

JUNE 2021

# Process for Evaluating the GHG Emissions Implications of the Statewide Transportation Improvement Program (STIP)



**Executive Order 20-04**  
Report to the Governor

## **PURPOSE**

Executive Order 20-04 (§10(B))(2020), directs the Oregon Department of Transportation (ODOT) to develop and apply a process for evaluating the greenhouse gas (GHG) emissions implications of transportation projects when planning for the Statewide Transportation Improvement Program (STIP) and report back to the Governor on that process. The focus of this report is to describe ODOT's approach to integrating GHG emissions considerations into the STIP development process.

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# APPLYING A CLIMATE LENS TO THE STIP

In March 2020, ODOT established a Climate Office in order to provide a comprehensive and coordinated response to climate change issues and priorities. The Climate Office is charged with implementing the directives of Executive Order 20-04 and integrating climate change considerations into all aspects of the Department’s work, including the Statewide Transportation Improvement Program (STIP) planning and implementation. Additionally, the Oregon Transportation Commission (OTC) formally established climate as an Agency-wide priority within the 2021–2023 ODOT Strategic Action Plan.

Development of the STIP begins about four years in advance of each cycle and is a complex three-year process, concluding with an OTC action to adopt the final draft STIP. The 2024–2027 STIP development process began in July 2020 and will conclude with the OTC adopting the final draft in June of 2023 just prior to the kick-off for the 2027–2030 STIP development. Rather than developing a process to apply to the 2027–2030 STIP development, the Climate Office decided to expedite development and integration of an analysis process concurrent with the 2024–2027 STIP planning already underway. This real-time integration required a focused examination of existing STIP development processes to identify when and how key decisions are made, and to determine what types of analyses would best capture and inform related GHG emissions implications.

## 2024–2027 STIP—CLIMATE OFFICE APPROACH AND ANALYSIS PROCESS

The Climate Office identified three major decision points during STIP development: program funding allocations, project scope and selection, and final draft STIP adoption. Each phase of the process (Figure 1, below) was designed to inform and influence the decision-making processes leading up to and including these major decision points.

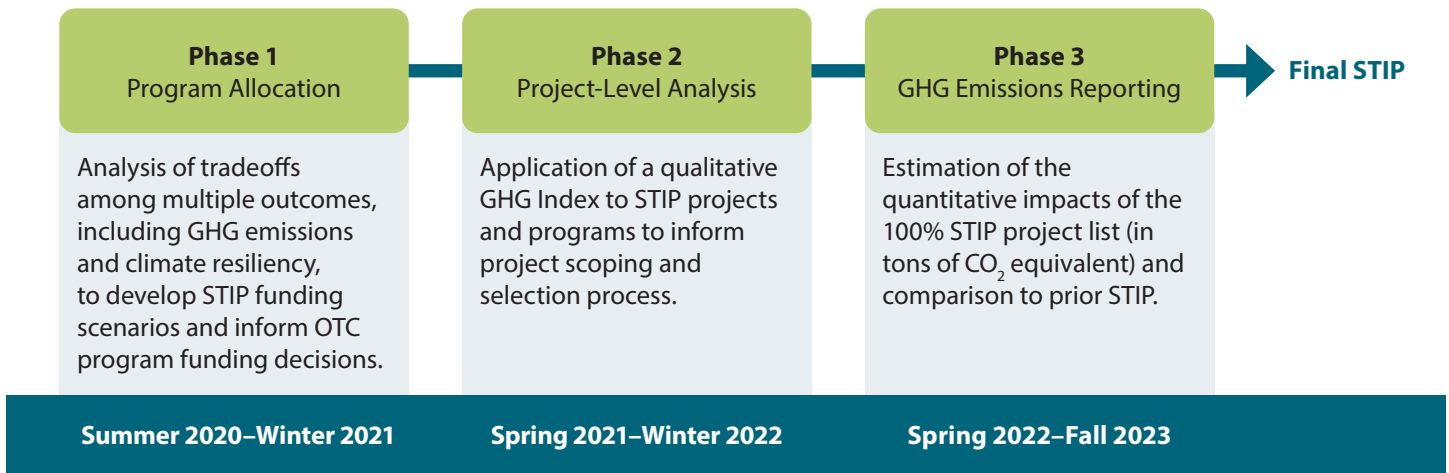


Figure 1. GHG Analysis Process for the 2024-27 STIP Cycle

The first decision point, program funding allocations, refers to the OTC determination of how discretionary STIP funds are divided among program funding categories such as Fix-it, Safety, and Public and Active Transportation. Once program funding allocations are decided, funding levels for ODOT programs within each category are set and the preliminary project selection process begins. At this point initial project lists are developed and submitted for field-scoping. Field-scoping helps to refine project details and cost-estimates that inform each program’s fiscally constrained project-lists incorporated in the draft STIP submitted to the OTC for approval.

