

# INTERMODAL—INcreasing Transportation Efficiency and Resiliency through MODELing Assets and Logistics

## PROJECT DESCRIPTIONS

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### National Renewable Energy Laboratory – Golden, CO

*Intermodal Freight Optimization for a Resilient Mobility Energy System (INFORMES) - \$2,200,000*

National Renewable Energy Laboratory (NREL) will develop a national-level intermodal freight modeling framework for infrastructure planning and logistics operations that would provide insights to decision-makers redesigning the national freight infrastructure and intermodal logistics system to meet net-zero targets by 2050. NREL will develop and integrate models to identify and quantify the most cost-effective low-carbon infrastructure deployment strategies and robust optimal operations for intermodal logistics over the national freight transportation network.

### Michigan Technological University – Houghton, MI

*A Decarbonized and Resilient Intermodal Freight Transportation (DRIFT) Modeling Platform for Intermodal Logistical Decisions Under Uncertainty - \$1,200,000*

Michigan Technological University will develop a modeling platform to support long-term planning decisions on transportation mode, route, and charging, as well as make planning more flexible and adaptive by continually updating its logistics decisions to consider real-time traffic conditions and natural- and human-made disruptions. The proposed platform could empower decision-makers to conduct planning analysis under uncertainty by identifying new optimal intermodal routes, reducing the overall energy usage per ton-mile of freight while minimizing cost and increasing the resiliency of the supply chain.

### University of Tennessee, Knoxville – Knoxville, TN

*A Cognitive Freight Transportation Digital Twin for Resiliency and Emission Control Through Optimizing Intermodal Logistics (RECOIL) - \$1,900,000*

The University of Tennessee, Knoxville will develop a cognitive digital twin for the U.S. intermodal freight transportation system, including all road, rail, and waterways, to maximize efficiency and resiliency and minimize life cycle greenhouse gas emissions. This digital representation could offer flow planning, scheduling, and optimization of the entire intermodal freight system within 24 hours. Additionally, the proposed technology could adapt quickly to traffic, weather, and other disruptions by supplying local route rescheduling within one hour.

### Pacific Northwest National Laboratory – Richland, WA

*Optimal Global Platform for Transportation (Opt-GPT): Optimal Net-Zero Technology Deployment and Route Planning Co-Design in Intermodal Freight Transportation for Multi-Objective System-level Efficiency and Climate Change Mitigation - \$1,500,000*

Pacific Northwest National Laboratory (PNNL) will develop a decision-support tool to evaluate the impact of present and future low-emission fuels on intermodal freight transportation with the goal of optimizing the fuel-mix deployment to

minimize the cost of decarbonization. PNNL's innovative approach could reduce greenhouse gas emissions from the intermodal transit system by 60% by 2050.

### **University of Illinois at Urbana-Champaign – Urbana, IL**

*Integrated Intermodal Freight Models and Tools for Efficiency and Resiliency - \$1,500,000*

The University of Illinois at Urbana-Champaign (UIUC) will develop data and computational models to provide systematic data-driven intermodal freight analysis and critical infrastructure planning that prioritizes decarbonization. UIUC's approach will enable a prototype freight data hub on intermodal freight operations as well as logistics optimization models explaining decisions by planners while assessing system resilience amid disruptions.

### **Oliver Wyman – Princeton, NJ**

*Intermodal Routing and Environmental Impact Analysis Tool - \$500,000*

Oliver Wyman will develop a publicly available software that would empower shippers, freight carriers, and infrastructure planners to seamlessly integrate intermodal transit route logistics. The proposed software goes further than typical in-house proprietary tools by creating an end-to-end software package that generates optimized shipping options across the interconnected intermodal network given network-wide freight demand.

### **Northwestern University – Chicago, IL**

*Inter Modal Analytics for Green Infrastructure Network Energy Decarbonization (IMAGINED) - \$2,200,000*

Northwestern University will develop an online, open-source platform that would support the roll out of decarbonized infrastructure investments across the freight network and offer logistics routing for individual shipments. Northwestern University's platform could pinpoint opportunities for decarbonization at transloading terminals, which play a crucial role in determining the feasibility and efficiency of intermodal transit.