

# INNOVATE FORT COLLINS Challenge

## Innovate Fort Collins Challenge (IFCC) 2018 Project Summary

### KEY TAKEAWAYS

- Total GHG reductions for the 2018 project year was ~4,500 Metric Tons (MT) CO<sub>2</sub>e
  - This is the equivalent to taking 959 passenger vehicles off the road for one year or removing 541 homes' energy use from the electric grid for one year
  - Reductions exceeded initial projections of ~3,700 MT CO<sub>2</sub>e
- Estimated impacts for 2018-2020 are up to 12,300 MT CO<sub>2</sub>e
- In 2020, the 2018 projects will have an approximate 0.2% contribution toward that year's goal of 20% GHG reduction below 2005 levels
  - This is comparable to other small-scale City initiatives such as the solar power purchasing program or building energy scoring
- The Spring Back Recycling project demonstrated the largest reduction to global GHG emissions
- Poudre School District (PSD) has significant scaling potential with additional investment. At scale, this IFCC project would have the largest quantifiable impact to the Fort Collins GHG goals
- All projects contributed to savings even if impact was smaller or not readily quantifiable
- All projects experienced varied levels of success, none failing during the pilot year
- All projects had triple bottom line benefits to the Fort Collins community and region

**Total IFCC 2018 Project Cost: \$275,000**

**Total Leveraged Dollars: \$65,636**

### OVERVIEW

The IFCC round one cohort included Springback Mattress, Poudre School District (PSD), Front Range Community College, and Colorado State University (CSU). This report details the estimated reductions in greenhouse gas emissions of each project. Where information was available, key factors in greenhouse gas reductions and estimates of project impact at scale are described.

## PROJECT DETAILS, IMPACTS, AND SCALING POTENTIAL

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### **SPRING BACK CO MATTRESS RECYCLING PROJECT**

**AWARD: \$75,000**

**LEVERAGED DOLLARS: \$0**

Spring Back CO North (Spring Back) was awarded \$75,000 to scale their business operations in Fort Collins. This non-profit organization uses a redemptive employment model, which trains and supports men that are re-entering the workforce after struggling with barriers to sustainable living. These can include unemployment, homelessness, previous incarceration, and addiction. Spring Back collects and recycles mattress sets, recycling 95% of this material for other useful products. They proposed scaling their operation to gather, deconstruct and recycle mattress sets by testing innovative equipment to improve operational efficiency, hiring two employees and providing additional training and support for their operations staff.

**PILOT PERIOD REDUCTIONS: 3,600 MTCO<sub>2</sub>E**

**THROUGH 2020: 10,850 MTCO<sub>2</sub>E**

#### **KEY FACTORS FOR REDUCTIONS:**

- Percentage of materials that are recycled and thus able to offset production of mattresses using virgin materials.
- Type of material recycled. Polyurethane foam has the highest avoided emissions and is thus a key driver of their reductions.

#### **SCALING POTENTIAL:**

Spring Back CO North could continue to scale its operations by adding additional staff capacity, however it is unclear how much scaling can take place before operations would be constrained by space. Any further scaling, through efficiencies, staff, or otherwise, would lead to considerable GHG reductions on a global scale, assuming all recovered resources are recycled and offset virgin materials.

### TBL BENEFITS:

- Two employees hired through redemptive employment model, trained and provided:
  - 200 hours of onsite work training
  - GED training, test training and computer skills
  - Five transit passes for employees
  - Additional training with counselor
- Hourly raise and housing allowance for one employee (project graduate) who now lives independently and can now have parental visits with his children

### KEY LESSONS LEARNED:

- The use of a tractor trailer and locating a permanent location was challenging. They will be using a smaller container for collection that has a smaller labor requirement and safety considerations
- There are many challenges related to this type of employment model, which made consistent scaling of operations challenging
- The original testing of new technology for box spring separation failed, but the company found a sustainable alternative with a laser knife that has allowed production efficiency equivalent to the work of 4 individuals vs. 6 used previously. This has greatly assisted in the operations scalability



### PSD COMPOSTING PROJECT

**AWARD: \$40,000**

**LEVERAGED DOLLARS: \$16,436**

Poudre School District was awarded \$40,000 to purchase a compost unit they could host at a local middle school. This type of equipment was new to the U.S. and would allow the school to process food waste from lunches and help meet the District's goal of a 60% waste diversion by 2020. The proposed a pilot project would be run by students as part of their Environmental Club,

allowing the students to learn about the technology, assist in the waste diversion by monitoring the waste collection at lunch time and use the final compost product on school grounds.

