



Breakthrough in Organics Landfill Diversion (BOLD)

A recycling credit designed to accelerate the transition to a resource-efficient, low-carbon, and inclusive circular economy

BOLD Recycling Credit

dMRV Methodology: certification of organic waste diversion from landfills to aerobic composting facilities for biological treatment and distribution of rewards to supply chain contributors

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1. OVERVIEW

Organic waste constitutes 49% of global waste, and while it is 100% recyclable, at least 80% of it ends up in landfills¹, where it decomposes anaerobically and generates methane, a potent greenhouse gas (GHG). Landfills are the third-largest emitters of anthropogenic-derived methane, representing 11% of global methane emissions² and between 3.2%³ and 5%⁴ of global GHG emissions. Given methane's global warming potential is 81 times greater than CO₂ over 20 years, addressing methane emissions is critical to combating climate change.⁵ Despite the need to reduce these emissions by a third by 2030⁶ to limit global warming to 1.5°C, methane levels continue to rise.

But this is only part of the picture. Organic waste, when mixed with recyclables, also hinders the work of sorting and recycling other materials, reducing overall recovery volumes and recycling rates. As recyclable materials are buried in landfills or burned in incinerators, additional raw material extraction, hauling, and processing are required, all of which are very carbon-intensive and could be avoided. The existing inefficiency in resource management presents a great opportunity to not only preserve natural resources and eliminate waste but also to decarbonize our global economy. It is estimated that a transition to a circular economy can reduce global GHG emissions by 45%⁷. A separate study suggests that if we simply double our current circularity rate, we could address 85% of the GHG reduction needed to stay below 2 degrees Celsius⁸, **making the transition to a circular economy one of the most important and effective climate change mitigation strategies available today.**

The key to unlocking the transition to a low-carbon circular economy is to remove organic waste from traditional landfill waste streams and direct it to proper biological treatment, such as professional composting facilities—the subject of this methodology. Unfortunately, organic waste sorting, hauling and treatment are more expensive than landfilling or incineration, presenting a serious economic and political

¹ World Bank - What a Waste 2.0 [Report](#)

² World Bank - What a Waste 2.0 [Report](#)

³ Hannah Ritchie (2020), published online at OurWorldInData.org - "[Sector by sector: where do global greenhouse gas emissions come from?](#)" [Online Resource]

⁴ Greenhouse Gas Emissions from Landfills (Zhang, Xu, Feng, Chen), [published April 16 2019](#)

⁵ IPCC: Sixth Assessment [Report](#)

⁶ Climate & Clean Air Coalition - [Article](#): New IPCC Report Bolsters Evidence that Methane Reductions are Key to Preventing Climate Catastrophe

⁷ Climate Governance Initiative, in collaboration with Accenture for the World Economic Forum: [Climate Governance and the Circular Economy: A Primer for Boards](#) - White Paper (OCT 2023)

⁸ Circle Economy Foundation - Circularity Gap [Report](#) 2021

challenge for putting the necessary infrastructure and incentives in place. The BOLD (Breakthrough in Organics Landfill Diversion) Recycling Credit, certified by this methodology, is designed to reward participants for their environmental and social contributions related to recycling and encourage others to join in organic waste sorting and composting, thus driving overall system change from a linear “Take > Make > Waste” economy to a circular economy. Carrot utilizes a digital Measurement, Reporting and Verification (dMRV) process for recording and verifying circularity. The proceeds from the sale of recycling credits are distributed to supply chain participants in accordance with Carrot’s [Rewards Distribution Policy](#) and can be verified by anyone, as the transactions are recorded on a public blockchain. The process for issuing credits is verified by independent third parties, and the added transparency provided through Carrot’s technology aims to make certification affordable and accessible to composting facilities around the world, helping to jumpstart the circular economy everywhere.

We view BOLD as an innovative system change solution to effectively jump-start the transition from an inefficient and wasteful linear economy to a resource-efficient, low-carbon, and inclusive circular economy. BOLD will not only educate and change behavior but also unite the world on the common cause of living sustainably on this planet.

The following table describes the key elements of the BOLD Recycling Credit methodology, also referred to as BOLD Recycling and/or simply BOLD Credit.

