benefit high need areas, address critical infrastructure maintenance, and serve highly populated areas, and
  - Prioritizing and recommending project elements to support more detailed prioritization, including a qualitative assessment of the benefits of the top

tier of projects from across the island.

- HDOT developed the **Hawai‘i Statewide Transportation Improvement Program (STIP) FY 2019-2024.** The provides a list of State and County transportation projects slated for federal funding over the next four years. STIP is developed using existing transportation plans and policies, and current highway, transit, and transportation programming processes administered by the O‘ahu and Maui MPOs and HDOT.

- The **new directive under *Hawai‘i Act 131 (2021)***, signed into law on July 1, 2021, calls for HDOT to report on its progress to deliver motor vehicle, bicycle, and pedestrian networks every year to track how projects achieve complete streets, equity, and climate action goals. Hawai‘i Act 131 specifically directs HDOT to develop, implement, and coordinate with each county to create networks of bicycle and pedestrian pathways to connect all public schools, libraries, retail centers, and residential areas as well as physically separated/protected pedestrian exercise and active health pathways in residential and high-density communities. Hawai‘i Act 131 also establishes new annual reporting requirements for HDOT to detail how planned projects implement the following 11 goals listed in the bill:
  - “(1) Assess and maximize total throughput of people across all modes of transportation;
  - (2) Meet complete streets goals as defined in section 264-20.5;
  - (3) Reduce vehicle miles traveled;
  - (4) Provide capacity to meet future mode share goals established by the ground transportation modernization commission;
  - (5) Provide equity for all communities and users;
  - (6) Improve safety and achieve vision zero goals defined in section 286-75;
  - (7) Reduce user cost of transportation;
  - (8) Improve public health;
  - (9) Reduce carbon emissions and greenhouse gases to meet state climate and zero emissions clean economy goals as defined in section 269-92 and zero emissions clean economy by 2045 as defined in section 225P-5;

- (10) Reduce urban temperatures by incorporating tree canopy and foliage over hardened surfaces; and
- (11) Beautify public infrastructure.[132]"

- In Section 1 of Hawai'i Act 131, the Legislature notes that "vehicles now account for nearly two-thirds of Hawai'i's greenhouse gas emissions, as the state's car-centric ground transportation system does not offer people convenient transportation alternatives." Also, the Legislature expresses that low-income people are disproportionately burdened by the transportation system, as they must spend higher proportions of their income to afford car access, lack multimodal transportation infrastructure, and are more likely to be killed by traffic collisions.

[132] Hawai'i Senate Bill 1402: Relating to Transportation., Passed on July 1, 2021, Link

VII. Opportunities for Transportation Planning and Implementation to Support VMT Reduction

State and county transportation plans, project development standards, transportation improvement programs, and progress reporting should sustain a multimodal transportation system that serves statewide needs and priorities, including increasing the quantity and quality of non-driving mobility options. The following list presents specific opportunities for plans, policies, and practices to promote modal shift based on current transportation planning and implementation mechanisms:

1. **Consider all user needs on State and county facilities and prioritize people walking, biking, and taking transit early in project development.** Interconnected networks of bikeways, walkways, and transit-priority facilities across the State and within counties would provide people with attractive non-driving options to reach local and regional destinations. While most roads and highways in the state safely and comfortably accommodate people traveling in a car, there are significant gaps and deficiencies in transportation infrastructure networks that comfortably, safely, and equitably connect people who bike, walk, or ride transit to get to where they need to go. Current state and county transportation needs identification and project development processes tend to prioritize and design for vehicle movements while facility improvements for non-motorized modes tend to be considered in later phases of project development. Adjusting project development and scoping processes to consider all facility users early would increase the number of transportation investments that would receive high scores within the Oʻahu and Maui MPO project evaluation processes to build TIPs and the STIP that grow quality transportation options throughout the state.

