



2024-2027 STATEWIDE TRANSPORTATION IMPROVEMENT PROGRAM (STIP) FUNDING ALLOCATION SCENARIO ANALYSIS REPORT

Prepared by ODOT Climate Office, November 2020

This report to the Oregon Transportation Commission provides tradeoff information for five different 2021-2024 STIP program funding allocation scenarios under OTC consideration. The results of ODOT's analysis, captured in this report, shows how modifying investment levels (allocating more or less money) across STIP program areas (i.e. public and active transportation, safety, fix-it and other programs) might impact ODOT's progress in achieving priority outcomes, such as reducing greenhouse gas emissions, social equity, achieving a state of good repair and more.

**Note: This report was published prior to the Oregon Transportation Commission's final decision on the 2024-2027 STIP program funding allocations in December 2020. For detailed information on the additional funding scenarios considered and the final 2024-2027 STIP program funding allocations, selected by the Commission, please see the Addendum to this Report.*

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Acronyms

| | |
|-----------------|---|
| ADA | Americans with Disabilities Act |
| ARTS | All Roads Transportation Safety Program |
| Ped/Bike | Pedestrian and/or Bicycle |
| EO | Executive Order |
| EV | Electric Vehicle |
| FTA | Federal Transit Administration |
| GHG | Greenhouse Gases |
| HOV | High Occupancy Vehicle |
| ITS | Intelligent Transportation System |
| O&M | Operations and Maintenance |
| ODOT | Oregon Department of Transportation |
| OTC | Oregon Transportation Commission (also referred to as the “Commission”) |
| SME | Subject Matter Expert(s) |
| SOGR | State of Good Repair |
| SRTS | Safe Routes to School (infrastructure or non-infrastructure) |
| STF | Special Transportation Fund |
| STIF | Statewide Transportation Improvement Fund |
| STIP | Statewide Transportation Improvement Program |
| TDM | Transportation Demand Management |
| TSMO | Transportation System Management and Operations |
| VMT | Vehicle Miles Travelled |

Executive Summary

This report provides background on the methodology used to analyze program funding categories and proposed allocations in the draft 2024-2027 STIP funding scenarios. Identified needs are included to help determine how each scenario performs across desired outcome areas, including:

- Climate Change: GHG Mitigation
- Climate Change: Adaptation/Resilience
- Congestion Relief
- Social Equity
- Multimodal Mobility
- Safety
- State of Good Repair (SOGR)

The summary results are designed to help the OTC (also referred to as “the Commission”) understand a more complete picture of the impacts, implications, and trade-offs anticipated from each of the proposed program funding allocation scenarios.

The process developed here will continue to inform OTC program funding allocation decisions in future STIP cycles. Additionally, the analysis to date provides an opportunity to continue to monitor projects over the life of the STIP, tracking how projects attributes and STIP amendments change the impact on the desired outcomes listed above.

Proposed 2024-2027 STIP Funding Scenarios

| Funding Category Changes from 2021-2024 Funding Levels | | | | |
|---|--|---|--|--|
| Adjusted Baseline | Scenario 1 Enhance | Scenario 2 Non-Highway | Scenario 3 Safety/Non-Highway | Scenario 4 Fix-it |
| <ul style="list-style-type: none"> ⬆ Increased Fix-it ⬇ Reduced Non-highway | <ul style="list-style-type: none"> ⬇ Reduced Fix-it ⬆ Increased Enhance, Non-highway, Safety | <ul style="list-style-type: none"> ⬇ Reduced Fix-it ⬆ Increased Non-highway | <ul style="list-style-type: none"> ⬇ Reduced Fix-it ⬆ Increased Enhance, Non-highway, Safety | <ul style="list-style-type: none"> ⬇ Reduced Non-highway, ⬆ Increased Fix-it |

Page 3 includes a summary chart showing the result of each scenario relative to the Adjusted Baseline.

Summary of Key Findings

Needs Outweigh Available Funding – Historical Funding-Levels Favored Some Outcome Areas Over Others

With limited funding to meet increasing needs across the transportation system, parts of the multimodal system remain disconnected and overall system conditions will continue to decline resulting in significant consequences for Oregonians -- impacting the safety and efficiency for all modes and users.

Today’s funding levels are inadequate to preserve existing infrastructure or services at their current levels and needs continue to far outpace available funding. Although this is the case across all outcome areas, there are outcome areas that have been historically underfunded resulting in larger gap between funding and needs – top among these are Climate GHG Mitigation, Social Equity, and Multimodal Mobility.

Key Relationships Identified between Program Funding Categories and Priority Outcome Areas

Investments in Non-highway program funding most benefit GHG Mitigation, Multimodal Mobility, and Social Equity outcomes and indicators. While investments in Fix-it program funding most benefit State of Good Repair

and Climate 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.

Specific to Climate Change GHG Mitigation

The scenario analysis was initiated originally because of requirements set in Executive Order 20-04 on climate, which requires the Commission to consider the impact of STIP decisions on GHG emissions. The Climate Office undertook the work and expanded the effort to look at additional outcomes and the tradeoffs among them. Given the EO 20-04 directive, it is imperative to highlight the scenario analysis results specific to GHG emissions. While Scenario 2 (Non-highway) has the greatest potential positive impact for Climate Change Mitigation, Scenario 4 (Fix-it) has negative impacts for GHG Mitigation but the most positive impact for Adaptation/Resilience.

Future Analysis

The content of this report covers the first phase in a multi-part process to inform STIP development. This Phase I report informs the OTC's funding allocation decision in January 2021. Once program funding allocations have been decided, project selection for those funds will begin and continue over the next year. Phase II will occur at this time and focus on the addition of a GHG lens within project selection and scoping, per EO 20-04. We expect this phase to be challenging due to the sheer number of projects, complexity of GHG calculations, the varying level of detail of STIP projects, and that decisions are part of established process among local, regional and state actors. Phase III of the GHG emissions analysis will have similar challenges but focus on calculating and reporting on the projected GHG impacts of the full STIP investment program at the time of adoption.

Throughout each phase of this analysis, it will be important to capture lessons learned to continuously improve analyses of future STIP cycle efforts.

Summary Results | Changes Relative to the Baseline

| IMPACT OF SCENARIO FUNDING LEVELS ACROSS DESIRED OUTCOME AREAS | ADJUSTED BASELINE | ENHANCE | | | | S4 FIX-IT | INDICATORS | HIGHEST DESIRED-OUTCOME AREA ROI FUNDING CATEGORY |
|--|---|--|---|--|--|--|-------------|---|
| | | S1 | S2 | S3 | S4 | | | |
| CLIMATE CHANGE - GHG MITIGATION | D- Most trips drive alone & in low MPG cars | +271% ENHANCE +35% NON-HIGHWAY +35% SAFETY (-15% FIX-IT) | +103% NON-HIGHWAY (-14% FIX-IT) | +103% ENHANCE +55% SAFETY +42% NON-HIGHWAY (-15% FIX-IT) | +14% FIX-IT (-51% NON-HIGHWAY) | <ul style="list-style-type: none"> Reduction in Vehicle Miles Traveled Increased Transportation Options Increased % of Bridges and Culverts in Fair or Better Condition Sustainable repair/replacement schedule for culverts and bridges | Non-highway | |
| | C- Slow progress with preservation projects | Less funding to fix the system hampers ability to upgrade vulnerable infrastructure | Less funding to fix the system hampers ability to upgrade vulnerable infrastructure | Less funding to fix the system hampers ability to upgrade vulnerable infrastructure | Start to address locations or infrastructure that is most vulnerable | <ul style="list-style-type: none"> Increased Travel-time Reliability Increased Throughput Reduced safety incidents/crashes | Fix-it | |
| | B- Select, legislatively funded bottleneck projects in development | Starts to address a few critical bottlenecks | Slightly less funding impacts resources for bottleneck projects but is offset some by multimodal projects | Some funding for critical bottlenecks | Slightly less funding/impacts resources for bottleneck projects | <ul style="list-style-type: none"> Increased Low-cost Transportation Options Increased Access for More Populations | Enhance | |
| | C- Few low cost travel options | Increased accessibility for highest need users to low cost, low carbon modes | Increased access for all users to low cost, low carbon modes | Starting to increase access for all users to low cost, low carbon modes | Auto accessibility/high while access to non-auto travel does not improve | <ul style="list-style-type: none"> Increased Low-cost Transportation Options Increased Access for More Populations | Non-highway | |
| MULTIMODAL MOBILITY | D Many connectivity gaps | More strategic investments can be made to help complete critical connections | Cut timeframe to complete the biking and walking system in half, increased transit fleet replacement | Make strategic investments to help complete critical connections and start to fill gaps | Strips funding down to only met requirements, delaying the time to fill gaps and leaving the system disconnected | <ul style="list-style-type: none"> Reduction of gaps in Bike/Ped network Increased Safety for Vulnerable Users | Non-highway | |
| | B Focus on fatalities and serious injuries | Safety co-benefits of fix-it programs decline but more targeted safety investments stretch ability to address highest priority needs | Funding same as baseline, vulnerable user safety improved by non-highway funding increase | Targeted safety investments stretch ability to address highest priority needs, vulnerable user safety improves | Funding same as baseline, many safety co-benefits of fix-it projects | <ul style="list-style-type: none"> Reduction in Serious and Fatal Injuries Reduction in Roadway Departure Crashes | Safety | |
| STATE OF GOOD REPAIR | C Several assets and areas deteriorating | Pavement and bridge condition declines system-wide, including priority routes | Pavement and bridge condition declines system-wide, including priority routes | Pavement and bridge condition declines system-wide, including priority routes | Bridge and pavement conditions improve in the near-term but still continue to decline overall in the next decade | <ul style="list-style-type: none"> Increase in % of state-owned NBI bridges and paved roadway miles in fair or better condition Reduction of deferred backlog of work | Fix-it | |

Summary Results Table Capturing Impact of Scenario Funding Levels on Desired-Outcome Results and Highest Return on Investment Funding Categories.

Background

The complexity of the STIP makes it challenging to transparently share the impact of STIP funding decisions and performance over time. For example, any project in the STIP is funded by a mix of program areas and will blend funding from Fix-it, Non-Highway and elsewhere. Through the years there have been calls to increase transparency, the most recent are noted below.

HB 2017 contains several reporting requirements related to almost all HB 2017 revenue sources and further requires that ODOT provide information related to the actual and forecasted expenditures flowing from increased revenue collected and forecasted revenue. There were also several transparency requirements related to the agency's performance delivering projects, leading to the launch of ODOT's Transparency, Accountability, and Performance website. In the months following the passage of HB 2017, the Department, focused on developing pathways to satisfy the transparency and accountability sought by the legislature and the public.

In March 2020, Governor Brown issued EO 20-04 directing state agencies to take actions to reduce GHG emissions.¹ Specifically, EO 20-04 directs ODOT to develop and apply a process for evaluating the GHG implications of transportation projects in the STIP. The ODOT Climate Office took on the charge of the Executive Order and set to work on an analysis process for multiple phases of STIP decision-making. The first phase is the allocation of funding between different types of activities, Phase II is when projects are identified and narrowed, and Phase III is when project are selected and the STIP finalized. Although the directive was to establish an evaluation process by June 2021, staff worked quickly to develop and apply a process for more immediate decisions that would impact the next STIP (2024-2027). The first and immediate decision is Phase I: the allocation of funding between activities, such as how money to put towards fixing the system and how much should go to non-highway modes like biking, walking, and public transportation. This report summarizes the results of Phase I.

As the Climate Office took on the charge of Phase I STIP analysis, staff determined that a more holistic approach would be best, pulling in additional outcomes such as equity, state of good repair, and safety. Such an approach is more consistent with how decisions are made by the OTC and ODOT, where climate is one factor among many in making decisions. The importance is the tradeoffs between outcomes, including specific climate outcomes.

To understand what tradeoffs might exist, staff started by looking at how STIP funding was historically spent. For this report, real projects from the 2021-2024 STIP helped to set a baseline for the outcomes of current funding decisions and the results below.

