

Recycling Resources Economic Opportunity (RREO)
End Market Development for Colorado's Recycling Industry

2015 Grant Program
Final Report

Organization(s): Recycle Projects (lead), Eco-Products, Eco-Cycle

Project Title: Food-Grade Plastic Sorting Facility

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List of Appendices:

Appendix A – Grant Metrics Table
Appendix B – Community Leader Contact Info
Appendix C – Letter Regarding Permitting
Appendix D – MRF Training Materials

Recycle Projects

ReConnecting to the Community.

II. WORK PLAN

Work Plan Table

Deliverables & Key Activities	Completion Date	Comments <i>(if deliverable was not completed, please explain why and what progress has been made)</i>
The Contractor shall purchase all equipment necessary to implement the project.	6/19/2015	
The Contractor shall submit to the CDPHE Program Administrator a copy of the training materials used to instruct Material Recovery Facilities.	8/7/2015	A preliminary MRF pre-sort pilot was conducted at the WM Franklin St MRF and draft training materials were developed (see Appendix D). Revised training materials will be developed as the program progresses.
The Contractor shall include in the final report the results of all purity tests and identify whether the samples taken comply with the standards outlined by the Food and Drug Administration.		RP is still awaiting completion of the equipment line, which includes custom parts. Preliminary data on expected purity of plastic separation is reported here, based on small-scale tests performed during the equipment development process. Compliance with FDA standards is learned to be most effective after the plastic pelletization process, which is part of our organization's future strategic initiatives.
The Contractor shall submit to the CDPHE Program Administrator a copy of the permit approval letters for both electrical and wastewater, or a letter explaining why permits were not necessary.	8/7/2015	See Appendix C for the letter containing an explanation why permitting is not necessary at this time.

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III. PROJECT SUMMARY

1. Executive Summary

This RREO grant supported Recycle Projects (RP) to develop a small-scale plastics sorting and processing facility that will increase diversion of disposable plastics and eventually supply manufacturers seeking recycled plastic approved for remanufacturing into containers approved for food-contact by the Food and Drug Administration.

The impetus for this program was to divert roughly 1 million pounds a month of disposable food and drink container plastic that is estimated being landfilled on the Colorado front-range alone, by starting locally and working with companies like Eco-Cycle and Eco-Products which represent aspects of the material diversion supply chain. Food grade plastic is often difficult to sort in a Material Recovery Facility (MRF) and therefore does not have a domestic market for diversion. Our program requires working closely with multiple Colorado MRFs and plastics manufacturers to collect plastic that will be sorted and to ensure high quality PP, PS, and PET regrind can be sold to manufacturers.

In collaboration with Colorado MRFs and under the advice of nationally recognized plastic manufacturers, we have developed draft food grade sorting MRF training material and developed a strategic plan for achieving FDA approval of the regrind product.

Successful completion of the grinder, aspirator, and metal detector portions of the equipment line, and marketing of our program, has allowed this program to help divert nearly 50 tons of plastic waste. This has saved Colorado businesses thousand of dollars in landfill tipping fees.

Despite the grant program's relatively short timeline for completing customized equipment, our program successfully obtained data showing high purity of plastic separation (<< 1% contamination). Upon completion of the sorter and washer build and subsequent validation of the full equipment line, the facility developed under this grant program will provide an in-state market for diverting 100,000 pounds per month of disposable plastic in Colorado that is currently being landfilled or exported.

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2. Project Description and Overview of Work Completed

This RREO grant supported RP to develop a small-scale plastics sortation and processing facility with the primary goals of 1) increasing the diversion of disposable plastics in Colorado, and 2) supplying manufacturers seeking recycled plastic approved for remanufacturing into containers approved for food-contact by the Food and Drug Administration.

