

# Building Circular Supply Chains

CLOSED LOOP PARTNERS 2017 PROGRESS REPORT

CLOSED  
LOOP *partners*

## Introduction

Since the creation of Closed Loop Fund in 2015, our team and partners have identified and invested in a robust pipeline of infrastructure projects that will accelerate the development of more circular supply chains. In 2017, we established Closed Loop Ventures, an early stage venture fund focused on investing in catalytic technologies and business model. And in March 2018, we launched the Center for Circular Economy, which will serve as an incubator, convening center and R&D lab focused on new and emerging opportunities in circular supply chains. Together, the three distinct vehicles provide an on-ramp for accelerating solutions and investments that we believe can get us closer to closing the loop.

We've seen tremendous progress among our portfolio communities and companies as they prove out viable circular business models. We are grateful to our investors, portfolio members, government and industry partners for making this progress possible. Along the way, we've learned more about what's needed to accelerate the transition to more circular supply chains; this progress report is an opportunity for us to reflect on our most recent work.

As evidenced by our portfolio investments, more private firms and institutional investors are taking note and deploying much needed capital. Leading firms such as Goldman Sachs, Comerica Bank, Sidewalk Labs, and NEA are maintaining or increasing their investment levels, indicating the potential scale of capital available for circular supply chains.

At the same time, the past year has not been without its challenges. The disappearance of export markets for many recycled commodities has been a burden to many municipalities and recycling businesses in the Closed Loop Fund portfolio, as it has across the country. However, we see the current situation as further evidence of investment opportunities to develop domestic infrastructure and commodity markets for recycled materials.

We expect continued and growing opportunities to invest in the development of the circular economy. In North America, municipalities and businesses continue to operate in a system whereby they spend billions of dollars annually to landfill commodities worth billions of dollars in value. This system needs to be reimaged and restructured. Municipalities and businesses can avoid those costs, and, instead, profit from the value of directing commodities back into supply chains. Designers, manufacturers and brand owners can innovate by reducing and reusing materials in products and packaging. The incubation, commercialization, and scale of solutions in this new system is one of the great investment opportunities of our times.

Thank you, and we look forward to continuing our work together.



**The Closed Loop Fund investments in municipal recycling infrastructure projects and emerging technologies have been instrumental in Unilever U.S. progressing toward our 2025 global commitment of 100% recyclable, reusable or compostable plastic packaging and a minimum of 25% post-consumer recycled plastic packaging.**

**Jonathan Atwood**

Vice President, Sustainable Business and Communications,  
Unilever North America

CLOSED LOOP  
FUND

\$40+ Million

IN CAPITAL DEPLOYED

\$104 Million

ADDITIONAL CO-INVESTMENT  
CATALYZED

17 Projects

IN THE UNITED STATES AND  
CANADA

Nestlé Waters

NORTH AMERICA JOINS AS LP

In March 2018, CLF entered into a partnership with the State of Connecticut's Department of Energy and Environmental Protection (DEEP) to dedicate capital to the development of circular economy infrastructure and businesses in the state. This partnership model is one we expect to replicate in other states and regions in the coming year.

CLOSED LOOP  
VENTURES

11 companies

INVESTED SINCE INCEPTION

\$2.4 Million

DEPLOYED INTO SEED AND  
SERIES A STAGE COMPANIES  
ACROSS RECYCLING, FOOD &  
AGRICULTURE AND TEXTILES  
& APPAREL

450

INVESTMENT OPPORTUNITIES  
REVIEWED, INDICATING A  
LARGE AND GROWING PIPELINE  
OF ENTREPRENEURS EAGER  
TO ENTER THE FIELD AND  
PARTICIPATE IN THE NEW  
CIRCULAR ECONOMY.

Of that deal flow, the majority of companies we have seen fall into Recycling and Food & Ag verticals, with increasing interest from Textile & Apparel companies.

Initiated collaborative relationships with other mission-aligned investors, such as co-investments with NEA, Sidewalk Labs, Congruent Ventures, Radicle Impact, Gratitude Railroad, and CyclEffect among others.

Created relationships within the Closed Loop Partners network - connecting CLV portfolio companies for collaborations on grants and manufacturing projects, as well as supporting companies in their relationships (sales, feedstock procurement, etc.) to Closed Loop Fund borrowers.

CENTER FOR THE  
CIRCULAR ECONOMY

In the past year, we've initiated several research and early-stage innovation projects in the circular economy. The Center for Circular Economy will be our home for similar projects going forward. We've published actionable research on rPET (recycled PET), glass, and flexible film.

100+ leaders

CONVENED TO SET A VISION FOR  
CIRCULAR SUPPLY CHAINS

With Google, we co-hosted a convening of 100+ leaders across the system to set a vision for, and build connections to develop, circular supply chains going forward.

\$5 Million

COMMITTED TO A MORE CIRCULAR  
SOLUTION TO SINGLE SERVE CUPS

Starbucks has committed \$5 million over 3 years to build a pre-competitive industry partnership convened by CCE. The partnership will develop an innovation challenge and accelerator to identify and scale a more circular solution to single-serve cups.

INVESTMENT

Closed Loop Fund

Project finance  
focused on building  
supply chains in North  
America

INNOVATION

Center for the  
Circular Economy

Incubator, convening  
center and solution search  
practice focused on the  
circular economy

Closed Loop  
Ventures

Seed stage, market  
rate venture capital  
investment in disruptive  
circular technologies  
and business models

Closed Loop  
Foundation

Research and  
development grants  
and reports focused  
on identifying key  
bottlenecks and  
solutions

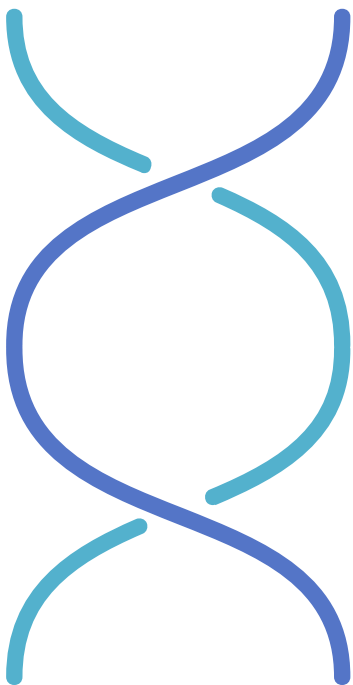
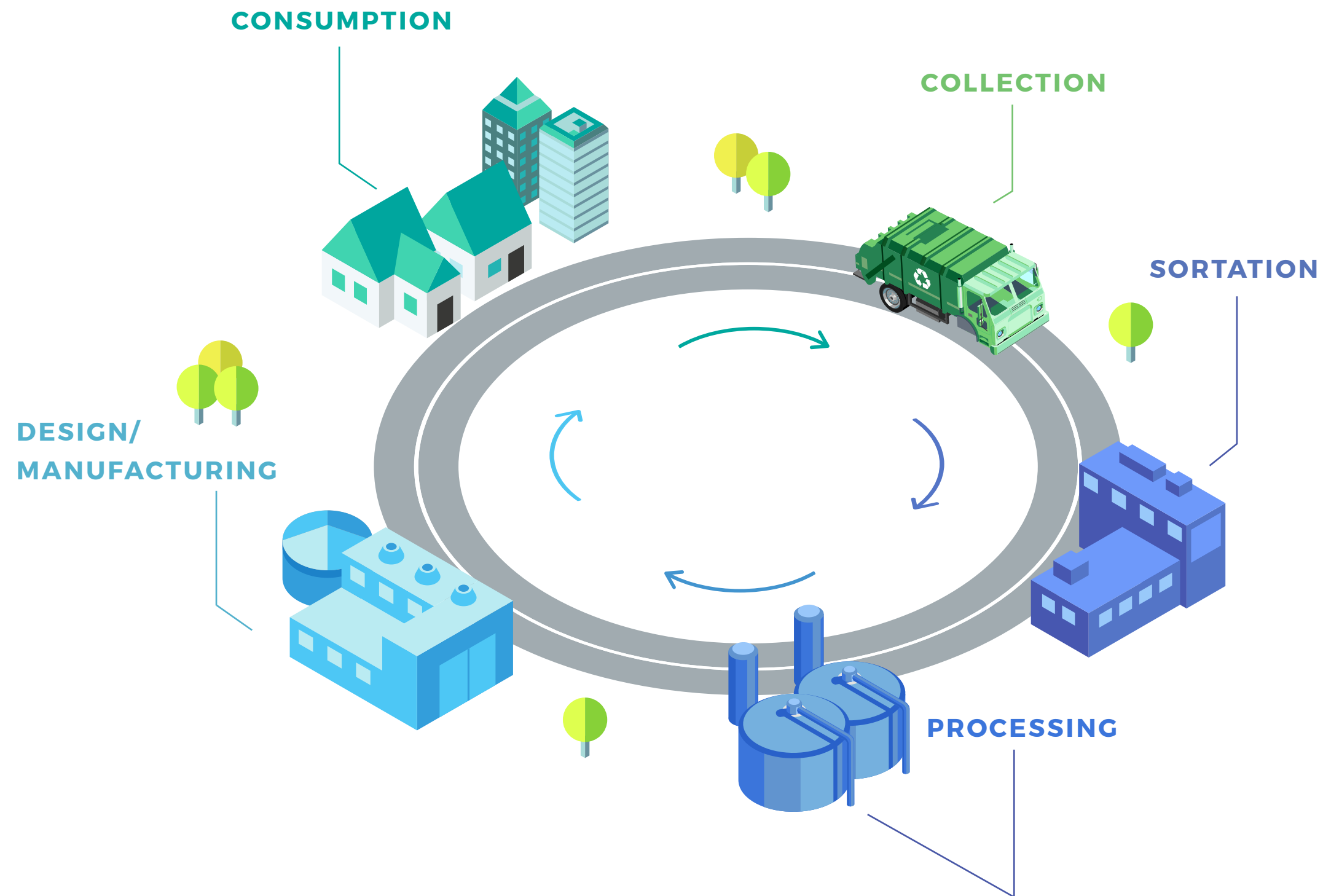