1.1 Summary Table

Subject	<i>The BOLD Recycling Credit digital Measurement, Reporting and Verification methodology establishes the certification process for confirming organic waste (and compostables) diversion from landfills towards professional, small-scale, offsite composting facilities for proper biological treatment, as well as the issuance of BOLD Recycling Credits that reward the participants involved along the supply chain for their environmental and societal contributions.</i>
BOLD is for	<i>Market participants that want to support the transition to a resource-efficient, low-carbon, and inclusive circular economy.</i> <i>Companies that want to offset a portion of their organic waste footprint by supporting system-based solutions that reduce waste.</i>

	<i>Composting facilities and organic waste haulers that want to be recognized for their environmental contributions and earn rewards for their achievements.</i> <i>Waste Generators that want to certify organic waste recycling (composting) and receive rewards that can reduce sorting, hauling, and composting costs.</i> <i>Municipalities that want support in preventing organic waste from entering landfills and contaminating recycling supply chains.</i> <i>Municipalities that want to jump-start Extended Producer Responsibility (EPR) schemes in the Agri-Food sector, whereby producers help cover the cost of proper biological treatment of organic waste by diverting this valuable resource from landfills.</i>
Objectives	<i>To uniquely identify and certify post-consumer and post-industrial organic waste mass arrival at composting facilities.</i> <i>To identify the good actors participating in well-functioning organic waste-to-compost supply chains.</i> <i>To properly measure and capture the value of composting work to society and the environment.</i> <i>To issue BOLD credits that reward the participants involved in verified organic waste sorting, hauling, and composting work and encourage adoption by those who are currently sending organic waste to landfills, dumps, or incinerators. Rewards to composting service providers serve as important capital for further investment in their businesses in a market where capital is often difficult to access or is prohibitively expensive.</i> <i>To enhance data transparency and quality and establish trust within the waste management sector by applying new technologies such as blockchain for waste tracking, smart contracts for transparent rewards payments, and digital Measurement, Reporting, and Verification (dMRV) processes for environmental certification.</i> <i>The certification of organic waste diversion from landfills and dumps demonstrates a serious commitment to the environment. Retired BOLD Recycling Credits serve as proof of investment in innovative solutions toward global sustainability and can be used to meet internal ESG goals and/or external EPR mandates.</i>

	<i>To help direct new resources efficiently to recycling supply chain service providers so that they can invest in their operations and increase their capacity for performing environmental work.</i>
Results	<i>BOLD Recycling Credit will accelerate the transition from a wasteful, linear economy to a resource-efficient, low-carbon, and inclusive circular economy by fomenting the sorting of organic waste into dedicated supply chains for biological treatment, thereby unleashing the full potential of the biological and technical cycles of a circular economy.</i> <i>BOLD Recycling Credit will reduce pollution to land, water, and the atmosphere; preserve vital natural resources for future generations to use; reduce GHG emissions associated with needless extraction, transportation, and processing of raw materials; restore topsoil with nutrient-rich compost that can help secure future food supplies; dramatically reduce the practice of landfilling and incineration and the expense that goes with it to the government and ultimately the taxpayer; and generate tens of millions of jobs, including for many of the most vulnerable among us, in composting, recycling, repair, and remanufacturing services.</i> <i>BOLD and the Carrot Network will form communities that work together locally and globally to build and sustain a resource-efficient, low-carbon, and inclusive circular economy.</i>
Geography	<i>Global</i>
SDGs	Primary: <i>12: Ensure Sustainable Consumption and Production (circular economy)</i> <i>13: Climate Action (avoid methane emissions at landfills and carbon emissions from eliminating needless extraction, hauling and processing activities resulting from improved recycling rates) [Note: prevented greenhouse gas emissions are not to be claimed by holders of BOLD Recycling Credits, as GHG emissions from composting are certified under a separate methodology, BOLD Carbon CH4). We present GHG emissions co-benefits only to advance general awareness regarding the value of composting.]</i> Secondary (co-benefit considerations): <i>03: Good Health and Well-Being (avoid pollution-related diseases)</i> <i>06: Clean water and sanitation (avoid leachate from landfills)</i>

	<i>08: Decent Work and Economic Growth (green jobs in recycling, composting, repair and remanufacturing)</i> <i>14: Life Below Water (sorted organic waste improves recovery and recyclability rates of technical materials (e.g., plastics) and reduces discharges to water bodies)</i> <i>15: Life on Land (nutrient-rich compost restores topsoil, reverses desertification and improves soil biodiversity)</i> <i>17: Partnerships for the Goals (working together on effective circular economy & climate financing)</i>
Enviro. Claims	<i>Ownership of a retired Tokenized Recycling Credit (TRC) provides verified proof that a quantifiable amount of source-separated organic waste was successfully recovered through composting. TRCs serve as credible instruments for recognizing circularity outcomes and compliance with Extended Producer Responsibility (EPR) or voluntary waste offsetting goals.</i> <i>[Important note: TRCs do not represent avoided greenhouse gas emissions] and therefore cannot be used to make carbon reduction claims. Emission reductions from landfill avoidance are instead accounted for under the BOLD Carbon (CH₄)-SSC methodology and associated Tokenized Carbon Credits (TCCs). This separation ensures clarity of claims and avoids environmental attribute double counting.</i> <i>[Note 2: Co-benefits such as job creation, reduced contamination, and soil restoration may be associated with TRC activity but cannot be simultaneously claimed under a TCC. As a standard practice, Carrot attributes these co-benefits to TRCs only, not to TCCs, ensuring that environmental and social value is transparently and exclusively allocated.]</i> <i>[Note 3: To eliminate any risk of double counting, Carrot uses a traceable digital infrastructure where each MassID—representing a discrete quantity of recycled material—can be linked to at most one Tokenized Recycling Credit and one Tokenized Carbon Credit. This dual tagging preserves environmental integrity across both credit classes.]</i>
Eligible Participants	• <i>Waste generators (all organic waste producers—e.g., restaurants, bars, companies, food producers, households, etc.)</i> • <i>Waste collectors and logistics providers</i> • <i>Composting and biological treatment facilities</i>