2. **Track and monitor results from transportation planning and implementation.** As HDOT prepares to meet new annual reporting requirements on how planned transportation projects implement the goals and outcomes established in HI SB1402, including VMT reduction, the agency can create tools and technical guidance for how state and county staff can calculate the VMT reduction benefits of specific projects. HDOT may also consider establishing and maintaining a statewide transportation data clearinghouse to support consistent estimation of project benefits. A statewide transportation data clearinghouse could help record and track project specific mitigation and

evaluation commitments, including strategies integrated into capacity projects that support single occupant vehicle travel. The state Congestion Management Process Report may also be a useful tool.[133]

3. **Build facilities and support development that reduces auto-dependent mobility.** State and county agencies should coordinate land use and transportation decisions to support dense, mixed-use development patterns and deliver transportation facilities that make public transit, walking, and biking more attractive. From the 1991 Functional Plan to the draft HSTP, HDOT acknowledges that "people's proximity to jobs, housing, and other land uses impacts how far they travel, how frequently they travel, and what modes they choose. Likewise, transportation investments can impact the type, location, and density of development." Today, the highway system statewide provides people with about 157 miles of bikeways, 153 miles of sidewalks, and approximately 9,800 miles of vehicular travel lanes – signaling that vehicle accessibility outpaces multimodal accessibility.

4. **Analyze a scenario with mode shift in the 2045 HSTP.** The draft 2045 HSTP acknowledges that past land use decisions and zoning measures tended to separate the places where people live and work by creating numerous "bedroom communities" and subsequently producing considerable distances between housing, jobs, essential destinations, and other opportunities. Additionally, resort areas were similarly constructed without employee housing or facilities to support commute travel, requiring resort employees, especially those on neighbor islands, to commute long distances for work. Growing tourist and shopping travel continues to add motor vehicles on the highway system. Without safe, affordable, and reliable transportation choices, all or majority of travel will generate congestion, accelerate road asset degradation, and disadvantage people with no or limited access to a car. The 2045 HSTP scenario evaluation process could model needed inputs to result in a shift by residents and visitors from driving alone to walking, bicycling, public transit, and shared modes.

[133] https://histategis.maps.arcgis.com/apps/Cascade/index.html?appid=9fcaf282558e47c7bd2d7becb23847a2

APPENDIX D

STAKEHOLDER FEEDBACK

VMT Reduction Toolkit - Stakeholder Feedback

Document, Section	Agency	Comment
Executive Summary, Why Must We Reduce VMT	DOH	Suggestion to add language: "The transportation energy sector is the largest contributor of GHG emissions and ground transportation is the foremost subsector from which large future GHG emissions reductions in transportation energy can be found." "Other than the Renewable Portfolio Standard, ground transportation is the only practicable area from which significant future GHG emissions reductions can be gained."
Executive Summary, Articulate a goal and champion change for VMT reduction	OPSD	First bullet—“person throughout” to “person throughput”
Recommendation #1, Next Steps: Mirror power sector success to reduce VMT	County of Kauai - Planning Department	Bullet Point #1 - Yes to working with other agencies to achieve this goal, but because this goal overlaps with so many other planning and transportation goals and policies, I am not sure VMT reduction alone is the best banner for this coalition. Need to think about how to build off the recent work done with complete streets, Vision Zero, safe routes to school, healthy community design, active transportation, etc.
Recommendation #1, Next Steps: Mirror power sector success to reduce VMT	County of Kauai - Planning Department	Bullet Point #2 - Yes to development of a statewide goal but clarify if this is per capita VMT (or per vehicle VMT) vs overall VMT. Per capita might be better since it would connect VMT and population growth. For example, Oahu’s population has been declining while neighbor island population is growing. Also, address the impact of visitor VMT.
Recommendation #2, Next Steps: Establish coordinated multi-agency responsibility for VMT reduction policies, strategies, and programs	HDOT, Highways	“Mandate engineering design directives for multimodal facilities. Require consistent design criteria informed by best practices for pedestrian, bicycle, transit and vehicle facilities to provide clear tools for local jurisdictions to design safe and inviting facilities for all modes.” The Highways Division requests clarification. We already follow national design standards and have a Complete Streets policy.
Recommendation #3, Next Steps: Analyze VMT outcomes of land use plans and tie land use decision making process to VMT goals	County of Kauai - Planning Department	Bullet Point #1 - What does it mean to “reconsider” low-density areas? For example, on Kauai we have many low-density areas (sprawling homestead areas for example) that we’d like to remain low-density. If we added infill to these areas, then VMT would increase.