The followings steps were taken to achieve the primary goals:

- a) Acquire a facility that meets the needs of a small-scale processing facility (appropriate power, space, docks, water supply, etc.)
- b) Purchase all equipment
- c) Work directly with MRFs to correctly identify food-grade plastic still in need of domestic or in-state market
- d) Work directly with MRFs to obtain sample plastic for sorter and washer validation
- e) Work directly with MRFs to develop instructional materials for pre-sorting food grade plastic for diversion to RP's small-scale processing plant
- f) Reach out into the community of plastic processors and manufacturers to better understand how to obtain FDA-approval of food grade plastic regrind

The following steps are currently underway and will be accomplished in the near future:

- g) Complete build of fully productional equipment line to sort and recycle food grade plastic
- h) Complete hiring of laborers to operate processing plant

This program addresses a large need for domestic, and especially in-state, markets to divert plastic waste. Tens of millions of tons of disposable food-grade plastic are being landfilled in the US each year, with an estimated 500 tons being landfilled on the Colorado front-range alone. The environmental and economic costs of plastic use are increasing annually as our usage rises. This program provides a local market for Colorado MRFs to divert this type of plastic domestically. It also generates a larger supply of recycled plastic for use by manufacturers in new food grade products. This lowers the cost to make their product, when compared to using virgin plastic, and provides a more environmental alternative for feedstock. Colorado has always embraced being environmentally and economically progressive, especially with its waste-diversion philosophy, and this program generates both of those benefits for the community.

3. Summary of Results

Through this program, RP has worked with Material Recovery Facilities (MRFs) – Boulder County Recycling Center (BCRC) MRF and Waste Management (WM) Franklin St. MRF - to obtain preliminary information on how to pre-sort food-grade plastic for collection by RP. Draft training materials were developed and used during a pilot sort at the Franklin St. MRF. These can be seen in **Appendix D**.

We have additionally reached out into the manufacturing community, to better understand the process for FDA-approving recycled plastic for use in new products. This helped us determine that FDA-approval should occur after the pelletization stage. Our new strategic plan includes adding pelletization to our process design for obtaining FDA-approval in the future.

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RP has successfully completed the build of a grinder, aspirator, and metal detector capable of recycling the targeted 100,000 pounds of plastic per month. These are fully productional and are currently being used to divert pre-consumer and post-consumer plastic waste streams that would otherwise not have an economically viable recycling market. To-date our program aided in the diversion of 27.5 tons (55,000 lbs) of food-grade plastic from Colorado businesses to a MRF for recycling and the diversion of 20 tons (40,000 lbs) of non food-grade plastic processed directly in our facility. This diversion is estimated to have saved local businesses over \$2,000 in landfill tipping fees.

Preliminary data from the development of our sorter indicates a high purity of plastic separation (<< 1%) for PS, PP, and PET. Data will continue to be taken as the sorter is completed. Preliminary data on the washer will be obtained by September.

As a result of this initial success and the marketing of our newly established facility, plastic processors and manufacturers outside of Colorado have expressed interest in our food grade recycling process. This is a big success for our program, as it adds momentum to improve diversion rates on a national scale. *(Thanks Colorado for being the first to believe in us!)*

4. Summary of Unanticipated Outcomes or Roadblocks

Completion of the customized sorter and washer by the end of the grant period represented the largest roadblock. As these are crucial pieces of equipment, our team has decided not to rush the engineering process, but instead to take intermediate level data during the development of those pieces. This is documented in Section III.4.

5. Communication of Project Findings

Recycle Projects has made a large effort to communicate our program to a broad audience. We have met with various community members in person, including John Tayer of the Boulder Chamber of Commerce, to keep them apprised of our program. We have also launched a website for the program – www.lifecycleplastics.com, where one can find a promotional video describing the “big picture” waste problem that is being solved by our program. Our facebook page, <https://www.facebook.com/lifecycleplastics> was additionally created to keep the public engaged in our milestones with the program.

In the future, we plan to send out a monthly e-newsletter to discuss our program’s progress and successes. In conjunction our program will continue to reach out to additional representatives of Colorado cities and the state within the coming months.

6. Future Impact of the Project

This program was intended to provide new market opportunities for a variety of Colorado business. The programs vision is to eventually provide those markets nationally, creating more jobs and diverting a substantial volume (10s of millions of tons) of plastic waste.