¹ https://www.oregon.gov/gov/Documents/executive_orders/eo_20-04.pdf

Figure 1, below, depicts the stages within Phase I, covered in this report, which informs the 2024-2027 OTC decision of program funding.

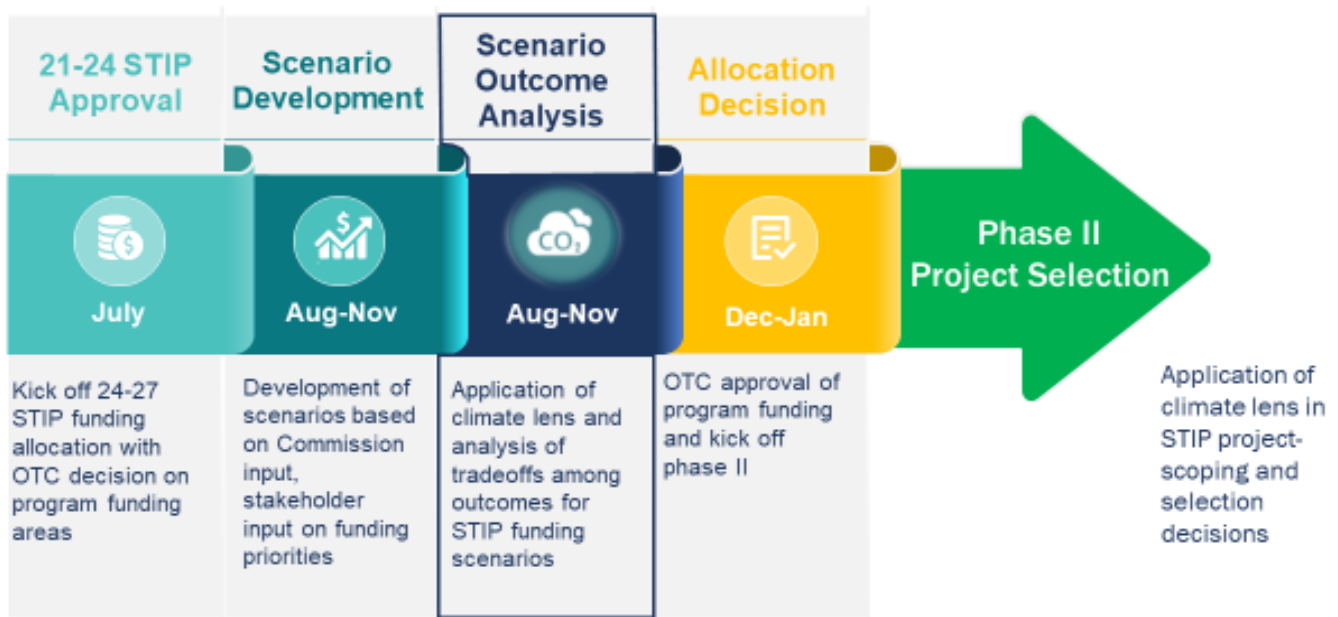


Figure 1 - STIP GHG Lens Phase I Process

Program Funding Scenarios

Public input and direction provided by the Commission in August/September 2020 informed funding scenarios for the 2024-2027 STIP. The proposed STIP funding scenarios differ on the amount of funding allocated across four program areas (Enhance, Non-Highway, Safety and Fix-It) while maintaining constant funding-levels for Local Programs and Other Functions categories. These programs are described in more detail below. Additional funding is added to meet ODOT’s commitment to make curb ramps ADA compliant in all scenarios.

Phase I analysis focuses on discretionary funding changes within four categories:

1. **Fix-it:** Fix-it is the largest program funding category. It has traditionally received most of ODOT’s federal formula funds, but with the passage of HB 2017 (2017), additional state highway funds supplement OTC allocation of federal funds.
2. **Enhance:** Enhance highway projects are those that add lanes or fix interchanges to make the highway system work better. In recent years these projects have primarily been funded by legislative earmarks in HB 2017. Given the amount of enhance funding coming from HB 2017, the Commission dedicated only a small portion of the discretionary federal funds to this category in the 2021-2024 STIP to add features to Fix-It projects.
3. **Safety:** Safety has three primary components:
 - The federally-funded ARTS program that goes to all roads, regardless of owner.
 - A \$10 million program created by HB 2017 specifically for ODOT highways.
 - Federal and state money that funds rail and highway crossing safety improvements.

4. **Non-highway:** Non-highway funding supports biking, walking, public transportation, transportation options/transportation demand management projects, investments and programs. Mandatory biking and walking funding is included per the Bike Bill (ORS 366.215). Other funding is discretionary and support off-system paths, elderly and disabled transit service and more. The OTC has significant authority to determine what priority investments are for non-highway programs. It's important to note this shows only a portion of ODOT's non-highway programs.

For Enhance, Highway, and Fix-it, nearly all of the funding is included in the STIP. Thus, the scenarios show virtually all of the money ODOT is investing in that area. For local funding and non-highway programs, most of the dedicated state and federal funding is not included in the STIP. For example, the non-highway funding in the STIP scenarios does not include FTA funds, STIF, state funds for senior and disabled transportation, Connect Oregon, passenger rail, and other programs.²

Figure 2 shows the variance between scenarios. The amount of discretionary funding that fluctuates between scenarios is about \$600 million— or about a third of total STIP funding.³ This is, in part, because much of the funding is directed by state and federal law, which imposes some constraints on the Commission's discretion.

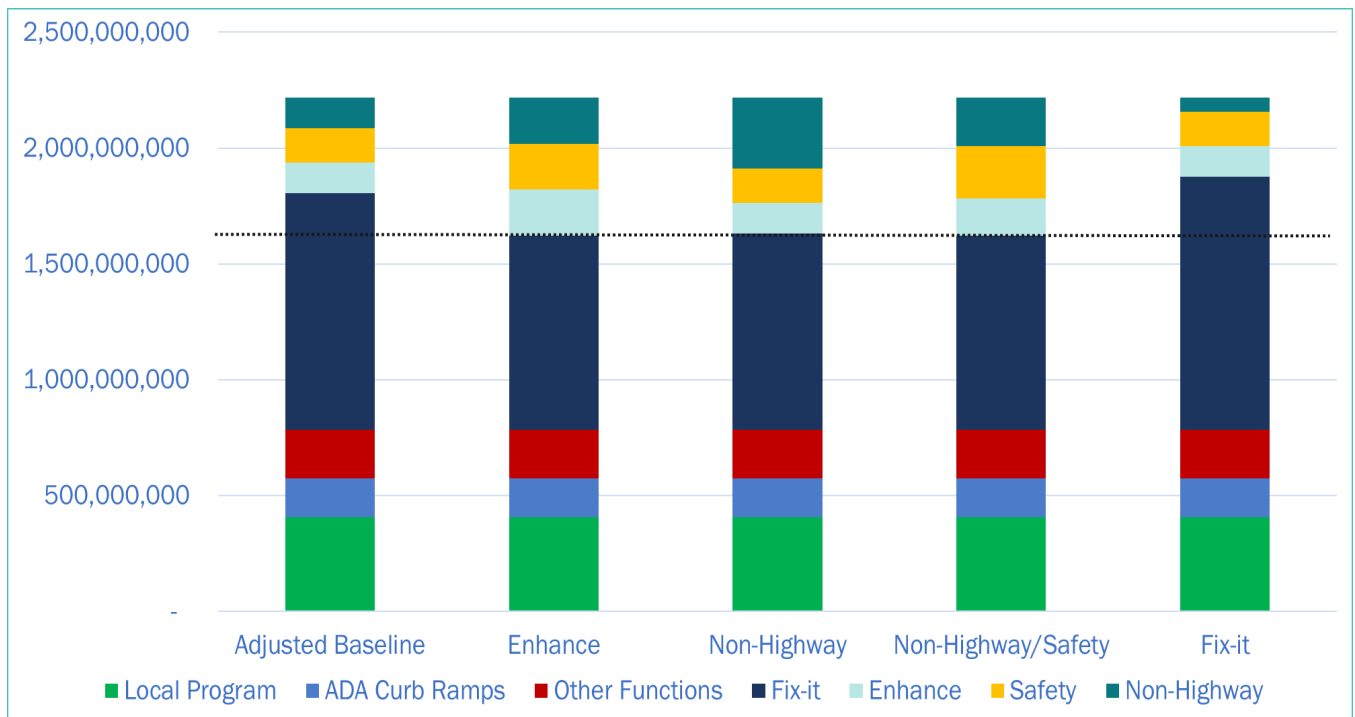


Figure 2 - Proposed 2024 - 2027 STIP Funding Scenarios (OTC control above dashed line)

² The additional non-highway funding, while not included in the STIP, was added to the total funding applied toward addressing identified needs to ensure total funded and unfunded need amounts were treated similarly across all outcome areas.

³ Not including, \$170M allocated for ADA Curb Ramps in the 2024-2027 STIP.

Scenario Changes from Baseline



Adjusted Baseline

Funding splits changed slightly from 2021-2024 STIP



Phase I STIP Program Funding Allocation Analysis

Prior to this report, the OTC made funding allocation decisions for past STIPs through a primarily qualitative discussion. In order to respond to EO 20-04, the Climate Office shifted to a more technical approach to provide a quantitative analysis and review of trade-offs associated with the proposed funding scenarios for the 2024-2027 STIP.

Desired Outcome Areas

Because Climate GHG Mitigation and Adaptation/Resilience are not the only priority outcome areas the Commission considers, additional outcome areas are included for this evaluation which are extrapolated from the priorities articulated in the OTC’s recently adopted Strategic Action Plan (2020 SAP), as shown in Figure 3 below.



Figure 3 – Desired Outcome Areas

Linking Funding Allocations to Performance

Staff developed an analytical process to translate program funding levels to impacts on desired outcomes. The analysis evaluates the historic 2021-2024 STIP program funding and the resulting projects that were selected. Several of the projects included multiple attributes, such as a bridge project, with bike lanes, and rumble strips. Staff captured all attributes in order to determine how each part of the project (attribute) contributed positively or negatively to the outcomes. Using this as a baseline allowed evaluation of potential impacts of the proposed 2024-2027 funding scenarios.

Projects funded in the 2021-2024 STIP were evaluated separately. Each project was distinguished by 23 identified project attributes which had the potential to contribute positively or negatively to an outcome area. For example, as shown in Figure 4 on the following page, a bridge project that adds capacity might be rated as positive for congestion relief while the new design standards also support Climate Adaptation/Resiliency outcomes, but the project also has new bike lanes and addresses a Safety issue. Each attribute is credited, proportional to the cost of that attribute, toward the associated outcomes. Credits can further be split across the various program areas funding a project. These baseline relationships are applied to a different mix of

funding found in the 2024-2027 STIP scenarios. Several steps benefit from agency reviews, including review of project attribute dollars and review of baseline relationships toward outcomes.