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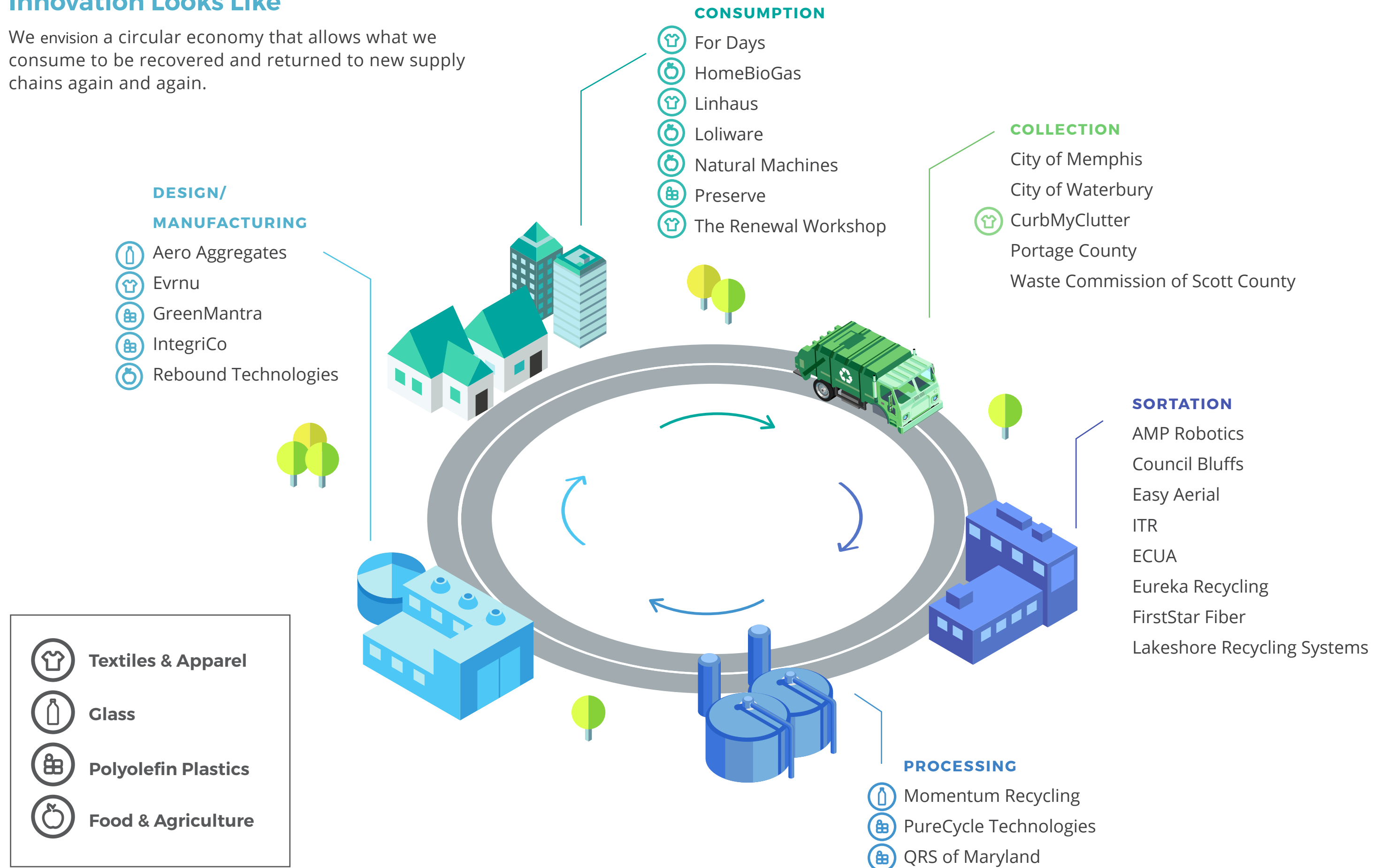
## Creating Value Across the System

Closed Loop investments demonstrate the opportunity for circular supply chains to create value across the system



## What Closed Loop Infrastructure and Innovation Looks Like

We envision a circular economy that allows what we consume to be recovered and returned to new supply chains again and again.







## PROGRESS TO DATE

# Closed Loop Fund

Project finance that invests in scaling recycling infrastructure and sustainable manufacturing technologies that advance the circular economy. Since 2015, CLF has raised \$71 million and deployed \$41 million. To date, 100% of borrowers have on-time payments; there have been no defaults.

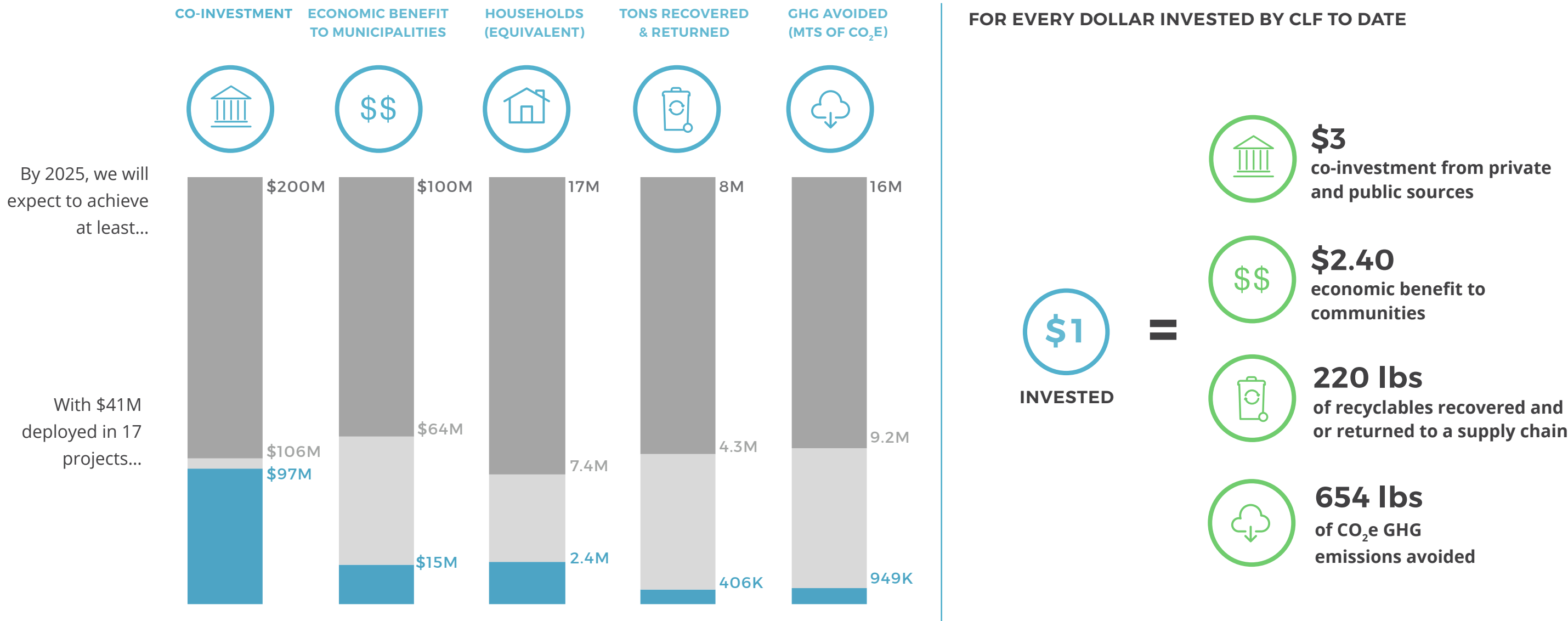
### INVESTORS INCLUDE:





# CLF by the numbers

We are making progress across key metrics



## About Our Impact

Our goal is to create value for the system

### CLF FUND PERFORMANCE



+

### VALUE OF SYSTEM SOLUTIONS







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## INCREASED RECYCLING

By 2025, we will demonstrate impact on greenhouse gas reduction or avoidance and national recycling rates, created by increasing annual and cumulative recovery and return of key post-consumer materials to supply chains.



INCREASED  
RECYCLING



PROFILE

**CJ MAY**  
Recycling Coordinator  
📍 Waterbury, CT



**Why did you start the program?**  
Waterbury’s curbside recycling effort is not only mandated by Connecticut law, but its efficient operation can also save the City enormous money through reduced trash tipping fees.

