**I. PROJECT STATEMENT**

The University of Minnesota Extension Regional Sustainable Development Partnership (RSDP) will lead this statewide project, *Filling Empty Trucks: Energy Efficient Regional Food Distribution* with the goal to implement “backhauling” as an air quality, climate change, and energy efficiency strategy for regional food distribution. Backhauling, or using the return trip of a delivery truck, can reduce the carbon footprint of local and regional food systems and drastically reduce environmental impacts. Empty trucks waste fuel. For example, project partner, Mason Brothers Wholesale Grocery in Wadena, Minnesota has a fleet of trucks traveling 48,000 miles per week delivering groceries, of which over 20,000 miles are trucks returning to the warehouse empty. The project team will plan and execute the Filling Empty Trucks (FET) backhaul model in three Minnesota regions (NE, NW, and West Central) by coordinating cross-docking and backhauling among three farmers, three rural grocery stores, and two wholesalers. Environmental benefits and cost saving mechanisms identified during this project will be ready for implementation by Minnesota businesses.

The proposed project will employ an expert public and private sector team to develop, research, confirm, and deploy transportation best practices that maximize transportation efficiency in the regional food supply chain, including efficient vehicle utilization, filling empty trucks via backhauling, developing transportation collaborations, and systematizing backhauling in the Minnesota food supply chain.

Minnesota leads the nation in developing a backhaul system that uses existing underutilized rural infrastructure to build an energy efficient regional food supply chain. This project works with partners in the wholesale grocer sector to reduce local food transportation miles, associated fuel, and emissions. Through development of an FET backhaul supply chain, the State of Minnesota can substantially reduce environmental impacts by making use of empty trucks already traveling from rural grocery stores to wholesale warehouses, thus working to protect, conserve, preserve, and enhance Minnesota’s resources.

**II. PROJECT ACTIVITIES AND OUTCOMES**

**ACTIVITY 1 Title: Develop and deploy the Filling Empty Trucks (FET) backhaul supply chain model**

**Description:** The project team researchers will analyze transportation routes, distribution requirements, incentives, and behaviors with the goal of identifying efficiencies that maximize fuel use and reduce total greenhouse gas emissions per unit delivered. The project team will also analyze the cold chain to identify opportunities to reduce energy usage and infrastructure build out (embedded energy and increased electrical load implications). The effects of optimizing driver behavior with reduction in fuel usage will be studied and quantified in terms of emission reduction. Formative evaluation will be used through continuous interactions with participating farmers, grocers, and wholesalers during the project.

**ENRTF BUDGET:** $350,544

|  |  |
| --- | --- |
| **Outcome** | **Completion Date** |
| 1. Analyze transportation routes, requirements, and the incentives and behaviors for participation in the FET backhaul supply chain. | 7/1/2021  (Year 1) |
| 2. Research reduction in fuel usage and emissions by fleet driver training on energy efficient driving combined with the FET backhaul model. | 7/1/2021  (Year 1) |
| 3. Analyze cold chain to reduce energy usage and infrastructure build out (embedded energy and increased electrical load implications). | 7/1/2022  (Year 2) |

**ACTIVITY 2:** Systematize Filling Empty Trucks (FET) backhaul model for broader implementation across stores, wholesalers, and farmers

**Description:** The project team will plan and execute the FET backhaul model in three Minnesota regions (NE, NW, and West Central) by coordinating cross-docking and backhauling among three farmers, three rural grocery stores, and two wholesalers. RSDP, in partnership with Vermont, developed a pilot curriculum for efficiency in transportation through fleet driver training, a tool that will be used in tandem with the FET backhaul model. The team will disseminate results.

**ENRTF BUDGET:** $708,228

|  |  |
| --- | --- |
| **Outcome** | **Completion Date** |
| 1. Pilot and implement the FET backhaul in three MN regions (NE, NW, West Central). Coordinate FET cross-docking and backhauling among multiple farmers, rural grocery stores and wholesalers at three sites to scale up and build efficient supply chain system(s) for locally grown foods. | 6/30/2023  (Year 2 and 3) |
| 2. Develop curriculum and tools for truckers, wholesalers, grocers, and farmers participating in the FET supply chain. Support scaling up and expanding to other Regions. | 6/30/2023  (Year 3) |
| 3. Evaluate and disseminate results across transportation and regional food system industry and support widespread adoption of Filling Empty Trucks. | 6/30/2023  (Year 3) |

**III. PROJECT PARTNERS AND COLLABORATORS:**

Filling Empty Trucks (FET) backhaul model will be tested with, but not limited to, three farms (**Round River Farm, Doubting Thomas Farm, and Big Stone Garlic**), Duke Harrison with **Mason Brothers Wholesale,** and **Russ Davis Wholesale**, and **Bonnie’s Hometown Grocery**, **Tony’s Supervalu,** and **Finland Cooperative General Store**.

Project collaborators include: **Dr. Kathryn Draeger,** Statewide Director, UMN Extension, RSDP; Adjunct Professor, member of the Graduate Faculty, Dept. Agronomy and Plant Genetics; **Ren Olive,** Program Associate, Sustainable Agriculture and Food Systems, UMN Extension, RSDP**; RSDP Regional Executive Directors:** Anne Dybsetter (SW), Dr. Okey Ukaga (SE), Molly Zins (Central), David Abazs (NE), Linda Kingery (NW)**; Dr. Karen Donohue,** Professor, Supply Chain and Operations, UMN Carlson School of Management;

**Dr. Kevin Linderman,** Curtis L. Carlson Professor, Supply Chain and Operations, UMN Carlson School;

**Lee Munnich,** Senior Fellow, State and Local Policy Program, Humphrey School of Public Affairs; Center for Transportation Studies; **Dr. Will Northrop,** Assoc. Professor, UMN Dept. of Mechanical Engineering, Center for Transportation Studies; **Ryan Pesch,** UMN Extension Community Economics;

**Dr. Hikaru Peterson,** Professor and Coordinator, Undergraduate Agricultural and Food Business Management Major UMN Dept. of Applied Economics; **Dr. Emily Hoover,** Professor and Head, Horticulture

**IV. LONG-TERM IMPLEMENTATION AND FUNDING:**

This Filling Empty Trucks supply chain project is a collaboration between UMN, grocers, wholesalers, and Minnesota farmers that can result in improved air quality, emissions reduction, and ultimately, mitigate climate change. Increasing delivery truck efficiency through backhauling and fleet driver training will have lasting impact on lowering the carbon footprint of food transportation. The project team will work with stakeholders across Minnesota to increase the environmental benefits and cost saving mechanisms identified during this project, enabling implementation by Minnesota businesses. Outreach and publicity generated during this project will speed adoption of backhauling as farmers, wholesalers, and retail business become aware of the practice and have access to curricula and educational materials.