	• <i>Carrot Network Integrators and platform-certified auditors</i> <i>Projects must be registered through the Carrot Network and submit data via approved digital MRV tools. Waste must be diverted from landfill, open dumping, or incineration and processed through facilities meeting the operational and data integrity requirements outlined in the Accreditation section.</i>
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2. DEFINITIONS

The following glossary lists some of the key definitions for basic comprehension of this methodology. A full and updated glossary can be found on the Carrot website at:

<https://whitepaper.carrot.eco/carrot-methodologies/glossary>.

Aerobic Composting: is the process of producing nutrient-rich compost through aerobic decomposition of organic matter utilizing microbes and natural processes. Aerobic composting produces little to no methane emissions when compared to anaerobic decomposition in landfills and dumps.

Auditors: independent, third-party businesses, organizations, or consultants who accredit Participants for participation in the Carrot Network and/or utilize Carrot methodologies to certify waste mass recycling and issue recycling or carbon credits.

Bad Actor: is a Participant who, intentionally or unintentionally, acts in a manner that is not in line with the policies of this methodology or the Carrot Network.

Baseline: A baseline (also known as a reference scenario) is a benchmark or reference point used to measure and compare the environmental gains of a project. It represents the environmental impact that would occur in the absence of the project or intervention being evaluated. The baseline is essential for determining the effectiveness of a project in reducing negative environmental impact.

Carrot Fndn: is a foundation in Switzerland building the Carrot Blockchain Network and creating a global community that will utilize, manage, own, and support it. Carrot Fndn's mission (purpose) is to accelerate the transition to a resource-efficient, low-carbon, and inclusive circular economy.

Carrot Network (or "Carrot"): is the technology infrastructure utilized to record product and waste supply chain data, apply a digital Measurement Reporting and Verification (dMRV) process for certifying environmental gain and issuing credits, and provide a distribution mechanism for rewarding supply chain participants who contributed to the environmental gain realized. The Carrot Network is stewarded by the Carrot Fndn, and governance will be progressively distributed to its global community of users.

Carrot Registry: is the repository where all retired credits are stored for public consultation. The Carrot Registry holds all of the Tokenized Recycling Credits (non-fungible tokens) that are no longer transferable and that can be used to prove environmental (waste and carbon) contributions.

Circle Economy: a system where materials never become waste and nature is regenerated. In a circular economy, products and materials are kept in circulation through processes like maintenance, reuse, refurbishment, remanufacture, recycling, and composting. The circular economy tackles climate change and other global challenges, like biodiversity loss, waste, and pollution, by decoupling economic activity from the consumption of finite resources. The circular economy is driven by three principles: eliminate waste and pollution, use circular products and materials (at their highest value), and regenerate nature ([Ellen MacArthur Foundation](#)).

Carrot Network Integrator (INT): is an accredited supply chain tracking, waste logistics, and waste recycling software or hardware application that records activity data of all types, including but not limited to product and waste identification, sorting, hauling,

processing, measuring, auditing, recycling, upcycling, and reuse, and submits them to the Carrot Network.

Extended Producer Responsibility (EPR): an environmental policy approach that holds producers responsible for product management through the product's lifecycle. EPR supports recycling and materials management goals that contribute to a circular economy and can also encourage product design changes that minimize environmental impacts.⁹ (For more information see also the OECD's [definition](#).)

Know Your Customer/Client (KYC): is the mandatory process of identifying and verifying the customer's identity when participating in a program. Participation may be denied or excluded permanently if a participant fails to meet KYC or KYB (Know Your Business) requirements.

MassID: A MassID is a unique digital asset created when any amount of post-consumer or post-industrial waste is identified and measured in the market and where custody is established. MassIDs represent publicly verifiable ownership, and therefore responsibility, over a unit of waste mass with an immutable record of recycling operations (executed service orders) logged in it. MassIDs are utilized to establish a chain of custody of waste in a manner that enables attaching waste responsibility all the way to the source of waste creation (its location and user.) MassIDs are the mechanism through which rewards can be distributed to Participants recorded along the recycling and reuse supply chains.