### **PILOT PERIOD REDUCTIONS: 30 MTCO<sub>2</sub>E THROUGH 2020: 230 MTCO<sub>2</sub>E**

#### **KEY FACTORS FOR REDUCTIONS:**

- Number of days of operation per school year
  - Proper maintenance and use and vendor support to avoid technical breakdowns.
- User behavior – proper sorting drives the amounts composted

#### **SCALING POTENTIAL:**

Wellington Middle School learned about this project and the composter unit and raised money through grants to purchase a smaller unit for their school. This allowed the project to scale across the region and Kinard Middle School is also pursuing additional funding to have a unit at their school. PSD has considerable scaling potential if it were to implement food waste digestors on-site at all their local schools. The estimated impact of this is 4,000 MTCO<sub>2</sub>e in 2020, which would have an approximate 0.2% contribution toward the goal. This is commensurate with other climate action initiatives and is a significant opportunity.

#### **TBL BENEFITS:**

- Over 1,500 students and 120 staff members at two middle schools have been part of the composting program
- Additional support included eight staff members from facilities maintenance
- PSD contributed \$16,435.94 for the purchase of the trailer that houses the unit, supplies for the trailer, electrical and plumbing installations
- Excitement, participation and interest has been high at Leshar Middle School as well as other schools
  - One parent stated that his son had taken an interest in technology careers as a result of his interaction with the composter unit
  - Teacher Testimonial: “Students have benefited from the hands-on learning, interactive problem solving and calculating metrics for meaningful waste audit data.”

#### **KEY LESSONS LEARNED:**

- Expect the unexpected. This project experienced multiple delays due to shipping and damage incurred. This set the timing of the project back 2 months and delayed the initial results due to the summer vacation schedule
- PSD determined improvements for their manufacturer training and maintenance for future contracts
- More maintenance was required than was anticipated
- The learning curve for students for operation was 2-3 weeks. The proposed concept of moving the trailer from site to site was too aggressive



## **FRONT RANGE COMMUNITY COLLEGE SOLAR LEARNING PROJECT**

**AWARD: \$65,212**

**LEVERAGED DOLLARS: \$5,000 PLUS ELECTRICITY FOR 1 YEAR OF PUBLIC EV CHARGING**

**PILOT PERIOD REDUCTIONS: 7 MTCO<sub>2</sub>E**

**THROUGH 2020: 40 MTCO<sub>2</sub>E**

### **KEY FACTORS FOR REDUCTIONS:**

- Charging station use

### **SCALING POTENTIAL:**

Front Range Community College (FRCC) Solar Learning could continue to add solar panels and charging stations to its campus and further reduce GHG emissions. Scaling potential of the solar array is likely limited by space, funding, and local restrictions on distributed generation, while the scaling potential of the charging stations depends on the EV uptake of campus visitors, students, and employees.

### **TBL BENEFITS:**

- 80 PSD middle school students were engaged in STEM education through the collaboration with Pretty Brainy for this project, introducing students to PV technology in a fun and engaging environment
- EV charging will be offered free to the public for the first year of operation
- The project provides ongoing public engagement to library visitors about the solar array, EV technology with the City logo prominently displayed
- FRCC students benefited from the construction and application of EV and PV technology

### **KEY LESSONS LEARNED:**

- FRCC staff's original design for the second array did not meet engineering requirements
- The project experienced multiple delays due to the inability to secure a fencing contract and not anticipating other construction delays and challenges. This delayed the array and charging equipment becoming operational



## **INSECTICYCLE COMPOSTING PROJECT**

**AWARD: \$40,000**

**LEVERAGED DOLLARS: \$19,200**

Insecticycle is a recycling start up business that focused on developing and implementing process improvements for food waste and other organic waste materials. The project used black soldier fly larvae insects, which rapidly consume and digest waste materials, converting waste into highly nutritious and sustainable insect protein for use in animal feed. This project focused on growing a laboratory scale processing system into a pilot scale system capable of demonstrating impact of a new and revolutionary process.

