INSIGHTS ENGINE CAPITAL TRACKER METHODOLOGY

JULY 2022

ReFED

CAPITAL TRACKER BETA

The Capital Tracker is being launched initially in a beta version to allow ReFED to collect feedback from initial users and iterate as needed. As a result, the methodology below for determining what to include is not meant to be rigid, but we expect it to evolve as changes take place in the sector, or as we learn that users are utilizing the tool differently from how we expected them to.

The beta includes only private capital data provided by PitchBook, curated to focus on food waste solutions. In the future, we will be building a version which is meant to also capture government and philanthropic funding through USAspending.gov and IRS Form 990-PFs, respectively.

CONTENTS

This Technical Appendix describes the methodology used to gain insight on where and how much capital is flowing into food waste solutions in the U.S, broken down by recipient, funder, capital type, thematic funding area, deal date, and many other dimensions. This information allows users to understand the landscape, identify key players, and plan out future funding strategies. The resulting data can be found in the Capital Tracker, which is part of the ReFED Insights Engine online platform.

ACKNOWLEDGMENTS

Contract Partners & Data Contributors

Juniata Analytics is a tech start-up working at the intersection of business, sustainability, and software to help organizations calculate, analyze, and share sustainability information across internal operations and supply chains. Juniata was responsible for crafting the initial vision for the ReFED Insights Engine, managing the project and coordinating contractors, developing the methodologies, collecting and processing data, and developing a web application to automate the data modeling.

Ocupop is a tight knit team of creative professionals focused on super-charging their clients' efforts to change the world. Ocupop has studios in Milwaukee, Honolulu, and Whistler, BC offering everything from brand strategy and identity systems, to printed and digital collateral, to software, environments, interiors, and consumer products for clients of nearly any scale. Ocupop was responsible for the design of the Capital Tracker which included wireframes and mockups with the developer Vizzuality.

PitchBook is a provider of data, research and analysis on private and public companies. The company specializes in researching global M&A, private equity and venture capital investments along with all participating parties, including limited partners, investors, service providers and the professionals involved. PitchBook provides the investment community with a proprietary data platform, research tools and custom analysis to enable better investment decisions. Data is collected through the company's extensive research process that includes machine-learning and natural language processing technology, comprehensive review of publicly available sources, direct primary research with all parties involved in deal flow, online surveys, and ongoing quality assurance. In addition to the PitchBook Platform, the company also publishes a daily newsletter and quarterly reports detailing key industry activities and trends. PitchBook provided access to their proprietary and rich data set through their Direct Data feed. The file was customized by ReFED.

Vizzuality is a world-leading data design agency that creates bespoke and compelling visualizations to help our clients tell the stories that matter to them and their communities. From developing digital tools that monitor deforestation to increasing government transparency through easy-to-use online dashboards, our work often bridges the gap between policy, science and citizens – making complex information less complicated and equipping world-changing organizations with a new way to communicate their research to the world.

Vizzuality was the developer of the frontend and backend of the Capital Tracker as well as the integration between the Capital Tracker and the Solution Provider Directory. Additionally, they built processes for automating data pulls coming from the PitchBook datafeed.

ACKNOWLEDGMENTS

Thank You To Our Funders

OVERVIEW

In 2016, ReFED launched its landmark Roadmap to Reduce U.S. Food Waste by 20%. That initial report became a touchstone for those in the food waste space, but there was a growing need for more – and more granular — data about the issue to fill in knowledge gaps and move the food system from awareness about the issue to insight-driven action. In early 2021, ReFED launched the ReFED Insights Engine which is the next generation of data, insights, and guidance on U.S. food waste. This online data and solutions hub for food loss and waste is designed to provide anyone interested in food waste reduction with the information they need to take meaningful action. Informed decision making is needed to achieve national and international goals of reducing food waste by 50 percent by 2030.

Current ReFED Insights Engine tools include:

- **Food Waste Monitor:** Centralized, trusted repository of information built with data from more than 50 public and proprietary datasets that shows how much food is being wasted in the U.S., why it's happening, and where it goes.

- **Solutions Database:** Provides a stakeholder-specific, comprehensive analysis of 40+ food waste reduction solutions based on impact goals, along with detailed fact sheets on each.

- **Solution Provider Directory:** Connects users with a vetted list of 1000+ nonprofit and for-profit organizations ready to help implement food waste reduction solutions.

- **Impact Calculator:** Quantifies the impact of wasted food on the climate, natural resources, and recoverable meals.

- **Capital Tracker:** Monitors the flow of capital into food waste innovation, allowing users to understand the landscape, identify key players, and plan out future funding strategies.

- **Policy Finder:** Reflects current food waste policy at the federal and state levels to discover best practices and recommendations for policy improvements that will support more food waste prevention, rescue, and recycling.

Capital Tracker

The Capital Tracker allows users to gain insight on where and how much capital is flowing in food waste in the U.S, broken down by recipient, funder, capital type, solution categorization, deal date, and many other dimensions. Before creating this tool, the ReFED team sought feedback from its network of industry professionals from businesses, capital providers, government agencies, nonprofits, and academia, to understand the industry need and use cases for this data. The Capital Tracker was designed to incorporate this feedback and fill key needs and data gaps not covered by existing tools in the market. The following are the key goals that ReFED has sought to meet when designing the Capital Tracker tool:

Sector Comprehensiveness

- **Defines the food waste funding landscape for the first time**: Defining which thematic funding areas are associated with food waste reduction is a difficult task that ReFED has completed and made public for the first time through this tool. By defining this landscape, ReFED aims to help the industry to standardize its thinking about what types of solutions and innovations are considered to be viable food waste reduction strategies.