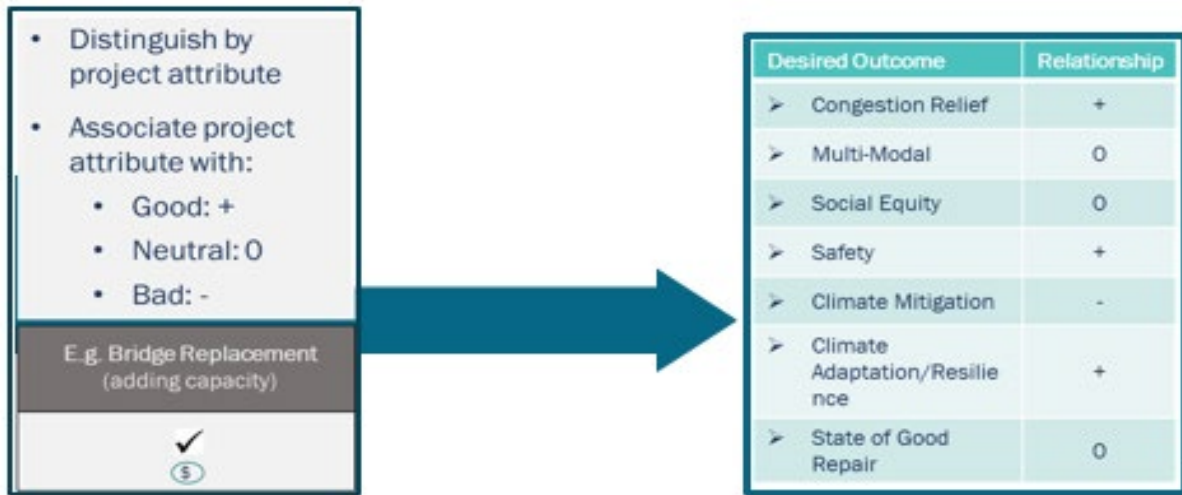


Figure 4 - Project Attribute Scoring

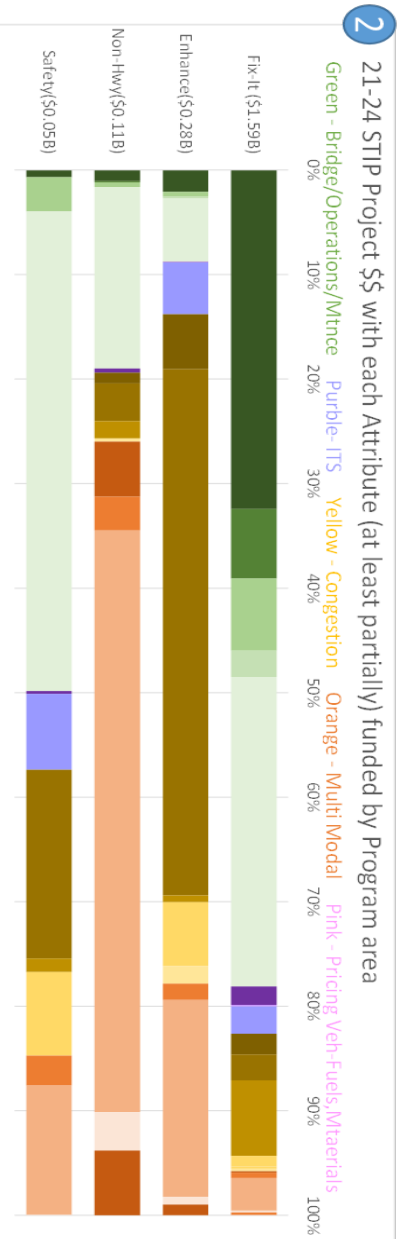
More detail on some of the analysis components are shown in the Figure 5, on page 10. The details include:

1. The full attribute-to-outcome relationship table generated by ODOT Climate Office in collaboration with subject matter experts.
2. The horizontal bars show the mix of 23 attributes identified from baseline 2021-2024 STIP project level data within each program area. As expected, Fix-it dollars fund (green) bridge and O&M projects, Enhance Program funds (gold) capacity and safety projects, and Non-Highway funds (orange) transit and bike/pedestrian projects.
3. A combination of 1 and 2, which yields the expected benefits for each desired outcome area for every Program dollar spent. The expected desired outcome area benefits per program dollar spent could then be applied to the 2024-2027 STIP funding scenarios mix, to estimate the impact of modifying STIP investments across the desired outcomes.

Analyzing STIP Data -- Details

Moving Program Funding\$ to Outcome\$ using project-level detail

Baseline 21-24 STIP
Project-Level Data



1 Attribute-to-Outcome Relationship

| No. Project Attribute Description | GOALS | | | | | | |
|--|-------|----------------|-----------|----|---------------|------------|--------|
| | SOCR | ADAPT/RESILIEN | CC MITTIG | MM | Social Equity | CONG (FRT) | SAFETY |
| 1 Bridge 1: replacement, deck repair, seismic | + | + | | | | | + |
| 2 Bridge 2: scour, erosion, paint, cathodic, monitor/inspect | + | + | | | | | + |
| 3 O&M 1: culverts, stormwater, vegetation, other basic | + | + | | | | + | + |
| 4 O&M 2: landslides, rockfall, other roadway hazards or | + | + | | | | + | + |
| 5 O&M 3: paving, repaving, striping, signs | + | | | | | | |
| 6 ITS 1: signal repair and timing | + | | | | | + | + |
| 7 ITS 2: signal priority or other ITS for transit/bike/ped | | | + | | | + | + |
| 8 ITS 3: variable signs, curve warnings, other TSMO | | | + | | | + | + |
| 9 Road Expand: (capacity) new lanes, new road or bridge, new | - | | - | | | + | + |
| 10 Road Expand: (safety) turn lane, intersection redesign, | | | - | | | + | + |
| 11 Road Safety 1: rumble strips, guardrails, curve correction, | | | | | | | + |
| 12 Road Safety 2: roundabout, pullouts, truck climbing lane | | | + | | | + | + |
| 13 Noise abatement | | | | | + | | + |
| 14 Freight: eliminate height/weight restriction, rail, weigh station | | | | | | + | |
| 15 TDM: park & ride, HOV, vanpool, other trip reduction | | | | | + | + | |
| 16 Bike-Ped 1: road diet, traffic calming, b/p signals | | | | | + | + | + |
| 17 Bike-Ped 2: ADA, new or improved b/p facility, b/p crossing, off- | | | | | + | + | + |
| 18 Transit 1: bus pullout, transit road infrastructure, | | | | | + | + | |
| 19 Transit 2: new bus, retrofit bus, transit shelter | | | | | + | + | |
| 20 Low Carbon Infrastructure: EV charging, EV parking, alt fuel | | | | | + | | |
| 21 Materials: recycled materials, low carbon fuel/material, LED | + | | | | + | | + |
| 22 Pricing: tolling | | | | | + | | |

3

Outcome\$ per Program Funding\$

(Non-OTC, 2021-2024STIP)

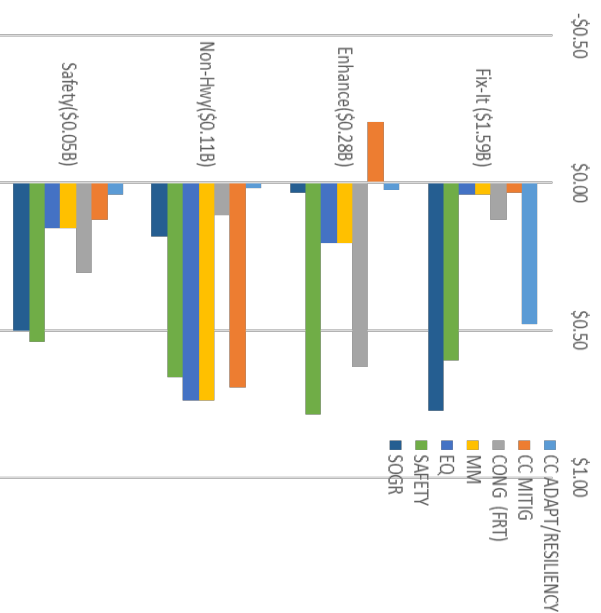


Figure 5 - Steps to Analyze STIP Data (see Appendix A for additional context and detailed breakdown of methodology)

System Needs and Historical Funding by Outcome Area

System needs for various assets and programs are collected for comparison with projected funding levels within each of the 2024-2027 STIP scenarios. System needs are mapped by program needs (e.g., bridge, safety, operations, etc.), then tied to the various outcome areas (e.g., SOGR, Congestion, Adaptation, etc.). This enables scaling and examination of how changes to program funding levels impacts performance relative to addressing system needs.

System costs/needs are identified based on best available program needs information, then mapped to the applicable outcome area.⁴ Since investment needs are shown over different time horizons, outcome area need amounts are annualized in the summary chart (Figure 6), below.

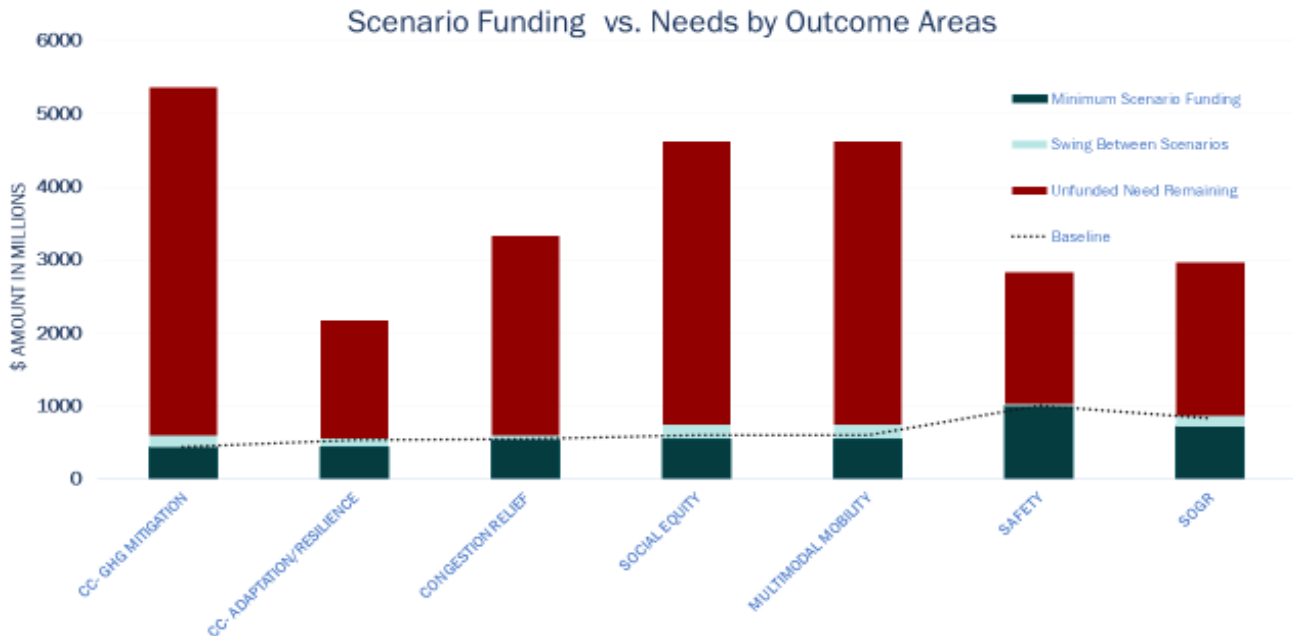


Figure 6 - Scenario Funding vs. Needs by Outcome Areas

Figure 6 also shows the estimated impact of the initial OTC funding scenarios relative to the overall need for each outcome. The reference levels are shown by the solid horizontal line, the dark blue indicates common levels from all funding scenarios, and the light blue indicates the variation among the initial funding scenarios.

Outcome-Area Indicators

Outcome area indicators are used as another data-point in the analysis related to the practical impacts and implications of shifting scenario funding levels. The indicators illustrate that despite the seemingly insignificant impact of any proposed scenario on addressing the total outcome area needs, shifting funds do result in noticeable impacts to asset conditions, deferred costs, as well as the projected time-horizon for achieving program targets. For example, the impact the funding scenarios have on the share of pavements in fair or better

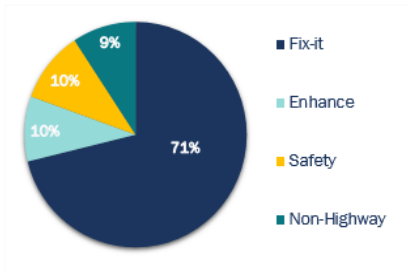
⁴ The 2020 OTC Investment Strategy (July 2020) the primary source for calculating the outcome-area need amounts; supplemented with modal plans adopted by the Commission.

condition, or years to complete a bike-pedestrian system. This puts the funding scenarios in more tangible terms and shows even small funding can have significant impact for the travelling public.