**PILOT PERIOD REDUCTIONS: 1 MTCO<sub>2</sub>E**

**THROUGH 2020: 50 MTCO<sub>2</sub>E**

### **KEY FACTORS FOR REDUCTIONS:**

- System performance and capacity are the predictors of food waste diversion and thus emissions reductions

### **SCALING POTENTIAL:**

Insecticycle does not have capacity to further scale the intake of its food waste processing operations at this time but is looking to expand into the fish feed market, which would represent an additional reduction in global GHGs.

### **TBL BENEFITS:**

- Project was highlighted at Business Appreciation Breakfast in 2018, diverting food waste that would have been landfilled otherwise

### KEY LESSONS LEARNED:

- This project had a substantial challenge with finding local and affordable rental space. The PM had to commit to a three-year lease that could likely result in a financial burden if the project doesn't further scale or commercialize
  - This project presented the greatest risk and was unable to scale to the proposed 50 gallon/day food waste diversion
  - Due to financial limitations, the PM is likely to pursue the development of a commercial scale operation in collaboration with other (international) businesses rather than focusing on a local project as currently proposed
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### CSU ONLINE TRANSPORTATION EDUCATION MODULE

**AWARD: \$44,250**

**LEVERAGED DOLLARS: \$25,000**

CSU proposed developing an online education module for incoming freshman that would provide an engaging platform to educate students on local active transportation options and safe cycling practices. The module would be designed based on best practices for behavior change and included a research component to study the impact of the project.

**PILOT PERIOD REDUCTIONS: N/A**

**THROUGH 2020: N/A**

### KEY FACTORS FOR REDUCTIONS:

- It is anticipated that this project will result in GHG reductions, however with the delay and low turnout for the pilot, reductions were extremely limited

### SCALING POTENTIAL:

Scaling potential is significant due to the number of students educated each year, however, impact at scale is not quantifiable at this time.

CSU does anticipate reductions that will be monitored and measured and still have a goal of shifting 11% of commute trips from SOV to bike or transit per year by 2022 (after 4 years of module implementation).

#### **TBL BENEFITS:**

- Based on student surveys, the module had an immediate and significant positive impact on the student's comfortability, familiarity and knowledge regarding alternative forms of transportation
- Because of the communication challenges with outreach to students, one key outcome was to move the control of student focused communication from CSU staff into the hands of the Associated Students of CSU (Student Government) members. This will result in better streamlined opportunities across the university and less chance of one individual roadblocking efforts as was experienced with this project
- Multiple universities across the country have expressed interest in use of the module, increasing the impact of this type of education module for increasing the use of active/alternative transportation and safer cycling practices.

#### **KEY LESSONS LEARNED:**

- The project team made key assumptions about the ability to do direct outreach to students to recruit for participation in the pilot. This was blocked by one individual who did not give permission for an email to be used for recruitment. This significantly limited participation in the pilot and resulting outcomes
- Because of the limitation of communication and outreach, CSU staff had to take a alternative approach, which resulted in a deepening of relationship with Student Affairs
- The project will continue into 2019 and beyond and will try again to reach students for participation in the module in Fall of 2019
- Staff will continue to pursue getting permission for a mandatory component for the online transportation module for incoming freshman

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#### **2018 KEY LESSONS LEARNED FOR CITY STAFF:**

- Providing additional direction and assistance to applicants results in higher quality applications and overall project strength
- Staff were reluctant to fund projects larger than \$75,000 due to risk and desire for a diverse portfolio of projects, benefit spread, etc.
- Contracting is often more complicated and lengthier than anticipated (e.g. Intergovernmental Agreements, staffing capacity, deadlines, etc.)
- The reporting mechanism for project outcomes needs improvement to better capture overall impact and quantitative results
- The expertise of PMs is highly varied and resulted in additional hours spent to capture final outcomes after final reporting
- The GHG reductions can come from unanticipated areas (e.g. Spring Back CO)
- City staff implemented LEAN process improvements to improve the application process and saved \$4,000 in staff time in 2019