- **Food waste specific**: The Capital Tracker is the only investment database geared specifically to food waste. The closest alternative method to arrive at this information has been to filter larger databases by loosely related topics such as "Ag Tech" or "Food Systems" that may have some overlap, but are not perfect proxies for the topic of food waste.

- **Automated keyword scan yields a thorough picture of food waste funding to date**: Over the last six years, ReFED's subject matter experts have developed a curated list of keywords used to describe food waste related topics (e.g., "compost", "food recovery", etc.). Using these keywords, ReFED's automated investment scanning system is able to search for and identify investments that may be related to food waste for the team to review. This automated scan is a more thorough approach than past attempts by ReFED and others to quantify the space. Subject matter experts still review the data, and in particular, the transactions that might be on the cusp of consideration.

- **To include a variety of capital types**: The ultimate goal of the Capital Tracker is to bring a variety of capital types (including public, private, and philanthropic) together into one centralized view.

Frequently Updated and Interactive

- **Frequently updated**: Due to the automated nature of the system ReFED has developed to assist in ingesting, reviewing, and maintaining investment data, ReFED is able to provide frequently updated information to the public. For instance, private capital investment data is updated on a weekly basis.

- **User-friendly online format**: The interactive, online Capital Tracker visualizes the data and allows users to see the big picture and to filter to information that is most useful to them. The Capital Tracker allows users to track funding amounts and deal counts over time, view individual transactions, and filter by food waste solution type, capital type, funding amount, deal date, funder, recipient, and recipient legal status (e.g., non-profits only).

- **Rapid feedback loop**: The Capital Tracker is intended to be iteratively designed as user needs evolve and become more clear. ReFED's automated system allows stakeholder feedback to be quickly incorporated.

Highest Quality Information

- **Best-in-class data sources**: Thanks to the generous support of ReFED donors allowing us to acquire the highest quality datasets, the Capital Tracker relies on the best available data sources to quantify investment.

- **Curated by ReFED's subject matter experts**: The ReFED team spends a great deal of time reviewing individual transaction data to ensure the latest industry thinking and methodologies are being applied; thereby providing the highest quality information with users. Additionally, the tool benefits from the expertise of ReFED's large network of stakeholders who provide input.

The Capital Tracker is being launched in beta version to allow ReFED to collect feedback from initial users and iterate as needed. On an ongoing basis, the tool is meant to be adaptive to changes in the sector and to continuing feedback from users. The tool is being launched with private investment data sourced from PitchBook, and we will be adding philanthropic and government funding data in its next phase of development.

NOTICE AN ISSUE WITH THE DATA?

Send us an email! The Insights Engine was designed to be radically transparent so that the community of people using this work can help spot issues and identify opportunities to continually improve the data over time. If you see any mistakes, have additional information, or have recommendations for how to improve this resource, please let us know.

SCOPE

Types of Capital

ReFED aspires to track a variety of types of capital flows into food waste innovation and solution adoption and scaling. ReFED groups food waste funding into the nine capital types listed in Table 1. So far, ReFED has or will be developing the ability to track eight out the nine capital types to varying degrees. The Capital Tracker at this point is able to mostly track venture capital, private equity and provide a small window into corporate finance (however not fulsome as it does not capture internal investments). In the future, we will be adding specifically data related to foundation funding to get a window into philanthropic funding (note: this does not include individual giving) and federal funding (which will not fully cover state or local funding by governments).

Table 1 describes the data sources ReFED uses to track each capital type, as well as any known data gaps. The table represents data sources we have identified, but not what is being reflected in the tool yet as philanthropic (U.S. Internal Revenue Service) and public (USAspending) data are not included in the beta launch.

Table 1. ReFED Classification of Capital Types and Data Sources for Tracking

CAPITAL TYPE	DEFINITION	DATA SOURCE FOR TRACKING CAPITAL
PRIVATE CAPITAL		
Venture Capital	A type of financing that investors provide to startup companies and other for-profit businesses that are believed to have long-term, high growth potential. Investors in this asset class have a perceived higher risk as companies are at an earlier stage and therefore require a high rate of return.	Data Source: PitchBook[1] Data Gaps: Although PitchBook has high visibility on venture capital deals - in particular in the focus geographies of North America, Europe, Israel, and Asia Pacific region (APAC) - there is a time lag in reporting transactions - in particular in the early stage of funding (seed, accelerators/incubators). See the Data Sources and Limitations section to learn more.
Private Equity	Composed of funds and investors that directly finance private companies. Organizations receiving this type of capital are established organizations or ones requiring growth equity.	Data Source: PitchBook[1] Data Gaps: See the Data Sources and Limitations section to learn more.
Corporate Finance & Spending	Spending by for-profit corporations with the intent to return the cost of capital. Examples include spending on solutions (through paying solution providers or internally developing capabilities) and corporate acquisitions (M&A). Marketing type spending (non-foundation spending) would be considered part of this category as an operating cost despite not directly leading to market returns. Additionally, ReFED has considered traditional lending (leases, working capital loans) as part of corporate finance and spending.	Data Source: PitchBook[1] Data Gaps: While some Corporate Financing & Spending transactions are covered by PitchBook, due to the proprietary nature of internal corporate investments, ReFED does not have full visibility into the amount of corporate capital invested. This type of capital will likely never be able to be tracked comprehensively. Furthermore, as technologies mature, a greater amount of investment tends to come from internal corporate investments as opposed to philanthropic or public sources. This means that as a food waste solution matures, the amount of visible funding may decrease despite the fact that internal corporate investments are increasing.

