Table A.1 Annotated Bibliography

Short Reference	Bibliographic Reference	Inventory	Analysis	Strategies	Planning and Implementation	Brief Description	Relevance to State DOT GHG Reduction
ACRP Report 11	Kim, B. Y., I. A. Waitz, M. L. Vigilante, and R. Bassarab. *ACRP Report 11: Guidebook on Preparing Airport Greenhouse Gas Emissions Inventories*. Transportation Research Board of the National Academies, Washington, D.C., 2009.	●				This document provides a framework for identifying and quantifying specific components of airport contributions to GHG emissions. The methods can be used by airport operators and others to prepare an airport-specific inventory of GHG emissions.	The methods may be relevant to DOTs that wish to address airport-related emissions as part of their GHG inventory and/or reduction strategy.
ACRP Report 56	CDM. *ACRP Report 56: Handbook for Considering Practical Greenhouse Gas Emission Reduction Strategies for Airports*. Transportation Research Board of the National Academies, Washington, D.C., 2011.		●	●		This report is a handbook and decision support tool (AirportGEAR) that assists airport operators in identifying, evaluating, prioritizing, and implementing practical, low-cost strategies to reduce and manage GHG emissions.	The methods may be relevant to DOTs that wish to address airport-related emissions as part of their GHG inventory and/or reduction strategy.
ACRP Synthesis 100	Barrett, S. *ACRP Synthesis 100: Airport Greenhouse Gas Reduction Efforts*. Transportation Research Board, Washington, D.C., 2019.			●		This report focuses on airport greenhouse gas reduction efforts. Through a survey and case examples, it describes GHG emissions reduction initiatives at airports and it provides lessons learned to support the successful implementation of future GHG reduction projects.	The methods may be relevant to DOTs that wish to address airport-related emissions as part of their GHG inventory and/or reduction strategy.
AASHTO (2003)	Soltis, D. *Using an Environmental Management System to Meet Transportation Challenges and Opportunities: An Implementation Guide*. American Association of State Highway and Transportation Officials, Washington, D.C., 2003.			●	●	This document explains the how and why of implementing an Environmental Management System at a State DOT.	Implementing GHG reduction activities within the framework of an existing Environmental Management System (EMS) can streamline activities for DOTs and introduce GHG considerations in a context and process with which the DOT staff already are familiar.
AASHTO (2007)	*Maintenance Manual for Roadways and Bridges*. American Association of State Highway and Transportation Officials, 2007.				●	Describes methods and procedures for ensuring maintenance of roads and bridges.	Provides a framework within which application of maintenance practices that reduce life-cycle GHG emissions may be considered.
AASHTO (2009)	CH2M Hill and Good Company. *AASHTO Sustainability Peer Exchange: Transportation and Sustainability Best Practices Background*. AASHTO Center for Environmental Excellence, Washington, D.C., 2009.				●	A summary memorandum of peer exchanges in May 2009, this report provided best practices that transportation professionals are using to understand and address sustainability in the transportation sector. It also outlines existing frameworks available and the role of State DOTs in sustainability efforts.	Provides State-level approaches and challenges to GHG mitigation and illustrates best practices that could be useful in future policy development for a DOT or metropolitan planning organization (MPO).
AASHTO (2014)	American Association of State Highway and Transportation Officials. *The Transportation Systems Management and Operations (TSM&O) Guidance*. American Association of State Highway and Transportation Officials, Washington, D.C., 2014. https://www.transportationops.org/tools/aashto-tsmo-guidance			●	●	An online tool that uses self-evaluation and best practice experience to help managers identify key program, process, and institutional preconditions to achieve more effective TSM&O. The self-assessment guidance is designed for transportation agency managers whose span of control relates to the operations and management of the roadway system.	Audiences include policy makers and program managers responsible for TSM&O programs and ITS programs at both the state and regional level, as well as managers of systems operations related activities such as traffic engineering, maintenance, and public safety.
AEO	U.S. Department of Energy. *Annual Energy Outlook*. U.S. Energy Information Administration Office of Energy Analysis, Washington, D.C., 2019. https://www.eia.gov/outlooks/aeo/	●				This online publication and data source, updated annually, provides base year and forecast estimates of energy use, GHG emissions, and driving factors (vehicles miles traveled (VMT), ton-miles carried, vehicle sales and stock, etc.) by vehicle type and technology. It is based on the National Energy Modeling System, an integrated model of energy use in the entire U.S. economy. Alternative forecasts also are provided (e.g., low and high oil price scenarios).	The AEO provides a benchmark for national forecast of transportation GHG emissions and energy and can be used to obtain parameters such as forecast fuel efficiency and alternative fuel vehicle sales and stock that can be applied at a State level.
Baker and Khatani (2017)	Baker, E.D., and S.N. Khatani. Developing a Metric for the Cost of Green House Gas Abatement. Prepared for Massachusetts Department of Transportation, University of Massachusetts Transportation Center Report 17.01, 2017.			●		This report estimates the GHG benefits and cost-effectiveness of traffic operations improvements based on 94 projects in Massachusetts.	Provides information on GHG strategy effectiveness.
California Governor's Office of Planning and Research (2014)	California Governor's Office of Planning and Research. *Updating Transportation Impacts Analysis in the California Environmental Quality Act (CEQA) Guidelines: Appendices B-F*, 22–45. Sacramento, CA, 2014. https://la.streetsblog.org/wp-content/uploads/sites/2/2014/08/Final_Preliminary_Discussion_Draft_of_Updates_Implementing_SB_743_080614.pdf		●			This document is meant to provide guidance to preliminary changes to the CEQA Guidelines under new California legislation (SB 743) which changes analysis of transportation impacts under the California Environmental Quality Act. Appendix B–F outlines the calculation procedures, project-/capacity-level impacts, and modeling for VMT.	While this overall report is targeted towards California-based practitioners, who must comply with the new relevant legislation (SB 743), the information in Appendix B–F provides a general overview of VMT and models which could be used by interested parties outside California as well.

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Caltrans (2013)	ICF International. *Caltrans Activities to Address Climate Change: Reducing Greenhouse Gas Emissions and Adapting to Impacts*. California Department of Transportation, 2013		●	●		This document describes activities that Caltrans is already doing that reduce GHG emissions, as well as additional activities that could be undertaken. Estimates of emissions reductions are provided.	This document may be helpful for other DOTs looking to identify document their emissions-reducing activities.
Caltrans (undated)	California Department of Transportation. "Forms and Templates." https://dot.ca.gov/programs/environmental-analysis/standard-environmental-reference-ser/forms-templates				●	Various templates on this website provide details on how, and under what circumstances, GHG is to be considered in project-level environmental analysis.	Provides an example of how one State considers GHG in project level environmental assessment.
Cambridge Systematics, Inc. (2009)	Porter, C. *Transportation Program Responses to GHG Reduction Initiatives and Energy Reduction Programs*. Cambridge Systematics for AASHTO. National Cooperative Highway Research Program (NCHRP) Project 25-25, Task 45, Washington, D.C., 2009. http://onlinepubs.trb.org/onlinepubs/nchrp/docs/NCHRP25-25(45)_FR.pdf			●		This study provides a review of strategies used or specific actions taken by various State DOTs for GHG emission reduction and energy use directly associated with transportation. It also estimates the level of GHG reduction impact achieved by outlined DOTs strategies and actions and extrapolates potential nationwide impact if all DOTs replicated key efforts.	Best practice sharing of GHG emissions reduction strategies that already have been used by a State DOT, as well as some information on estimated GHG impacts to assist in screening.