Results: 2024-2027 Adjusted Baseline Review

The adjusted baseline consists of status quo 2021-2024 STIP program finding-levels (%) applied to 2024-2027 STIP funding amounts with a slight 6% reduction to non-highway and additional 7% for fix-it funding derived from HB 2017 fuels tax increase.

2024-2027 Adjusted Baseline



Baseline

Status Quo (%) Program
Funding Allocations

| Outcome Areas | System Impacts and Implications |
|-------------------------------------|---|
| Climate – GHG Mitigation | D - Most trips drive alone & in low MPG cars |
| Climate – Adaptation/ Resilience | C - Slow progress with preservation projects |
| Congestion Relief | B - Select bottleneck projects in development |
| Social Equity | C - Few low cost travel options |
| Multimodal Mobility | D Connectivity gaps |
| Safety | B Focus on fatalities and serious injuries |
| State of Good Repair | C Several assets and areas deteriorating |

**Note, grades reflect progress toward meeting identified needs, and are not the same as level of service*

Figure 7 - Adjusted Baseline Funding Allocations and Scorecard

Figure 7 shows the overall results for the baseline, basically how today’s spending (2021-2024 STIP) impacts the outcomes. It also helps to illustrate the current state of meeting the outcome relative to needs. All outcome areas and scenario-specific results that follow are calculated relative to the adjusted baseline analysis results. The results are based on 2021-2024 status quo funding-levels and the 2021-2024 STIP project selection attribute mixes for each program funding category. The results are essentially an interpretation of high-level projections of potential outcomes if project selection is done in roughly the same way. The Commission can further steer investments toward outcome area needs by setting program specific policies related to project scoping and selection.

Results by Outcome Area | Climate Change - GHG Mitigation

This outcome area focuses on GHG emission reductions. Those emissions are primarily reduced by activities known to reduce VMT, as well as improved health as a result of improved air quality. Reductions are also expected by some ITS operational improvements and features such as roundabouts that reduce idling without capacity expansion. Although key to GHG emission reduction, investments in bus electrification and charging infrastructure are outside the STIP and/or OTC funding control, thus not included in this analysis.



Needs to address Climate GHG Mitigation far outpace today’s funding levels. Scenario 2 (Non-Highway) has the greatest potential positive impact/benefit for GHG Mitigation, while Scenario 4 (Fix-it) presents the most potential for negative GHG impacts. The benefits of Scenario 2 come from substantial increases in Non-Highway

funding, which has the greatest potential to contribute to Climate GHG Mitigation positively, and as shown in Figure 10. Scenario 4 performs poorly for GHG Mitigation since it pulls funding from Non-Highway to use in Fix-It projects.

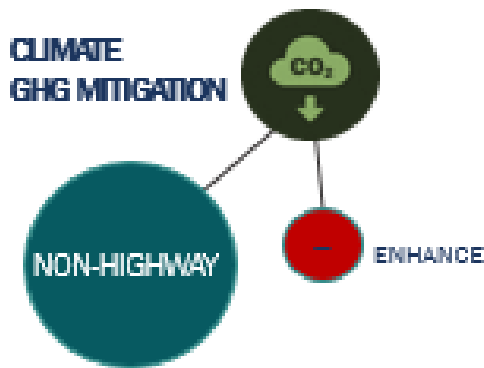


Figure 8 – Relationship between Climate Change GHG Mitigation and Program Funding Categories

Overall, Scenario 2 performs best for this outcome as well as Multimodal Mobility and Social Equity. However Scenario 2 (like Scenarios 1 and 3) reduce Fix-it funding, which impacts the ability to keep bridges and pavements in a State of Good Repair and to adapt to climate impacts (Climate Adaptation/Resilience).

| CLIMATE CHANGE – GHG MITIGATION | | | | |
|--|--|---|--|---|
| ADJUSTED BASELINE | S1 ENHANCE | S2 NON-HIGHWAY | S3 SAFETY/ NON-HIGHWAY | S4 FIX-IT |
| D- | | | | |
| Most trips drive alone & in low MPG cars | Increased investments in bike, pedestrian, transit, help to off-set capacity increases | Increased low carbon transportation options | Fewer crashes and some more low carbon options | Driving remains predominate travel option |
| INDICATORS | | | | |
| > Increased Non-highway Funding | | > Reduction in Vehicle Miles Traveled | | > Increased Transportation Options |

Figure 9 - Impact of Scenario Funding on Climate Change GHG Mitigation Outcomes

Results by Outcome Area | Climate Adaptation/ Resilience



This outcome area focuses on investments that increase the resilience of our transportation infrastructure in the face of extreme weather events and climate change impacts. The assets most heavily impacted are bridges, culverts, and other highway assets which closely link this outcome area to the State of Good Repair.

Climate Adaptation outcomes are strongly tied to Fix-It Funding (as are State of Good Repair outcomes). This reflects the need for new design standards, along with operations and maintenance projects to withstand and recover from expected storms, landslides, and wildfires. As such, the best STIP scenario for addressing Climate Adaptation outcomes is Scenario 4 and the baseline scenario with their strong Fix-it program funding. Scenario 4 has marginally more funding for Fix-it but reduces the other Program to bare minimum requirements, which plays negatively on Multi-Modal/Social Equity and GHG Mitigation outcomes.

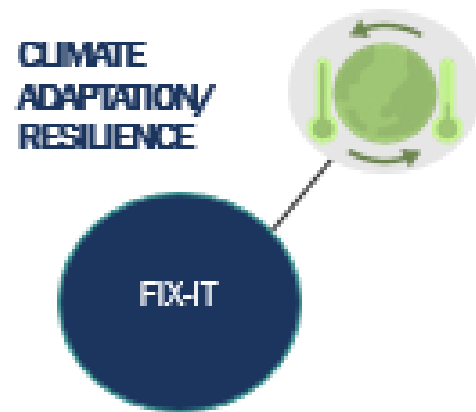


Figure 10- Relationship between Climate Change Adaptation/Resilience and Program Funding Categories

Climate change adaptation and resilience investments have been organized into three primary categories, priority corridors, highway asset condition improvement, and other maintenance and operations investments (e.g. cleaning out of culverts, roadside drainage, and storm-water facilities. Additionally, more now than ever, hazard tree removal and clearing debris from bridges and roadways). Focusing and prioritizing fix-it funding in locations where assets are most vulnerable and at-risk regardless of whether investments are on the state or local transportation system would most benefit adaptation outcomes.

In the event of an earthquake and tsunami, a resilient transportation network is necessary for reestablishing critical connections for emergency response, medical and shelter facilities, population centers, energy and communications facilities and freight needs for response and economic recovery. The Oregon Resilience Plan assessed the seismic integrity of Oregon's multimodal transportation system and characterized the work considered necessary to restore and maintain transportation lifeline routes after a Cascadia earthquake and tsunami. Despite the fact that state highway bridges are a critical component of the state's transportation system and resilience plan, Oregon's bridges are aging; most are reaching the end of their normal service life. Scarce bridge funding is focused on bridge repairs, stretching the replacement cycle to over 900 years. Bridge conditions continue to decline due to current funding levels. Replacing aging bridges can bring infrastructure up to current design standards, making it more resilient to climate extremes.

| CLIMATE CHANGE – ADAPTATION/RESILIENCE | | | | |
|---|---|---|---|---|
| ADJUSTED BASELINE | S1 ENHANCE | S2 NON-HIGHWAY | S3 SAFETY/ NON-HIGHWAY | S4 FIX-IT |
| C- | | | | |
| Slow progress with preservation projects | Less funding to fix the system hampers ability to upgrade vulnerable infrastructure | Less funding to fix the system hampers ability to upgrade vulnerable infrastructure | Less funding to fix the system hampers ability to upgrade vulnerable infrastructure | Start to address locations or infrastructure that is most vulnerable |
| INDICATORS | | | | |
| ➤ <i>Increase in Fix-it and Seismic Program Funding</i> | | ➤ <i>Increased % of Bridges and Culverts in Fair or Better Condition</i> | | ➤ <i>Sustainable repair/replacement schedule for culverts and bridges</i> |

Figure 11- Impact of Scenario Funding on Climate Change Adaptation/Resilience Outcomes

Results by Outcome Area | Congestion Relief

As the population and economy of the state grows, congestion increasingly afflicts the state, particularly in major urban areas. The Portland metro area faces unique transportation infrastructure challenges as it experiences population growth and increased economic activity. According to



ODOT's 2018 Traffic Performance Report for the Portland metro area, hours of congestion on the region's freeways increased 13% between 2015 and 2017, while daily vehicle hours of delay increased by 20%. The region faces 123 average daily hours of congestion and more than 80,000 daily vehicle hours of delay at an economic daily cost of \$2 million. Other urban areas in Oregon have also seen significant increases in congestion.

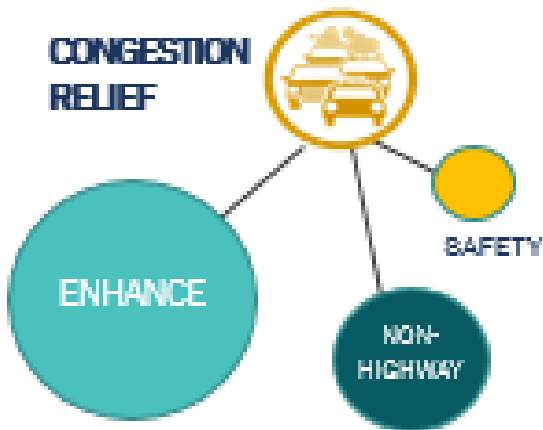


Figure 12 - Relationship between Congestion Relief and Program Funding Categories

Congestion relief outcomes have been significantly enhanced in the past few years via legislative funding from HB2017 that continues in the 2024-2027 STIP. Congestion relief can be funded by roadway enhancements, safety projects that reduce crashes that cause delay, and investments in Non-Highway modes, such as transit service. Thus Scenario 1 performs best for Congestion Relief. In general, congestion relief projects that expand the roadway system often contribute negatively to other goals, GHG Mitigation by increasing VMT. They can also create more miles to maintain, thus putting more burden to keep up with the State of Good Repair.

| CONGESTION RELIEF | | | | |
|---|--|---|---------------------------------------|---|
| ADJUSTED BASELINE | S1 ENHANCE | S2 NON-HIGHWAY | S3 SAFETY/ NON-HIGHWAY | S4 FIX-IT |
| B- | | | | |
| Select bottleneck projects in development | Starts to address a few critical bottlenecks | Resources for bottleneck projects are impacted by less funding, those impacts are offset by increase in multimodal projects | Some funding for critical bottlenecks | Slightly less funding impacts resources for bottleneck projects |
| INDICATORS | | | | |
| > Increased Enhance Funding | > Increased Travel-time Reliability | > Increased Throughput | > Reduced safety incidents/crashes | |

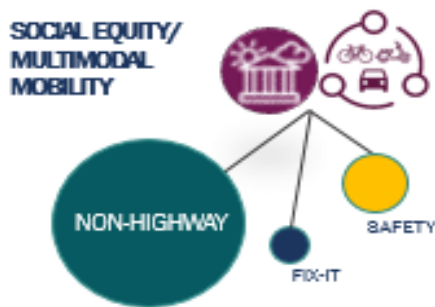
Figure 13 - Impact of Scenario Funding on Congestion Relief Outcomes

Results by Outcome Area | Social Equity & Multimodal Mobility

Although Social Equity and Multimodal Mobility are combined in this report, staff recognize that they are important outcomes in their own right and will seek to better distinguish them in future analysis. For the purposes of the 2024-2027 STIP and given the tight timelines for the analysis, geographic level analysis was not possible to determine when black, indigenous, communities of color, low income or other frontline communities were likely to be most benefited by a project. Instead, any project that expands low-cost transportation options like biking, walking, or public transportation was viewed as helping to make these modes available and accessible to all Oregonians and improving Social Equity. Other Non-Highway investments in Transportation Options/Transportation Demand Management also positively impact Equity by raising awareness of these travel options and how to use them. Overall, social Equity outcomes are strongly tied to Non-Highway Funding, having a 1:1 return on investment ratio (as is the case with multimodal mobility outcomes).



