



**Research Stage 1 Problem Statement**

**NUMBER 26-42 – “FEASIBILITY AND IMPACT STUDY TO INCREASE OREGON’S CURRENT PERMIT WEIGHT LIMIT FOR TRUCKS IN SUPPORT OF ELECTRIFICATION OF FREIGHT NETWORKS”**

**1. Concisely describe the transportation issue** (including problems, improvements, or untested solutions) that Oregon needs to research.

The National Zero-Emission Freight Corridor Strategy (2024) has identified a significant portion of the I-5 corridor in Oregon for its Phase I plan (2024-2027) to support zero-emission, primarily electric, medium- and heavy-duty vehicles. At the same time, several states, including the neighboring states of Idaho and Nevada, have designated freight routes with a heavier weight limit in response to demands from shipping and trucking industries. As a result, there is a growing need to increase Oregon’s current permit weight limit for trucks in support of (a) electrification of freight networks and (b) consistent weight limits within the region. The proposed research aims to conduct a feasibility and impact study for selective heavy-weight designations in Oregon’s freight system. The study will review and improve upon existing designation programs across the nation and evaluate potential ramifications on (a) risk to structural integrity of critical assets (e.g., pavement and bridges), (b) potential traffic safety impacts of road users on designated routes, and (c) environmental evaluation of increasing weight limits.

**2. What final product or information** needs to be produced to enable this research to be implemented?

Apart from the project report, results from this research will be compiled into a whitepaper summarizing potential routes for pilot projects and/or follow-up studies as well as the multi-faceted impacts of heavy-weight route designations. Specifically, the project report and whitepaper will provide recommended measures to support the route designation, including (a) necessary updates to state transportation asset management plan, (b) addition or change to weighing stations and/or weigh-in-motion systems, (c) adjustments to bridge inspection plans and load rating vehicles, and (d) the need of additional charging stations on designated routes, among others. Ultimately, if successful, the study can be used to update the current weight limit policy in Oregon.

**3. (Optional)** Are there any individuals in Oregon who will be instrumental to the success of implementing any solution that is identified by this research? If so, please list them below.

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#### 4. Decision making lenses

Please complete the following three sections. Your answers to these questions will be applied on a programmatic basis to support agency decisions. Answering yes to the questions below is not required. Resolving a narrowly focused technical research problem may meet agency needs without answering yes to any of the following questions. The ODOT Research Section will seek a balanced portfolio some projects will answer yes to one of the three categories below (e.g. climate, equity, and/ or safety) and other projects in a different category.

We are looking for an overall program balance and no one project is expected to balance all categories. Generally, a research problem statement is expected to be able to answer yes with clear and verifiable information in only one of the three categories below, some projects may be able to answer yes in two or even three categories. Some projects (i.e. needs focused on specific elements of infrastructure design), may have no yes answers but may still be high value research need.

#### Climate

Oregon recognizes the climate crisis and makes systemic changes to reduce emissions caused by travel. Every mile driven in Oregon is powered by a clean source of fuel. We seek research that supports construction and maintenance operations are carbon neutral and investments in mobility that support travel by low and no emission modes. While every research project may not result in a reduction in emissions, transportation investments overall support emission reductions to achieve state goals. Oregon envisions a transportation system that is resilient in the face of seismic and climate events and impacts to the degradation of the natural environment are reduced. Our vision includes a transportation infrastructure is built in a way that avoids impacts on key habitat and results in better environmental conditions for wildlife and native vegetation. For definitions and details please review the equity vision, goals, and objectives of the [ODOT Strategic Action Plan](#) and [Oregon Transportation Plan](#).

4f. Will addressing the **transportation issue** identified as a need in Question 1 develop, or validate methods for the estimation, measurement, or monitoring of transportation generated greenhouse gases (GHG)?

Yes

No

Unsure

4g. If climate or GHG is not the focus of this **transportation issue** identified in this problem statement, will the research apply a GHG analysis to transportation infrastructure, planning, operations, maintenance, or materials?

Yes

No

Unsure

4h. Will the addressing the **transportation issue** include development or testing of construction practices, methods, or materials to establish potential reductions in greenhouse gas emissions?

Yes

No

Unsure

4i. Will the solving the **transportation issue** in question 1 study or support the reduction of vehicle miles traveled and single occupancy vehicle travel or support transition to electric vehicles (or other types of zero emission vehicles) or low-carbon alternative fuels?

Yes

No

Unsure

4j. Will the solving the **transportation issue** in question 1 lead to work that will support, measure, monitor, transportation system resilience in response to expected climate events, effects, or natural

disasters in general?

Yes

No

Unsure

4k. Will the solving the **transportation issue** in question 1 lead to work that may result in better environmental conditions for wildlife and native vegetation?