Integrating climate considerations into existing processes is new from past analysis conducted for the STIP. This phased approach to analyzing the STIP was carefully developed to ensure alignment with existing STIP development processes and timelines, taking into consideration what program- and project-level data is consistently and readily available at each stage of STIP development and how that data could be used to inform the next major decision point.

The following sections provide details on the process, application to the 2024–2027 STIP.

## Phase 1: Program Funding Allocation—*Summer 2020–Winter 2021*

Phase 1 focused on analyzing the GHG emissions implications of proposed STIP program funding scenarios with the aim of advising the Commission (OTC) on the various trade-offs of investment options under consideration. Although this effort focuses on GHG emissions considerations and impacts, Phase 1 incorporated other ODOT priority outcome areas to show how modifications to program funding-levels altered the anticipated outcomes across seven priority outcome areas.

### **The priority outcome areas included:**

- Climate Change—GHG Mitigation
- Climate Change—Adaptation/Resilience
- Congestion Relief
- Social Equity
- Multimodal Mobility
- Safety
- State of Good Repair



### **APPLICATION FOR THE 2024-27 STIP**

The Climate Office used the previous STIP (2021–2024) program funding allocations and project-level data to establish a baseline and developed an analytical process to translate proposed program-funding scenarios to impacts on priority outcomes. The analysis involved investigation of how past investments performed at addressing system needs that advance transportation outcomes across the priorities areas listed above. System needs for various assets and programs were quantified and mapped to the priority outcome areas listed above, enabling evaluation of STIP performance based on the anticipated benefits/outcomes of projected investments when program categories are funded at different levels compared to the total funding need. The nexus between the program funding allocations, historical program investments, and the projected outcomes and co-benefits anticipated typify a rough return on investment calculation for each program funding category which was then applied to the proposed 2024–2027 funding scenarios.

Even though the funding allocations and the resulting projects in the 2021–2024 STIP are the best indicator available to project future STIP project-types and related attributes, projects vary from STIP cycle to STIP cycle. To account for this potential variation between the actual projects adopted in the 2021–2024 STIP and the projected project-types and attributes for the 2024–2027 STIP, results from our analysis were generalized and presented in terms of the order of magnitude differences observed.


The results reported to the OTC illustrated the trade-offs in performance outcomes associated with shifts in funding from one category to another and compared to the established 2021–2024 baseline. Results were color-coded on a scale (red to green) showing, based on our projections for the 2024–2027 STIP projects, whether anticipated outcomes will be consistent with the 2021–2024 baseline results, increase benefits, or decrease benefits across outcome areas.

## RESULTS AND KEY-FINDINGS

The Climate Office worked simultaneously to develop and apply a climate lens and tradeoff analysis to the 2024–2027 STIP development process already underway. Lessons learned and potential areas for continuous improvement or refinement (e.g. more clearly and accurately distinguishing between investments advancing multimodal mobility outcomes and those advancing social equity outcomes) were captured to address prior to the next STIP cycle. Despite needing minor refinements, the Phase 1 analysis successfully enabled transparent trade-off conversations, constructive and robust public input, and, ultimately, resulted in a record number of public comments received at this early STIP decision point. The OTC reviewed and considered a total of twelve funding scenarios, including seven “hybrid” scenarios that resulted from discussions among Commissioners to expand the range of options and trade-offs considered. At the OTC presentations, Climate Office staff specifically highlighted which scenarios yielded the best GHG emissions reduction outcomes and noted what additional modifications to funding levels would further advance beneficial climate outcomes.

The ability to see the impact of requested funding level adjustments across OTC and Department priorities led to the Commission’s decision to increase investment in climate-friendly Public and Active Transportation projects by a historic \$97 million, a 60-percent increase over the 2021–2024 STIP allocation.