Cambridge Systematics, Inc. (2010)	Cambridge Systematics. *Evaluate the Interactions between Transportation-Related Particulate Matter, Ozone, Air Toxics, Climate Change, and Other Air-Pollutant Control Strategies*. Cambridge Systematics for AASHTO. NCHRP 25-25, Task 59, Washington, D.C., 2010. http://onlinepubs.trb.org/onlinepubs/nchrp/docs/NCHRP25-25%2859%29_FR.pdf			●		This study evaluates the effectiveness of 34 different emissions control strategies on reducing emissions of various pollutants (ozone precursors, particulate matter (PM), air toxics, and GHG) and identifies which strategies may reduce some pollutants while increasing others. All of the control regimes are classified into three categories: transportation demand management (TDM), transportation systems management (TSM), and vehicle and fuel technology.	This study provides information on cost-effectiveness and multipollutant tradeoffs that can be used in screening GHG and other air quality measures and describes methods for evaluating multipollutant emissions tradeoffs.
Cambridge Systematics, Inc. and Oregon Systems Analytics (2016)	Cambridge Systematics, Inc. and Oregon Systems Analytics *Application of the Energy and Emissions Reduction Policy Analysis Tool (EERPAT) Greenhouse Gas Analysis Tool in Massachusetts: Final Report*. Prepared for Massachusetts Department of Transportation, Cambridge, MA, 2016. https://www.mass.gov/doc/eerpat-report/download		●	●		Describes a demonstration application of the use of the FHWA EERPAT tool for evaluating transportation sector GHG reduction measures in Massachusetts. The results provide information to the Massachusetts Department of Transportation and other stakeholders about the potential GHG reduction benefits of a variety of transportation emission reduction measures as well as the potential costs of implementing these measures.	Demonstrates technical methods and sample findings from the use of the EERPAT tool to assess policies under a DOT's control.
Cames et al. (2016)	Cames, M., R. Harthan, J. Füssler, M. Lazarus, C. Lee, P. Erickson, and R. Spalding-Fecher. *How Additional Is the Clean Development Mechanism?* Institute for Applied Ecology for Directorate-General for Climate Action, Berlin, Germany, 2016.			●		This study analyzes the opportunities and limits of the current Clean Development Mechanism framework for ensuring environmental integrity, i.e., that projects are additional and that emission reductions are not overestimated. It looks at the way in which the CDM framework has evolved over time, assesses the likelihood that emission reductions credited under the CDM ensure environmental integrity, and provides findings on the overall and project-type-specific environmental integrity of the CDM.	This report qualifies the potential effectiveness of carbon offset purchases at reducing GHG emissions and provides some insights about what types of offset projects may be more likely to reduce emissions.
CAPCOA (2010)	California Air Pollution Control Officers Association (CAPCOA). *Quantifying Greenhouse Gas Mitigation Measures: A Resource for Local Government to Assess Emission Reductions from Greenhouse Gas Mitigation Measures*. Sacramento, CA, 2010. http://www.capcoa.org/wp-content/uploads/2010/11/CAPCOA-Quantification-Report-9-14-Final.pdf		●	●		This report provides quantification of project-level mitigation of GHG emissions associated with land use, transportation, energy use, and other related project areas. It also provides a discussion of background information on programs and other circumstances in which quantification of GHG emissions is important. This includes voluntary emission reduction efforts, project-level emission reduction efforts, reductions for regulatory compliance, and reductions for some form of credit.	Certain key concepts for quantification are covered in greater depth. These include baseline, business-as-usual, types of emission reductions, project scope, life-cycle analysis, accuracy and reliability, additionality, and verification. The report does not endorse or provide guidance on any policy position.
CARB (2020)	California Air Resources Board (CARB). *Carbon Intensity Factors*. Sacramento, CA, 2020. https://www3.arb.ca.gov/fuels/lcfs/fuelpathways/pathwaytable.htm	●		●		These tables provide life-cycle carbon intensity values for fuels certified for the State's low carbon fuel standard program. Numerous fuels and pathways are provided.	This resource can be helpful if a State wishes to account for life-cycle emissions of alternative fuels.
CCAP (2005)	Dierkers, G., E. Silsbe, and S. Stott. *CCAP Transportation Emissions Guidebook. Center for Clean Air Policy.* Center for Clean Air Policy, Washington, D.C., 2005.		●	●		This guidebook helps State DOT and local officials understand how policy decisions impact air pollution, energy use, and GHG emissions and consists of two parts: 1) Land Use, Transit and Travel Demand Management, and 2) Vehicle Technology and Fuels.	Provides a general "rule-of-thumb" approach to estimating GHG emissions, and methods of mitigation. Has a simplified spreadsheet-based calculation tool as well. Data somewhat dated at this point.

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CCAP (2009)	Winkelman, S., C. Kooshian, and A. Bishins (2009). *Integrated State and Local Government Policy Approaches to Transportation and Climate Change*. Center for Clean Air Policy for AASHTO. NCHRP 25-25 Task 57. http://onlinepubs.trb.org/onlinepubs/nchrp/docs/NCHRP08-36(94)_FR.pdf				●	Summary of best practices workshop with attendees of selected State DOTs (California, Florida, Maryland, Missouri, and Washington). Each State outlined its procedures and progress in implementing efforts to reduce transportation-specific GHG emissions.	The workshop's discussion focused on projects reducing VMT or improving system efficiency. Perspectives by each State provide different approaches based on the State's experiences, its political environment, and regulatory structure.
CDM Smith et al. (2014)	CDM Smith, A. Horowitz, T. Creasey, R. Pendyala, and M. Chen. *NCHRP Report 765: Analytical Travel Forecasting Approaches for Project-Level Planning and Design.* Transportation Research Board of the National Academies, Washington, D.C., 2014.			●		This document provides information on travel forecasting techniques ranging from sketch methods to advanced travel demand models. It includes information on how information on induced travel demand can be accounted for in analysis.	Travel forecasting methods in general, including methods for considering induced travel, are important tools for accurately estimating GHG emissions changes resulting from transportation projects.
Chester (2008)	Chester, M. *Life-Cycle Environmental Inventory of Passenger Transportation in the United States*. University of California, Berkeley Institute of Transportation Studies, Dissertations, Berkeley, CA, 2008.	●				This study compares life-cycle emissions from various representative transport modes and systems. Both operating and nonoperating emissions (fuel production and transport, embodied vehicle and infrastructure emissions) are included.	
Chester and Horvath (2009)	Chester, M. and A. Horvath. Environmental Assessment of Passenger Transportation Should Include Infrastructure and Supply Chains. *Environmental Research Letters* 4(2), 2009.	●				This is a summary of a study comparing life-cycle emissions from various representative transport modes and systems. Both operating and nonoperating emissions (fuel production and transport, embodied vehicle and infrastructure emissions) are included.	Provides illustrative information on GHG effects beyond just the direct GHG emissions from vehicle operations.
Commonwealth of Massachusetts (2010)	Executive Office of Energy and Environmental Affairs. *Summary of the Final Revisions to the MEPA Greenhouse Gas Emissions Policy and Protocol*. Commonwealth of Massachusetts, Boston, MA, 2010. https://www.mass.gov/files/documents/2016/08/rp/ghg-policy-final-summary.pdf				●	This document sets forth the Commonwealth's policy on when and how to evaluate and mitigate GHG emissions when developing environmental documentation for projects subject to the Massachusetts Environmental Policy Act. Projects covered include development as well as transportation projects.	Provides an example of how one State considers GHG in project level environmental assessment.
DDOT (2012)	District of Columbia DOT. *District Department of Transportation Environmental Manual: Air Quality Policy and Regulations*. Washington, D.C., 2012. http://ddotsites.com/documents/environment/Files/Chapters/Chapter_14_-_Air_Quality_Policy_and_Regulations.pdf				●	This document provides guidance on how to conduct air quality analysis as part of project environmental review.	Provides an example of how one State considers GHG in project level environmental assessment.