Yes

No

Unsure

4l. If you answered yes to any of the climate questions above or can provide alternative details related to climate, please provide additional information:

- 4g: The research will apply GHG calculation to assess potential impact of increasing weight limits on designated routes.
- 4i: One unique lens of this research is to investigate the opportunities associated with raising weight limits to facilitate the transition to electric freight vehicles.

## Equity

Equity can have many dimensions and impacts relating to communities, and transportation. It is important that problem statement proposals clearly explain in what capacities are equity dimensions or impacts being examined within problem statements. It is a goal of the OTP to “Improve access to safe and affordable transportation for all, recognizing the unmet mobility needs of people who have been systemically excluded and underserved. Create an equitable and transparent engagement and communications decision-making structure that builds public trust”. Proposed research may have the intent of studying elements of this goal or apply analysis to specific transportation topics to ensure the resulting research recommendations is consistent with our equity goals. For definitions and details please review the equity vision, goals, and objectives of the [ODOT Strategic Action Plan](#) and [Oregon Transportation Plan](#).

4a Is the **transportation issue** identified as a need in Question 1 specifically focused on transportation equity?

Yes

No

Unsure

4b If the **transportation issue** is not focused on transportation equity, will the primary topic be assessed for equity benefits or impacts within the research project?

Yes

No

Unsure

4c Is the implementation of potential findings from this research likely to directly involve participation from an identified group that would benefit from an equitable process or outcome?

Yes

No

Unsure

4d Is the intended final product or information expected to support ODOT’s equity efforts (including but not limited to supporting one of the equity related objectives of the [ODOT's Strategic Action Plan](#) or [Oregon Transportation Plan](#)) ?

Yes

No

Unsure

4e If you answered yes to any of the equity questions above or can provide alternative details related to equity, please provide additional information:

Not applicable

## Safety

Research outcomes may include interventions and countermeasures to prevent or reduce the frequency of crashes or other causes of transportation-related injury or death; or may include measures to reduce severity of injury (including prevention of death) after a crash or other injurious event. For definitions and details please review the equity vision, goals, and objectives of the [ODOT Strategic Action Plan](#), [Oregon Transportation Safety Action Plan](#) and [Oregon Transportation Plan](#).

4m. Will solving the **transportation issue** in question 1 support improving **safety culture** for either transportation workers or the traveling public?

Yes  No  Unsure

4n. Will the solving the **transportation issue** support improving safety through **healthy and livable communities**?

Yes  No  Unsure

4o. Will solving the **transportation issue** support improving safety through using **best available technologies**?

Yes  No  Unsure

4p. Will solving the **transportation issue** support improving safety through **communication and collaboration**?

Yes  No  Unsure

4q. Will the solving the **transportation issue** support improving safety through **investing strategically**?

Yes  No  Unsure

4r. If you answered yes to any of the safety questions above or can provide alternative details related to safety, please provide additional information:

- 4q: The research will analyze tradeoffs regarding the impacts of commercial vehicles of different weights and lengths on selected corridors.

5. Other comments:

To address the transportation issue described in Question 1, the research will carry out the following tasks:

- Apply network analysis and panel deliberation to identify candidate corridors and routes to improve freight capacity within the state as well as freight throughput across the region.
- Gather and analyze load spectra on the candidate routes as well as load configuration of typical electric trucks; collect condition data of pavement and bridge assets on the candidate routes. Compare load and condition data of Oregon routes with 129,900-lbs routes in Idaho and Nevada. Screen candidate routes based on load rating, structural reliability, and life-cycle analysis.

- Rank and optimize candidate routes based on risk-informed cost-benefit analysis. The cost will be quantified for both direct agency cost as well as externalities associated with traffic safety, environmental impact, and GHG emissions. The benefit will be quantified from the perspectives of freight performance and transition to electric trucks.
- Identify a corridor or a set of corridors for a potential pilot project; provide recommendations on inspection, maintenance, and operation in support of the weight increase on pilot corridors. Develop a tiered list of high-weight corridors for phased implementation.

To facilitate the accomplishment of these tasks, relevant experience from the submitter is listed below:

Yang, D.Y. and Frangopol, D.M., 2020. Life-cycle management of deteriorating bridge networks with network-level risk bounds and system reliability analysis. *Structural Safety*, 83, p.101911.

Yang, D.Y. and Frangopol, D.M., 2018. Risk-informed bridge ranking at project and network levels. *ASCE Journal of Infrastructure Systems*, 24(3), p.04018018.

In addition, the research team will leverage developed tools and results from their previous and ongoing projects:

Yang, D.Y., White, K., and Wood, T.A., 2022-2025. Risk-Based Methodology for Structural Evaluation of Bridge-Sized Culverts. *Federal Highway Administration (FHWA) Contract No. 693JJ321C000036*.

**6. Corresponding Submitter’s Contact Information:**

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This form is not a grant application or contract document.