CAPITAL TYPE	DEFINITION	DATA SOURCE FOR TRACKING CAPITAL
PRIVATE CAPITAL		
Commercial Project Finance	Financing provided for specific projects whereby the cash flows of the project pay down the project loan. This is sourced from for-profit financiers.	Data Source: PitchBook[1] Data Gaps: While some Commercial Project Finance transactions are covered by PitchBook, due to the proprietary nature of internal corporate investments, ReFED does not have full visibility into the amount of corporate capital invested. Project-based lending transactions are not fully captured by our current data sources nor will there be visibility on syndicates.
PHILANTHROPIC CAPITAL		
Non-Government Grants	Philanthropic grants from non-government sources, including high networth individuals, family offices, and foundations.	Data Source: U.S. Internal Revenue Service Form 990-PF[2] Data Gaps: Some data gaps exist in using 990-PF forms to track non-government grants (e.g., missing donor advised funds and high-net-worth individuals, time lag in reporting, limited grant descriptions). Additionally, this does not include individual giving. See the Data Sources and Limitations section to learn more.
Impact-First Investments	Investments that seek some sort of financial return, but are willing to accept more risk or potentially lower returns in pursuit of measurable social or environmental impact. Examples include low or no-interest loans, loan guarantees, variable payment options, program-related investments (PRIs), etc.	Data Source: PitchBook[1], U.S. Internal Revenue Service Form 990-PF[2] Data Gaps: ReFED has not yet identified an accessible data source for the full scope of impact-first investments. Some transactions will likely be captured by the PitchBook data and IRS 990-PF forms, but these sources will not be exhaustive.
PUBLIC CAPITAL		
Tax Incentives	Tax incentives and deductions related to donations. R&D tax credits are not factored in this analysis.	Data Source: N/A Data Gaps: ReFED has not yet identified an accessible data source for the amount of realized tax incentives associated with food waste reduction.
Government Grants	Public funding in the form of grants and payment for ongoing services (e.g, municipal compost collection).	Data Source: U.S. Office of Management and Budget[3] Data Gaps: The federal government data only includes federal grants. Currently ReFED has not identified a data source to track state or local government grants.
Government Project Finance	Direct municipal, state, or federal project financing.	Data Source: U.S. Office of Management and Budget[3] Data Gaps: The federal government data only includes federal contracts. Currently ReFED has not identified a data source to track state or local project finance.

Note: There are types of capital that are hybrids or exist outside of the types listed above. Mission Related Investments (MRIs), for instance, would fall under the broad definition of "Impact-First Investments'', but require market-rate returns. Therefore, it could arguably be a form of venture capital or its own capital type.

Thematic Funding Areas

By defining which thematic funding areas are associated with food waste reduction, ReFED has been striving to help the industry achieve a certain level of standardization as it has developed its Insights Engine tools.

The scope of the Capital Tracker begins with all organizations and associated transactions that would fall under ReFED's modeled and unmodeled solutions in the Solutions Database. The below outlines ReFED's initial process of including a solution within the Solution Database.

> *ReFED included solutions that have been demonstrated as feasible to implement and having a measurable impact on food waste reduction. The data analysis was limited to solutions that ReFED was able to model using available data. For each solution, ReFED researched publicly available sources and consulted experts to find the best available data. Some solutions were excluded from the analysis because the available data was proprietary and could not be publicly disclosed. Others were excluded because there was no available data or because they were deemed to be best practices that are already widely adopted. To make sure that solutions with data gaps are prioritized for future research, ReFED maintains a list of unmodeled solutions in the Solutions Database. These solutions have qualitative fact sheets available, but they are not included in the data modeling. While the list of modeled solutions is not exhaustive and is intended to be continuously improved and expanded, the proposed solutions provide a practical roadmap to achieve the national goal to cut food waste in half by 2030. ReFED has identified these solutions as contributing to reducing or diverting food waste[4].*

Acknowledging that the Solutions Database is not exhaustive, the team also aimed to be holistic with inclusion of new solutions that might not be named or outlined. This part of the process involved an assessment of whether: 1) the organization receiving funding has a clear connection / relationship with food surplus and 2) (optional but ideal) existing data or white papers evidence that the solution is a net positive in preventing or diverting food waste. If the first test is not met, the solution provider/investment would be considered out of scope.

After this, ReFED categorizes food waste funding into two Applicability categories based on the company:

- **Direct Food Waste Funding**: Explicitly focused on funding food waste initiatives. ReFED's rule of thumb in these cases is if the funded organization has >50% or greater of operations devoted to reducing food waste, we have deemed it to be a direct investment.
- **Indirect Food Waste Funding**: Funding that is not explicitly for food waste initiatives. Situations where this will occur are for food banks that supplement donations with purchased food and food waste solutions that are part of much larger platforms. ReFED's general rule is that if an organization is >20% but less than 50% of operations devoted to food waste, it is considered indirect; the same logic is applied to individual investments.