FAA (2015)	Federal Aviation Administration (2015). *Aviation Emissions, Impacts & Mitigation: A Primer*. Office of Environment and Energy.	●	●	●	●	This document provides information on emissions from aviation, the impacts of these emissions, and mitigation measures.	This primer can help State DOT staff who need to understand, measure, and/or work to mitigate aviation emissions.
FHWA (2008)	Louch, H., E. Flanigan, K. Jeannotte, and C. Titze. *Statewide Opportunities For Linking Planning and Operations: A Primer*. Federal Highway Administration, FHWA-HOP-08-028, 2008.				●	This document explains how transportation planning activities can be linked and coordinated with transportation operations functions.	This document describes a framework within which GHG-reducing transportation system management and operations activities may be planned and implemented.
FHWA (2010a)	ICF International, Inc. *Climate Change—Model Language in Transportation Plans*. Prepared for FHWA, Washington, D.C., 2010. http://climatechange.transportation.org/pdf/climate%20change%20and%20planning%20-%20model%20language%205-13-10.pdf				●	This document provides examples or excerpts from various State or regional transportation agencies where climate change is addressed, including emissions.	May provide useful examples to States or MPOs as they try to describe their GHG inventory and reduction efforts in the actual planning process.
FHWA (2010b)	Federal Highway Administration. *Beyond the Short-Term—Transportation Asset Management for Long-Term Sustainability, Accountability and Performance*. Washington, D.C., 2010. https://www.fhwa.dot.gov/asset/10009/tam_topr806.pdf			●		Provides an overview of asset management; looks at key transportation agency roles in implementing asset management; highlights how asset management can be used to improve quality; and examines structures, strategies, and information needs. Also features case studies of successful asset management programs both in the United States and around the world.	Provides examples of State DOTs that have made changes to their asset management practices in order to help the agency prioritize investment strategies based on the use of and function being served by the transportation system components, agency goals, and both short- and long-term agency objectives.

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FHWA (2012)	RAND Corporation and RSG, Inc. *Reference Sourcebook for Reducing Greenhouse Gas Emissions from Transportation Sources. Federal Highway Administration*. Prepared for FHWA, Washington, D.C., 2012. https://www.fhwa.dot.gov/environment/sustainability/energy/publications/reference_sourcebook/index.cfm			●		This sourcebook presents the results of a literature review of GHG mitigation strategies, summarizing what has been published about the GHG effects of different strategies, their costs, and the social feasibility of implementing them. These results can be used by State DOTs and MPOs to help evaluate and plan mitigation efforts within their own regions or jurisdictions.	Provides an overview of different strategies and methodologies for GHG emissions mitigation, but also presents realistic challenges and costs to implementation.
FHWA (2013a)	ICF International, Inc. and Fehr & Peers. *Handbook for Estimating Transportation Greenhouse Gases for Integration into the Planning Process*. FHWA-HEP-13-026, Washington, D.C., 2013. https://www.fhwa.dot.gov/environment/sustainability/energy/publications/ghg_handbook/ghghandbook.pdf	●	●		●	This handbook was designed to help individuals at State DOTs and MPOs understand possible approaches, data sources, and step-by-step procedures for analyzing GHG emissions around the transportation planning process—especially if they or the organization has little previous experience. It also provides an overview of the analytical processes required and directs users to more detailed user manuals and technical resources regarding specific models and tools.	The handbook addresses GHG emissions analysis within the context of statewide and metropolitan transportation planning, although not at the individual project level.
FHWA (2013b)	ICF International, Inc. and Sarah J. Siwek & Associates. *A Performance-Based Approach to Addressing Greenhouse Gas Emissions through Transportation Planning*. FHWA-HEP-14-020, Washington, D.C., 2013. https://www.fhwa.dot.gov/environment/sustainability/energy/publications/ghg_planning/ghg_planning.pdf				●	Federal guidance for addressing GHG emissions through performance-based planning and programming (PBPP). Describes considerations for selecting relevant GHG performance measures, techniques for evaluating performance, and approaches for using performance information to support investment choices.	Useful guidance on possible interrelation between PBPP and GHG emissions strategies. Also provides list of available resources for integrating climate change analysis into planning, as well as references for PBPP.
FHWA (2014)	Federal Highway Administration. *Travel and Emissions Impacts of Highway Operations Strategies: Final Report*. FHWA-HOP-14-013, Washington, D.C., 2014.		●	●		This report considers the potential impacts of induced demand on overall emissions benefits of highway operations strategies, using case studies based on diverse data sources and analysis methods in a number of U.S. metro areas.	This report provides information on the potential factors that can influence the effect of induced demand on GHG emissions, and methods for analyzing induced demand effects.
FHWA (2015)	Fordham, D., J. Norris, and J. Proudfoot. *Feasibility and Implications of Electric Vehicle (EV) Deployment and Infrastructure Development*. FHWA-HEP-15-021, Washington, D.C., 2015.			●	●	This FHWA research project analyzed the potential deployment of electric vehicles in the United States and their potential impact on the mission of FHWA, including financial implications for available highway revenues. This Final Report summarizes the information gathered during the various foundational research activities of the project, describes the development of eight long-term market penetration scenarios, presents the methodology used to undertake the scenario analysis, summarizes the findings of the analysis, and presents conclusions covering a range of possible "pathways" for FHWA and partner action, including possible additional research for consideration.	This research will help transportation agencies to understand whether and how transportation policies, programs, infrastructure, services, funding models, and administrative activities may have to change as more electric vehicles are deployed on highways, roads, and streets – whether by simply responding to the increased vehicles, more actively supporting them, or proactively helping to accelerate their deployment.
FHWA (2016a)	Twaddell ,H., A. McKeeman, M. Grant, J. Klion, U. Avin, K. Ange, and M. Callahan. *Supporting Performance-Based Planning and Programming Through Scenario Planning*. Prepared for Federal Highway Administration, FHWA-HEP-16-068, 2016.				●	This document describes how scenario planning can be applied to consider alternative futures, rather than a single deterministic future, in transportation planning.	Scenario planning approaches can be useful for GHG emissions forecasting and strategy evaluation when factors affecting future GHG emissions are uncertain.
FHWA (2016b)	*Updated Interim Guidance on Mobile Source Air Toxic Analysis in NEPA Documents*. Memorandum from Emily Biondi, Acting Director, Office of Natural Environment, to Division Administrators and Federal Lands Highway Division Engineers. October 18, 2016. https://www.fhwa.dot.gov/environment/air_quality/air_toxics/policy_and_guidance/msat/		●			This document provides guidance on analyzing mobile source air toxics under NEPA.	The guidance includes criteria/thresholds for which quantitative MSAT analysis is recommended, as well as other recommended modeling procedures. Since GHG emissions can be evaluated using similar methods to MSATs, States may choose to consider this guidance when developing their own guidance for when and how to evaluate GHG impacts of projects.
FHWA (2017)	Federal Highway Administration. *Active Transportation and Demand Management Implementation and Operations Guide*. Washington, D.C., 2017.				●	Guide describes the stepwise approach to accomplishing active traffic and demand management (ATDM) implementation through the application of the system engineering process; comprehensive planning; and organizational considerations, capabilities, and design considerations. It utilizes a combination of relevant existing resources and documents along with best practices and lessons learned gleaned from early adopters to offer practical guidance. It also emphasizes the value of active traffic management (ATM) and what these strategies can offer to operating agencies as part of their broader TSMO program.	Guide is geared towards providing regional and local agencies guidance on how to strategically and effectively implement and operate ATM strategies. Provides case studies that highlight State DOTs that were early adopters of various ATM strategies.