NGO Beneficiary: a non-profit organization that receives token rewards from the Carrot Network. NGO Beneficiaries can be accredited if their mission is related to advancing the transition to a circular economy through activities related to research, development, awareness, education, or other activities.

Non-Fungible Token (NFT): is a blockchain-based, cryptographic token that attributes single ownership to a unique digital or physical asset. Cryptographic signatures, native to blockchains, store transactional information, including the prior and current owner of each NFT.

NFT Smart Contract: is a digital contract that governs how NFTs function. It is a blockchain computer program that executes automatically when predetermined terms and conditions are met. Smart contracts issue NFTs and determine an owner, set a price for purchase and payouts (also known as royalties) to other contributors, and establish rules for how the NFT can be deactivated (retired or burned), among many other functions.

Organic Waste: is a biological material originating from plants and animals that will no longer be consumed, such as food, food waste, green waste, sludge (industrial, domestic, and sewage), pulp, paper, cardboard, wood and wood products, etc.

⁹ CalRecycle [website](#).

Producer: a producer is any company involved in any activity along the product chain, including sourcing (e.g., extracting raw materials, growing biological products (crops, cattle, etc.)), hauling, processing, converting, manufacturing, filling, packing, and selling.

Producer Responsibility Organization (PRO): is an organization, typically a non-profit, that represents a group of companies participating in an EPR (Extended Producer Responsibility) program (also known as a producer responsibility program). PROs can develop and manage their own programs or participate in larger regional or national programs.

Recycling: is the process that involves changing the physical, chemical, or biological properties of waste with the aim of transforming it into a new resource that can be utilized.

Recycling Credit Buyer: a business or individual that purchases a credit with the aim of financially supporting the recovery and transformation of waste into new resources that can be used again within the economy. The buyer contributes by generating external environmental and social benefits (see [co-benefits](#) section) for meeting individual and/or corporate ESG goals while also potentially meeting compliance mandates such as those related to carbon and waste reduction (Extended Producer Responsibility).

Supply Chain “Participants”: supply chain participants include those individuals or businesses involved in sorting, hauling, storing, processing, recycling, and buying recycled materials. They include:

- **Waste Generator:** is an individual or business (excluding processors and recyclers) with an identified location where waste is picked up. The Waste Generator can be considered the source of where waste is created (see Waste Source below) and holds the critical task of sorting waste correctly;
- **Hauler:** a business and/or individual that transports waste from one location to another;
- **Processor:** a business that sorts waste without performing comprehensive mass transformation;
- **Recycler** (aka End Processor): a Processor that performs the most comprehensive work of mass transformation for reintroduction into the economy as a new input (e.g., Composter);
- **Buyer of recycled materials:** a business and/or individual that purchases recycled materials for use in their production processes.

Tokenized Recycling Credit (TRC): is a blockchain token representing the environmental work expended by a set of contributing Participants to recycle a unique amount of waste, measured in tons. The purchase of a TRC NFT (Non-Fungible Token) using blockchain fungible tokens distributes rewards in the form of fungible tokens to contributing Participant’s digital wallets in accordance with the NFT’s smart contract. Retired TRCs (to Carrot’s Registry) serve as proof of environmental contribution and can be utilized as waste offsets by Producers in Extended Producer Responsibility programs.

(For more information, see definitions for Non-Fungible Tokens and NFT Smart Contracts).

Waste Delivery Summary Report: is a compliance document issued by the Recycler and submitted to an environmental regulator that reports the amount and type of post-consumer and post-industrial waste received at the recycling facility during a given period.

[Example: In the case of Brazil, the document is called a final destination certificate, or *Certificado de Destinação Final* (“CDF”). The CDF is submitted to the Brazilian Ministry of the Environment and it contains a series of waste transport manifests (known as “MTRs”, see separate definition).]

Waste “Source”: The source of organic waste creation is an identified Waste Generator where a resource has been consumed and transformed into waste at a given location. The waste source may also be further distinguished between post-consumer and post-industrial.

Waste Transport Manifest: is an environmental compliance document for reporting waste hauling activities to environmental government agencies. It identifies the location and holder of the waste where it was collected, the Hauler, the location and business where it was (or will be) dropped off, along with the physical properties of the materials being hauled.

[Example: in the case of Brazil, this document is referred to as the *MTR*¹⁰ (*Manifesto de Transporte de Resíduos*). The document is registered in a federal waste monitoring and reporting system known as SINIR (*Sistema Nacional de Informações sobre a Gestão de Resíduos Sólidos*).]

Windrow System: Is the composting process identified as long, open-air piles of organic matter built from a mixture of brown (carbon-rich) and green (nitrogen-rich) materials in ratios that optimize air and water infiltration and microbial life. A compost heap organized in a row is called a windrow.