If the solution provider's food waste operations fall below the 20% threshold, the organization would fall out of scope for the Capital Tracker since their food waste solutions would not be considered material. For example, after Kroger acquired Home Chef (a meal kit company that was previously tracked as a food waste solution provider), Home Chef accounted for an immaterial portion of Kroger's operations, so would no longer be tracked by the Capital Tracker. There is also no way to strip out investment going forward to Home Chef.

Figure 1. A visualization of the decision tree for determining if an organization falls within scope to be tracked by the Capital Tracker
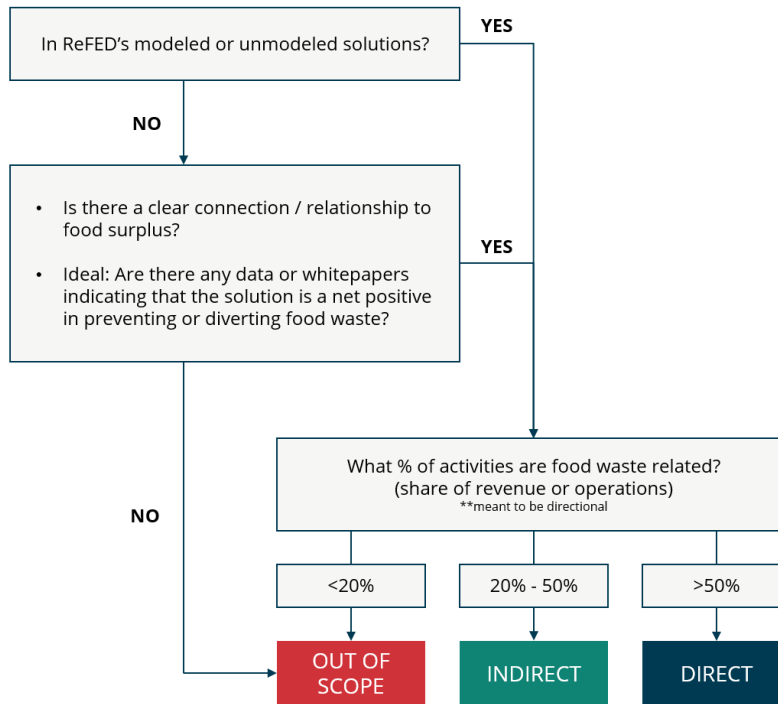

Table 2 provides an example of following this process for an organization that ultimately was determined to be indirect.

Table 2. Example of Process for Determining if Within Scope

- **Organization Name**: Interstate Waste Services
- **Description**: Provider of solid waste management services serving residential, industrial and commercial customers. The company offers collecting, recycling, composting, and disposal of organic material and other comprehensive arrays of environmentally responsible services that include construction and demolition and material recovery services.

RESULT OF TEST	RATIONALE
IN REFED'S MODELED OR UNMODELED SOLUTIONS?	
No	Cannot be classified into specific solutions.
IS THERE A CLEAR CONNECTION / RELATIONSHIP TO FOOD SURPLUS? **ANY DATA / WHITEPAPERS INDICATING THE SOLUTION IS A NET POSITIVE IN PREVENTING / DIVERTING FOOD WASTE?**	
Yes	There is a connection to food surplus through their organic material disposal and compost offering. Could be considered under the less granular solution type: recycling.
WHAT % OF ACTIVITIES ARE FOOD WASTE RELATED? (SHARE OF REVENUE OR OPERATIONS)	
20% - 50%	Based on description and desk research, it is determined that this organization does have some operations devoted to organics disposal. The team is unable to determine the mix so default would be to track but not include in direct food waste.
Conclusion: Recycling | Indirect | Include	

Table 3 below lists and describes a range of solution areas where ReFED has done a lot of thinking around scoping and were the most difficult to categorize. Most ReFED modeled solutions would fall under direct so have not been included in this table. Based on the decision tree process defined above, these are the typical conclusions as to whether companies within these solution areas are directly related to food waste reduction, indirectly related, or simply out of scope.

Table 3. ReFED Classification of Thematic Food Waste Funding Areas, Including Out of Scope Topics

SOLUTIONS	DESCRIPTION AND RATIONALE FOR CLASSIFICATION
INDIRECT FOOD WASTE FUNDING	
Online Marketplace Platform	ReFED Solution - Online platform that facilitates Business-to-Business (B2B) sales between suppliers and businesses in a centralized space, which can increase accessibility to a variety of goods and decrease time and resources needed to make a sale, thereby reducing waste. Examples include BlueCart. Given their food volumes are not usually focused on surplus food, companies within this solution will typically be classified as this should usually be Indirect. Companies set up as Online Market Platforms that do deal with a waste stream will typically be classified into a different thematic area. There are exceptions if they deal with specifically a waste stream but those would be classified as Assisted Distressed Sales or Imperfect and Surplus Produce Channels.
Direct to Consumer Channels	ReFED Solution - Use of alternative channels, apps, e-commerce models, or other, where products are sold directly to end customers without third-party retailers, wholesalers, or other middlemen. Examples include Barn2Door and Local Food Marketplace. These are considered food waste solutions as they reduce waste associated with the display and additional transportation needed for brick-and-mortar sales. Given their food volumes are not usually focused on surplus food, companies within this solution will typically be classified as Indirect. Companies set up with Direct to Consumer models that do deal with a waste stream will typically be classified into a different thematic area. There are exceptions if they deal with specifically a waste stream but those would be classified as Assisted Distressed Sales or Imperfect and Surplus Produce Channels.
Local Food Systems	What we think of as solutions that enable people to purchase more locally - thereby reducing waste relative to longer supply chains. Given the companies exercising this model, their food volumes are not usually focused on surplus food, these would usually be classified as Indirect.
Hunger Relief Organizations	Typically these are food banks and pantries. Many of these organizations would fall under the ReFED solution Donation Storage Handling & Capacity. Many hunger relief organizations have to supplement food rescue with food purchases to a significant degree. As a result, these organizations are typically classified as indirect solutions to food waste.
Cold Chain Facilities	ReFED will only be considering cold chain facilities that specifically support the distribution of food and perishables. Examples of this include Lineage Logistics and Americold. Although these organizations enable the safe distribution of food, it is difficult to attribute each dollar that goes towards cold chain organizations as a dollar going towards preventing food waste. As a result, food cold chain facilities are considered indirect.

