



FY 2025 Annual Program Research Project Statement 25-107

Title:	Synthesis: Carbon Capture and Repurposing By-Products
The Problem:	There is a need to implement new methods of carbon emissions point source capture. Investigating the opportunities of carbon capture and its repurposing, the Texas Department of Transportation could aid in large project environmental clearances and reuse of materials within our highway designs and operations.
Technical Objectives:	<p>The objectives of this synthesis project are:</p> <ul style="list-style-type: none"> ● Conduct a literature review and summarize state-of-the practice and key findings. ● Identify the various opportunities for carbon capture within DOT operations, including but not limited to: <ul style="list-style-type: none"> ○ Prevailing practices of carbon capture in the transportation infrastructure industry. ○ Identifying point source opportunities. ● Determine and recommend various methodologies, conventional and unconventional, to perform removal or separation of carbon emissions that are currently available for point source capture. ● Determine how captured carbon emissions can be repurposed as a commodity or material for transportation use. <ul style="list-style-type: none"> ○ Conduct an assessment of processing and conversion technology (e.g., pre-combustion capture, post-combustion capture, and direct air capture), regulatory and safety considerations, quality and performance standards, including engineering and testing, economic viability of by-products, and environmental impacts/benefits (e.g., using Life Cycle Assessment framework). ○ Propose methods to process and re purpose carbon emission by-products for various transportation uses. ● Determine the current Federal incentives for carbon capture. Identify grant and other sources of funding opportunities to fund the recommended practices and infrastructure project including carbon capture methods. ● Outline a recommended plan towards implementation on TxDOT projects including recommending designs, processes, equipment, and governance, including the involvement of non-TxDOT entities. <p>The expected technology readiness level (TRL) for this project is 2.</p>
Anticipated Deliverables :	<ol style="list-style-type: none"> 1. Technical memorandum for each task completed. 2. Monthly progress reports. 3. Project Summary Report 4. Research report documenting the findings of this research, including: <ul style="list-style-type: none"> ● Methods of carbon capture and technological evaluation, ● Results of the repurposing assessment and other considerations, ● Potential federal incentives and other funding resources, ● Recommended implementation guidance, ● Value of Research (VoR) that includes both qualitative and economic benefits.
Proposal Requirements:	<ol style="list-style-type: none"> 1. The project duration shall not exceed 12 months. 2. The project budget shall not exceed \$65,000.00. 3. RFP#1 Q&A Deadline: 12:00 p.m. Central Time, Tuesday, February 20, 2024. 4. Proposal Deadline: 12:00 p.m. Central Time, Thursday, March 21, 2024. 5. Use the current “ProjAgre” and “PA Forms” templates located at the RTI Forms webpage. 6. Proposals will be considered non-responsive and will not be accepted for technical evaluation if they are not received by the deadline or do not meet the requirements stated in RTI's University Handbook. 7. Proposals should be submitted by the University Liaison in PDF format; (1) PDF file per proposal. File name should include project name and university abbreviation. 8. This project will be tracked during the life of the project using the Technology Readiness Level (TRL) scale. 9. The 2021 Texas Legislative Session requires that universities be in compliance with Senate Bill 475 by submitting a completed and signed TxDOT Security Questionnaire (TSQ) to RTIMAIN@txdot.gov. Universities that have not submitted a completed and signed TSQ one week after award will be considered non-compliant and unable to participate in the Program.