Document, Section	Agency	Comment
Recommendation #3, Next Steps: Analyze VMT outcomes of land use plans and tie land use decision making process to VMT goals	County of Kauai - Planning Department	Bullet Point #2 - Acknowledge that certain development patterns won't rapidly change, even with a plan in place, even with updated zoning, especially in rural areas.
Recommendation #3, Next Steps: Analyze VMT outcomes of land use plans and tie land use decision making process to VMT goals	County of Kauai - Planning Department	Bullet Point #3 - However, what most of these plans may not have is the following: a list of prioritized transportation improvements (not just new roads) that support bike/ped/transit trips by all ages. I would argue such plans should address dangerous intersections, safe routes to school, safe routes to parks, "stroads" that need improvement, local roads that need traffic calming, and other connections such as shared-use pathways.
Recommendation #3, Whole Document	County of Kauai - Planning Department	Acknowledge that planning to reduce SOV travel and commuting is called "smart growth" or "new urbanism" and almost every County general plan and community plan already contains policies that support this.
Recommendation #3, Whole Document	Hawaii Climate Change Mitigation and Adaptation Commission	Should our LUC also set GHG reduction targets/VMT reduction targets, or at the very least commit to the state's targets more formally?

Document, Section	Agency	Comment
Recommendation #3, Whole Document	Hawaii Climate Change Mitigation and Adaptation Commission	Consider adding a strategy that recommends the revision of HDOT's Functional Plan
Recommendation #3, Whole Document	County of Kauai - Planning Department	If mentioning important plans that need updating, please include DOT's plans. Especially their long-range land transportation plans and their mid-range plans (not to mention the STIP). I would really appreciate an analysis of how these transportation planning documents can he updated to prioritize VMT reduction, i.e., drastically increasing pedestrian, bicycle, and transit trips! I feel most land use plans already include such goals/policies.
Recommendation #4, The Current Situation: Transportation-related environmental impacts are not consistently defined and analyzed	OPSD	Line 5 under Current Situation, "Environmental Council" to "Environmental Advisory Council"
Recommendation #4, Next Steps: Refine planning and prioritization processes to incorporate VMT into project-level frameworks for funding.	Hawaii Climate Change Mitigation and Adaptation Commission	Add next step of changing HEPA law

Document, Section	Agency	Comment
Recommendation #4, Next Steps: Refine planning and prioritization processes to incorporate VMT into project-level frameworks for funding	HDOT, Highways	"It is important to both incentivize more investment in transit and active transportation infrastructure and to remove vehicle capacity and congestion analysis from the environmental impacts review process. Remove level of service (LOS) and other performance metrics centered on car mobility from investment prioritization frameworks. Rather than inform decision-making about investments, vehicle operations analysis should be narrowly applied to identify local operational constraints and small-scale improvements such as signal coordination and transit priority." The Highways Division has significant concerns with the recommendation. This is something we must consider based on USDOT National Goals and performance measures. It is not the only criteria we consider when we evaluate needs and investment strategies. We have the challenge of balancing the needs of the transportation system and its users within the limited right of way we have and to also serve the land use context of the area.
Recommendation #5, Introduction	OPSD	First sentence footnote number is incorrect? Should be #2?
Recommendation #5, Next Steps: Align state, local, federal, and developer funding with state and local climate goals	County of Kauai - Planning Department	Bullet Point #1 - Major improvements in safety for pedestrians, cyclists, school children, etc. are needed to make a drastic shift away from SOV travel.

Document, Section	Agency	Comment
Recommendation #5, Next Steps: Align state, local, federal, and developer funding with state and local climate goals, Added Strategy	Hawaii Climate Change Mitigation and Adaptation Commission	Should we recommend that the MPOs set GHG reduction targets and that their short-range (TIP) and long-range plans address how they will meet GHG targets?
Recommendation #5, Next Steps: Align state, local, federal, and developer funding with state and local climate goals, Added Strategy	HDOT, Highways	"Align STIP funding decisions with VMT reduction. A focus on aligning transportation funding with established climate goals and GHG reduction targets will allow for subsequent phasing of planned capacity projects to be revisited with integrated TDM strategies." The Highways Division is concerned because we need to look at the transportation system and our investments comprehensively and consider all of the National Transportation Goals established by the USDOT, for example, and all the needs of the transportation system.
Recommendation #6, Introduction	County of Kauai - Planning Department	I would strongly argue that this is the most important of all. We have many policies and plans in place already and implementation of both large catalyst projects and small projects needs to happen if we are serious about mode shift.
Recommendation #6, Next Steps: Build staff capacity at all levels and fund sustainable transportation improvements	County of Kauai - Planning Department	Many roadway projects do not factor in bike/ped facilities even though such facilities are already identified and supported in existing plans and policies.