SOLUTIONS	DESCRIPTION AND RATIONALE FOR CLASSIFICATION
OUT OF SCOPE	
Precision Agriculture	Examples of businesses operating within Precision Agriculture include software tools to improve yields, hardware for crop monitoring. This solution does not necessarily prevent waste in the traditional sense of post-harvest and are mostly focused on yield optimization. These are not included in scope as ReFED has looked at food surplus and waste from a post-harvest perspective and require further exploration.
Crop Protection	Crop protection examples include vertical farming (which has controlled environments), pesticides, etc. This solution does not necessarily prevent waste in the traditional sense of post-harvest and is mostly focused on yield optimization. These are not included in scope as ReFED has looked at food surplus and waste from a post-harvest perspective and require further exploration.
Online grocery	Not included as there is no conclusive data that indicates it prevents food waste. E.g. Instacart. ReFED would consider pure unique ideas like Online, Advanced Grocery Sales (ReFED solution).
Last mile delivery	Examples are grocery food and restaurant delivery. These are not included as there is no conclusive data that indicates it prevents food waste.

METHODOLOGY

Data Ingestion and Review Process

ReFED has developed an automated web application that runs in the background to assist in the ingestion, review, and maintenance of investment data for the Capital Tracker. The foundation of the automation process is built around a set of keywords that can be grouped into two types:

- **Solution Provider Keywords**: Based on the name of known food waste solution providers (e.g., "Spoiler Alert"), ReFED has developed a list of keywords that indicate a particular investment was distributed to a predetermined list of providers, many of which are included in ReFED's Solution Provider Directory[5], which includes over 1,000 providers offering products and services to help reduce food waste.

- **"Regular" Keywords**: Based on terms that people use to describe topics that ReFED has determined are either directly or indirectly related to food waste reduction (e.g., "food waste", "compost", "animal feed"). See the previous Scope section for more information on which topics ReFED considers to be in scope.

The automated system intakes newly posted investment data on a monthly basis from a variety of data sources and runs each investment through the decision tree displayed in Figure 2. In cases where an automated decision cannot be made about whether to include or reject the investment, the recipient, and ultimately the investment, is manually reviewed by a ReFED staff member. Standard information attributes (listed in Table 4) are collected and stored for each investment that is ultimately included and accepted into the Capital Tracker.

Figure 2. ReFED Decision Tree and Review Process for Inclusion of Investments in the Capital Tracker
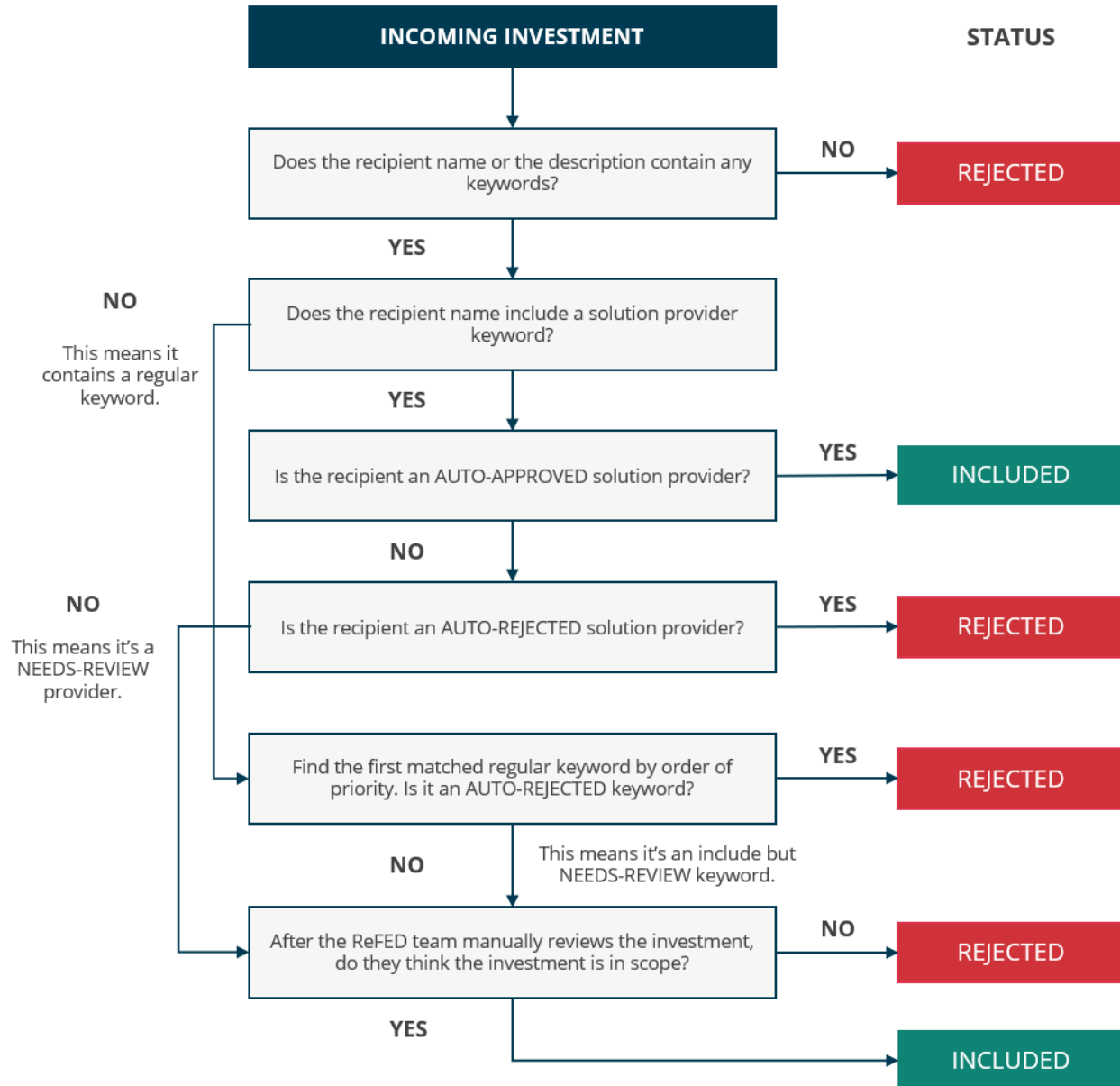
Table 4. Data Attributes Collected and Stored for Each Included Investment