Safety funding can also contribute positively toward both Social Equity and Multimodal Mobility by addressing unsafe network connections and intersections that improve the attractiveness of these modes. Fix-it also supports these outcomes by maintain the roadways shared by buses, bikes, and more.



Multimodal Mobility is most improved through Non-Highway funds that can help complete the existing disconnected system, and enhance service levels.

The impact of scenarios on the time it will take to complete the biking and walking system is significant. Scenario 2 cuts the timeframe in half, while scenario 4 more than doubles it. The impact of scenarios on the time it will take to complete the biking and walking system is significant. Scenario 2 cuts the timeframe in half, while scenario 4 more than doubles it, see Figure 17.

Figure 14 - Relationship between Social Equity / Multimodal Mobility and Program Funding

| SOCIAL EQUITY | | | | |
|---------------------------------|--|--|---|--|
| ADJUSTED BASELINE | S1 ENHANCE | S2 NON-HIGHWAY | S3 SAFETY/ NON-HIGHWAY | S4 FIX-IT |
| C- | | | | |
| Few low cost travel options | Increased accessibility for highest need users to low cost, low carbon modes | Increased access for all users to low cost, low carbon modes | Starting to increase access for all users to low cost, low carbon modes | Auto accessibility high while access to non-auto travel does not improve |
| INDICATORS | | | | |
| ➤ Increased Non-Highway Funding | | ➤ Increased Access for More Populations | | ➤ Increased Low-cost Transportation Options |

Figure 15- Impact of Scenario Funding on Social Equity Outcomes

| MULTIMODAL MOBILITY | | | | |
|---------------------------------|--|--|---|--|
| ADJUSTED BASELINE | S1 ENHANCE | S2 NON-HIGHWAY | S3 SAFETY/ NON-HIGHWAY | S4 FIX-IT |
| D | | | | |
| Connectivity gaps | More strategic investments can be made to help complete critical connections | Cut timeframe to complete the biking and walking system in half; increased transit fleet replacement | Make strategic investments to help complete critical connections and start to fill gaps | Strips funding down to only min requirements, doubling the time to fill gaps and leaving the system disconnected |
| INDICATORS | | | | |
| > Increased Non-Highway Funding | | > Reduction of gaps in Bike/Ped network | | > Increased Safety for Vulnerable Users |

Figure 16 – Impact of Scenario Funding on Multimodal Mobility Outcomes

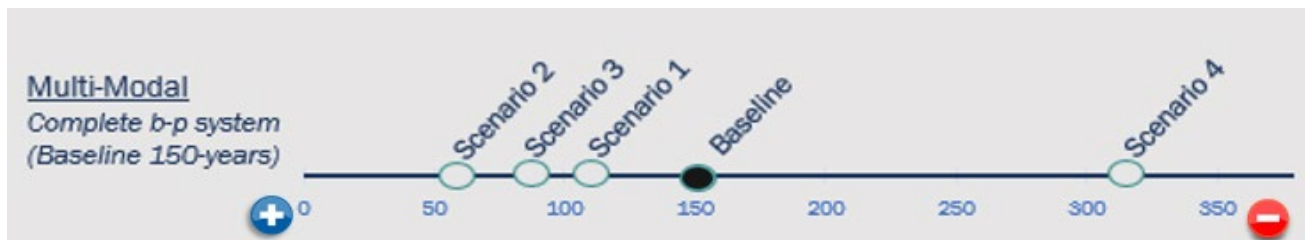


Figure 17 – Indicator showing direct impact of Scenario Funding Levels on Timeline for Bike/Ped Network Completion

Results by Outcome Area | Safety

This outcome area focuses on prioritizing the safety of system users and transportation workers. To most effectively use limited highway safety funds, the ARTS program in particular funds projects through a data driven process to find the best reductions in fatal and serious injury crashes for the money spent.

Currently, state highways have the highest rate of fatal and serious injury crashes per mile and city streets and county roads have the highest rates per VMT. While increases in overall crashes are linked to primary driver-error, such as speeding, impaired driving, not wearing seatbelts and distracted driving, the implementation of safety countermeasures can reduce the severity of the crashes and sometimes prevent the crash. Although trends have been in the wrong direction, through evaluation of projects it is evident the investments in safety measures are saving lives. Any increase in investments will pay off in lives saved and reductions in serious injuries.

By making safety a top priority of ODOT in that last few years, Safety now permeates all aspects of ODOT programs (Figure 18). As a result, all program funding categories improve Safety outcomes. For example, safety improvements that address high-crash locations also help to reduce congestion, since roughly 25% of roadway congestion is caused by crashes.

While Safety outcomes benefit directly by set-aside funding (especially with a strategic focus on fatalities and serious injuries), Safety outcomes also accrue through co-benefits of other program investments. At current funding levels the number of fatal and serious injury crashes are increasing, or, at best, holding level. To make gains more funding is needed. Many of the easy fixes have been done; the remaining fixes are more expensive and inflation reduces efficiency of the funding. The relatively recent introduction of systemic low cost measures helps. Scenario 3 includes the largest increase for Safety funding.

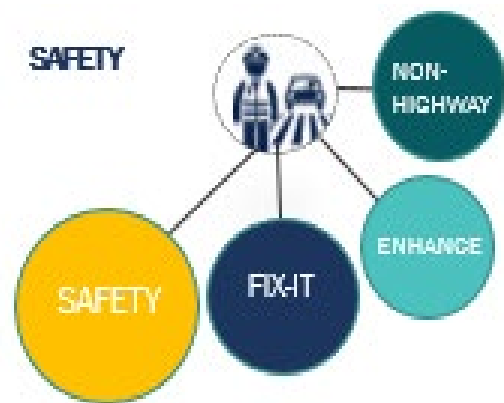


Figure 18 - Relationship between Safety and Program Funding Categories

| SAFETY | | | | |
|--|--|---|--|--|
| ADJUSTED BASELINE | S1 ENHANCE | S2 NON-HIGHWAY | S3 SAFETY/ NON-HIGHWAY | S4 FIX-IT |
| B | | | | |
| Focus on fatalities and serious injuries | Safety co-benefits of fix-it programs decline but more targeted safety investments stretch ability to address highest priority needs | Funding same as baseline; vulnerable user safety improved by non-highway funding increase | Targeted safety investments stretch ability to address highest priority needs; vulnerable user safety improves | Funding same as baseline; many safety co-benefits of fix-it projects |
| INDICATORS | | | | |
| ➤ Increased Safety Funding | | ➤ Reduction in Serious and Fatal Injuries | | ➤ Reduction in Roadway Departure Crashes |

Figure 19 – Impact of Scenario Funding on Safety Outcomes

Results by Outcome Area | State of Good Repair

State of Good Repair is most heavily influenced by Fix-it funding. Although the majority of funds have gone into the Fix-it program in past years, the funding does not keep pace with an aging system, leaving many of the State’s roads, bridges, and other highway assets in a state of disrepair. ODOT’s investments in pavement focus on bridge, pavement, culvert and other highway asset conditions along a set of priority corridors. Even though fix-it priority corridors consist of road-miles that connect most communities in the state, they don’t actually include most miles of the state highways.

The Fix-It program provides the most benefit toward State of Good Repair outcomes of the multi-modal transportation system, followed by Safety funding. Operations and Maintenance funding will also become increasingly important to address anticipated needs in adapting to a changing climate. Pavement smoothness also contributes to better vehicle fuel economy and maintenance costs, and alleviates pot-hole safety concerns for vulnerable road users. Enhance Program funding, which expands system maintenance needs works against State of Good Repair outcomes.

Scenarios 1-3 increase funding in other programs by taking funding away from Fix-it – thus all negatively impacting State of Good Repair, as well as Climate Adaptation. While Scenario 4 places more funding in Fix-it, the improvements to State of Good Repair are proportionally marginal and align similarly to the Baseline.

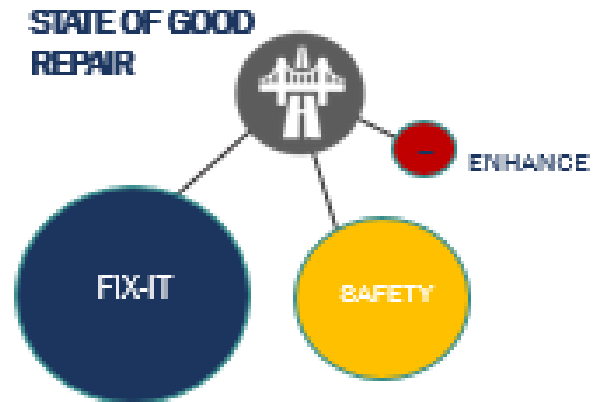


Figure 20 – Relationship between State of Good Repair and Program Funding Categories

Despite that, differences are seen between scenarios as shown in Figure 22 on the next page. If status quo funding is maintained, 70% of ODOTs pavements on Priority Routes will be in fair or better condition by 2030 as opposed to the 90% in fair or better condition today. Even though Scenario 4 performs better relative to the other scenarios, the result of increased funding will only maintain, not improve existing conditions over the next 10 years. Scenarios 1 and 2 would result in a higher percentage of declining pavement conditions over the same time-horizon.

| STATE OF GOOD REPAIR (SOGR) | | | | |
|--|--|---|---|--|
| ADJUSTED BASELINE | S1 ENHANCE | S2 NON-HIGHWAY | S3 SAFETY/ NON-HIGHWAY | S4 FIX-IT |
| C | | | | |
| Several assets and areas deteriorating | Pavement and bridge condition declines system-wide, including priority routes | Pavement and bridge condition declines system-wide, including priority routes | Pavement and bridge condition declines system-wide, including priority routes | Bridge and pavement conditions improve in the near-term but still continue to decline overall in the next decade |
| INDICATORS | | | | |
| > Increased Fix-it Funding | > Increase in % of state-owned NBI bridges and paved roadway miles in fair or better condition | | > Reduction of deferred backlog of work | |

Figure 218 – Impact of Scenario Funding on State of Good Repair Outcomes



Figure 22 – Indicator showing direct impact of Scenario Funding Levels on % of pavement conditions in SOGR by 2030

Today, pavement projects also commonly include roadside safety features, curb ramp upgrades, more expensive reflective striping, and additional safety features like rumble strips. While these elements are important, it substantially increases the cost to pave a mile of road. ODOT is able to pave most highways on a 50 year cycle. As a result pavement conditions will decline, increasing the cost of rehabilitating failing pavement. These deferred costs are shown in Figure 28.