Zero Waste “Definition”: The conservation of all resources by means of responsible production, consumption, reuse, and recovery of products, packaging, and materials without burning and with no discharges to land, water, or air that threaten the environment or human health. ([ZWIA](#))

Zero Waste Goal: To reduce waste to landfills by more than 90% by reducing, reusing, recycling, and composting resources without incineration.

¹⁰ Brazil law related to how waste transport manifests must be utilized and PORTARIA Nº 280, DE 29 DE JUNHO DE 2020. BRASIL. Institui o Manifesto de Transporte de Resíduos - *MTR* nacional, como ferramenta de gestão e documento declaratório de implantação e operacionalização do plano de gerenciamento de resíduos, dispõe sobre o Inventário Nacional de Resíduos Sólidos. Available at: <https://www.in.gov.br/en/web/dou/-/portaria-n-280-de-29-de-junho-de-2020-264244199>

3. SCOPE

3.1 Scope

The BOLD Recycling Credit methodology comprises a process for certifying a unique amount of sorted organic waste, measured in kilograms, arriving at a professional and legally qualified composting facility for transformation into organic fertilizer or compost using aerobic, thermophilic composting techniques.

3.2 Applicability

This methodology applies to all non-toxic, source-sorted organic waste collection, sorting, hauling, and delivery activities that track organic waste to decentralized, professional, legally qualified composting facilities for off-site biological treatment.

Applicable organic waste types for this methodology include, but are not limited to: food waste, green waste, and certified compostable products, materials, and packaging capable of decomposing completely and in a timely manner through the process of aerobic composting.

3.2.1 Participant Eligibility

This methodology applies to all geographies and does not exclude Participant types, even those legally required to sort and treat organic waste for biological treatment, as even in such geographies, biological treatment rates are low due to a lack of legal enforcement. The business of composting always competes with free (dumping or burning) or cheap (landfilling and waste-to-energy) alternatives. As a system-based solution that can work at scale, all participants need to be encouraged to participate and reap fair and transparent rewards for their contributions.

[Note: Waste Generators identified as large revenue-generating organizations will have rewards significantly discounted to them, thereby addressing concerns about companies benefiting even in scenarios where they are legally required to sort, haul, and compost organic waste. The ecosystem at large will still benefit from the added rewards, and service providers will obtain important resources to further invest in property, plants, and equipment. More information can be found at [Rewards Distribution Policy](#).]

The BOLD methodology's primary objective is to serve as an effective, low-cost, transparent mechanism to value the environmental work performed through organic waste composting and to serve as an incentive tool to encourage others to participate in contracting composting services that can divert more organic waste from landfills toward composting centers. **BOLD Recycling serves as a systems change solution to jump-start the transition to a low-carbon, circular global economy.**

While BOLD aims to certify off-site recycling (composting), the Carrot team always points out that on-site composting can be of greater environmental value due to avoided transportation if composting is conducted in a professional manner and compost is utilized properly, and that not generating waste in the first place is the ideal practice, as presented in the [Zero Waste Hierarchy](#).

3.2.2 Not Applicable

Waste that is not organic **is not within the scope** of this methodology.

Organic waste that has been contaminated **is not applicable** under this methodology.

This methodology **does not apply to** composting of residues containing organic and non-organic materials collected by non-source-sorted municipal solid waste programs, as these contain significant contamination and also often result in landfilling post facto.

3.2.3 Objectives & Considerations

The BOLD methodology's primary objective is to issue BOLD Recycling Credits in an affordable, inclusive, and scalable manner whereby the proceeds serve as rewards to composting supply chain participants and incentives for non-participants to join in. The use of digital Measurement, Reporting, and Verification (dMRV) processes for supply chain and composting verification is critical to reducing costs associated with auditing and certification, thereby making participation worthwhile for all stakeholders. The complexity and cost of certification for credit issuance for small-scale composting have proven to be prohibitive. BOLD Recycling, therefore, presents a technology-driven solution to issuing recycling credits at scale and encouraging the growth of small, decentralized composting facilities around the world.

While BOLD certifies recycling at off-site composting, the Carrot team always points out that on-site composting can be of greater environmental value due to prevented transportation emissions if composting work is conducted in a professional manner and the resulting compost is utilized properly. Reducing, or not generating, waste should always be prioritized, in accordance with the [Zero Waste Hierarchy](#).

The Carrot Fndn aims to work initially with **well-established professional composting facilities** that have a strong track record in the market, with evidence of solid financials, good governance, and experienced teams, thereby reducing the risk of projects being canceled. Project diversification under this methodology will also be pursued in the future, such that no project represents more than 20% of total credit issuance.