	2021–2024 STIP	24–27 Final Scenario
Fix-it	\$850 million	\$800 million
Enhance	\$24 million	\$65 million
Non-highway	\$158 million	\$255 million
Safety	\$147 million	\$147 million
Climate Change— GHG Mitigation	<b>D-</b> Most trips drive alone in low MPG cars.	<b>Slight GHG reductions anticipated</b> (Modest improvements above baseline)
Climate Change— Adaptation/Resilience	<b>C-</b> Slow progress with preservation projects.	<b>A few less adaptation projects</b> (Marginal decline from baseline)
Congestion Relief	<b>B-</b> Select, legislative bottleneck projects in development.	<b>Bit of funding to supplement needs</b> (Some funding to supplement larger projects)
Social Equity	<b>C-</b> Few low cost travel options.	<b>Small increase in access for all users</b> (More multimodal projects than 2A, less than 3B)
Multimodal Mobility	<b>D</b> Many connectivity gaps.	<b>Small increase in bikeways, walkways, TDM programs</b> (More multimodal projects than 2A, less than 3B)
State of Good Repair	<b>B</b> Focus on fatalities and serious injuries.	<b>No change from baseline</b> (Safety funding flat, consistent with baseline and 21-24 STIP)
Non-highway	<b>C</b> Several assets and areas deteriorating.	<b>Small decline from baseline</b> (Slight decline from baseline which indicates trend of deteriorating conditions over time)

 Areas of modest improvement.

**Figure 2.** Phase 1 analysis results for selected 2024–2027 STIP program funding allocations as compared to the 2021–2024 STIP baseline.

### **1. Needs outweigh available funding—historical funding levels favored some outcome areas over others.**

Although the needs are great across all areas, the need is especially great for Climate Change—GHG Mitigation, Social Equity, and Multimodal Mobility, which have been historically underfunded resulting in a larger gap between funding and needs compared to the other outcome areas.

### **2. Key relationships identified between program funding categories and priority outcome areas.**

Investments in Non-Highway program funding most benefit Climate Change—GHG Mitigation, Multimodal Mobility, and Social Equity outcomes and indicators. Investments in Fix-it program funding most benefit State of Good Repair and Climate Change Adaptation/Resilience outcomes and indicators. Because Safety has long been a top priority within ODOT, safety benefits are achieved as a result of funding any category (Fix-It, Non-Highway, etc.). Future investments can be influenced in the same way, by integrating outcomes such as equity and climate further into project selection and design via program policies or guidelines.

### **3. Climate-beneficial strategies vary between mitigation and adaptation/resilience.**

While Scenario 2 (Figure 2) has the greatest potential positive impact for Climate Change—GHG Mitigation, Scenario 4 has negative impacts for Climate Change—GHG Mitigation but the most positive impact for Climate Change Adaptation/Resilience. In relation to climate goals, investments in non-highway modes favor both GHG mitigation and emissions reductions, while investments in system preservation and maintenance tend to benefit adaptation and transportation resiliency.

## **Phase 2: Project-Level Analysis—Spring 2021–Winter 2022**

Phase 2 transitions from funding allocation between investment programs (e.g. Safety and Fix-It) to identification of projects within and across programs. ODOT identifies potential projects to include in the STIP based, for the most part, on program-specific project selection criteria, which typically rely heavily on a data-driven, asset management approach to prioritization. Phase 2 is focused on informing and influencing decision-making related to project scoping and prioritization with the goal of informing the types of projects selected for inclusion in the STIP, and any identified options for modifying projects during the field-scoping process to reduce or off-set GHG emissions where practicable.

The project-level GHG analysis builds on the technical analysis completed in Phase 1. We are focused on providing actionable information about the potential GHG emissions implications of each STIP program's initial list of projects to ensure climate impacts are known and considered when the final mix of projects that could be included in the final 2024–2027 STIP. At this stage, we are applying GHG considerations to projects and programs that are within ODOT purview and authority for project selection and scoping—regardless of who owns the facility or eventually delivers the project.

This evaluation is complicated by the large number of projects being considered at this stage, the wide-range of project-types, and the limited level of detail known for some projects prior to scoping. To address this challenge, the Climate Office developed a “GHG Index” for proposed projects under each STIP program. The GHG Index is a qualitative tool that will inform program managers and project development/scoping teams about the relative scale of the GHG implications of proposed STIP projects and their attributes such as roadway expansion, intelligent transportation system (ITS) tools, or basic maintenance such as repaving or culvert repair.