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Good Company (2010)	Good Company. *Life-Cycle Greenhouse Gas Analysis and Emissions Mitigation Strategies for the N. Vancouver Avenue Columbia Slough Bridge (Portland) Construction Project*. Prepared for Portland Bureau of Transportation, Portland, OR, 2010.	●		●		This report describes the methods and findings of a life-cycle greenhouse gas analysis and emissions mitigation strategy assessment for a bridge replacement project.	This report provides insights into methods for life-cycle GHG analysis, as well as the relative contributions of various bridge designs and mitigation strategies to GHG emissions.
Good Company (2015)	Good Company. *West Coast Climate Forum Supply Chain Greenhouse Gas Inventory Meta-Analysis*. Eugene, OR, 2015.	●		●		This meta-analysis considers the results of 86 supply chain GHG inventories from 36 public agencies, public utilities, and higher education institutions. These supply chain GHG inventories estimate the energy use and process emissions released during the production of goods and services from extraction of raw materials to the point of retail sale of a good or service to the buying agency. This analysis is intended to help agencies understand the climate impact of purchases, identify "hot spots" within supply chain emissions, and help target positive procurement activities to reduce supply chain impacts.	This work is meant to guide the efforts of small to medium-sized governments and higher education institutions that may not have the in-house expertise or resources to conduct their own supply chain GHG inventory.
Gordon (2010)	Gordon, R. L. *NCHRP Synthesis 409: Traffic Signal Retiming Practices in the United States*. Transportation Research Board of the National Academies, Washington, D.C., 2010.			●	●	This is a synthesis report on the practices that operating agencies currently use to revise traffic signal timing. It includes the planning needed to develop signal timing plans and the processes used to develop, install, verify, fine-tune, and evaluate the plans. The document also includes several case studies.	Traffic signals that are not timed to coordinate efficiently with vehicular traffic can cause travel delays, increased accident rates, increased pollution from vehicle emissions, and increased fuel consumption, among other concerns. The report identifies optimal traffic signal retiming practices for operating agencies.
Highway Statistics	Federal Highway Administration. "Highway Statistics Series." Washington, D.C., 2018. https://www.fhwa.dot.gov/policyinformation/statistics.cfm	●				Provides historical data on VMT and vehicle registrations by vehicle type, road type, and State.	Data from Highway Statistics may be used in combination with fuel efficiency and emission factors to support baseline GHG inventories for on-road vehicles.
ICF Consulting (2006)	ICF Consulting. *Assessment of Greenhouse Gas Analysis Techniques for Transportation Projects*. Prepared for AASHTO. NCHRP 25-25 Task 17, Washington, D.C., 2006. http://onlinepubs.trb.org/onlinepubs/archive/NotesDocs/25-25(17)_FR.pdf	●	●			This study was developed to help transportation users understand the strengths, limitations, and applicability of available GHG analysis techniques, and identify gaps in existing methodologies. A total of 17 tools and methods (determined as viable at the time, in 2006) were identified and grouped into three categories: 1) Transportation GHG calculation tool—require user input of activity levels (i.e., VMT) and fleet information (i.e., vehicle type, mpg, age); 2) Transportation/emissions strategy analysis tool—base emissions on estimation of travel activities; and 3) Energy/economic forecasting tools—use energy consumption patterns to estimate GHG emissions.	Outlines tools available at the time of publication, and what input level may be required of the user. Some of the information is still relevant, while in other cases tools have been significantly updated or are no longer available.
ICF International (2011)	ICF International, Inc. *Greenhouse Gas Emission Inventory Methodologies for State Transportation Departments*. Prepared for AASHTO. NCHRP 25-25 Task 65, Washington, D.C., 2011. http://onlinepubs.trb.org/onlinepubs/nchrp/docs/NCHRP25-25(65)_FR.pdf	●				This study provides GHG accounting procedures to help State DOTs prepare GHG emission inventories and increase consistency across State DOT inventories. It outlines GHG accounting basics, identifies emission sources relevant to State DOTs, methods for completing GHG emission estimates, approaches for obtaining or approximating data, and identifies resources and materials available. The inventories developed help calculate GHG emissions occurring through both direct (DOT facilities and fleet) and indirect activities (power used, products purchased, waste, contacts, and employee commutes) associated DOT operations and activities.	Provide background information to assist State DOTs in conducting GHG inventories, along with methods.
ICF International and Marie Venner (2010)	Gallivan, F., J. Ang-Olson, A. Papson, and M. Venner. *Greenhouse Gas Mitigation Measures for Transportation Construction, Maintenance, and Operations Activities*. *Transportation Research Board*. NCHRP Project 25-25, Task 58, Washington, D.C., 2010. https://trid.trb.org/view/1266322	●	●	●		This study developed a spreadsheet-based calculator tool, the Greenhouse Gas Calculator for State Departments of Transportation (GreenDOT), which estimates carbon dioxide (CO_2) emissions from State DOT construction, maintenance, and operations activities. The study sought to better capture emissions values from electricity used in roadways, on-road vehicle fleets, off-road equipment, and materials used in roadway construction.	The resulting tool can be used to estimate construction, maintenance, and operations emissions.
ICLEI (2013)	ICLEI—Local Governments for Sustainability USA. *U.S. Community Protocol for Accounting and Reporting of Greenhouse Gas Emissions Version 1.1*. 2013. http://icleiusa.org/publications/us-community-protocol/	●				This document establishes requirements and best practices for U.S. local governments to account for and report on GHG emissions associated with the communities they represent. Appendix D provides detail on Transportation and Other Mobile Emission Activities and Sources. The protocol provides guidance for activity-based as well as in-boundary emissions estimation.	The methods and data sources in the ICLEI protocol may be relevant to State DOTs who also are doing large-scale versions of community-level inventories or providing guidance to communities in doing so. In contrast to the WRI/WBCSD GPC, the ICLEI protocol references U.S.-specific data sources and relevant methods.

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IPCC (2014)	Intergovernmental Panel on Climate Change. *Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*. IPCC, Geneva, Switzerland, 2014.	●				The Synthesis Report distills and integrates the findings of the three Working Group contributions to the Fifth Assessment Report (AR5) of the Intergovernmental Panel on Climate Change (IPCC), the most comprehensive assessment of climate change undertaken thus far by the IPCC. The report includes a consistent evaluation and assessment of uncertainties and risks; integrated costing and economic analysis; regional aspects; changes, impacts and responses related to water and earth systems, the carbon cycle including ocean acidification, cryosphere and sea level rise; as well as treatment of mitigation and adaptation options within the framework of sustainable development.	One of the report's four sections is "Future Pathways for Adaptation, Mitigation."
ITS Benefits Database	U.S. Department of Transportation, ITS Joint Program Office. "ITS Benefits Database." https://www.itskrs.its.dot.gov/benefits			●		Provides estimated data on benefits of ITS strategies as modeled or observed in evaluations.	Can be used to support estimation of GHG reduction benefits of operations strategies based on changes in delay, speed, etc. Some studies report emission reductions directly.
Jack Faucett Associates (2002)	Jack Faucett Associates. *Guidebook on Induced Travel Demand*. Prepared for U.S. Environmental Protection Agency. Washington, D.C., 2002.			●		This guidebook provides a comprehensive overview of the phenomenon of induced travel demand, evidence on its effects, the various components of induced demand, and how they can be accounted for in transportation analysis.	Induced demand can be an important consideration when estimating the GHG benefits of strategies that increase transportation system capacity or improve level of service.
MDOT and MDE (2016)	Maryland Department of Transportation and Maryland Department of Environment. *Charting the Path Forward: A Transportation Strategy for Meeting Long-Term Air Quality and Greenhouse Gas Emissions Goals and Enhancing Maryland's Economy and Quality of Life*. 2016.	●	●	●	●	This document provides an inventory, forecast, and assessment of transportation GHG reduction strategies for Maryland's transportation sector.	Provides an example of a strategic-level GHG forecast and assessment that other DOTs may find useful.