The first market opportunity is for Colorado MRFs to divert a large volume of disposable plastic that is unsorted and currently being sold to overseas markets or landfilled. The second market opportunity is for Colorado plastics manufacturers to have a local,

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reliable source of food grade quality regrind that provides an alternative to virgin feedstock.

After the sorter is fully productional and successfully processing food grade plastic, there will be an opportunity to integrate it into other plastic processing facilities and potentially partner directly with MRFs to lower city costs for plastic transportation and processing. Making the use of this technology available to Colorado businesses is part of our vision and has the ability to accelerate state-wide plastic waste diversion.

7. Financial Summary

The Grant Budget Table below shows the actual grant and matching/in-kind funds to-date that were spent in support of the program award under this RREO grant. The total RREO grant award amount is \$209,000.

Grant Budget Table

Description	Grant Funds Spent	Matching/In Kind Amount (if any)	Total Amount
Personnel Salaries*	\$0.00	\$12,500.00	\$12,500.00
Fringe Benefits	\$0.00	\$0.00	\$0.00
Tuition/Fees	\$0.00	\$0.00	\$0.00
Travel Costs	\$0.00	\$0.00	\$0.00
Materials/Supplies/Equipment (under \$5000)	\$0.00	\$0.00	\$0.00
Equipment Purchases (over \$5000)	\$209,000.00	\$0.00	\$209,000.00
Contractors/Subcontractors	\$0.00	\$0.00	\$0.00
Consultants	\$0.00	\$4,406.00	\$4,406.00
Training/Education	\$0.00	\$595.00	\$595.00
Marketing/Advertising	\$0.00	\$5,051.00	\$5,051.00
Other Direct Costs	\$0.00	\$31,293.00	\$31,293.00
Indirect Costs	\$0.00	\$501.00	\$501.00
Total Project Cost:	\$209,000.00	\$54,346.00	\$263,346.00

**In-kind labor, equivalent salary for donation of time to program by RP staff.*

8. Conclusion

This RREO grant program has facilitated the future diversion of a high-volume of plastic waste in Colorado. Recycle Projects, through our successes from this grant program, has shown that the process for sorting and recycling food grade plastic is viable for creating new end markets in Colorado recycling. It is our mission to pursue the development of this new food grade plastic sorting and processing facility to divert the maximum amount of food grade plastic waste as a long-term waste diversion solution for Colorado.

Grant Metrics Table

Date project fully operational (if applicable):

Based on deliverables. Provide the month during which the grant project increased diversion/created jobs/increased number of customers.

Diversion Rates:

Choose one material per blue box from the drop-down menu provided. If your material is not listed, enter a description in the "Other" box. Only list materials diverted as a direct result of the grant project. Must be listed in tons. See tab labeled "Conversion Tables" if needed.

Material Diverted #1

"Other" Material:

Tons Diverted	
July-14	0
August-14	0
September-14	0
October-14	0
November-14	0
December-14	0
January-15	0
February-15	0
March-15	0
April-15	0
May-15	0
June-15	0
Total	0

Material Diverted #2

"Other" Material:

Tons Diverted	
July-14	
August-14	
September-14	
October-14	
November-14	
December-14	
January-15	
February-15	
March-15	
April-15	
May-15	
June-15	
Total	0

Material Diverted #3

"Other" Material:

Tons Diverted	
July-14	
August-14	
September-14	
October-14	
November-14	
December-14	
January-15	
February-15	
March-15	
April-15	
May-15	
June-15	
Total	0

Material Diverted #4

"Other" Material:

Tons Diverted	
July-14	
August-14	
September-14	
October-14	
November-14	
December-14	
January-15	
February-15	
March-15	
April-15	
May-15	
June-15	
Total	0

Material Diverted #5

"Other" Material:

Tons Diverted	
July-14	
August-14	
September-14	
October-14	
November-14	
December-14	
January-15	
February-15	
March-15	
April-15	
May-15	
June-15	
Total	0

Material Diverted #6

"Other" Material:

Tons Diverted	
July-14	
August-14	
September-14	
October-14	
November-14	
December-14	
January-15	
February-15	
March-15	
April-15	
May-15	
June-15	
Total	0

Material Diverted #7

"Other" Material:

Tons Diverted	
July-14	
August-14	
September-14	
October-14	
November-14	
December-14	
January-15	
February-15	
March-15	
April-15	
May-15	
June-15	
Total	0

Material Diverted #8

"Other" Material:

Tons Diverted	
July-14	
August-14	
September-14	
October-14	
November-14	
December-14	
January-15	
February-15	
March-15	
April-15	
May-15	
June-15	
Total	0

End use of diverted materials:

Describe where materials are going (e.g. MRF, new products, reuse)

In July, prior to our equipment line being fully productional, our program facilitated diverting over 27.5 tons (55,000 lb) of food-grade plastic from a Boulder County business; the plastic was sent to a MRF for recycling. During our grant term, as a result of having a grinder, we were able to divert 20 tons (40,000 lb) of non food grade plastic waste generated by Colorado businesses to our facility for recycling; the plastic will be sold in August to a compounder who can pelletize it, and will ultimately used in new products by a manufacturer.

Number of Permanent Jobs Created:

Include full-time & part time paid positions. 1 FTE = 40 Hours Per Week

Type of Permanent Job(s) Created:

Provide titles of jobs created

In August 2015, our program will hire 1 FTE as an equipment technician.

Average Salaries of Jobs Created:

Average of all jobs created

Average Monthly Customers:

Estimate or refer to customer list

	Avg. Monthly Amount
July-14	0
August-14	0
September-14	0
October-14	0
November-14	0
December-14	0
January-15	0
February-15	0
March-15	0
April-15	0
May-15	0
June-15	0
Avg / FY 15	0

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Appendix B - Community Leader Contact Info

Listed here are 3 community leaders that are familiar with this project.

Name: Dan Matsch
Title: Manager of Center for Hard-to-Recycle Materials (CHARM) for Eco-Cycle in Boulder, CO
Phone: 303-444-6634
Email: dan@ecocycle.org

Name: Sarah Martinez
Title: Sustainability Maven for Eco-Products in Boulder, CO
Phone: 720-542-6355
Email: smartinez@ecoproducts.com

Name: Jack Debell
Title: Development Director at Univ. of Colorado Recycling; Manager of National Recycling Coalition Campus Council
Phone: 303-492-8307
Email: debell@colorado.edu

Appendix C – Letter Regarding Permitting

Dear RREO Grant Administrator:

On behalf of Recycle Projects, this is an explanation as to why no permitting was required to-date for this program.

To support facility development for this program, a building was acquired in an industrial zone in Commerce City, which resides in Adams County. The building already contained sufficient power and the appropriate electrical disconnects, and no electrical upgrades or modifications were made. Therefore, no electrical permitting was required. Similarly, our program has not discharged any industrial water to-date. The design of our sorter and washer, both of which use water, are deliberately to be closed-loop. And, to-date, our program has not and does not plan to discharge any chemicals or substances in an industrial process that is of concern to the Adams County Waste Water Treatment facility or the EPA. We will comply with the Adams County Water Treatment Rules and Regulations in the future, if such changes to the sorter and/or washer occur.

Sincerely,



Laura Brower
Executive Director

What Plastic to Sort – Food & Drink Collection



NO FILM



NO STYROFOAM

YES....

Food Clamshells

Cups & Lids

Food Containers & Lids

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FOOD CLAMSHELLS

Clear, any size



Clear, any size



Clear, any size



Clear or Black trays, any size



Black or Clear, any size



Color Pattern, Black, or Clear, any size



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CUPS & LIDS

Thick and sturdy, any color



Thick and sturdy, any color



Clear or white, any size



Thin, any color



Clear Lids



Colored Hot Drink Lids



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FOOD CONTAINERS & LIDS

Yogurt cups, small, any color



Tubs, any color



Clear containers & lids, any size



Tubs, any color



Containers & lids, any size