ATTRIBUTE	DESCRIPTION	EXAMPLE
Amount	U.S. Dollar Amount of transaction	$100,000
Deal Date	Date the transaction took place. For private foundation grants, only the fiscal year is available.	11/1/2012
Recipient	The entity receiving the capital	Apeel
Funder	The entity providing the capital	Bill & Melinda Gates Foundation
Description	A brief description of the the investment	The company raised $100,000 of grant funding from Bill & Melinda Gates Foundation in November 2012.
Capital Type	ReFED maintains a hierarchical classification of capital types: • Capital Type: Higher level groups of philanthropic, government, and private capital. • Funding Group: Further segmentation of Capital Types to the following groups - tax incentives, government grants, non-government grants, impact-first investments, venture capital, private equity, corporate finance and spending, commercial project finance, government project finance. These groups are described in detail in the Solution Database Methodology. • Investment Type: Provides further detail as to the nature of the transaction. • Detailed Investment Type: Provides further detail as to the nature of the transaction. See Appendix A for the full classification hierarchy.	Philanthropic Non-government Grants Grant n/a
Solution Type	ReFED maintains a hierarchical classification of food waste solution types: • Solution Group • Action Area • Solution Name NOTE: It is important to note that depending on who the recipient of the investment is and depending on the information provided in the investment description, it is often not possible for ReFED to tag an investment with an individual food waste solution. In cases where it is clear that the investment is for food waste, but the exact topic area is not specified, ReFED tags investments with more general Solution Type categories such as "General" or "Prevention". This does make it difficult to use the Capital Tracker dataset to quantify exactly how much capital has been invested in a particular solution. See Appendix B for the full list of food waste solutions.	Prevention Maximize Product Utilization Edible Coatings

ATTRIBUTE	DESCRIPTION	EXAMPLE
Applicability	Whether an investment is directly or indirectly related to food waste: • Direct: Explicitly funding food waste initiatives. ReFED rule of thumb is that organizations/initiatives receiving funding should be >50% related to food waste diversion or reduction. • Indirect: Funding that is not explicitly for food waste initiatives. ReFED's general rule is that if an organization is >20% but less than 50% of operations devoted to food waste, it is considered indirect; the same logic is applied to individual investments. See the Scope: Thematic Funding Areas section for more information about which topics are considered Direct versus Indirectly related to food waste.	Direct
Data Source	Source from which the investment information was obtained	PitchBook
Link	If available, a website link to more information about the investment straight from the Data Source	n/a

Data Sources and Limitations

PitchBook

PitchBook is a financial data and software company that maintains a curated database and analytical tools to explore investments in public and private equity markets, including venture capital, private equity, and mergers & acquisitions. ReFED subscribes to a curated, weekly data feed of food waste related investment data from PitchBook based on a list of predetermined food waste solution providers using the keyword approach described in the previous section. While no data source is perfect, and occasionally there are investments that are missed, PitchBook is very thorough and maintains high, people-based quality assurance standards as opposed to automated web scrapers provided by others. After reviewing PitchBook's data and comparing it to others, ReFED found the PitchBook dataset to be of the highest quality for the purposes of tracking U.S. private investment.

Table 5. List of Investment Types Tracked by PitchBook

INVESTMENT TYPE	DESCRIPTION
PRIVATE CAPITAL: VENTURE CAPITAL	
Accelerator/Incubator	An event where a company joins a temporary program that variably provides funding, office space, technological development, and/or mentorship. Often in exchange for equity in the company. PitchBook's tracking criteria only includes accelerators/incubators that take equity or give a cash disbursement as part of the program.
Angel (individual)	When a high net-worth individual provides capital to a company in its early stage in exchange for a minority stake. The investment must come directly from the individual's own funds and not from any other source.
Capitalization	When the founders, owners or upper management of a company need initial funding and use their own money to provide the financial backing. This deal type is often called bootstrapping.