Carrot's primary focus is on environmental work. Carrot aims to keep a narrow focus and not pass judgment on the activities of its Participants that extend beyond the environmental work employed and the methodology's requirements. Many of the Participants are located in developing countries and are working in challenging economic

conditions. The rewards that will be distributed will improve financial conditions for Participants, enabling them to make important strides towards performing in a more environmentally, socially, and economically conscious manner.

3.3 Activities and Participants

Confirmation of the delivery of organic waste at a composting facility requires at least 1) the identification of the last location where the organic waste was picked up (a Waste Generator or Processor) along with the responsible individual at the pickup location (the "Holder"); 2) the hauling company that transported the waste mass; and 3) the Recycler's responsible party at the drop-off location (the "Receiver"), who serves as the "[Validator](#)" of the amount, quality, and type of waste received at the composting facility.

The composting facility ("Recycler") is a key participant in the recycling process, and it must undergo a comprehensive accreditation/homologation review, involving an on-site visit by a third-party auditor, to ensure its composting capacity and that it is performing the composting work to scientifically acceptable and legal standards. Each Recycler is responsible for requesting that their data be submitted to this methodology for proper evaluation, certification, and the issuance of BOLD credits.

Processing facilities that sort organic waste before it reaches a Recycler will also need to be accredited, as they are also an important stakeholder in ensuring proper sorting is conducted before it reaches a composting facility.

Both Recyclers and Processors will need to work with their waste management software providers, identified as Carrot Network Integrators ("INTs"), to become accredited by the Carrot Fndn and be considered for certification under the BOLD methodology.

Waste Generators will need to comply with the [Requirements](#) of this methodology, including undergoing an extensive KYC/KYB (Know Your Customer/Know Your Business) verification. Additional information will be required of businesses, including disclosing the size of the operation. It is the responsibility of the business managers to sign Carrot's agreements, verify their data, and provide all necessary information.

Haulers will also need to meet all of the Participant Requirements and be identified within the digital management system.

All participants will need to work with INTs to ensure that their data is correct and properly submitted to the Carrot Network.

All participants are thoroughly KYC'ed / KYB'ed requiring comprehensive individual and company identification.

3.4 Safeguards

3.4.1. Protection & Inclusion

Carrot works to ensure that the projects involved in its methodologies are inclusive of a broad set of stakeholders and limit the risk of negative consequences associated with its activities. Carrot aims to assure:

- There is no harm to the environment or the communities involved.
- Human rights are protected.
- Stakeholders are consulted.
- Legal requirements are complied with.
- Corruption and bribery do not occur.

The accreditation of Processors and Recyclers is conducted annually to verify and assure, as best as possible, that the activities above are being met.

3.4.2 Avoiding Double-Counting

Carrot communicates to supply chain participants (Waste Generator, Haulers, Processors or Recyclers) through its Terms & Conditions that participants cannot claim waste offset benefits. This right is transferred to the holder of a unique, non-transferable, retired recycling credit (e.g., held by a Producer). EPR program managers must only accept Carrot “offset” claims through proof of ownership of retired tokenized recycling credits (TRCs). Waste Generators may claim “contribution to waste reduction,” but if they are found to claim offsetting, they will be [penalized or suspended](#).

This methodology cannot guarantee that its participants are not involved in the sale of other environmental credits associated with the specific waste mass being tracked; however, every participant vouches not to do so as part of Carrot’s Terms & Conditions and their involvement in this methodology. If such activities are discovered, the participant will be penalized, along with, potentially, all of those who are associated with the bad actor. (For more information, see the sections on [Bad Actors, Self-Policing, and Proof-of-Authority](#) and [Penalties & Suspensions](#)).

3.4.2 Participant Verification

Processors and Recyclers must be accredited by Carrot before participating in this methodology and Audited by an independent third-party composting expert.

Carrot Integrators (INTs) must be accredited by Carrot for data integration and to ensure quality.

Non-Government Organizations receiving rewards must be accredited.

All Participants are KYC'd (Know Your Customer), including Waste Generators and BOLD Credit Buyers as part of the [Participation Requirements](#).

3.4.3 Data Verification

The Carrot engineering team verifies the data structure of supply chain and recycling records submitted to it by integrators (INTs) in advance of approval for data submission.

Code scripts are run to verify mass supply chain data and environmental compliance with this methodology to ensure high-integrity data for digital Measurement, Verification, and Reporting (dMRV) purposes.

Data verification models will improve over time and will help build confidence in the Carrot Network.

More information can be found in the [Monitoring & Measuring Mass](#) section.

3.5 Entry into force

The date of entry into force of this methodology is August 5, 2025.

4. NORMATIVE REFERENCES

There are no global standards for composting that can be applied broadly to all locations and facility types.