Meyer, Amekudzi, and O'Har (2010)	Meyer, M. D., A. Amekudzi, and J. P. O'Har. Transportation Asset Management Systems and Climate Change: Adaptive Systems Management Approach. *Transportation Research Record: Journal of the Transportation Research Board*, No. 2160, Washington, D.C., 2010, pp. 12–20.			●	●	This paper uses a typical asset management system as a framework for discussing where climate change considerations could be incorporated into the transportation systems. The paper also discusses the types of climate and weather changes as they might affect transportation systems; provides international examples of where climate change has been incorporated into asset management systems; and discusses risk appraisal as a key component of a climate change-oriented asset management system.	This paper describes how an asset management system can be used as a decision-making framework for incorporating such concerns into a transportation agency's management approach.
MnDOT (2017)	Minnesota Department of Transportation. *Minnesota Department of Transportation Sustainability Report: Establishing a Baseline (2016)*.	●				This report outlines MnDOT's current sustainability efforts and performance targets. It provides the baseline to help MnDOT identify future strategies to achieve the targets outlined in the sustainability dashboards.	Contains examples of a State DOT setting GHG reduction targets and comparing progress against targets.
MnDOT (2019)	Minnesota Department of Transportation. *Pathways to Decarbonizing Transportation in Minnesota*. 2019.		●	●		The purpose of the report is to explore opportunities for GHG emission reductions from surface transportation. The report includes modeling of alternative future scenarios and also describes outreach to stakeholders.	Provides examples of DOT-led GHG scenario modeling, as well as public outreach in support of strategy identification.
MnDOT (undated)	Minnesota Department of Transportation. "Highway Project Development Process." http://www.dot.state.mn.us/planning/hpdp/index.html				●	Various templates on this website provide details on how, and under what circumstances, GHG is to be considered in project-level environmental analysis.	Provides an example of how one State considers GHG in project level environmental assessment.
Moving Cooler	Cambridge Systematics. *Moving Cooler: An Analysis of Transportation Strategies for Reducing Greenhouse Gas Emissions*. Urban Land Institute, 2009. https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/MovingCoolerExecSummaryULI.pdf			●		This report provides a comprehensive assessment of the GHG reduction potential and cost-effectiveness of nearly 50 GHG reduction strategies, measured over the 2010-2050 timeframe. The report provides national-level estimates built up from estimates developed for seven urbanized area types in the U.S. Travel demand reduction and system efficiency strategies are included.	This report provides information for screening GHG reduction strategies based on impacts and cost-effectiveness.
NAS (2008)	Chapter 3: Impacts of Climate Change on Transportation. In *Special Report 290: Potential Impacts of Climate Change on U.S. Transportation*. Transportation Research Board of the National Academies, Washington, D.C., 2008, pp. 79–123.	●	●			The third chapter of this study, "Impacts of Climate Change on Transportation," explores what is known about the potential impacts of climate change on transportation, including system vulnerability, potential impacts by mode, and assessed impacts in several regions and metropolitan areas.	Provides high-level information on how and why various modes will be impacted by climate change and how impacts will vary depending on the location, mode, and condition of the transportation infrastructure. Appendix B, "Contribution of U.S. Transportation Sector to Greenhouse Gas Emissions and Assessment of Mitigation Strategies" provides a broad overview of GHGs in transportation.

Short Reference	Bibliographic Reference	Inventory	Analysis	Strategies	Planning and Implementation	Brief Description	Relevance to State DOT GHG Reduction
NCHRP 25-25 Task 73 (2012)	McVoy, G., M. Venner, M Sengenberger. *NCHRP 25-25 Task 73: Improved Environmental Performance of Highway Maintenance*. Washington, D.C., 2012.		●	●	●	This report evaluates (a) how state DOTs are addressing existing environmental requirements and stewardship in their highway maintenance programs, (b) how personnel are trained so staff are aware of and understand compliance with environmental requirements, (c) stewardship policies and practices that are in place and how the notion of stewardship is engendered in the agency, and (d) how DOTs are measuring compliance and stewardship accomplishments through the use of comprehensive audits and assessments.	The report details its findings and offers links to information that DOT maintenance organizations can use in their continuing efforts to improve their environmental compliance, stewardship, and sustainability performance.
NCHRP Report 708 (2011)	Zietsman, J., T. Ramani, J. Potter, V. Reeder, J. DeFlorio. *NCHRP Report 708: A Guidebook for Sustainability Performance Measurement for Transportation Agencies*. Transportation Research Board of the National Academies, Washington D.C. 2011. https://doi.org/10.17226/14598				●	Developed through NCHRP Project 08-74, this guidebook provides direction for State DOTs and other transportation agencies to understand, apply, and implement concepts of sustainability through performance measurement. Highlights activities in areas including planning, programming, project development, system operations, and maintenance.	While not focused specifically on GHG, this guide is a reference document for integrating overall sustainability (which should include GHG considerations) into core transportation activities while providing flexibility in approaches, making it applicable to various transportation agencies and for specific contexts.
NCHRP Report 750 Vol. 4 (2014)	Booz Allen Hamilton. *NCHRP Report 750: Strategic Issues Facing Transportation, Volume 4: Sustainability as an Organizing Principle for Transportation Agencies*. Transportation Research Board of the National Academies, 2014. https://doi.org/10.17226/22379				●	Volume 4 of the NCHRP Foresight Series provides State DOTs and other transportation agencies with an analytical framework for evaluating capacity issues over the next 30 to 50 years.	While not specifically focused on GHG emissions, this report may be useful in better understanding overall sustainability and/or energy issues. This background may be relevant to practitioners who are building a GHG emissions process or strategy.
NCHRP Report 750 Vol. 5 (2014)	Sorensen, P., T. Light, C. Samaras, L. Ecola, E. M. Daehner, D. S. Ortiz, M. Wachs, E. Enarson-Hering, and Steven Pickrell. *NCHRP Report 750: Strategic Issues Facing Transportation, Volume 5: Preparing State Transportation Agencies for an Uncertain Energy Future*. Transportation Research Board of the National Academies, 2014. https://doi.org/10.17226/22378				●	Volume 5 of the NCHRP Foresight Series analyzed how the role, mandate, funding and operations of State DOTs may be affected by changes in energy supply and demand over the next 30 to 50 years and outlines potential strategies for preparing for this impact. Among other topics, this report addresses the question of whether roadside vegetation could be managed as a revenue producing (cost reducing) generation of carbon credits or could be used as a feedstock for sale to biofuel and bioenergy producers. The report is accompanied by Excel-based feasibility tools to test temporal viability and financial performance.	While not specifically focused on GHG emissions, this report may be useful in better understanding overall sustainability and/or energy issues. This background may be relevant to practitioners who are building a GHG emissions process or strategy. Roadside vegetation is one strategy under the DOT's direct control.
NCHRP Report 750 Vol. 6 (2014)	Zmud, J. P., V. P. Barabba, M. Bradley, J. R. Kuzmyak, M. Zmud, and D. Orrell. *NCHRP Report 750: Strategic Issues Facing Transportation, Volume 6: The Effects of Socio-Demographics on Future Travel Demand*. Transportation Research Board of the National Academies, 2014. http://www.trb.org/Main/Blurbs/171200.aspx		●			Volume 6 of the NCHRP Foresight Series presents the results of research on how sociodemographic changes over the next 30 to 50 years will impact travel demand at the regional level. It is accompanied by a software tool, Impacts 2050, to support transportation agencies in their long-term planning activities to enhance decision-making. Four illustrative future scenarios are presented.	The information in this report, and the accompanying tool Impacts 2050, can be used by State DOTs to help understand the impacts of changes in sociodemographics on travel demand and by inference on energy use and GHG emissions.