INVESTMENT TYPE	DESCRIPTION
PRIVATE CAPITAL: VENTURE CAPITAL	
Early Stage VC	An early stage round of financing by a venture capital firm in a company. Early stage is usually a Series A to Series B financing deal and occurred within 5 years of the company's founding date. If there is no series associated with the deal and the deal occurred within 5 years of the company's founding date, we also categorize the deal as early stage VC.
Equity Crowdfunding	Financing received from a crowdfunding platform where individuals provide venture or growth funding through the purchase of the target company's equities.
Later Stage VC	A later stage round of financing by a venture capital firm into a company. Later stage is usually Series B to Series Z+ rounds and/or occurred more than 5 years after the company's founding date.
Product Crowdfunding	Financing received from a crowdfunding platform through which individuals have provided non-equity funding in exchange for companies' products, generally before they have been released to the market.
Seed Round	When any investor type provides the initial financing for a new enterprise that is in the earliest stages of development. PitchBook will only designate an equity raise as seed financing when it's explicitly referenced as a seed deal in sources.
PRIVATE CAPITAL: PRIVATE EQUITY	
Buyout/LBO	Purchase of at least a controlling percentage of a company's capital stock* by a PE firm to take over its assets and operations. A leveraged buyout (LBO) involves borrowing money to finance a portion of the purchase price. *On a fully diluted basis.
Mezzanine	Mezzanine debt has lower priority than senior debt but usually has a higher interest rate and often includes warrants. This debt type also often involves taking a small portion of equity in the target company.
PE Growth/Expansion	When a private equity firm makes a non-control, equity investment in a company. Cash is received by the company and not the selling shareholders.
Platform Creation	When a private equity team provides the initial capital for the creation of a new company.
PRIVATE CAPITAL: CORPORATE FINANCE & SPENDING	
Bankruptcy: Liquidation	A bankruptcy proceeding in which a company stops all operations and goes completely out of business. A trustee is appointed to liquidate (sell) the company's assets and the money is used to pay off debt.
Corporate	When a Corporation injects capital into a private company in exchange for newly issued shares of that private company.
Corporate Asset Purchase	When a Corporation acquires a majority stake (>50%) of the equity in an asset. For details, see the article Corporate asset purchase.
Debt - General	Transactions where the primary source of financing is debt.
Debt - PPP	Paycheck Protection Program Loans are a U.S. Small Business Administration (SBA) loan that's meant to help businesses keep their workforce employed during the Coronavirus (COVID-19) crisis.
Debt Refinancing	The borrower obtains a new loan with better terms than their existing loan and then uses the new loan to pay off the original loan.

INVESTMENT TYPE	DESCRIPTION
PRIVATE CAPITAL: CORPORATE FINANCE & SPENDING	
Debt Repayment	Payment of debt obligation.
IPO	An investment open for the general public or retail investors after the company has complied with the registration requirements of new securities laid down by the security & exchange commission.
Joint Venture	When two or more companies develop a new entity or asset by contributing existing assets, funding, etc for a stake in the new entity/asset.
Merger/Acquisition	When a corporation acquires at least a controlling percentage of a company's capital stock in another corporation. This deal type is often called a strategic investment.
Out of Business	Company stops all operations and goes completely out of business.
PIPE	When a private investor (such as a private equity firm) makes a non-control equity investment in a publicly-traded enterprise through the acquisition of securities issued directly by the company.
Public Investment 2nd Offering	The issuance of new stock for public sale from a company that has already made its initial public offering (IPO).
Reverse Merger	When a public company is acquired by a private company, allowing the private company to bypass the usually lengthy and complex process of going public. EX: Company A acquires Company B and after acquisition Company A dissolves.
PRIVATE: OTHER	
Secondary Transaction - Open Market	A transaction where the holders of stock sell their shares on a publicly-traded exchange or a private secondary purchase marketplace.
Secondary Transaction - Private	An investment where one investor buys a minority equity interest in a target company directly from another investor.
Share Repurchase	Management repurchases shares from shareholders, often in an attempt to bolster share price by reducing supply.
Undetermined	Catch-all for deals that are not able to be classified.

WORKS CITED

1. PitchBook: https://pitchbook.com/platform-data/deals
2. U.S. Internal Revenue Service Form 990-PF: https://www.irs.gov/charities-non-profits/form-990-series-downloads
3. USASpending.gov: https://www.usaspending.gov/
4. ReFED Solutions Database and Impact Methodology: https://insights.refed.org/uploads/documents/refed-insights-engine-solution-database-methodology-vfinal2021-05-27.pdf
5. ReFED Solution Provider Directory: https://insights-engine.refed.org/solution-provider-directory