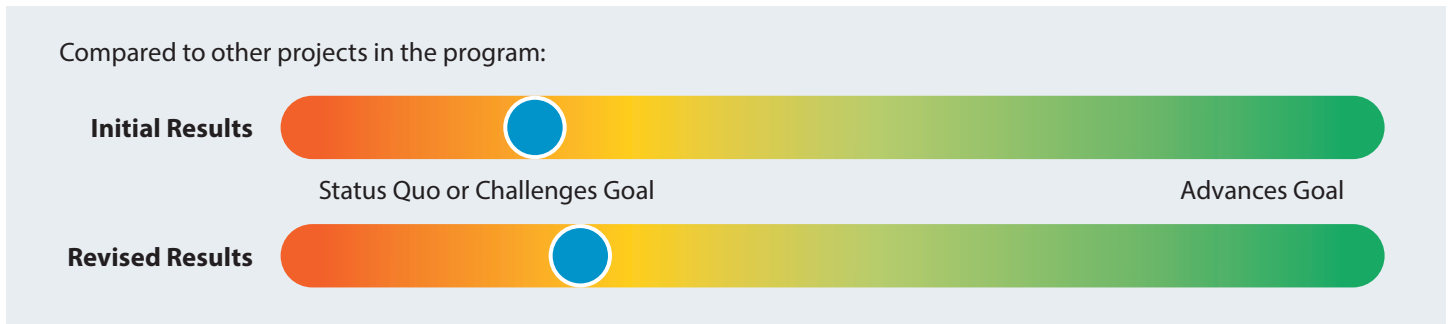
The GHG Index helps to highlight those projects and actions that are beneficial in terms of reducing GHG emissions from transportation. The Index relies on strategies from the Statewide Transportation Strategy (STS), including roadway pricing, electrification, and ITS improvements.

## APPLICATION FOR THE 2024-27 STIP

Phase 2 is primarily focused on capturing “user emissions” in system operations and increasing the number and types of projects in the STIP that make it easier for people to transition to lower carbon modes such as walking, biking, and transit. “Embodied emissions,” or those emissions resulting from materials and construction, will be a focus for later cycles. Examples from this category of work include use of cleaner burning vehicles and fuels, and use of lower carbon materials, such as low carbon concrete. During project selection and field-scoping processes, there are opportunities to leverage projects, large and small, and to modify the project elements so that even routine maintenance projects can be refined to advance GHG reduction goals. For example, the Fix-It program, using the Blueprint for Urban Design, identifies low cost ways to improve safety and multimodal connectivity (e.g. narrowing lanes to provide buffered bike lanes, converting low volume 4-lane highways to 3-lanes with bike lanes) which fit naturally as additional refinements to the project while also reducing the overall carbon impacts.

As project selection teams were formed, direction was provided on when and how to incorporate a GHG lens in their processes. In addition, project selection teams were told they will need to provide information about their lists of proposed projects under consideration which will be filtered through a GHG Index evaluation. The Climate Office released an online survey tool designed to collect necessary data (capturing project attributes, location, and cost estimate) to inform development of the GHG Index evaluation. Program managers and their designees in each ODOT Region were directed to complete the GHG Index survey form by June 30, 2021. Using the survey data, the Climate Office will conduct the GHG Index analysis, the results of which will be provided to program managers and scoping teams. Information from the GHG Index analysis will show how each proposed project performs relative to similar projects within a program, and on whole, how the 2024-2027 emissions profile for each program compares to results from the GHG Index analysis of the prior 2021-24 STIP. In addition to program results, the GHG Index reports will include a customized list of recommended options for improving the GHG performance on specific proposed projects.

To test the viability of the GHG Index analysis tool before launching a broader application, projects in the adopted 2021-2024 STIP were evaluated. The results of that analysis will be used as a benchmark for comparing results for the initial and final draft 2024–2027 STIP project lists.



**Figure 3.** Example Summary Result from GHG Index

## Phase 3: Quantitative GHG Emissions Reporting—*Spring 2022–Fall 2023*

Phase 3 of ODOT's analysis will focus on quantifying emissions impacts of proposed projects included in the final draft STIP, submitted to the OTC for consideration and adoption. During this phase (late 2022 and into 2023), the Climate Office will conduct a quantitative emissions evaluation for all projects included in the draft STIP, generating an estimate of the tons of carbon dioxide equivalent (CO<sub>2</sub>e) emissions anticipated from investments. This analysis will help decision-makers understand the full GHG emissions impact of the 2024–2027 STIP over the lifecycle of the facilities included in the project list.