NCHRP Report 909 (2019)	Porter, C., T. Grose, J. Koupal, K. Boriboonsomsin, G. Noel, and A. Eilbert. *NCHRP Research Report 909: Guide to Truck Activity Data for Emissions Modeling*. Transportation Research Board, Washington, D.C., 2019. https://www.nap.edu/catalog/25484/guide-to-truck-activity-data-for-emissions-modeling		●			This study developed a guide for transportation practitioners on methods, procedures, and data sets needed to capture commercial vehicle activity, including vehicle characteristics and operations parameters which can be used for estimating and forecasting pollutants, air toxics, and GHG emissions from goods and services movement. The focus is on developing locally specific inputs to the MOVES model.	Provides methods for improving local data to estimate current and future emissions, including GHGs, from trucks. Does not specifically address strategy evaluation, although the emissions data and methods would support strategy evaluation.
NCHRP Web-Only Document 152 (2010)	Grant, M., J. D'Ignazio, J. Ang-Olson, A. Chavis, F. Gallivan, M. Harris, K. Rooney, T. Silla, E. Wallis, and S. Siwek. *NCHRP Web-Only Document 152: Assessing Mechanisms for Integrating Transportation-Related Greenhouse Gas Reduction Objectives into Transportation Decision Making*. Transportation Research Board of the National Academies, Washington, D.C., 2010. https://doi.org/10.17226/22967				●	This study sought to evaluate the merits of various methods which State DOTs and MPOs can use to manage transportation-specific GHG emissions and help relevant policy-makers to understand: 1) the impact individual approaches may have on GHG emissions; 2) issues involved in implementation of a specific approach; and 3) tools available to support each approach.	This research focuses on the policy approaches and mechanisms that will affect planning and investment decisions, including new legislation, regulations, rulemaking, and policy approaches which may require DOTs and/or MPOs to set specific targets for GHGs or associated mitigation actions (e.g., reducing VMT).
NCHRP Web-Only Document 210 (2015)	Porter, C., D. Kall, D. Beagan, R. Margiotta, J. Koupal, S. Fincher, and A. Stanard. *NCHRP Web-Only Document 210: Input Guidelines for Motor Vehicle Emissions Simulator Model, Volume 1: Practitioners' Handbook: Regional Level Inputs*. Transportation Research Board, Washington, D.C., 2015.	●	●			This report provides guidelines on how inputs to the U.S. EPA MOVES model can be prepared in order to estimate emissions from motor vehicles, including GHG emissions.	Provides a reference on how to prepare inputs for a tool widely used, and recommended by the federal government, for GHG emissions estimation.

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Oregon DOT (2012)	Oregon Department of Transportation. "Greenhouse Gas Emissions Reduction Toolkit." 2012. https://www.oregon.gov/odot/Planning/Pages/GHG-Toolkit.aspx		●	●		ODOT developed a toolkit to assist local governments to develop and execute actions and programs to reduce GHG emissions from light-weight vehicle traffic. This section of the toolkit focuses on the modeling and analysis tools currently available to evaluate packages of programs and actions intended to reduce these GHG emissions.	Includes information on GHG analysis tools that State DOTs may find useful.
Oregon DOT (2013)	Oregon Department of Transportation. *Oregon Statewide Transportation Strategy: A 2050 Vision for Greenhouse Gas Emissions Reduction*. 2013.		●	●	●	This strategy document projects future GHG emissions from Oregon's transportation system, considers strategies for reducing GHG emissions, and estimates the potential emissions reductions from these strategies.	Provides an example of a strategic-level GHG forecast and assessment that other DOTs may find useful.
Oregon DOT (2017)	Oregon Department of Transportation. Sustainability Progress Report. 2017. https://www.oregon.gov/ODOT/Programs/TDD%20Documents/ODOT-Sustainability-Progress-Report-2017.pdf	●		●		This report highlights projects and initiatives implemented through ODOT's internal operations and reports on the agency's progress towards meeting its sustainability goals. It includes an inventory of GHG emissions from ODOT's fleets and facilities.	Provides an example of measurement of emissions related to the Central Administration functional area, as well as some examples of emission reduction strategies.
Oregon DOT (2018a)	Oregon Department of Transportation. *Air Quality Manual: Project Level*. 2018. https://www.oregon.gov/ODOT/GeoEnvironmental/Docs_Environmental/Air-Quality-Manual.pdf				●	This document is a technical resource for air analysts, on Federal and State regulations and guidance, such as NEPA, the Clean Air Act, and the Conformity Rule as they apply to transportation projects. Greenhouse gas emissions are included in the manual as driven by NEPA disclosure requirements. Operational, construction, and maintenance emissions are included.	The guidance could be used as an example by other States wishing to consider GHG in NEPA or State environmental review.
Oregon DOT (2018b)	Oregon Department of Transportation. *Statewide Transportation Strategy: A 2050 Vision for Greenhouse Gas Emissions Reduction—2018 Monitoring Report*. 2018.	●		●	●	This report addresses the ODOT-led actions contained in the Oregon Statewide Transportation Strategy Short-Term Implementation Plan, describes additional efforts by the agency, and provides a summary of progress towards achieving the overall Statewide Transportation Strategy vision.	Provides examples of monitoring to track the status of strategy implementation as well as overall transportation system emissions.
Oregon DOT (2018c)	Oregon Department of Transportation. *Oregon Greenhouse Gas Modeling and Analysis Tools*. 2018. https://www.oregon.gov/ODOT/Planning/Documents/GHG_Tools_Overview.pdf	●	●	●		This report provides an inventory of GHG analysis tools and assesses their capabilities and limitations. Tools are categorized based on their function for strategic, tactical, and operational level analysis. The report assesses ODOT's GHG analysis capabilities for specific GHG strategies based on currently available tools.	This report provides an assessment of GHG tools from a DOT's perspective.
Parsons Brinckerhoff (2012)	Parsons Brinckerhoff. *Synthesis of State DOT and MPO Planning and Analysis Strategies to Reduce Greenhouse Gas Emissions*. Prepared for AASHTO. NCHRP 08-36, Task 107, Washington, D.C., 2012. https://onlinepubs.trb.org/onlinepubs/nchrp/docs/NCHRP08-36(107)_FR.pdf		●	●	●	This report analyzed strategies being used by DOTs and MPOs for reducing transportation-specific GHG emissions. The research focuses on analytic efforts, tools being used, emissions reduction strategies, and challenges.	Provides useful overview of GHG emissions strategies and the analysis needed, but with a limited geographic scope. This document includes information on the DOTs of Maryland, Minnesota, and Oregon; along with 7 MPOs throughout the U.S.
PennDOT (2017)	Pennsylvania Department Of Transportation. *Project-Level Air Quality Handbook. PennDOT Publication 321*. 2017. https://www.dot.state.pa.us/public/PubsForms/Publications/PUB%20321.pdf				●	This document provides guidance on how to conduct air quality analysis as part of project environmental review.	Provides an example of how one State considers GHG in project level environmental assessment.
SHRP 2 C09 Practitioners Guide	PB Americas, Inc.; Cambridge Systematics, Inc.; E. H. Pechan & Associates, Inc.; and EuQuant, Inc. *SHRP 2 Report S2-C09-RW-2: Practitioners Guide to Incorporating Greenhouse Gas Emissions into the Collaborative Decision-Making Process*. Transportation Research Board of the National Academies, Washington, D.C., 2012. https://doi.org/10.17226/22802		●	●	●	The Practitioners Guide presents a framework to help a user decide when and how GHG emissions can be considered in planning and decision-making. Individual decision points are outlined for their specific GHG impact and/or the interaction that decision may have with other decisions. The Guide also describes methods and approaches for considering GHG emissions in different decision-making contexts, allowing users to understand GHG emissions implications throughout a planning process or at the individual planning task level.	Provides an easy-to-follow decision framework for users analyzing GHG emissions in statewide or regional long-range planning, programming, corridor planning, project development, and environmental analysis.