APPENDIX

Appendix A: ReFED Classification of Capital Types

FUNDING GROUP	INVESTMENT TYPE	DETAILED INVESTMENT TYPE
PRIVATE CAPITAL (SEE PITCHBOOK SECTION FOR DEFINITIONS OF PRIVATE CAPITAL TYPES)		
Venture Capital	Accelerator/Incubator	N/A
	Angel (individual)	N/A
	Capitalization	N/A
	Early Stage VC	N/A
	Equity Crowdfunding	N/A
	Later Stage VC	N/A
	Product Crowdfunding	N/A
	Seed Round	N/A
Private Equity	Buyout/LBO	N/A
	Mezzanine	N/A
	PE Growth/Expansion	N/A
	Platform Creation	N/A
Corporate Finance & Spending	Bankruptcy: Liquidation	N/A
	Corporate	N/A
	Corporate Asset Purchase	N/A
	Debt - General	N/A
	Debt - PPP	N/A
	Debt Refinancing	N/A
	Debt Repayment	N/A
	IPO	N/A
	Joint Venture	N/A
	Merger/Acquisition	N/A
	Out of Business	N/A
	PIPE	N/A
	Public Investment 2nd Offering	N/A
	Reverse Merger	N/A
Other	Secondary Transaction - Open Market	N/A
	Secondary Transaction - Private	N/A
	Share Repurchase	N/A
	Undetermined	N/A

FUNDING GROUP	INVESTMENT TYPE	DETAILED INVESTMENT TYPE
PHILANTHROPIC CAPITAL		
Non-Government Grants	N/A	N/A
PUBLIC CAPITAL (SEE U.S. OFFICE OF MANAGEMENT AND BUDGET SECTION FOR DEFINITIONS OF PUBLIC CAPITAL TYPES)		
Government Project Finance	Loans	Direct Loan
Government Grants	Contracts/Services	Blank Purchase Agreement (BPA) Call
		BOA Basic Ordering Agreement
		BPA Blanket Purchase Agreement
		Definitive Contract
		Delivery Order
		FSS Federal Supply Schedule
		GWAC Government Wide Acquisition Contract
		ICD Indefinite Delivery Contract / Definite Quantity
		ICD Indefinite Delivery Contract / Indefinite Quantity
		ICD Indefinite Delivery Contract / Requirements
		IDC Multi-Agency Contract, Other Indefinite Delivery Contract
		Purchase Order
	Direct Payments	Direct Payment for Specified Use
		Direct Payment with Unrestricted Use
	Grant	Block Grant
		Cooperative Agreement
		Formula Grant
		Project Grant
	Loans	Guaranteed/Insured Loan
	Other Financial Assistance	Insurance
		Other Financial Assistance

Appendix B: ReFED Classification of Food Waste Solutions

ACTION AREA	SOLUTION NAME AND LINK TO SOLUTION FACT SHEET IN THE INSIGHTS ENGINE
PREVENTION SOLUTIONS	
Optimize The Harvest	Field Cooling Units
	Labor Matching
	Imperfect & Surplus Produce Channels
	Smaller Harvest Lots
	Innovative Grower Contracts
	Partial Order Acceptance
	Gleaning
	In Field Sanitation Monitoring
	Buyer Specification Expansion
Enhance Product Distribution	Early Spoilage Detection (hyperspectral Imaging)
	Temperature Monitoring (pallet Transport)
	Decreased Transit Time
	Advanced Shipment Notifications
	Vibration & Drops Tracking
	Reduced Warehouse Handling
	Inventory Traceability
	Intelligent Routing
	First Expired First Out
	Modified Atmosphere Packaging System
Refine Product Management	Minimized On Hand Inventory
	Online Marketplace Platform
	Dynamic Pricing
	Waste Tracking (foodservice)
	Decreased Minimum Order Quantity
	Low-waste Event Contracts
	Retail Automated Order Fulfillment
	Direct To Consumer Channels
	Online, Advanced Grocery Sales
	Precision Event Attendance
	Repackaging Partially Damaged Products
	Markdown Alert Applications
	Increased Delivery Frequency
	Temperature Monitoring (foodservice)

ACTION AREA	SOLUTION NAME AND LINK TO SOLUTION FACT SHEET IN THE INSIGHTS ENGINE
PREVENTION SOLUTIONS	
Refine Product Management	Assisted Distressed Sales
	Enhanced Demand Planning
Maximize Product Utilization	In-house Repurposing
	Edible Coatings
	Manufacturing Line Optimization
	Manufacturing Byproduct Utilization (upcycling)
	Precision Food Safety
	Improved Recipe Planning
	Active & Intelligent Packaging
Reshape Consumer Environments	Meal Kits
	Smart Home Devices
	Consumer Education Campaigns
	K-12 Education Campaigns
	Buffet Signage
	K-12 Lunch Improvements
	Small Plates
	Home Shelf-life Extension Technologies
	Trayless
	Portion Sizes
	Package Design
	Standardized Date Labels
RESCUE SOLUTIONS	
Strengthen Food Rescue	Donation Value-added Processing
	Donation Storage Handling & Capacity
	Blast Chilling To Enable Donations
	Donation Education
	Donation Reverse Logistics
	Donation Coordination & Matching
	Donation Transportation
RECYCLING SOLUTIONS	
Recycle Anything Remaining	Community Composting
	Waste-derived Bio-plastics
	Livestock Feed
	Waste-derived Biomaterials

ACTION AREA	SOLUTION NAME AND LINK TO SOLUTION FACT SHEET IN THE INSIGHTS ENGINE
RECYCLING SOLUTIONS	
Recycle Anything Remaining	Centralized Composting
	Home Composting
	Centralized Anaerobic Digestion
	Rendering
	Insect Farming
	Waste-derived Processed Animal Feed
	Co-digestion At Wastewater Treatment Plants
	Waste-derived Agricultural Inputs