ODOT's analysis may show some projects having an increase in GHG emissions, however the key is to achieve net reductions across our programs, on whole. ODOT will be looking for programmatic emissions reductions overtime, using past STIP results as a baseline for comparison.

### APPLICATION FOR THE 2024–27 STIP

Although work on Phase 3 has not started yet, the Climate Office expects to produce a detailed quantitative emissions evaluation methodology by Fall 2021. The goal of this phase is to calculate and report on GHG emissions reductions at a programmatic level. This methodology will be applied to the finalized draft STIP project list, in mid-2022, after field-scoping and final business cases have been completed. The quantitative analysis results for the 2024–2027 STIP will function as the baseline for comparing proposed projects in future STIP cycles.

The results of the Phase 3 emissions reporting will be provided with ample context to the OTC, interested stakeholders, and the public at large to make sense of the scale of the emissions impacts presented.

Although proposed projects will move forward based on each STIP program's specific project selection criteria and the anticipated project benefits across the full range of priority outcome areas, the anticipated GHG impacts will be clearly understood and considered as well. ODOT and the Climate Office will still need the continued support and engagement of the Governor's Office and the OTC to ensure this analysis is factored into decision-making, ultimately resulting in a meaningful change to the anticipated GHG impacts of STIP investments on whole.

## STAKEHOLDER ENGAGEMENT

Many groups have interests in the STIP GHG emissions evaluation process and outcomes, including, but not limited to, ODOT leadership and staff, local and regional government agencies and elected officials, including metropolitan planning organizations, other advisory bodies (e.g. the Oregon Global Warming Commission), and the public at large.

The Climate Office plans to engage these stakeholders and keep them informed by posting relevant materials (i.e. reports and factsheets) to the office website, providing briefings to the OTC during their public meetings, and conducting stakeholder interviews.

Using these tools, the stakeholder engagement process seeks to:

1. Provide transparency to stakeholders about the Climate Office approach to this work and the process.
2. Influence the decision-making of project sponsors to result in more STIP projects that reduce GHG emissions moving forward.
3. Educate stakeholders about the ODOT Climate Office, the objectives/goals for each phase of this effort.
4. Ensure stakeholders and staff understand how integrating a GHG lens to the STIP impacts their work and/or leads to different outcomes for the state and transportation system.

Early in 2021, the Climate Office created fact sheets for internal and external distribution that aimed to set the stage for the Phase 2 and 3 work. The timing of stakeholder engagement during the current phase of work (Phase 2) has been pushed back slightly while the Climate Office works to establish and test the evaluation approach. Ongoing outreach to stakeholders will continue in the second half of 2021 and into 2022.

When the current GHG emissions evaluation process is complete, the Climate Office and key stakeholders will conduct a review that will consider how to modify and streamline the process to better achieve our objectives in future STIP cycles.



## CONCLUSION AND NEXT STEPS

During Summer and Fall 2021, the Climate Office will collect project data using the online survey tool (outlined in Phase 2 above) to inform the programmatic GHG Index for projects, programs, and ODOT regions. Index results will be shared with program managers and regional project delivery and scoping teams to inform the refinement of project scopes and eventual narrowing of proposed project lists. In Fall 2021, the Phase 3 methodology will be finalized and in Spring 2022, work will begin on the quantitative analysis of the entire draft STIP.

This is new and challenging work, and ODOT is fully committed to integrating climate considerations (GHG emissions mitigation) across programs and decision-making throughout the STIP development process. The aim is to create a robust process that is transparent and that provides a baseline for continued performance monitoring during current and future STIP cycles. Ideas generated, feedback received, and other lessons learned will inform continuous improvement efforts to refine ODOT's approach for future STIP cycles.

Integrating a climate lens and GHG emissions analysis in STIP decision-making is an effort few states have undertaken. Oregon's climate leadership will be scrutinized, not only for the analytical rigor of this process, but also for whether it results in tangible policy and funding outcomes that advance the state's ambitious climate goals. Continued support from the Governor's Office and the OTC will be critical as the GHG emissions evaluation process moves ahead, particularly between now and when the draft STIP project list is finalized in 2022.

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**For more  
information**

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