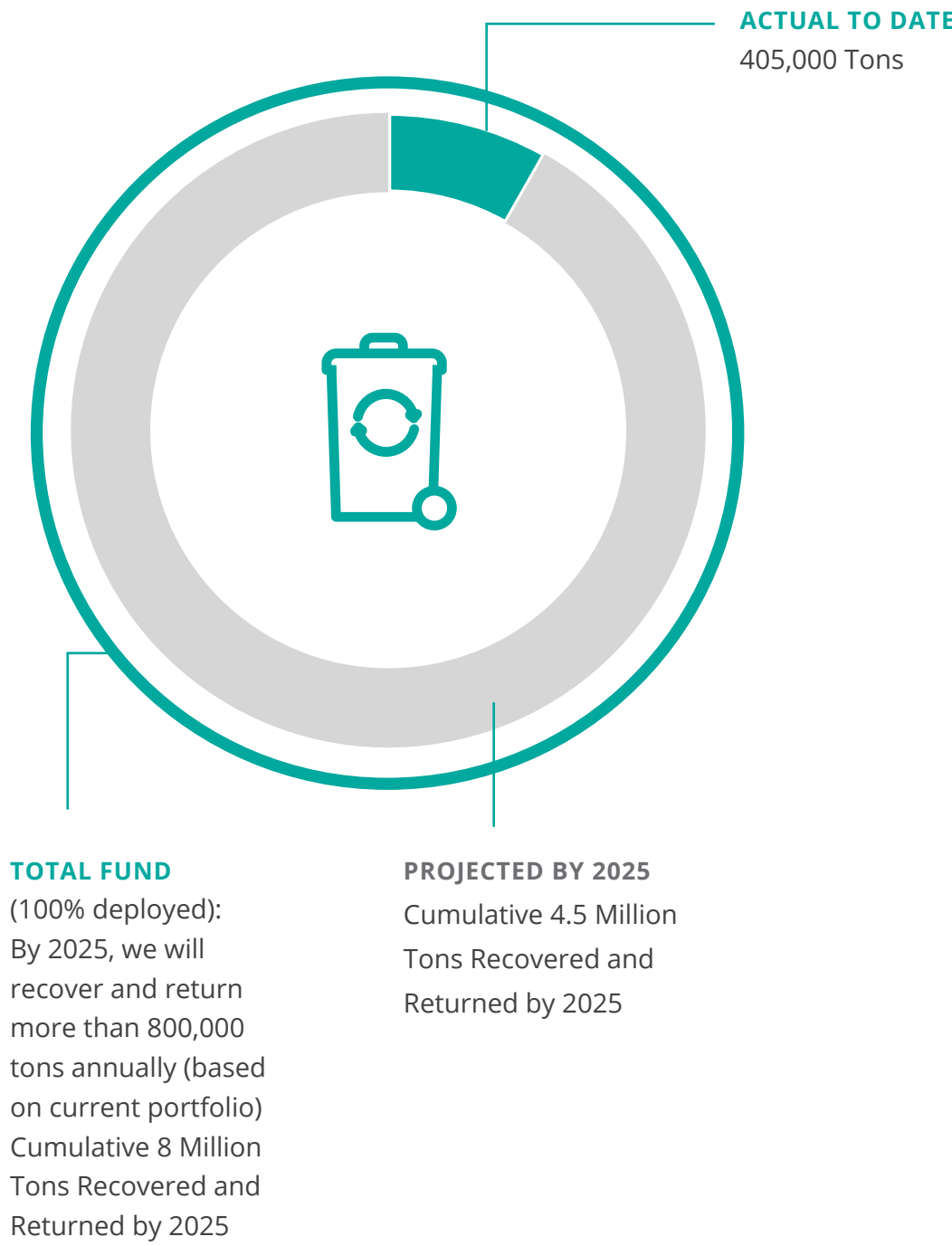
**What impact do you hope to achieve?**  
In a time when our nation, and city, are divided by politics, we have united residents from diverse backgrounds with the knowledge that sending recyclables to Connecticut waste-to-energy plants effectively “burns money,” but by participating in the enhanced recycling program they “earn money.”

**What’s one highlight of your progress from the past year?**  
We have already increased participation by our 30,000 households and have begun enjoying additional financial savings (approx \$50,000 additional avoided tipping fees over the first 6 months). A side benefit is the boosting of moral and sense of partnership and community.

**About City of Waterbury’s Recycling Program**  
Waterbury’s Bureau of Refuse introduced enhanced curbside recycling collection for all residents in December 2017. The Bureau provides curbside collection of all types of municipal solid waste and recycling materials for the citizens of Waterbury and all municipal buildings. Over the years, it has strengthened ties with neighborhood associations and city residents by educating them about recycling and how to comply with solid waste practices.

TONS DIVERTED

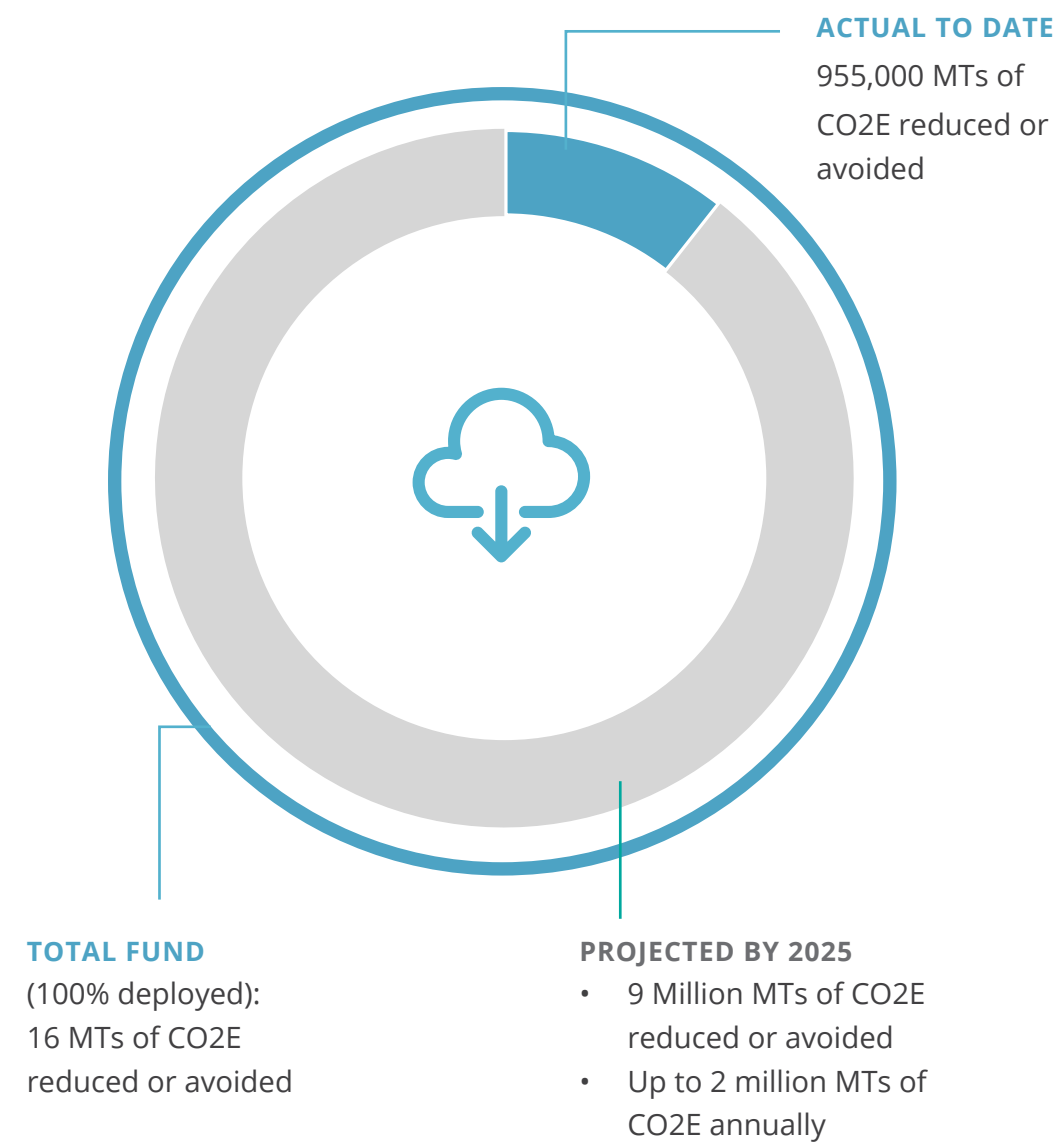
Across the CLF portfolio, we have recovered and returned more than 405,000 tons of material to supply chains



INCREASED  
RECYCLING

GHG REDUCTION AND AVOIDANCE

Nearly 1 million MTs of CO2E reduced/avoided, like taking 210,000 cars off the road for a year



Results to date solely reflect GHG benefit from material processed.

In reality, projects are realizing additional GHG benefits from increased operational efficiencies and reduced transportation.