SHRP 2 C09 Report	B Americas, Inc.; Cambridge Systematics, Inc.; E. H. Pechan & Associates, Inc.; and EuQuant, Inc. *SHRP 2 Report S2-C09-RR-1: Incorporating Greenhouse Gas Emissions into the Collaborative Decision-Making Process*. Transportation Research Board of the National Academies, Washington, D.C., 2012. https://doi.org/10.17226/22805		●	●	●	This report used the Transportation for Communities: Advancing Projects through Partnerships (TCAPP) decision-making model and identified where and how GHG emissions and energy consumption fit into this conceptual framework. Transportation-specific GHG emissions reduction strategies are presented, including impacts, gaps in their methodology, and likelihood of adoption. A technical framework is outlined for evaluating transportation GHG emissions in various planning and decision-making contexts and is organized around questions to help guide analysts to appropriate GHG emission data tools.	Gives a strong overview of GHG emission reduction strategies, and realistic challenges and opportunities to their adoption. Useful guide (including website) to identify and evaluate which data/tool would be appropriate and when. Most tools are still relevant although there have been some advances since the research was conducted.

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Sime et al. (2020)	Sime, M, G. Baily, E. Y. Jajj, and R. Chkaiban. *Impact of Pavement Roughness on Fuel Consumption for a Range of Vehicle Types*. Presented at the 99th Annual Meeting of the Transportation Research Board, Paper No. 20-03322, 2020.			●		This paper uses a physics-based modeling approach to estimate the impacts of pavement roughness on fuel consumption. 29 vehicles, including light-duty vehicles, medium trucks, and heavy trucks are modeled.	This paper provides insights into the potential benefits of pavement maintenance for reducing GHG emissions.
TRB/NRC (2009)	*Special Report 298: Driving and the Built Environment: The Effects of Compact Development on Motorized Travel, Energy Use, and CO2 Emissions*. Transportation Research Board of the National Academies, Washington, D.C., 2009.			●		This report reviews the scientific evidence on the potential for land use and compact development to reduce travel, energy, and emissions, and provides a nationwide assessment of potential impacts.	This report can be helpful in identifying potential VMT, energy, and emission reductions from land use strategies that reduce travel demand.
Texas DOT (2018)	Texas DOT. *Statewide On-Road Greenhouse Gas Emissions Analysis and Climate Change Assessment*. 725.01.RPT. 2018. https://ftp.dot.state.tx.us/pub/txdot-info/env/toolkit/725-01-rpt.pdf	●			●	This report provides an analysis of 1) available data regarding statewide GHG emissions and on-road and fuel cycle GHG emissions, 2) projected climate change for the State of Texas, and 3) TxDOT's current strategies and plans for addressing the changing climate. TxDOT's goal is to provide reasonably available information regarding climate change to the public and to provide information for consideration during the environmental analysis of a project.	This report demonstrates methods and data sources for inventorying and forecasting transportation GHG emissions.
TTI (2014)	Kenney, M., M. Castro., and T. Ramani. *Incorporating Greenhouse Gas (GHG) Emissions in Long-Range Transportation Planning*. Texas A&M Transportation Institute. FHWA/TX-14/0-6696-1, 2014. https://static.tti.tamu.edu/tti.tamu.edu/documents/0-6696-1.pdf		●		●	This report, developed in cooperation with FHWA, developed a framework to link long-range transportation plans with specific GHG emissions strategies within the State of Texas. The framework provides relevant stakeholders in Texas (TxDOT, MPO level) with tools to address GHG emissions within the overall long-range transportation plan (LRTP) process, including control strategies, performance measures, and evaluation tools.	This study shows a State-specific (Texas) framework for addressing GHG emissions, especially working with MPOs. Also, can be used to supplement Federal-level guidance or policy.
U.S. DOE (2019)	U.S. Department of Energy and U.S. Energy Information Administration. *2019 Annual Energy Outlook*. Washington, D.C., 2019. https://www.eia.gov/outlooks/aeo/data/browser/	●				Provides national projections of transportation activity, fuel efficiency, energy consumption, and GHG emissions by mode and technology. Projections are made through 2050. Multiple scenarios are provided. Projections are based on an economy-wide model (National Energy Modeling System).	Useful for default factors, such as fuel efficiency by vehicle type and energy prices, to inform State-level inventories and projections.
U.S. DOT (2009)	U.S. Department of Transportation. *Investment Opportunities for Managing Transportation Performance through Technology*. Joint Program Office, Washington, D.C., 2009.			●		This document discusses how transportation systems technology can be used to improve system performance.	Includes general information on TSM&O approaches, strategies, and environmental effectiveness.
U.S. DOT (2010)	U.S. Department of Transportation. *Transportation's Role in Reducing U.S. Greenhouse Gas Emissions, Volume 1: Report to Congress*. U.S. Department of Transportation, 2010. https://rosap.ntl.bts.gov/view/dot/17790			●		This report provides a comprehensive overview of the state of knowledge on transportation GHG reduction strategies, including emission reduction potential, cost-effectiveness, and co-benefits, including air quality and equity. The report covers low-carbon fuels, fuel-efficient vehicle technology, system efficiency, and reducing carbon intense travel activity.	This report provides information for screening GHG reduction strategies based on impacts, cost-effectiveness, other benefits, and applicability to a State DOT.
U.S. DOT (2016a)	Cooper, C., D. Arthur, A. Epstein, C. Poe, and A. Brecher. *U.S. Airport Greenhouse Gas Emissions Inventories: State of the Practice and Recommendations for Airports*. Report DOT-VNTSC-FAA-16-06. U.S. Department of Transportation Volpe National Transportation Systems Center, Cambridge, MA, 2016.	●				This document presents highlights from five research reports on airport greenhouse gas (GHG) emissions inventories. This summary document presents the most salient findings for policy makers and U.S. airports seeking to better understand and inventory airport GHG emissions. The emphasis in this summary is to provide recommendations for reasonably accurate and low cost methods to inventory airport GHGs.	The impetus for this report was an understanding that the first step in reducing GHG emissions is the development of a baseline inventory. Information on the usability, affordability, and reliability of various inventory methods can help agencies managing airports to achieve this goal.
U.S. DOT (2016b)	U.S. Department of Transportation. "Transportation and Climate Change Clearinghouse." Washington, D.C., 2016. https://www.transportation.gov/sustainability/climate/about-center	●	●	●	●	This project, developed under NCHRP 25-25 Task 44, sought to develop and implement a clearinghouse within the U.S. DOT to serve as a "one-stop" source for users and planners on transportation-specific issues around climate change. The project was jointly funded with FHWA. The objective is to provide knowledge and understanding within the transportation community on the relationship between transportation activities and climate change to support informed decision-making and planning. The most recent update to the clearinghouse was in March 2017.	National-level resource that can provide information for GHG mitigation planning and implementation, including background knowledge, analytic methods and tools, GHG reduction strategies, and approaches for integrating climate change considerations into transportation decision-making. Some of the information may be out of date (e.g., MOBILE6 is still referenced as U.S. EPA's emission factor model).
U.S EPA (2010)	Houk, J. Greenhouse Gas Emissions Analysis of Regional Transportation Plans with EPA's Motor Vehicle Emission Simulator (MOVES) Model. Federal Highway Administration Resource Center, Washington, D.C., 2010. https://www3.epa.gov/ttnchie1/conference/ei19/session6/houk.pdf		●			This white paper gives 1) an overview of existing MPO planning responsibilities and possible GHG emissions analysis requirements; 2) an overview of EPA MOVES (on-road) methodology; and 3) available processes for comprehensive GHG emissions analysis for various activities (on-road emissions, construction and maintenance emissions, and fuel/vehicle life-cycle effects).	Paper is directed at MPO-level analysis, which may be useful as more MPOs may be required or would like to be involved in statewide GHG inventory processes.