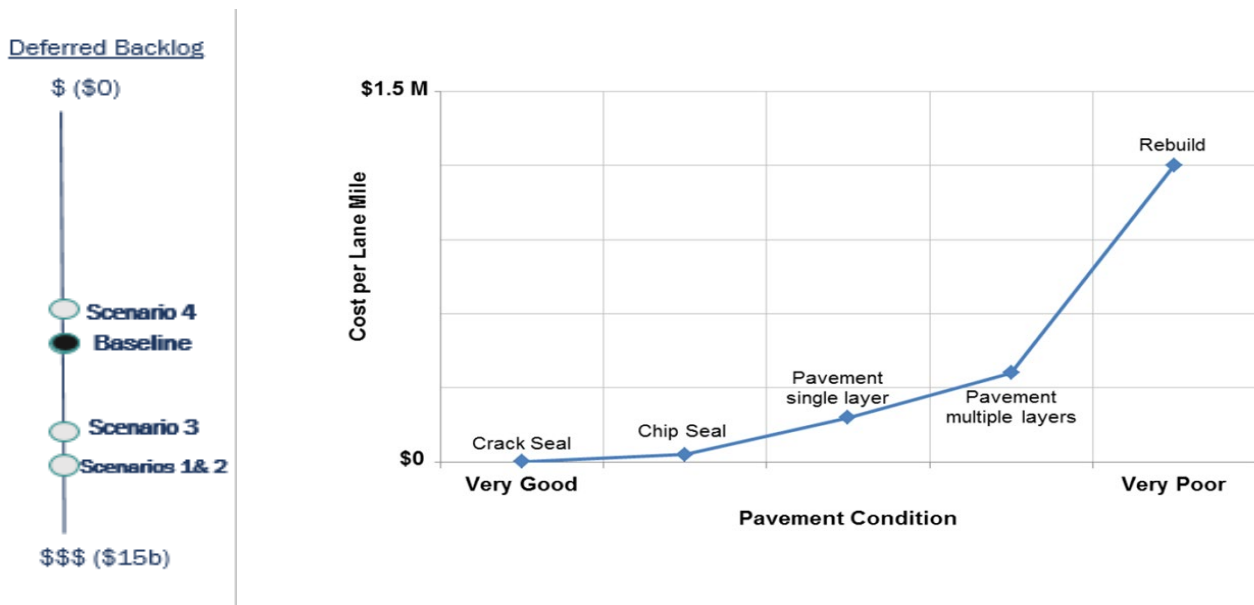


Figure 23 – Impact of Scenario Funding Levels on Deferred Backlog and Cost per Lane Mile Base on Type of Repair/Replacement Needed

Overall Results

Figure 24 Table on the following page describes how modified funding levels in each scenario impacts tradeoffs across desired outcome areas. Note, the color-coding in the table is indicative of improvements (light to darker green depending on degree of improvement we expect to see) or declining performance (bright red) under each scenario relative to the baseline. Grey indicates little to no negative or positive impact for a specific

outcome relative to the baseline results. Scenario 2 has the highest shifts to positive outcome, while scenario 3 has the most overall positive outcomes in comparison to the baseline.

Summary Results | Changes Relative to the Baseline

| IMPACT OF SCENARIO FINDING LEVELS ACROSS DESIRED OUTCOME AREAS | ADJUSTED BASELINE | S1 ENHANCE | | | S2 NON-HIGHWAY | | S3 SAFETY/ NON-HIGHWAY | | S4 FIX-IT | INDICATORS | HIGHEST DESIRED-OUTCOME AREA ROI FUNDING CATEGORY |
|--|--|--|--|---------------------------------|---|--------------------------------|--|--|--|--|---|
| | | +8 FIX-IT (-7% NON-HIGHWAY) | +271% ENHANCE +35% NON-HIGHWAY +35% SAFETY (-15% FIX-IT) | +103% NON-HIGHWAY (-14% FIX-IT) | +103% ENHANCE +55% SAFETY +42% NON-HIGHWAY (-15% FIX-IT) | +14% FIX-IT (-51% NON-HIGHWAY) | | | | | |
| CLIMATE CHANGE - GHG MITIGATION | D- Most trips drive alone & in low MPG cars | Increased investments in bike, pedestrian, transit, help to offset capacity increases | | | Increased low carbon transportation options | | Fewer crashes and some more low carbon options | | Driving remains predominant travel option | <ul style="list-style-type: none"> Reduction in Vehicle Miles Traveled Increased Transportation Options Increased % of Bridges and Culverts in Fair or Better Condition Sustainable repair/replacement schedule for culverts and bridges | Non-highway |
| | | Less funding to fix the system hampers ability to upgrade vulnerable infrastructure | | | Less funding to fix the system hampers ability to upgrade vulnerable infrastructure | | Less funding to fix the system hampers ability to upgrade vulnerable infrastructure | | Start to address locations or infrastructure that is most vulnerable | | |
| CLIMATE CHANGE - ADAPTATION/ RESILIENCE | C- Slow progress with preservation projects | Less funding to fix the system hampers ability to upgrade vulnerable infrastructure | | | Less funding to fix the system hampers ability to upgrade vulnerable infrastructure | | Less funding to fix the system hampers ability to upgrade vulnerable infrastructure | | Start to address locations or infrastructure that is most vulnerable | <ul style="list-style-type: none"> Increased Travel-time Reliability Increased Throughput Reduced safety incidents/crashes Increased Low-cost Transportation Options Increased Access for More Populations | Enhance |
| | | Starts to address a few critical bottlenecks | | | Slightly less funding impacts resources for bottleneck projects but is offset some by multimodal projects | | Some funding for critical bottlenecks | | Slightly less funding impacts resources for bottleneck projects | | |
| CONGESTION RELIEF | B- Select, legislatively funded bottleneck projects in development | Increased accessibility for highest need users to low cost, low carbon modes | | | Increased access for all users to low cost, low carbon modes | | Starting to increase access for all users to low cost, low carbon modes | | Auto accessibility high while access to non-auto travel does not improve | <ul style="list-style-type: none"> Increased Low-cost Transportation Options Increased Access for More Populations | Non-highway |
| | | More strategic investments can be made to help complete critical connections | | | Cut timeframe to complete the biking and walking system in half, increased transit fleet replacement | | Make strategic investments to help complete critical connections and start to fill gaps | | Stripes funding down to only main requirements, detailing the time to fill gaps and leverage the system disconnected | | |
| SOCIAL EQUITY | C- Few low cost travel options | Safety co-benefits of fix-it programs decline but more targeted safety investments stretch ability to address highest priority needs | | | Funding same as baseline, vulnerable user safety improved by non-highway funding increase | | Targeted safety investments stretch ability to address highest priority needs, vulnerable user safety improves | | Funding same as baseline, many safety co-benefits of fix-it projects | <ul style="list-style-type: none"> Reduction in Serious and Fatal Injuries Reduction in Roadway Departure Crashes | Safety |
| | | Safety co-benefits of fix-it programs decline but more targeted safety investments stretch ability to address highest priority needs | | | Funding same as baseline, vulnerable user safety improved by non-highway funding increase | | Targeted safety investments stretch ability to address highest priority needs, vulnerable user safety improves | | Funding same as baseline, many safety co-benefits of fix-it projects | | |
| MULTIMODAL MOBILITY | D- Many connectivity gaps | Safety co-benefits of fix-it programs decline but more targeted safety investments stretch ability to address highest priority needs | | | Funding same as baseline, vulnerable user safety improved by non-highway funding increase | | Targeted safety investments stretch ability to address highest priority needs, vulnerable user safety improves | | Funding same as baseline, many safety co-benefits of fix-it projects | <ul style="list-style-type: none"> Reduction in Serious and Fatal Injuries Reduction in Roadway Departure Crashes | Safety |
| | | Safety co-benefits of fix-it programs decline but more targeted safety investments stretch ability to address highest priority needs | | | Funding same as baseline, vulnerable user safety improved by non-highway funding increase | | Targeted safety investments stretch ability to address highest priority needs, vulnerable user safety improves | | Funding same as baseline, many safety co-benefits of fix-it projects | | |
| STATE OF GOOD REPAIR | C- Several assets and areas deteriorating | Pavement and bridge condition declines system-wide, including priority routes | | | Pavement and bridge condition declines system-wide, including priority routes | | Pavement and bridge condition declines system-wide, including priority routes | | Bridge and pavement conditions improve in the near-term but still continue to decline overall in the next decade | <ul style="list-style-type: none"> Increase in % of state-owned NBI bridges and paved roadway miles in fair or better condition Reduction of deferred backlog of work | Fix-It |
| | | Pavement and bridge condition declines system-wide, including priority routes | | | Pavement and bridge condition declines system-wide, including priority routes | | Pavement and bridge condition declines system-wide, including priority routes | | Bridge and pavement conditions improve in the near-term but still continue to decline overall in the next decade | | |

Figure 24 – Summary Results Table Capturing Impact of Scenario Funding Levels on Desired-Outcome Results and Highest Return on Investment Funding Categories.

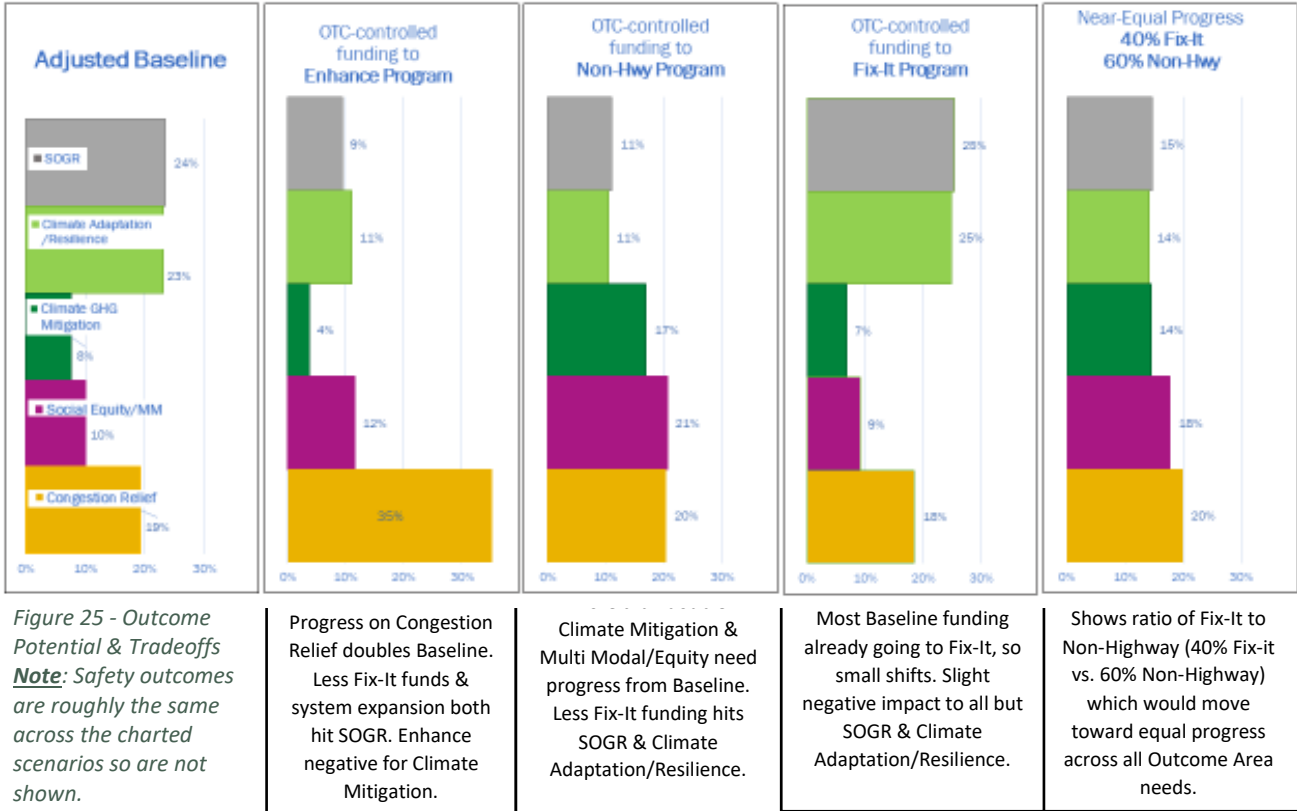
Links between Investments and Outcomes

Funding tradeoffs are highlighted in Figure 25, which shows the potential results when most of the OTC-controlled (discretionary) funding is shifted to a specific program funding category. To calculate this, we used the adjusted baseline return on investment, dollars spent toward addressing outcome area needs in the adjusted baseline, and applied those ratios to extreme shifts of OTC-controlled funding. The baseline alone, highlights how the historical funding mix prioritizes State of Good Repair and Congestion Relief outcomes over progress on Climate Mitigation, Multimodal Mobility, and Social Equity. As shown in Figure 25, Safety outcomes are roughly the same across the charts so are not shown). Even under these extreme funding scenarios, outcome area needs still far outweigh what available funding can address.