CITY OF MEMPHIS

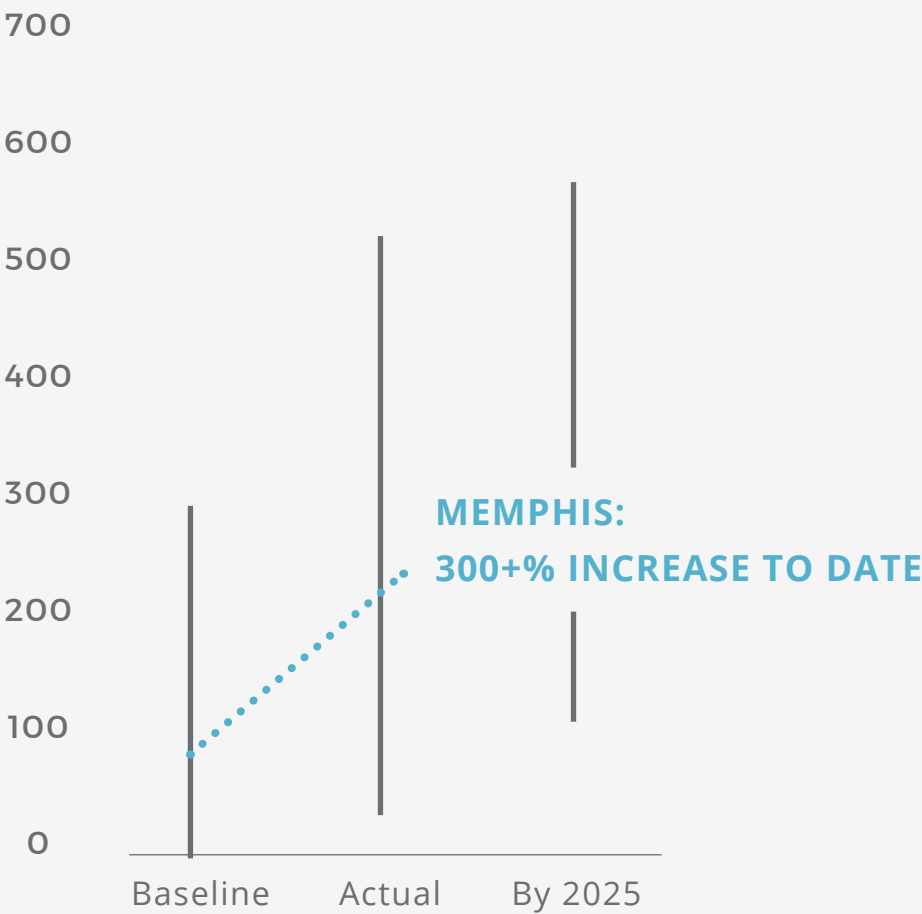
The City of Memphis has seen a significant increase in Recovery Per Household

Prior to the citywide rollout of 100K+ curbside carts, they collected a baseline of 80 lbs/hh of recycling.

In the past year, the City has seen a lift of an additional 180 lbs/hh of recycling collected, or a total of 265 lbs/hh/year.

ANNUAL LBS. RECOVERED

MEMPHIS, TO DATE AND CLF PORTFOLIO (RANGE)





**More important than Closed Loop's financial support was the technical and, dare I say, personal support. Closed Loop did not just write a check and walk away. The staff of the Closed Loop Partners have truly been partners. Their wealth of experience and support have, in my opinion, been a gift greater than a multi-million dollar loan for new carts and trucks."**

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**CJ May**

Refuse/Recycling Coordinator

City of Waterbury



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## SUPPLY CHAIN OPTIMIZATION

By 2025, we will demonstrate impact on improved capacity and utilization of quality post-consumer recycled materials across the value chain, as well as increased competitiveness and sustainability of end markets for those materials

SUPPLY CHAIN OPTIMIZATION



PROFILE

**JOHN LAIR**  
Momentum Recycling  
Denver, CO



**Why did you start your company?**  
We started Momentum Recycling with the goal of helping Salt Lake City-area businesses keep as much material out of local area landfills as possible. This led to an unexpected expertise in glass recycling, which we have taken to the Denver area as well.

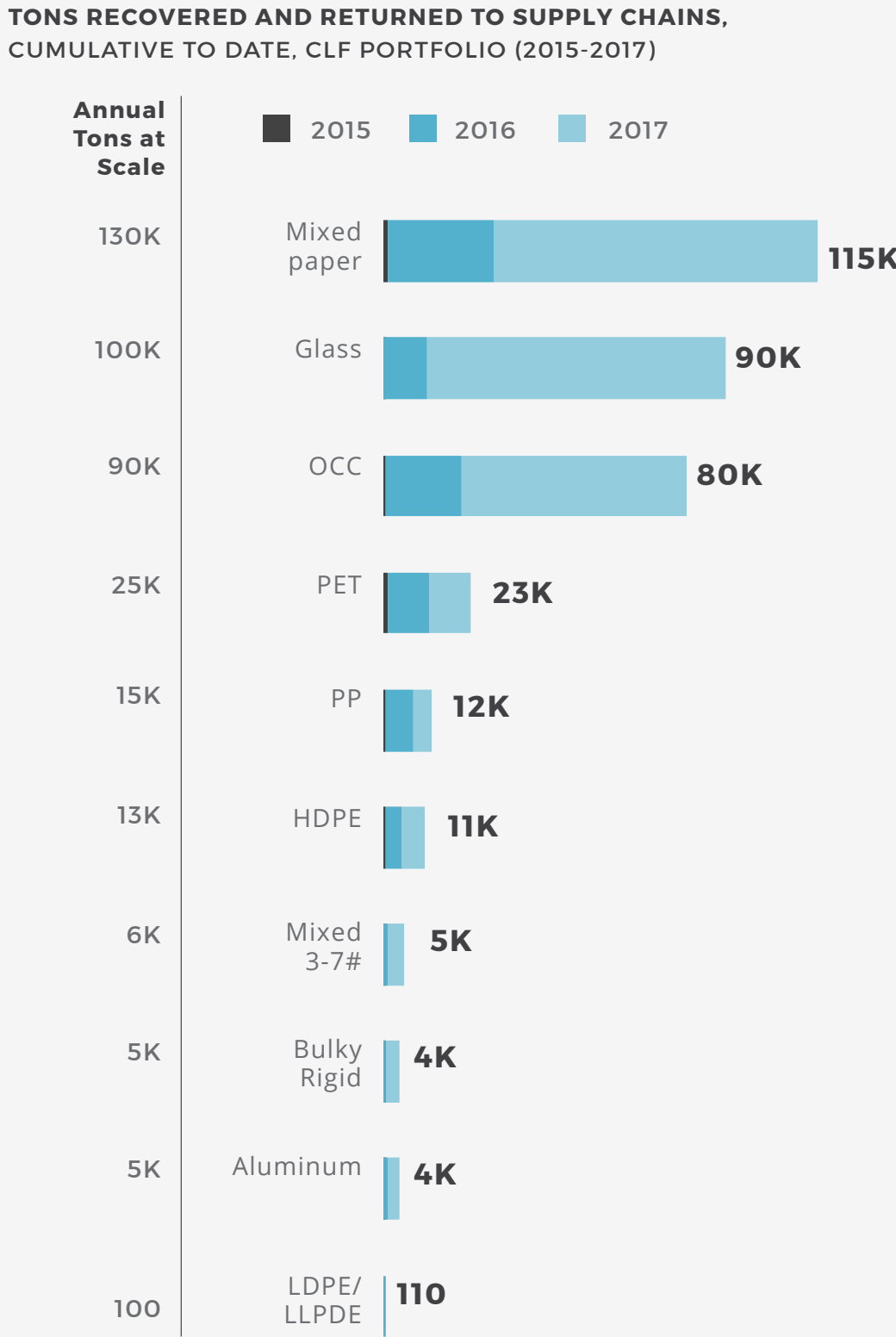
**What impact do you hope to achieve?**  
We intend to radically increase the glass recycling rates in the Mountain West region of the US.

**What's one highlight of your progress from the past year?**  
In the past year, we've helped 40,000 tons of glass waste get turned back into new bottles and fiberglass insulation.

**About Momentum Recycling**  
Momentum Recycling operates a glass recycling plant in Salt Lake City, UT and opened a state-of-the-art, bottle-to-bottle glass recycling plant in Colorado in 2016 with financing from Closed Loop Fund.