Document, Section	Agency	Comment
Recommendation #6, Next Steps: Build staff capacity at all levels and fund sustainable transportation improvements	County of Kauai - Planning Department	Connect to work previously completed (complete streets, multi-modal transportation, pedestrian safety plan, bicycle plan) and current work (Vision Zero, State DOH plans, various county plans).
Recommendation #6, Next Steps: Build staff capacity at all levels and fund sustainable transportation improvements	County of Kauai - Planning Department	Acknowledge that speeding and reckless driving is getting worse and that current roadway design is part of the problem, and that we have the opportunity to reduce injuries/death by making roads safer for all users (vs. prioritizing vehicle travel and flow).
Recommendation #6, Next Steps: Build staff capacity at all levels and fund sustainable transportation improvements	County of Kauai - Planning Department	We also did a Complete Streets Toolkit (in 2013?) with the State DOT… what happened to that? I would be interested to learn how that design guidance is being used… There are toolboxes and lots of options available that should be implemented based on the unique circumstances of the roadway. This is also called “content sensitive design."
Recommendation #6, Next Steps: Build staff capacity at all levels and fund sustainable transportation improvements	HDOT, Highways	“Establish a Low-carbon Mobility Division in HDOT to advance multimodal system development, policy implementation, and accountability (model after similar divisions at Washington DOT, Oregon DOT, and Caltrans).” The Highways Division has concerns regarding the proposed changes to its structure and operations.

Document, Section	Agency	Comment
Recommendation #7, Next Steps: Establish a shared understanding of responsibility for supporting change	County of Kauai - Planning Department	This is good but VMT reduction in and of itself might a hard sell to community members. As much as possible, frame the goal in terms of not just emissions reduction, but Keiki safety, bicycle and pedestrian safety, health, travel mode choice, and $$ savings.
Recommendation #7, Next Steps: Establish a shared understanding of responsibility for supporting change	County of Kauai - Planning Department	Also, should talk about the high cost of driving. When gas prices increase, VMT goes down. One recommendation (even though its politically unpopular) is to increase the gas tax and make it more expensive to drive a car that isn't electric. However this would burden many households.
Appendix C	OPSD	Second paragraph, OPSD released a "draft report". Footnote cites incorrect source. The Hawaii State Plan Update: Phase 1 Final Report did not include the land use system review and discussion as described in that paragraph. If you need a reference, the document is "State Land Use System Review", State Office of Planning, Draft Report, May 2015. It is no longer available online.
General Comment	HDOT, Highways	In pursuing increases in bicycle and pedestrian mode share to reduce VMT and greenhouse gas emissions, the Highways Division is concerned due to the limitations of bicycle use for economically disadvantaged individuals that cannot afford to live within the urban core. It is also not feasible for everyone to bicycle, walk, or take transit based on length of trip distance, the purpose of the trip (e.g., transporting kids, tools, and/or groceries), physical capability, profession (e.g., plumber or electrician needs to transport tools to each job site), etc.

Document, Section	Agency	Comment
General Comment	HDOT, Highways	Reducing VMT not only requires choices in the mode of travel, but choices in terms of destination for reaching goods, services, housing, and employment centers. The Highways Division provides mode options for users of all modes and abilities. We have an existing and robust bicycle and pedestrian program plus a Complete Streets policy that helps us identify and address needs and accessibility for nonmotorized modes of transportation. This includes regular coordination internally, with our County and Federal partners, and our stakeholder groups. The DOT has increased bikeway miles by 53% between 2003 and 2020, and another 14% between 2020 and early 2022. As demonstrated by our annual Bikeway Projects and Expenditures legislative report, the DOT has exceeded its requirement to expend 2% of eligible federal monies on bikeway expenditures each year. In addition, according to the 2018 Benchmarking Report on Bicycling and Walking in the United States, Hawaii is already #7 out of 50 states for the combined percentage of workers who bike and/or walk to work. The Benchmarking Report lists Hawaii as #6 for walk to work and #10 for bike to work. Between 2010 and 2019, biking to work has remained at 0.5% nationally, and most states remained the same or decreased in their overall percentages of workers who bike to work.
General Comment	HDOT, Highways	In reducing VMT/GHG emissions, studies have shown that electrification and increased transit have been the most effective. The following references are provided. https://www.epa.gov/greenvehicles/routes-lower-greenhouse-gas-emissions-transportationfuture#:~:text=There%20are%20three%20routes%20to,and%20using%20lower%2Dcarbon%20fuels. https://www.apta.com/wpcontent/uploads/Resources/resources/reportsandpublications/Documents/greenhouse_brochure.pdf https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/FTA_Report_No._0090.pdf https://www.fhwa.dot.gov/policy/otps/innovation/issue1/policies.cfm