The BOLD methodology will require that local composting laws and regulations are met and will rely on local industry experts performing on-site facility audits to ensure that composting is conducted at a professional level, including the verification of test methods for the examination of Composting and Compost quality.

[Note: verification of the quality of composting work is not difficult given that measuring the temperature within heaps demonstrates the microbial activity engaged and ensures that oxygen, moisture, and the carbon, nitrogen, and phosphorus ratios are being met.]

5. PARTICIPATION REQUIREMENTS

Individuals and companies wishing to participate in the BOLD methodology must meet the participation requirements set below. Additional information will be required based on Participant roles identified in the Accreditation process and throughout this document.

Carrot Fndn may issue new requirements at any time, and the Participants wishing to comply with the new role requirements will need to update their information within a communicated period.

The implementation of activities required for participation in the BOLD methodology must not lead to the violation of any applicable local law, statute, or regulation, regardless of whether or not they are enforced.

Failure to comply with the requirements and the general spirit of the Carrot Network may result in immediate disqualification from the BOLD methodology and exclusion from the Carrot Network altogether.

5.1 Carrot's Terms & Conditions

All participants in the BOLD methodology must accept the Carrot Fndn's Terms & Conditions (T&C). The following items contained within the T&C are highlighted for added clarity.

5.1.1 Know Your Customer (KYC)

In order to participate in the Carrot ecosystem and receive token rewards from the BOLD methodology, all Participants (Waste Generators, Haulers, Processors, Recyclers, and Credit Buyers) will need to provide individual identification information, which include:

- full name,
- mobile number,
- birthdate,
- email address,
- residential address,
- document showing proof of residential address,
- provide all nationalities,
- show government ID for each nationality,
- share documents showing proof of government ID, including proof of possession, such as a photo of the individual holding the ID.

In the case of a company, the legal representative must provide, in addition to their individual identification, the following information:

- documents showing proof of legal representation,

- a corporate email,
- the legal name of the corporation,
- Tax ID of the company,
- a document demonstrating proof of tax identification as well as any additional information that the Foundation may legitimately request from time to time in order to complete the Foundation's examination ("KYC-Check").

5.1.2 Money Laundering and Combating the Financing of Terrorism

Blockchain is a transformative technology. Unfortunately, there have been instances where Bad Actors have used such solutions to launder money and finance terrorism.

For this reason, Participants in the BOLD methodology and the Carrot Network must understand that partaking in money laundering or the financing of terrorist activities on or off of the Carrot Network will not be tolerated. Any evidence of such activities may lead to immediate and permanent removal from the platform (see [Penalties & Suspensions](#) section). In addition, Carrot Fndn will cooperate fully with authorities investigating money laundering activities as well as assist with any work required for Combating the Financing of Terrorism (CFT) that may involve the Carrot Network. Participants need to acknowledge and accept such audits as identified in the Carrot Network's Terms and Conditions.

5.1.3 Compliance with Local Digital Asset Laws

Digital asset legislation is at different stages of development around the world. All Participants must understand local digital asset laws and ensure that they are meeting legal requirements. In order to understand these risks, please review the following:

1. Carrot will use smart contracts to mint Non-Fungible Tokens (NFTs), which will contain MassIDs that represent waste recovered at accredited recycling centers;
2. Stablecoins and/or Central Bank Digital Currencies (CBDCs) will be utilized as the purchasing vehicle of NFTs for Recycling Credit Buyers (Note: while a credit buyer may make a purchase directly with the foundation without directly interacting with Stablecoins or CBDCs, it must be clear that digital assets will be the mechanism through which rewards are distributed to recycling contributors);
3. Stable Coins and/or CBDCs will be distributed to Participants who have provided their digital wallets for receiving the proceeds from their contributions within successful supply chains;
4. All Participants who receive stablecoins will be KYC'd;
5. Carrot Fndn does not provide custody of wallets or assets;
6. Each Participant is responsible for providing their wallet address, managing their digital assets, and any keys related to accessing their wallets for retrieving their rewards.

The Carrot Fndn uses blockchain technology to reduce costs related to providing transparency in the distribution of rewards and as a mechanism to scale the use of the

protocol and its methodologies around the world so that it can deliver environmental, social, and economic impact as quickly as possible.

5.1.4 Commitment to Proper Sorting and Recycling Participation

All Participants commit to pursuing high-performance recycling practices, which may involve contracting with professional recycling and composting service providers, purchasing adequate equipment, establishing internal processes for sorting and storing waste properly, training employees, educating customers, hiring consultants, paying for logistics, and using waste management software for waste tracking and recycling certification, among others.

Each participant is responsible for doing their part in properly sorting, storing, hauling, and composting organic waste and, where necessary, working with partners to educate, improve practices, and collaborate on keeping processes clean, efficient, effective, and low-cost.