RECOVERY

The CLF portfolio focuses on returning key materials to supply chains

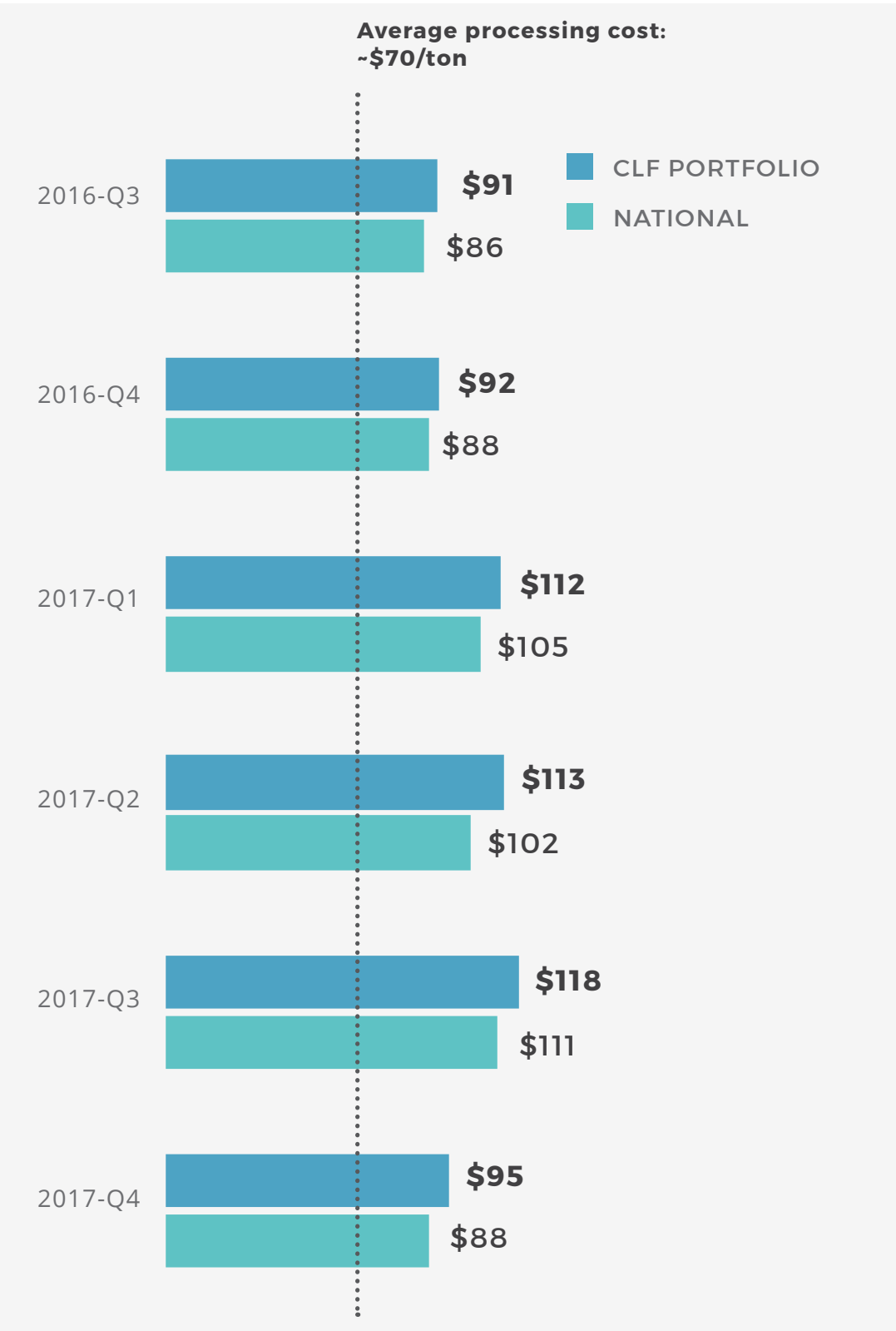




SUPPLY CHAIN OPTIMIZATION

PERFORMANCE

CLF Portfolio has historically outperformed national average “basket” commodity values



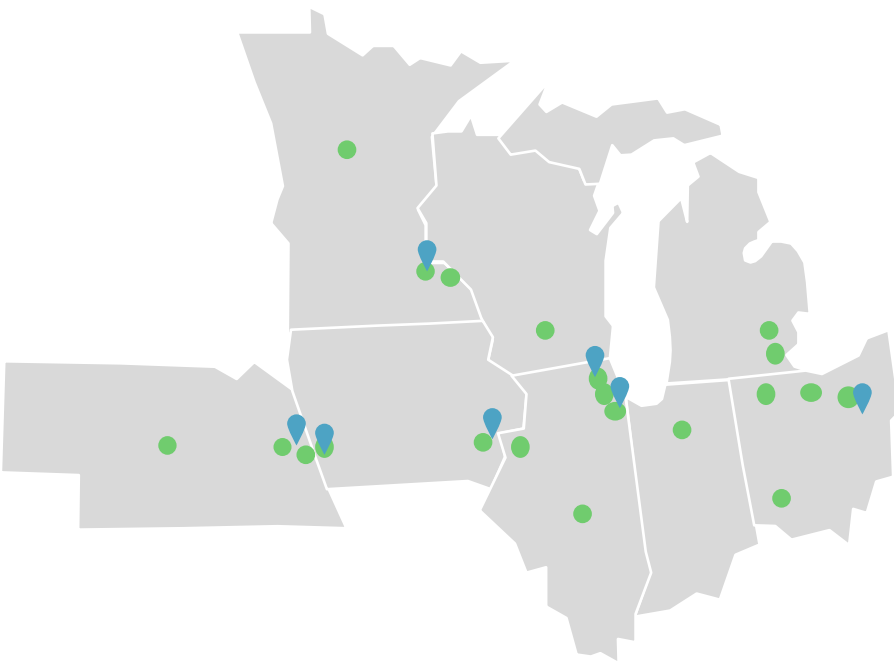
MIDWEST PROJECTS

In the Midwest, best-in-class operators demonstrate what it takes to navigate dynamic commodities markets

**Portfolio projects in the Midwest benefit from access to domestic processing and manufacturing infrastructure.**

Long-term relationships with down-stream customers have helped to reduce exposure to price volatility and declines in export markets.

As a result, more material is recovered and returned to supply chains.



CLF MIDWEST PORTFOLIO

- Council Bluffs | IA
- Eureka Recycling | MN
- FirstStar Fiber | NE
- Lakeshore Recycling (2) | IL
- Portage County | OH
- Scott County | IA

Collections and Sortation projects only

- CLF FUNDED PROJECT
- DOWNSTREAM CUSTOMER



**Our investment in Closed Loop Fund is helping ensure that our consumers have access to polypropylene recycling and that markets continue to grow. Investments like recycling carts in Memphis, MRF upgrades like FirstStar in Nebraska, and new processes for cleaning recycled propylene like PureCycle are helping get millions of pounds of new polypropylene out of landfills and back in the supply chain.”**

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**Monique Oxender**

Chief Sustainability Officer

Keurig Green Mountain





## CATALYTIC CAPITAL

By 2025, we will demonstrate our impact on resources leveraged and gained by communities and throughout the system, by attracting new investment that spurs further growth and replication of successful models at scale.



CATALYTIC  
CAPITAL



PROFILE

**ARCHIE FILSHILL &  
TOM MCGRATH**

Aero Aggregates  
📍 Eddystone, PA



Why did you start your company?

AeroAggregates was established with a focus to provide ultra-lightweight fill material for infrastructure projects throughout the Mid-Atlantic region. The goal was to provide a cost-effective material that meets the technical requirements of design engineers, State DOTs and the Federal Highway Administration. At the same time, we wanted to provide a home for curbside recycled glass that has no other home outside of landfilling.

What impact do you hope to achieve?

Our goal is to create a company footprint in several major markets throughout the USA to provide lightweight aggregates fill materials for multiple applications and establish ourselves as the technical leader for ultra-lightweight foamed glass aggregates based on the last 6 years of testing and R&D.

What's one highlight of your progress from the past year?

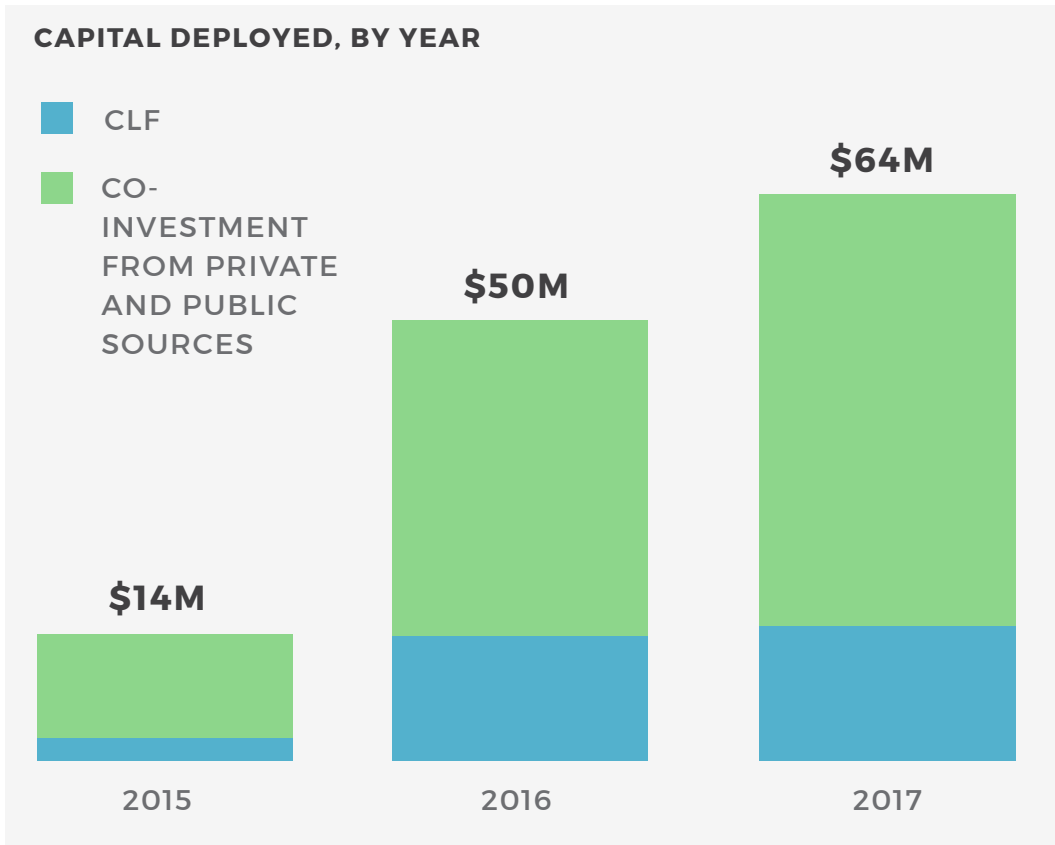
Our highlight over the last year was being selected for major DOT projects in New York City, Philadelphia, PA and Kearny, NJ.

About Aero Aggregates

AeroAggregates LLC is the first vertically-integrated, U.S.-based company to produce lightweight aggregates from 100% recycled glass. Our manufacturing capabilities include the ability to make several types of foamed glass including both open and closed cell aggregates.

