



Research Stage 1 Problem Statement

Number 26-47 – “Climate Education Center focused on to transportation pavements, bridges, and structures”

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

Net zero, greenhouse gas emissions, environmental product declarations (EPDs), global warming potential (GWP), biofuels, electrification, and several other climate-related topics have been and will continue to be discussed by many in the construction industry. However, the public, decision-makers, construction and production workers, contractors, other industry partners, and students generally do not know much about these concepts. This project will expand on an educational center at OSU to expand the teaching of different climate-related terms and factors and their connection to transportation pavements, bridges, and structures.

2. What **final product or information** needs to be produced to enable this research to be implemented? A series of modules will be prepared for various audiences. The modules would be offered to the industry and ODOT employees for educational credits. The modules would be available fully online in an on-demand format. Some of the courses can be offered in person, depending on interest and availability. The courses could be ‘linked’ for a certificate to demonstrate competency by individuals taking the course. The courses would be designed to be 8 to 10 hours long and could include a wide variety of topics. Deliverables will include classes, seminars and webinars.

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 gasses (GHG)?

Yes

No

Unsure

[The project provide education on estimation and measurement of greenhouse gas emissions.](#)

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

[The project provide education on estimation and measurement of greenhouse gas emissions.](#)

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

[The project provide education on estimation and measurement of greenhouse gas emissions.](#)

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

[The project provide education on estimation and measurement of greenhouse gas emissions.](#)

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:

[See responses above](#)

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:

[While the project is not focused on equity the process can be used by all and provides a level platform for evaluating material solutions. Education can be provided to a wide range of users.](#)

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

While the project is not focused on safety the process can be used by all and provides a level platform for evaluating material solutions. Education can be provided to a wide range of users.

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:

[These results are provided in the sections above.](#)

5. Other comments:

[Title: Identification and Specification of Alternative Supplementary Cementitious Materials for making Lower Clinker Content Concrete with a Low GWP](#)

[Category: Process for Substantially Lower Embodied Carbon](#)

Net zero, greenhouse gas emissions, environmental product declarations (EPDs), global warming potential (GWP), biofuels, electrification, and several other climate-related topics have been discussed by many, and we all keep hearing those concepts. However, the public, decision-makers, construction and production workers, contractors, other industry partners, and students generally do not know much about those concepts. It is important to start an education center to teach the meaning of different climate-related terms and factors and their connection to transportation pavements, bridges, and structures.

Oregon State is a leader in distance education. Several PIs have offered numerous courses at Purdue and Oregon State in the distance platform. Recently, a memorandum of understanding has been developed to offer distance courses for industry and the profession. The team suggests the development of a series of modules for the industry, and the costs of development would be partially borne by this grant. The modules would be offered to the industry for a fee, and ODOT employees would receive educational credits that would cover the cost of their modules. The modules would be available fully online in an on-demand format. Some of the courses can be offered in person, depending on interest

and availability. The courses could be ‘linked’ for a certificate to demonstrate competency by individuals taking the course. The courses would be designed to be 8 to 10 hours long and could include a wide variety of topics:

- 1) Importance of Global Warming and Current Global Strategies to Mitigate its Impact on the Environment
- 2) Environmental Product Declarations – What are They and How Are They Used?
- 3) Going Green - Green Concrete Materials
- 4) Modern Supplementary Cementing Materials
- 5) Low-Carbon Asphalt Mixtures without Sacrificing Long-term Performance
- 6) Strategies to Reduce Asphalt Plant Production Emissions
- 7) General Strategies and Production Plant Improvements to Improve the Performance of Asphalt Mixtures with High Reclaimed Asphalt Pavement (RAP) Contents
- 8) GWP Reduction Rules of Thumb and Voluntary Guidelines
- 9) Accelerating Strength Development in Low Clinker Materials
- 10) Testing for Performance Engineered Concrete Mixtures
- 11) Acceptance Criteria for Performance Engineered Concrete Mixtures
- 12) Balanced Asphalt Mixture Design and Performance Based Specifications
- 13) Performance Engineered Concrete for Pavements and Structures
- 14) Life Cycle Assessment of Concrete Elements
- 15) Life Cycle Assessment of Asphalt Materials

Webinars, mini symposia, and industry visits (including production plants) can be organized in this center. This effort will also aim to include cities and counties in climate-related topics. The findings from all the research projects in this grant can also be shared with the public through this center. The benefits of this center and the program could also be quantified through surveys and interviews with the people involved in the program.

This center can be impactful and create positive publicity for ODOT regarding climate-related efforts. It will also demonstrate to the industry the importance of climate change and the smooth transitioning process to achieve net zero. This effort can encourage what can be done at the pavement and structural level to mitigate climate change.

The full listing of courses will be developed in discussion with a study advisory group composed of ODOT, industry, and Oregon State faculty. The model formed would allow OSU to charge for the classes after development (using the ODOT credits for ODOT personnel) to allow additional classes to be developed as well as courses to be maintained. This would also include time for questions and answers.

6. Corresponding Submitter’s Contact Information:

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This form is not a grant application or contract document.