An extreme push of funding into the Enhance program funding category, shows big gains in Congestion Relief, reflecting mostly highway, but also small gains in transit options that also support this outcome area. These gains come at the expense of all other outcomes (e.g. negative impacts to both Climate Change – GHG Mitigation, by promoting single occupancy vehicle trips and SOGR, by expanding the roadway system, thus increasing maintenance needs). An extreme push of funding to the Non-Highway program funding category results in significant gains for low carbon modes that support Climate Change- GHG Mitigation, Social Equity and Multimodal Mobility outcomes. Gains in Congestion Relief under an extreme Non-Highway Funding Scenario, however, are limited. Both of these extreme scenarios (pushing discretionary funds to Enhance or Non-Highway) have a detrimental to SOGR & Climate Change – Adaptation/Resilience as the increased funding is pulled from the Fix-It program funding category. In contrast, since most funding in the STIP already goes to the Fix-It program funding category, a shift in this funding reflects a smaller percentage of total funds resulting in a limited impact to any outcomes.

Figure 25, on the following page, highlights how different funding categories contribute to outcomes. Beyond the connections of funding to outcomes in the bubble charts (shown above with each outcome), this chart shows what is possible within given funding levels. The goal to inform the public and OTC of the impact of funding choices on desired outcomes, and guide OTC's final 2024-2027 funding scenario in response to agency and public comments

Illustrative of Potential Impact of Shifting Available, Discretionary Funding on Outcome Area Needs



Conclusion

With limited funding to meet increasing needs across the multimodal transportation system, system conditions over time will decline resulting in significant consequences for Oregonians -- impacting the safety and efficiency for all modes and users.

Today’s funding levels are inadequate to preserve existing infrastructure or services at their current levels and needs continue to far outweigh available funding. Although this is the case across all outcome areas, there are outcome areas that have been historically underfunded resulting in larger gap between funding and needs – top among these are Climate GHG Mitigation, Social Equity, and Multimodal Mobility.

ODOT is taking steps to better incorporate these key priorities in decisions, including investments and project selection, across the agency’s portfolio, and has begun to develop structures and plans to better address desired outcome area needs in the near-term.

Future Analysis

As project selection begins and continues over the next year triggering phase II of the GHG analysis, the Climate Office will be working with internal and external stakeholders to review and refine this process and to seek additional opportunities to integrate agency priorities into existing these existing processes.

Phase II of the GHG Mitigation work, will apply a GHG lens to the STIP project-scoping and project-selection process. We expect the next phases to be challenging due to the sheer number of projects, complexity of GHG

calculations, the varying level of detail of STIP projects, and that decisions are part of established process among local, regional and state actors. Phase III of the GHG emissions analysis will be the work of tracking and reporting on impact of the full STIP investment program at the time of adoption.

We will be reporting out future results as well as capturing feedback and lessons learned in an effort to continuously improve analyses of future STIP cycle efforts and to better inform decisions making with the ultimate aim of enhancing the outcomes we achieve.

Appendix A – Summary of Analysis Methods

In order to inform OTC decisions an analytical process was developed to translate Program funding levels to impacts on desired Outcomes. The analysis evaluates the historic 2021-2024 STIP program funding and the resulting projects that were selected, and apply those relationships to funding assumed in the 2024-2027 scenarios, using the steps summarized in Figure A1.

Analyzing STIP Data – Process

Moving Program\$ to Outcome\$ using project-level data

Baseline 2021-2024 STIP

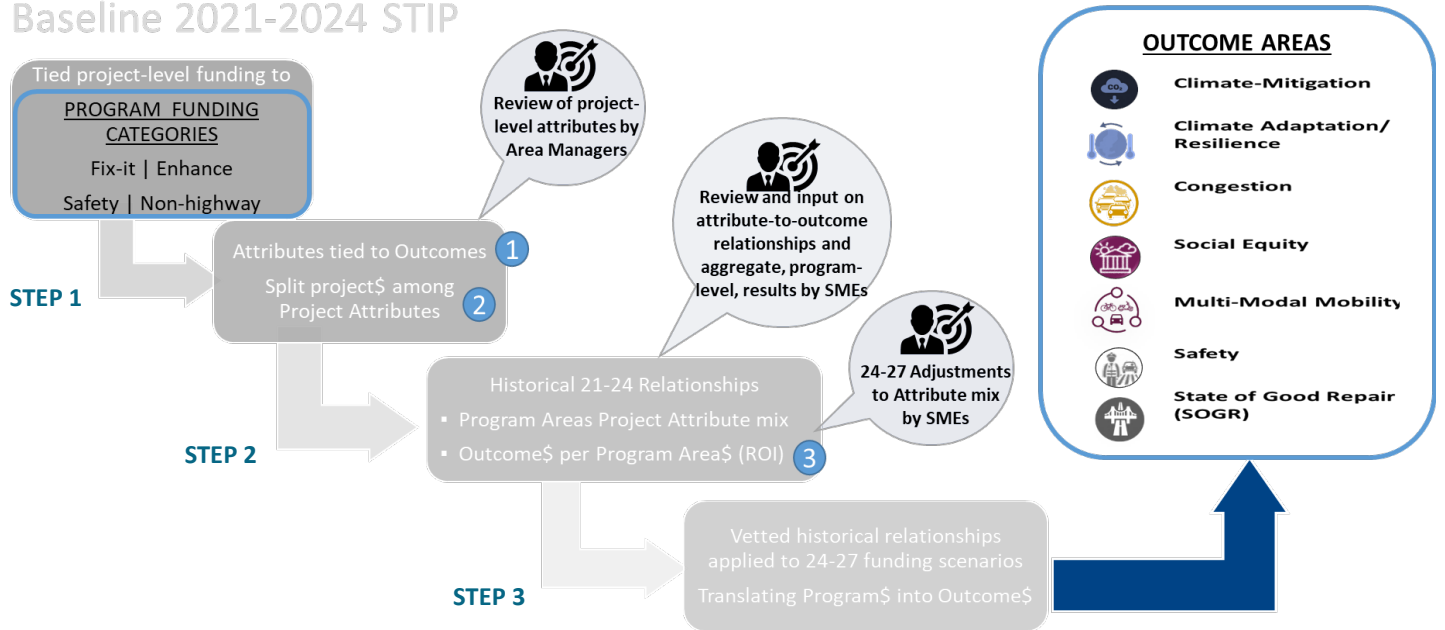


Figure A1 - Program Funding to Outcome Funding Process

Step1: Project Attributes. The process defines a set of project attributes and how these attributes would tie to Outcomes. The list of 23 attributes and their assumed contribution positively or negatively to each Outcome area is shown in Figure A2. This attribute-to-outcome relationship table was generated by ODOT Climate Office in collaboration with subject matter experts. Costs for each project in the prior STIP were split across these 23 identified project attributes. Each project includes multiple attributes, such as a bridge project, with bike lanes, and rumble strips. Staff captured all attributes in order to determine how each part of the project (attribute) contributed positively or negatively to the outcomes. The funding by project attribute was reviewed by Area Managers. The resulting mix of project attributes are summarized in Figure A3. The horizontal bars show the mix of 23 attributes identified from baseline 2021-2024 STIP project level data within each program area. As expected, Fix-it dollars fund (green) bridge and O&M projects, Enhance Program funds (gold) capacity and safety projects, and Non-Highway funds (orange) transit and bike/pedestrian projects.

1 Attribute-to-Outcome Relationship

| No. | Project Attribute Description | GOALS | | | | | | |
|-----|---|-------|----------------|----------|----|---------------|------------|--------|
| | | SOGR | ADAPT/RESILIEN | CC MITIG | MM | Social Equity | CONG (FRT) | SAFETY |
| 1 | Bridge 1: replacement, deck repair, seismic | + | + | | | | | + |
| 2 | Bridge 2: scour, erosion, paint, cathodic, monitor/inspect | + | + | | | | | |
| 3 | O&M 1: culverts, stormwater, vegetation, other basic | + | + | | | | | + |
| 4 | O&M 2: landslides, rockfall, other roadway hazards or | + | + | | | | + | + |
| 5 | O&M 3: paving, repaving, striping, signs | + | | | | | | |
| 6 | ITS 1: signal repair and timing | + | | | | | + | + |
| 7 | ITS 2: signal priority or other ITS for transit/bike/ped | | | + | + | | + | + |
| 8 | ITS 3: variable signs, curve warnings, other TSMO | | | + | | | + | + |
| 9 | Road Expand: (capacity) new lanes, new road or bridge, new | - | | - | | | + | |
| 10 | Road Expand: (safety) turn lane, intersection redesign, | | | - | | | + | + |
| 11 | Road Safety 1: rumble strips, guardrails, curve correction, | | | | | | | + |
| 12 | Road Safety 2: roundabout, pullouts, truck climbing lane | | | + | | | + | + |
| 13 | Noise abatement | | | | | + | | + |
| 14 | Freight: eliminate height/weight restriction, rail, weigh station | | | | | | + | |
| 15 | TDM: park & ride, HOV, vanpool, other trip reduction | | | + | + | + | + | |
| 16 | Bike-Ped 1: road diet, traffic calming, b/p signals | | | + | + | + | - | + |
| 17 | Bike-Ped 2: ADA, new or improved b/p facility, b/p crossing, off- | | | + | + | + | | + |
| 18 | Transit 1: bus pullout, transit road infrastructure, | | | + | + | + | + | |
| 19 | Transit 2: new bus, retrofit bus, transit shelter | | | + | + | + | | |
| 20 | Low Carbon Infrastructure: EV charging, EV parking, alt fuel | | | + | | | | |
| 21 | Materials: recycled materials, low carbon fuel/material, LED | + | | + | | | | |
| 22 | Pricing: tolling | | | + | + | | + | |

Figure A2 –Project attributes and their tie to Outcome areas

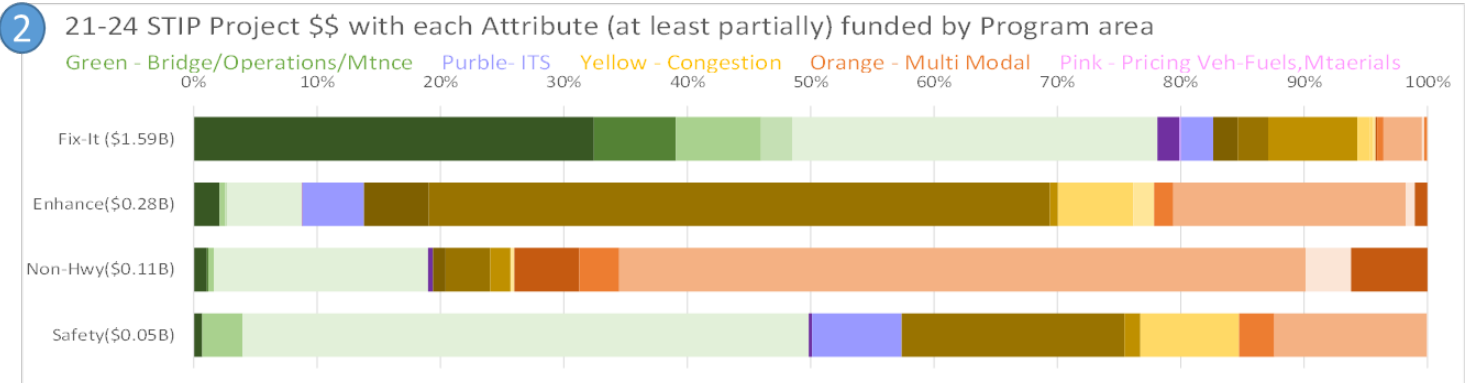
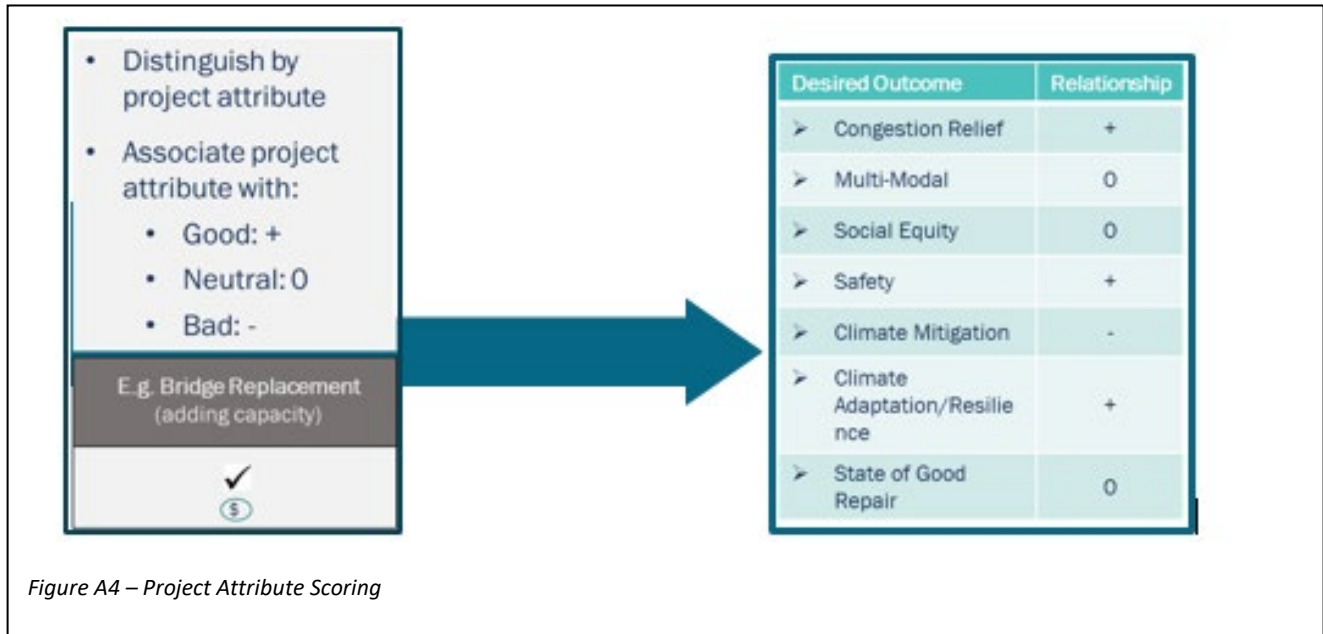