INVESTMENT

For every \$1 CLF invests, we achieve **\$3 in co-investment** from private and public sources



**70% FROM PRIVATE (EQUITY, DEBT, OTHER ASSETS)**

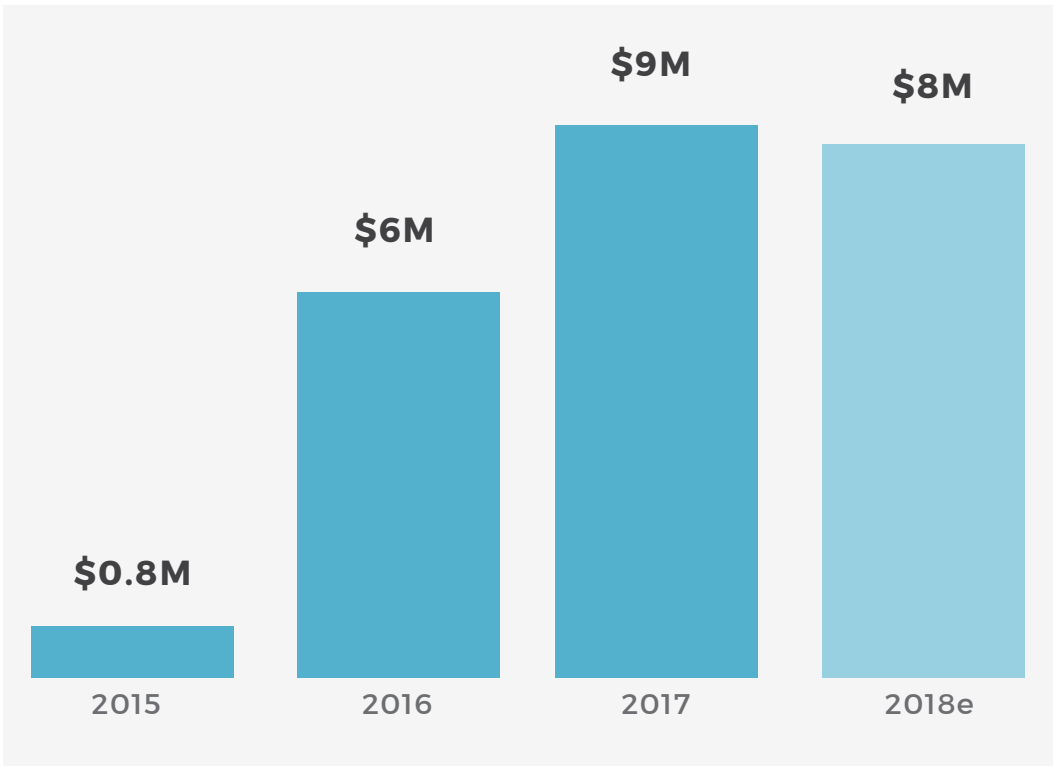
**30% FROM PUBLIC (GRANTS, BONDS)**

CATALYTIC  
CAPITAL

ECONOMIC BENEFIT

Investments have generated more than **\$15 million in economic benefit** to communities.

Includes new revenue and savings realized by municipalities and wages from new jobs created.



**\$1** FROM CLF =  
**\$2.40** IN DIRECT REVENUE AND SAVINGS BY 2025

AVG. **\$43/TON** TO MUNICIPALITIES

**250+** JOBS CREATED

PARTNERSHIPS

We are partnering with state agencies and other funders to drive more capital for impact.



**# of CT Households: 1.35 million**

**Landfill tip fee (state avg.): ~\$70/ton**

**DEEP grants to recycling: \$95,000 (2016)**

CONTEXT

In 2017, CLF helped the City of Waterbury finance 32,000 new carts for curbside collection, co-investing alongside CT DEEP

OPPORTUNITY

CT Department of Environment and Energy Protection (DEEP) and CLF have since established a formal partnership to support recycling infrastructure

IF WE ARE SUCCESSFUL

- Efficient and coordinated deployment of high-impact capital
- Replicable model
- Stronger local markets through follow-on investments across the system



**Goldman Sachs was an early supporter of the Closed Loop Fund and is proud of the progress that it and its partners have made in building the infrastructure needed to support more circular supply chains. Now, as an investor in Lakeshore Recycling Systems, Goldman Sachs is able to deploy additional capital into this growing industry.”**

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**Kevin M. Smith**

Vice President, Environmental Markets Group

Goldman, Sachs & Co.

## PROGRESS TO DATE

# Closed Loop Ventures

Closed Loop Ventures was created to help catalyze solutions for the circular economy. This takes the form of early-stage equity investments into sustainable consumer goods companies, advanced recycling technologies, and services related to the circular economy – reducing waste or closing the loop on various materials.

Since inception, we have worked towards circularity in specific verticals: recycling, textiles & apparel, and food & agriculture.

PORTFOLIO COMPANIES INCLUDE:







### PROFILE

#### NICOLE BASSETT

The Renewal Workshop

📍 Cascade Locks, OR



### Why did you start your company?

We started The Renewal Workshop to enable a circular economy for the apparel industry. Today clothing is made inside a linear system where raw materials are taken from the earth, clothing is made, used and at the end of its use sent to landfill. There is an opportunity to intersect that model and make it circular. The Renewal Workshop partners with apparel brands to enable them to change how they make, design, and sell their apparel inside a circular system. Together we are showing the world the opportunity that exists for a new type of business model.

### What impact do you hope to achieve?

The impact we hope to achieve is two fold, to demonstrate that a circular business model is financially viable and the second is to eliminate textile waste because we have created the systems to collect, extends its life and funnel it into viable recycling channels.

### What's one highlight of your progress from the past year?

One exciting highlight is our progress from 5 brands to 16 brands who are partnering with us to demonstrate a circular economy.

### About The Renewal Workshop

The Renewal Workshop takes discarded apparel and textiles from its brand partners and turns them into renewed apparel, upcycled materials or feedstock for recycled fiber.



### PROFILE

#### OSHIK EFRATI

HomeBiogas

📍 Israel



### Why did you start your company?

HomeBiogas was created to give power to the people: to make biogas energy simple, affordable and accessible to all.

### What impact do you hope to achieve?

In the developing world, cooking with solid fuels exposes millions of people to indoor air pollution and unsafe conditions. We hope to improve the lives of these people by providing clean cooking gas, dramatically improving their health and quality of life. Within the developed world, our technology gives families a way to recycle their waste more sustainably while also providing renewable energy for cooking. Across all communities, HomeBiogas systems allow families to have a positive and meaningful impact on the environment.

### What's one highlight of your progress from the past year?

Our impact is only growing; by the year 2022, we are projected to reach one million people, divert 222,600 tons of waste from landfills, avert 2.4 million tons of CO2 from the atmosphere, and protect 1750 hectares of forest.

### About HomeBioGas

Homebiogas is an off-grid system to properly treat household waste that generates clean energy without any electricity. From up to 12 liters of food waste or 40 liters of animal waste, each system produces up to 2 hours of cooking gas every day.



### PROFILE

#### MATANYA HOROWITZ

AMP Robotics

📍 Denver, CO



### Why did you start your company?

I came to recycling from outside the industry. During graduate school, I saw what the new technology in machine learning and robotics was capable of, and I was looking for a place to use it. I began studying several industries, but after having visited several recycling facilities it was immediately apparent that robotics on sorting lines could be powerful for the industry. I started AMP to leverage this new technology to solve these key pain points for recyclers.

### What impact do you hope to achieve?

The mission of AMP Robotics is to change the fundamental economics of recycling. There is a tremendous amount of value locked up in all the material that goes to the landfill. If we can remove the costs of sorting - either through sortation technology or new data streams - we can increase the profitability of recycling and improve the incentives for material capture.

### What's one highlight of your progress from the past year?

In the last year AMP has seen the promise of robotics and artificial intelligence begin to be realized inside these recycling facilities. We have achieved exceptional runtime and material purities, and from what we're seeing, the systems are only getting better. We are seeing recycling facilities begin to truly rely on these systems for their operations.

### About AMP Robotics

AMP Robotics products help material recovery facilities identify and pick recyclable materials more effectively and efficiently, helping MRFs generate higher throughput, increased commodity revenues, and fixed labor costs.



### PROFILE

#### CHELSEA BRIGANTI

Loliware Co-founder and SheEO

📍 New York, NY



### Why did you start your company?

We set out to change the world of sustainable product design. Prior to LOLIWARE, we designed breakthrough innovations for global CPG companies, where we questioned the concept that all products, including single-use items, should be 'built to last' to exist well beyond their useful life. LOLIWARE is leading product design for single-use disposable items away from the 'built to last' philosophy and towards a new philosophy of 'designed to disappear'.

### What impact do you hope to achieve?

The world needs a radically new approach to our daily consumption of single-use plastics. Our solutions transform disposables into "plant fuel" through composting, or 'human fuel' through consumption. Our goal is to replace one billion plastic disposables by 2020.

### What's one highlight of your progress from the past year?

Whether it's continuing to build a rockstar team, being accepted into TechStars and Sustainable Ocean Alliance accelerators, or seeing Richard Branson tweet us 5 times in one day, we believe in making progress daily towards our ambitious goal to replace plastic forever.

### About Loliware

LOLIWARE is the world's first edible bioplastics company dedicated to replacing plastic with hypercompostable, edible materials derived from seaweed.