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U.S. EPA (2013)	Booz Allen Hamilton. *Analysis of Recycling of Asphalt Shingles in Pavement Mixes from a Life Cycle Perspective*. Prepared for U.S. Environmental Protection Agency, 2013.		●	●		This report provides information on a method to reduce GHG emissions by using recycled materials in asphalt.	May be of interest to State DOTs looking to reduce carbon emissions associated with construction and maintenance materials.
U.S. EPA (2016a)	U.S. Environmental Protection Agency. *Using MOVES for Estimating State and Local Inventories of Onroad Greenhouse Gas Emissions and Energy Consumption*. EPA-420-B-16-059, Washington, D.C., 2016. https://nepis.epa.gov/Exe/ZyPDF.cgi?Dockey=P100OW0B.pdf	●				This document provides guidance on how to use the MOVES model to estimate GHG emissions.	Technical guidance for State DOT staff applying MOVES for GHG analysis.
U.S. EPA (2016b)	U.S. Environmental Protection Agency. *National Port Strategy Assessment: Reducing Air Pollution and Greenhouse Gases at U.S. Ports*. EPA-420-R16-011, Washington, D.C., 2016. https://www.epa.gov/ports-initiative/national-port-strategy-assessment-reducing-air-pollution-and-greenhouse-gases-us	●	●	●	●	This document examines current and future emissions from a variety of diesel sources operating in port areas; explores a range of available strategies to reduce emissions from port-related trucks, locomotives, cargo handling equipment, harbor craft, and ocean-going vessels; and provides an assessment tool for State and local governments, ports and port operators, Tribes, communities, and other stakeholders to inform their priorities and decisions for port areas; and achieve emission reductions.	This document will be useful for State DOTs whose State has significant port operations and who wish to address port-related emissions as part of their GHG inventory and/or reduction strategy.
U.S EPA (2018)	U.S. Environmental Protection Agency. Inventory of U.S. Greenhouse Gas Emissions and Sinks. Washington, D.C., 2018. 430-R-19–001. https://www.epa.gov/sites/production/files/2019-04/documents/us-ghg-inventory-2019-main-text.pdf	●				Annual report which tracks U.S. greenhouse gas emissions and sinks by source, economic sector, and by specific greenhouse gas. Data provided dates back to 1990, with most recent data for 2016.	This resource provides useful data for State DOTs to assess transportation-sector GHG contributions.
U.S. EPA (2019)	U.S. Environmental Protection Agency. *Inventory of U.S. Greenhouse Gas Emissions and Sinks, 1990–2017*. Washington, D.C., 2019.	●				This report, updated annually, provides data on GHG emissions from all sectors of the U.S. economy, including transportation.	The data are useful for looking at the relative contribution of transportation on a nationwide basis, and trends in this contribution.
U.S. Forest Service (undated)	U.S. Forest Service (undated). "Tools for Carbon Inventory, Management, and Reporting." https://www.nrs.fs.fed.us/carbon/tools/	●				These resources provide methods for calculating forest ecosystem and harvested carbon, with standard estimates for forest types of the United States.	The resources provide factors and methods that may be helpful for estimating the carbon impacts of vegetation management strategies in highway rights-of-way, or in off-site sequestration programs.
U.S. GCRP (2017)	U.S. Global Change Research Program. *Fourth National Climate Assessment, Volume I: Climate Science Special Report.* Washington, D.C., 2017. https://science2017.globalchange.gov/					This report provides a detailed analysis of how climate change is affecting the physical earth system across the United States and provides the foundational physical science upon which much of the assessment of impacts in this report is based.	This report provides helpful background on climate science, including scenarios for the potential magnitude and impacts of climate change that can inform the need for action.
U.S. GCRP (2018)	U.S. Global Change Research Program. *Fourth National Climate Assessment, Volume II: Impacts, Risks, and Adaptation in the United States*. Washington, D.C., 2018. https://nca2018.globalchange.gov/					This report focuses on the human welfare, societal, and environmental elements of climate change and variability for 10 regions and 18 national topics in the United States.	This report provides helpful background on climate science, including scenarios for the potential magnitude and impacts of climate change that can inform the need for action.
Venner Consulting and Parsons Brinckerhoff (2004)	Venner Consulting and Parsons Brinckerhoff. *Environmental Stewardship Practices, Procedures, and Policies for Highway Construction and Maintenance*. Prepared for AASHTO. NCHRP 25-25, Task 4, Washington, D.C., 2004. http://onlinepubs.trb.org/onlinepubs/archive/NotesDocs/25-25(4)_FR.pdf			●		This study presented a summary of available environmental stewardship practices in transportation construction and maintenance using available literature, State DOT procedures, and interviews. This report sought to provide support in the development of EMS and environmental strategic plans, either at the broad organizational level or for specific function areas.	Includes practices that may be relevant to mitigation of GHG from construction and maintenance activities.
WRI (2015)	Cooper, E., et al. *Policy and Action Standard Road Transport Sector Guidance*. World Resources Institute, Washington, D.C., 2015. https://ghgprotocol.org/sites/default/files/standards/Policy%20and%20Action%20Standard.pdf	●	●			This is one in a series of guidance documents to establish a comprehensive global standard framework to measure and manage GHG emissions from private- and public-sector operations, value chains, and mitigation actions. This guidance document provides sector-specific guidance for evaluating policies and actions, including boundary definition, estimating baseline emissions, *ex-ante* and *ex-post* evaluation, and monitoring.	The policy and action standards are focused on rigorous reporting needs (e.g., for documentation of verified carbon reductions for trading markets). It also provides useful emissions-calculation tools, designed for specific user groups.

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WRI GPC	Fong, W. K., M. Doust, and A. Marques. *Global Protocol for Community-Scale Greenhouse Gas Emission Inventories*. Retrieved from World Resources Institute, C40 Cities, and ICLEI, 2014. https://ghgprotocol.org/sites/default/files/standards/GHGP_GPC_0.pdf	●	●			This is one in a series of guidance documents to establish a comprehensive global standard framework to measure and manage GHG emissions from private- and public-sector operations, value chains, and mitigation actions. The GHG Protocols seek to develop internationally accepted GHG accounting and reporting standards and to promote their broad adoption. Individual protocols are developed to support specific sectors, stakeholders, or user groups. The GPC provides a framework for accounting and reporting citywide GHG emissions.	Community-scale inventory development and policy analysis protocols may be useful for State DOTs wishing to comply or be consistent with international protocols.
WSDOT (2018)	Washington State DOT. *Guidance for National Environmental Policy Act (NEPA) and SEPA Project-Level Climate Change Evaluations*. WSDOT Environmental Services Office, Olympia, WA, 2017 https://www.wsdot.wa.gov/environment/technical/disciplines/air-quality-noise-energy/addressing-climate-change				●	This document provides guidance on how to consider GHG evaluation for projects subject to Federal and/or State environmental review requirements. This document is updated regularly.	This guidance could serve as an example for other State DOTs wishing to consider GHGs and document effects at the project level.
Zamurs (2016)	Zamurs, J. "Project-Level GHG Analysis or What's the Big Deal?" Presented in Session 871 of the TRB 2016 Annual Meeting, 2016.		●			This presentation includes a summary of GHG changes between build and no-build alternatives as identified in a variety of environmental impact statements reviewed.	This presentation provides information on the potential range of GHG reductions that might be achieved from highway project alternatives.