Figure A3 –Mix of 2021-2024 STIP Project attributes by Program funding area (Projects with OTC control)

Step2: Historical Relationships. Once prior STIP projects were attributed with associated dollars, each project could be scored as to its dollars that contributed towards or against the various Outcome areas. For example, as shown in Figure A4, a bridge project that adds capacity might be rated as positive for Congestion Relief while the new design standards also support Climate Adaptation/Resiliency outcomes, but the project also has new bike lanes and addresses a Safety issue. Each attribute is credited, proportional to the cost of that attribute, toward the associated outcomes. Credits can further be split across the various program areas funding a project. Supposing a \$100M project was equally funded by bridge and safety, and the bridge attribute part of the project was \$60M with the scoring relationship in Figure A4, \$30M (50% of \$60M) would be credited towards the 3 positive (Congestion Relief, Safety and Climate Adaptation/Resiliency) and one negative (Climate Mitigation)

Outcomes for each of the Program Funding categories. A similar exercise would be applied to scoring the other \$40M worth of attributes. The total Outcomes resulting from all the projects funded by a specific Program Area, forms a core relationship, the Outcome dollars expected for every Program dollar spent. This relationship is shown in the bar chart of Figure A5.



Step3: Apply relationships to 2024-2027 Scenarios. These baseline relationships from the 2021-2024 STIP projects (Step 2) are applied to a different mix of funding found in the 2024-2027 STIP scenarios. The outcomes funded by program area, can then be combined with 2024-2027 STIP scenarios mix of program funding, to estimate the total STIP investments toward each outcome. That is given the mix of project attributes funded by that Program area remains the same, how many dollars would the funding from that Program Area support each outcome area. Combining the funding from all Program areas, results in the combined effect on the each Outcome area. Subject Matter Experts reviewed historical baseline relationships toward outcomes and made adjustments to better reflect anticipated shifts in the 2024-2027 funding scenarios.

Investments to Influence Outcomes

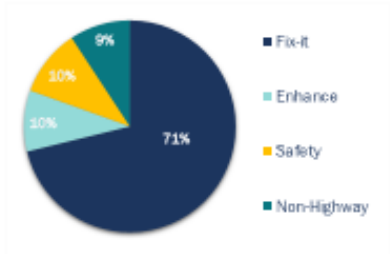
Investment categories scaled to their support of outcomes



Appendix B – Individual Scenario Results

As previously mentioned the Baseline grades are derived from real 2021-2024 STIP data regarding how funding is allocated to real projects and how those projects will address needs across outcome areas. All individual scenario results are relative to the 2021-2024 STIP baseline results. The Commission has the ability to further influence how allocated funding is spent by setting program specific policy.

Adjusted Baseline



Baseline

Funding splits unchanged

| Outcome Areas | System Impacts and Implications |
|---------------------------------|---|
| Climate – GHG Mitigation | D - Most trips drive alone & in low MPG cars |
| Climate – Adaptation/Resilience | C - Slow progress with preservation projects |
| Congestion Relief | B - Select bottleneck projects in development |
| Social Equity | C - Few low cost travel options |
| Multimodal Mobility | D Connectivity gaps |
| Safety | B Focus on fatalities and serious injuries |
| State of Good Repair | C Several assets and areas deteriorating |

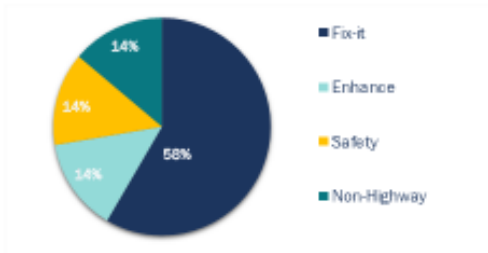
*Note, grades reflect progress toward meeting identified needs, and are not the same as level of service

Note:

- Left side has a pie chart that shows funding split and changes in funding levels from the adjusted baseline.
- The table on right shows results.
- The adjusted baseline table is the only one that will show letter grades. These are not the same a level of service; instead grades to relate overall funding versus need.
- Need far outpaces funding for all outcome areas.

S1 – Enhance

Changes from Baseline

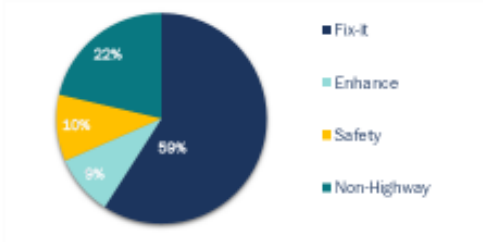


| Outcome Areas | | System Impacts and Implications |
|---------------------------------|---|--|
| Climate – GHG Mitigation | = | Increased investments in bike, ped, transit, help to off-set capacity increases |
| Climate – Adaptation/Resilience | ↓ | Less funding to fix the system hampers ability to upgrade vulnerable infrastructure |
| Congestion Relief | ↑ | Starts to address a few critical bottlenecks |
| Social Equity | ↑ | Increased accessibility for highest need users to low cost, low carbon modes |
| Multimodal Mobility | ↑ | More strategic investments can be made to help complete critical connections |
| Safety | ↑ | Safety co-benefits of fix-it programs decline but more targeted safety investments stretch ability to address highest priority needs |
| State of Good Repair | ↓ | Pavement and bridge condition declines system-wide, including priority routes |

Note:

- The most significant change in this scenario is adding funding for enhance, with additional dollars to non-highway and safety as well.
- In turn, improvements are seen to congestion relief, multi-mobility mobility as well as slight improvements to safety.
- GHG emissions are likely to stay relatively flat compared to the baseline (MM helps offset capacity projects), but the hit in this scenario and the next several comes from the Fix it program.
- Reducing Fix-it funding impacts our ability to keep bridges and pavements in a state of good repair and to adapt to climate impacts.

S2 – Non-highway Changes from Baseline

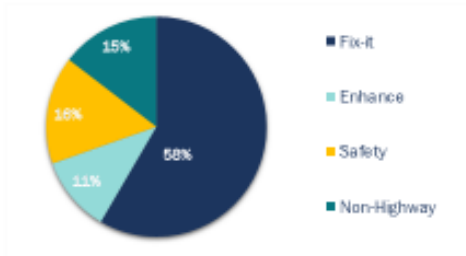


| Outcome Areas | System Impacts and Implications |
|--|---|
| Climate – GHG Mitigation | Increased low carbon transportation options |
| Climate – Adaptation/Resilience | Less funding to fix the system hampers ability to upgrade vulnerable infrastructure |
| Congestion Relief | Slightly less funding impacts resources for bottleneck projects but is offset some by multimodal projects |
| Social Equity | Increased access for all users to low cost, low carbon modes |
| Multimodal Mobility | Cut timeframe to complete the biking and walking system in half; increased transit fleet replacement |
| Safety | Funding same as baseline; vulnerable user safety improved by non-highway funding increase |
| State of Good Repair | Pavement and bridge condition declines system-wide, including priority routes |

Note:

- Here we see some key changes in significant funding shifting to non-highway.
- GHG emissions can be reduced most in this scenario.
- Such a substantial increase in funding to non-highway cuts the timeframe to complete the bike-ped system in half.
- Increased MM mobility leads to more low carbon transportation options for all users – benefiting social equity.

S3 – Safety/ Non-highway Changes from Baseline



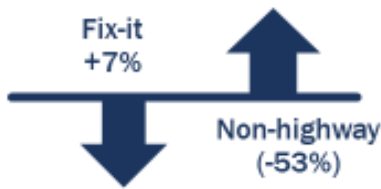
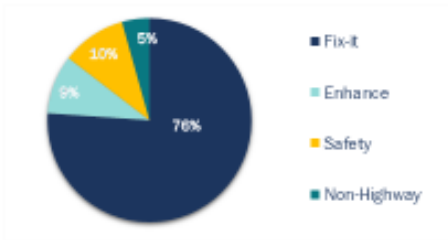
| Outcome Areas | System Impacts and Implications |
|---------------------------------|--|
| Climate – GHG Mitigation | Fewer crashes and some more low carbon options |
| Climate – Adaptation/Resilience | Less funding to fix the system hampers ability to upgrade vulnerable infrastructure |
| Congestion Relief | Some funding for critical bottlenecks |
| Social Equity | Starting to increase access for all users to low cost, low carbon modes |
| Multimodal Mobility | Make strategic investments to help complete critical connections and start to fill gaps |
| Safety | Targeted safety investments stretch ability to address highest priority needs; vulnerable user safety improves |
| State of Good Repair | Pavement and bridge condition declines system-wide, including priority routes |

Note:

- Like Scenario 1, Scenario 3 includes increases to Enhance, Non-Highway, and Safety.
- However the amounts vary with less for Enhance and more for Non-Highway in this scenario.
- Overall results of this scenario are positive nearly across the board relative to the baseline.
- The exception is SOGR and Adaptation.

S4 – Fix-it

Changes from Baseline



| Outcome Areas | System Impacts and Implications |
|--|--|
| Climate – GHG Mitigation | Driving remains predominate travel option |
| Climate – Adaptation/Resilience | Start to address locations or infrastructure that is most vulnerable |
| Congestion Relief | Slightly less funding impacts resources for bottleneck projects |
| Social Equity | Auto accessibility high while access to non-auto travel does not improve |
| Multimodal Mobility | Strips funding down to only min requirements, doubling the time to fill gaps and leaving the system disconnected |
| Safety | Funding same as baseline; many safety co-benefits of fix-it projects |
| State of Good Repair | Bridge and pavement conditions improve in the near-term but still continue to decline overall in the next decade |

Note:

- But SOGR and Adaptation/Resilience get their ‘time in the spotlight’ in this scenario, with an increase of fix-it funding by 7%.
- This funding comes from non-highway, significantly gutting that program to bare minimum requirements.
- The result of this plays fairly negative in most categories.