## Notes on Methodology

Descriptions and analysis of specific projects have been synthesized from reports, interviews, and communications with borrowers and their project partners, and is provided with their permission.

### Closed Loop Fund

Investments are made according to our theory of change and value model framework (see page #). We track and report the impact of our portfolio following a consistent methodology, outlined below. For every project in our portfolio, Closed Loop Fund:

1. Identifies relevant metrics and establishes a baseline for material volumes, costs (e.g., landfill tip fees), and other metrics relevant to the project prior to project implementation
2. Projects impact on materials diverted, recovered and/or returned to supply chains, greenhouse gas emissions reduced/avoided, households represented, jobs created, economic benefit to municipalities, and other metrics relevant to the project and our value model.
3. Tracks incremental progress over time. As a condition of funding, clients are required to report to Closed loop Fund on their progress on key metrics, agreed to as part of closing. Data are reviewed by Closed Loop Fund’s staff and contractors to validate and ensure accuracy.
4. Reports progress in aggregate and in case studies quarterly to our advisory board and investment committee; public reports are issued at least annually.

### GHG Calculations

For Closed Loop Fund, we use two primary methods for tracking GHG emissions reduced or avoided as a result of a project being implemented. The methodology is chosen based on the type of project and capacity of our clients to provide data.

1. For collections and sortation projects: GHG emissions reduced based on new tons recycled, calculated using data from the US EPA WARM Model (most recent version applies).
2. For processing and end market manufacturing projects: GHG emissions reduced or avoided are calculated based on tons of source material reduced, and net of GHG emissions associated with the alternative used. Sources: US EPA WARM model, or for materials not included in the WARM model, third-party research made available by the Greenhouse Gas Protocol (ghgprotocol.org)
3. Where data are available, clients have also provided us with GHG impacts of operations, e.g., efficiencies gained or energy used/reduced, as a result of the funded project. In those cases, we also include these GHG impacts in our aggregated reporting.

### Closed Loop Ventures

Closed Loop Ventures creates a Theory of Change analysis for each of our portfolio companies, and independent metrics to track the impacts related to that Theory of Change. We also have aggregate metrics that run across the various supply chains. These metrics include the following, though not all are applicable to each company:

- Tons Diverted from Landfill
- GHG Emissions Avoided
- Water Savings from Products Sold
- Jobs Created
- Households Represented

Today, many of these companies are in the early stages of deploying their technologies in the field, limiting the amount of data available. However, we intend for a more robust data set to be available by YE 2018 when more units are deployed for each company.

### Definitions

We believe globally held standards of impact are important measures of our success, and apply definitions developed by the UN (SDGs), the GIIN (IRIS), and GRI to our reporting.

*We thank the Three Cairns Fellowship at Columbia Business School for helping us in Spring 2018.*

Value	Sustainable Development Goals	CLF Indicators	GRI and IRIS Indicators
Increased Recycling	• Goal 8: Decent Work and Economic Growth  • Goal 9: Industry, Innovation and Infrastructure  • Goal 11: Sustainable Cities and Communities  • Goal 12: Responsible Consumption and Production	• Materials recovered (# tons collected, diverted)	GRI 305-1 through -4, 306-2
		• GHG emissions reduced (# MTs of CO2E)	
		• Contribution to recycling rate (tons equivalent to % of annual generation)	IRIS OI1479, OI2535
Supply Chain Optimization	• Goal 13: Climate Action  • Goal 15: Life on Land	• Post-consumer recycled material used by end markets (# tons, by material type)	GRI 301-2, 302-5
		• % of portfolio demonstrating “best-in-class” operations	
		• # of solutions to system bottlenecks demonstrated by portfolio	IRIS FP8569, PI3825, PI5926, PI8177
Catalytic Capital		• Capital from public and private sources (\$, ratio) co-invested with CLF	GRI 201-1
		• Growth and replication of portfolio entities (#, \$)	
		• Economic benefit to communities (\$ saved and generated, jobs created)	IRIS FP3297, PI3687

“Tons Diverted” refers to tons recovered from landfill, net of residue.

“Economic benefit to municipalities (or communities)” is calculated based on client reporting, including real savings from landfill tip fees, shared revenues from commodities sold, and, when relevant, wages from jobs created.

“Households represented” refers to: for collections and sortation projects, households directly reached by the project; for processing and end-market manufacturing projects, the number of households represented is calculated as the total weight of material diverted or reduced divided by the weight of the same material generated by a household, on average, in a year. Average generation is taken from the most recent available composition data for curbside single-stream recycling programs in the US.

“Jobs created” refers to new full-time or full-time equivalent positions created as part of the *project*.

“Recovery per household” is calculated as total weight of material diverted or recovered, divided by the total number of households in the program service area (not based on actual participation).

“Water savings from products sold” is calculated as the total number of gallons saved versus an industry baseline.



## Closed Loop Fund Portfolio

Investment	Location	Material	Summary	Projected Impact by 2025
Aero Aggregates	Eddystone, PA	Glass	Aero Aggregates LLC, produces ultra-lightweight aggregates from 100% post-consumer, mixed color, recycled glass. The material can be used in road and building construction, foundations, and concrete.	<ul style="list-style-type: none"> <li>Return to supply chains more than 190,000 tons of glass in the form of foamed glass aggregate</li> <li>Create 15 jobs</li> </ul>
Council Bluffs Recycling Center	IA	Single stream	The Council Bluffs Recycling Center sorting facility serves 42,500 households in a rural community.	<ul style="list-style-type: none"> <li>Recover more than 65,000 tons of post-consumer recyclables</li> <li>Save local municipalities more than \$3M</li> </ul>
Escambia County Utility Authority	FL	Single stream	Emerald Coast Utility Authority material recovery facility serves more than 250,000 households across Escambia County, the Florida panhandle, and eastern Alabama. ECUA's facility processes 45,000 tons of recyclables each year.	<ul style="list-style-type: none"> <li>Recover 400,000 tons of single-stream recyclables</li> <li>Generate more than \$20M in savings and revenues for the County</li> <li>Create more than 30 jobs</li> </ul>
Eureka Recycling	Minneapolis, MN	Single stream	Eureka Recycling is a nonprofit social enterprise based in the Twin Cities, whose mission is to demonstrate that waste is preventable, not inevitable. Eureka provides recycling collection and processing services to over 200,000 households and sorts over 90,000 tons a year.	<ul style="list-style-type: none"> <li>Recover more than 700,000 tons of single-stream recyclables</li> </ul>
FirstStar	NE	Single stream	FirstStar Recycling is the largest full service recycler (hauler and MRF) in the state of Nebraska ensuring comprehensive recycling in the greater Omaha and Lincoln metro areas.	<ul style="list-style-type: none"> <li>Recover and return to supply chains more than 125,000 tons of single-stream recyclables</li> </ul>
GreenMantra	Ontario, Canada	Plastics	GreenMantra Technologies is focused on applying its upcycling catalytic technology to advance the circular economy. The first application of the technology, the production of polyethylene and polypropylene into an industrial wax used in construction products, has now reached commercial scale.	<ul style="list-style-type: none"> <li>Return to supply chains more than 20,000 tons of low-value plastics in the form of industrial waxes</li> </ul>
IntegriCo	Sarepta, LA	Plastics	IntegriCo Composites is a manufacturer of composite railway products including railway crossties and composite grade using 100% recycled plastics.	<ul style="list-style-type: none"> <li>Return to supply chains more than 100,000 tons of waste plastics in the form of plastic railroad ties</li> <li>Create more than 20 jobs</li> </ul>
ITR	TX	Single stream, glass	ITR provides new collections, sorting, and processing capacity for post-consumer single stream in the Houston, TX, market. At scale, the facility will handle 33,000 tons of single-stream material per year.	<ul style="list-style-type: none"> <li>Improve access to convenient curbside recycling for 300,000 multifamily housing residents</li> <li>Recover and return to supply chains 275,000 tons of single-stream material</li> <li>Create more than 20 jobs</li> </ul>
Lakeshore Recycling Systems	Chicago IL	Single stream	Lakeshore Recycling Systems (LRS) is Illinois' largest private waste company, specializing in recycling and waste diversion programs for Chicagoland businesses and homeowners, dumpster services and portable restroom rental. LRS controls over 2.3 million tons per year and does not own a landfill.	<ul style="list-style-type: none"> <li>Recover more than 1.3 million tons of single-stream recyclables</li> <li>Create more than 100 jobs</li> </ul>
City of Memphis	TN	Single stream	The City of Memphis introduced universal single stream curbside recycling across the city in 2016. More efficient carts and trucks bring significantly more material to the area's material recovery facility.	<ul style="list-style-type: none"> <li>Improve access to convenient curbside recycling for more than 100,000 households</li> <li>Recover more than 160,000 tons of single-stream recyclables</li> <li>Save the city more than \$4M in landfill tip fees avoided</li> </ul>
Momentum Recycling	Denver, CO	Glass	Momentum Recycling is a cullet processor and recycling services provider, with operations in Salt Lake City and Denver. The Denver facility processes over 75,000 tons of glass per year for container, fiberglass, and abrasives markets.	<ul style="list-style-type: none"> <li>Recover and return to supply chains more than 580,000 tons of post-consumer glass</li> <li>Create 15 jobs</li> </ul>
Portage County Solid Waste Recycling District	OH	Single stream	Portage County, OH is a rural county in Ohio, SE of Cleveland with a population of 165,000 residents. The Solid Waste Recycling District provides curbside collections service to more than 25,000 households.	<ul style="list-style-type: none"> <li>Return to supply chains 70,000 tons of polypropylene</li> <li>Create 70 jobs</li> </ul>
Preserve	Waltham, MA	Plastics	Preserve, a certified B Corporation, makes stylish, eco-friendly products for the home, including a full line of food service cutlery, kitchen products, tableware, and personal care products, using 100% recycled plastic and plant-based compostable materials.	<ul style="list-style-type: none"> <li>Recovered and returned to supply chains more than 36,000 tons of mixed 3-7 plastics in its first two years of operations</li> </ul>
PureCycle Technologies	OH	Plastics	PureCycle Technologies uses a proprietary process to transform colored and contaminated polypropylene (PP) into an FDA-grade clear / natural PP pellet. At scale, the Lawrence County, OH, facility will process 50,000 tons of PP a year.	<ul style="list-style-type: none"> <li>Return to supply chains 70,000 tons of polypropylene</li> <li>Create 70 jobs</li> </ul>

Investment	Location	Material	Summary	Projected Impact by 2025
QRS of Maryland	Baltimore MD	Mixed 3-7 Plastics	QRS of Maryland was a plastics recovery facility that sorted and processed post-consumer mixed plastics with limited markets into a washed flake.	<ul style="list-style-type: none"> <li>Recovered and returned to supply chains more than 36,000 tons of mixed 3-7 plastics in its first two years of operations</li> </ul>
Waste Commission of Scott County	IA	Single stream	Waste Commission of Scott County, a solid waste district in NE Iowa serves the Quad Cities area. A new material recovery facility handles more than 17,000 tons of recyclables per year from expanded curbside programs in Bettendorf and Davenport, as well as for the region.	<ul style="list-style-type: none"> <li>Improve access to convenient curbside recycling for 48,500 households</li> <li>Recover 88,000 tons of single-stream recyclables</li> <li>Generate more than \$2.8M in savings and revenues in the County</li> </ul>
City of Waterbury	CT	Single stream	The City of Waterbury CT has expanded its curbside recycling program, offering 95-gallon recycling carts to every household with a goal to increase the current 6% recycling rate to 25% in the next three years.	<ul style="list-style-type: none"> <li>Improve access to convenient curbside recycling for more than 32,000 households</li> <li>Generate more than \$3M in savings for the City</li> </ul>

## Closed Loop Ventures Portfolio

Investment	Location	Material	Summary	Potential for Impact
AMP Robotics	CO	Single Stream Recyclables	AMP Robotics is a startup focused on reducing the fundamental costs of recycling through the use of artificial intelligence. AMP's solution is a combination of state of the art computer vision and robotic products that can rapidly identify and recover material from the waste stream.	<ul style="list-style-type: none"> <li>Improves the quantity and quality of recycled commodities recovered from co-mingled waste streams.</li> </ul>
Curb My Clutter	NY	Electronics, Textiles	Curb My Clutter is a CRM application that enables municipalities and haulers to collect and recycle used electronics and apparel. Households can schedule a collection and identify the items through a text based, smart phone system.	<ul style="list-style-type: none"> <li>Diverts textiles and electronics from landfill by dedicated collection and sales. CMC has the potential to collect 75lbs/person/year of textile waste.</li> </ul>
Easy Aerial	NY	Single Stream Recyclables	Easy Aerial is developing advanced and customized autonomous aerial monitoring solutions. Its versatile solutions are based on a lightweight, wirelessly charged drone that can carry various payloads; self-sustaining, durable and portable ground station that automatically charges the drone; and a unique fleet-management software that operates and monitor the drone(s) autonomously.	<ul style="list-style-type: none"> <li>Improved quality and efficiency of recycling operations, e.g., increasing the quality of material coming into MRFs by enhanced hauler visibility systems.</li> </ul>
Evrnu	WA	Textiles	Using state-of-the-art chemical regeneration, Evrnu's technology transforms post-consumer cotton garment waste into high quality cellulosic fiber.	<ul style="list-style-type: none"> <li>Diverts and recovers all cotton fiber waste and converts it to new fibers, thereby at least halving the need for virgin cotton fibers.</li> </ul>
For Days	CA	Textiles	Bringing consumers into the circular supply chain by a subscription-based relationship to recycled garments.	<ul style="list-style-type: none"> <li>Reimagines consumption habits of basic apparel, thereby dramatically reducing the 75lbs/person/year that get disposed of in landfill.</li> </ul>
HomeBioGas	Israel	Organics	HomeBiogas produces household biogas systems which turn your food leftovers and animal waste into gas for cooking and fertilizer for your plants. The HomeBiogas system enables people access to clean, affordable and renewable energy while providing a viable solution for organic waste management.	<ul style="list-style-type: none"> <li>Diverts food waste from landfill and dramatically increases its value as usable fuel, reduces indoor air pollution from dirty cookstoves, and increases the productivity of farms with "free" fertilizer.</li> </ul>
Linhaus	NY	Metals, Minerals	Linhaus Design is a proprietary technology and design platform that delivers customizable and closed-loop jewelry with a unique customer experience. Linhaus products avoid extractive diamond and gemstone mining and increase demand for recycled metals.	<ul style="list-style-type: none"> <li>Increases the use of lab-grown diamonds and recycled metals in jewelry making.</li> </ul>
Loliware	NY	Organics	LOLIWARE is the world's first Edible Bioplastic Company dedicated to replacing plastic with edible materials.	<ul style="list-style-type: none"> <li>Reduces the need for unrecyclable plastic straws with hyper-compostable alternatives.</li> </ul>
Natural Machines	Spain	Organics	Natural Machines is a 3D food printing can reduce food waste throughout the food value chain: from the customization of portion sizes allowing people to print what they want to eat and nothing more, to recovering food that is traditionally classified as food waste – such as “ugly” foods	<ul style="list-style-type: none"> <li>Makes use of food scraps in commercial kitchens, diverting discarded food from landfill.</li> </ul>
Rebound Technologies	CO	Organics	Rebound Technologies delivers unprecedented control and efficiency to industrial freezers. Their IcePoint product enables strategic bursts of high capacity cooling that accelerate freezing processes and mitigate peak demand expenses, and generates sub-zero temperatures at 40% greater efficiency than legacy refrigeration systems.	<ul style="list-style-type: none"> <li>Dramatically cuts fresh food waste at logistics sites, and reduces energy consumption for freeze-point cooling.</li> </ul>
The Renewal Workshop	OR	Textiles	The Renewal Workshop serves apparel brands and retailers by taking discarded apparel and textiles and turning them into renewed apparel, upcycling materials or feedstock for recycled fiber.	<ul style="list-style-type: none"> <li>Diverts textiles that would otherwise be sent to landfill or incineration.</li> </ul>

## Closed Loop Foundation

Our affiliated 501c3 has granted \$567,500 to innovative programs and organizations solving for food waste and flexible film recycling

Investment	Location	Material	Summary
Alameda County	CA	Food Waste/ Organics	ALL IN Alameda: The New War on Poverty is a comprehensive social enterprise that efficiently recovers wasted food from retail
BioWorks Energy and City of Flint	MI	Food Waste/ Organics	Technology to make food waste into a sludge that can be incorporated into waste water digesters
Drought Diet Products	CA	Flexible Film	This irrigation company uses post-consumer film plastic feedstock in its irrigation piping products, diverting more than 1 billion lbs. of plastic films from landfills annually
Full Cycle BioPlastics	CA	Food Waste/ Organics	Circular economy solution for food waste and plastic pollution that converts post-consumer food waste into a compostable bioplastic.
Georgia Tech	GA	Food Waste/ Organics	Aquaponic system adds value to food waste nutrients by converting these nutrients into algal meal fish feed for aquaponic urban farming systems at schools.
Gonzaga University	WA	Food Waste/ Organics	The Hold That Tray! Program is a university-based model for Education, diversion, and combined anaerobic digestion/composting that highlights the value in food not served or wasted
Indiana Recycling Coalition	IN	Food Waste/ Organics	Collection and processing system solution for commercial food waste
Renewal Mill	CT	Food Waste/ Organics	Harvests undervalued byproducts from current food production processes and upcycles them into high-value nutritious and wholesome products
Vermont Natural Ag Products	VT	Food Waste/ Organics	Recapture renewable thermal energy created in its compost system to reduce energy consumption, time and therefore cost of creating the compost product
Zzyzx	PA	Flexible Film	Develops technology making recycled plastic pellets from challenging waste streams. Zzyzx will be able to process 7 million pounds of film per year per machine

**DISCLAIMER**

Notice to Recipients

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## ACKNOWLEDGMENTS

Our limited partners have exhibited tremendous leadership in coming together to support a new model for systems change. We hope the Closed Loop Fund investment model, where corporations recognize the opportunities available to invest in their supply chains, will continue to expand.

The municipalities, operators and entrepreneurs that we lend to have shown the vision and execution required to both make the pay loan payments on time and have the impact expected. Most are rethinking old business models and leading their peers in the industry. Closed Loop Fund is fortunate to have the opportunity to support and learn from these municipal leaders and business innovators.

We would like to recognize our partners at Dentons. They have exhibited incredible patience and collaboration in structuring both our unique fund and our innovative investments.

CLP acknowledges the excellent service of our auditing firm, CohnReznick, and our banking partners, Silicon Valley Bank and First Republic Bank.

We would also like to thank everyone on the Closed Loop Partners team for their contributions and commitments.

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