5.1.5 Commitment to Data Quality and Self-Policing

Data quality is of the utmost importance.

Diligence with proper sorting, measuring (weighing), identifying waste types, and logging data regarding shipment, hauling, receipt, weighing, and auditing, among other activities, is necessary in order to effectively participate in this and any other of Carrot's methodologies.

Participants also recognize their role in reporting any data anomalies they observe to the Carrot Network so that proper orientation can be given and a high standard of data quality can be maintained.

5.1.6 Compliance with labor laws and work conditions

Participants must comply with all local, national, and international labor laws. We bring special attention to the following:

Participants must conduct their business activities in accordance with the International Labor Office's (ILO's) Declaration on Fundamental Principles and Rights at Work¹¹ concerning fundamental rights, namely, freedom of association and the effective recognition of the right to collective bargaining; the elimination of all forms of forced or compulsory labor; the effective abolition of child labor; the elimination of discrimination in respect of employment and occupation; and a safe and healthy working environment.

¹¹ International Labour Office, ILO Declaration on Fundamental Principles and Rights at Work. Available at: https://www.ilo.org/wcmsp5/groups/public/---ed_norm/---declaration/documents/normativeinstrument/wcms_716594.pdf

Participants are committed to implementing and improving occupational health safety and management systems aimed at minimizing work-related risks, hazards, and fatalities, oriented by the International Labour Office (ILO) guidelines on occupational safety and health management systems¹² and the ILO training manual WARM¹³, Work Adjustment for Recycling and Managing Waste.

Participants adhere to the United Nations Convention on the Rights of the Child¹⁴. The Convention distinguishes childhood from adulthood, which lasts until 18 years of age. Childhood is considered a special, protected period in a person's life, and children must be allowed to grow, learn, play, develop, and flourish with dignity.

5.1.7 Compliance with Data Privacy and Confidentiality

All Participants, in particular the Carrot Integrators (INTs), must comply with local and international data privacy laws to ensure the privacy of all Participants are protected.

Attention should be given to laws such as the EU's General Data Protection Regulation (GDPR)¹⁵, The Council of Europe's Convention for the Protection of Individuals with regard to Automatic Processing of Personal Data¹⁶, the California Consumer Privacy Act (CCPA)¹⁷ and Brazil's General Law for Protection of Personal Data (LGPD)¹⁸, to name a few.

5.1.8 Commitment to Confidentiality

All Participants, in particular the Carrot Integrators (INTs), must commit to protecting the confidentiality of the business activities of network Participants in order to preserve a healthy business environment and the collaborative spirit of working together to optimize waste recovery and minimize pollution.

¹² ILO-OSH, 2001. Guidelines on occupational safety and health management systems. INTERNATIONAL LABOUR OFFICE, Geneva. Available at: https://www.ilo.org/wcmsp5/groups/public/---ed_protect/---protrav/---safework/documents/normativeinstrument/wcms_107727.pdf

¹³ International Labour Office, ILO training manual WARM, Work Adjustment for Recycling and Managing Waste. Available at: https://www.ilo.org/wcmsp5/groups/public/---asia/---ro-bangkok/---sro-bangkok/documents/publication/wcms_126981.pdf

¹⁴ UNICEF: [United Nations Convention on the Rights of the Child](#).

¹⁵ EU: [General Data Protection Regulation](#)

¹⁶ ETS No 108, Convention for the Protection of Individuals with regard to Automatic Processing of Personal Data, Council of Europe (CoE). Available at: <https://rm.coe.int/1680078b37>

¹⁷ California Privacy Protection Agency: [The California Privacy Rights Act of 2020](#)

¹⁸ LEI Nº 13.709, DE 14 DE AGOSTO DE 2018. BRASIL, Lei Geral de Proteção de Dados Pessoais (LGPD). Available at: https://www.planalto.gov.br/ccivil_03/_ato2015-2018/2018/lei/13709.htm

5.1.9 Transfer of Data Rights

Participants understand that they transfer all rights to the data submitted to the Carrot Network to the Carrot Fndn. Participants also understand that Carrot Fndn seeks to sell credits on a best-efforts basis but that it has no obligation to do so.

Participants recognize that they cannot request that other certification entities issue recycling, carbon, or other environmental credits relating to the data that is submitted, as this would constitute double counting and possibly double profiting. Such activities will result in immediate suspension and likely permanent removal from participation in this methodology or any other methodologies utilized by the Carrot Network. For more information, see the section on [Penalties & Suspensions](#).

5.2 Carrot's Token Sale Agreement

Buyers of credits (tokens) and receivers of rewards must accept the terms set in Carrot Fndn's Token Sale Agreement.

We expect BOLD Buyers to understand the early stages of the development of the Carrot Network and the associated risks before making a purchase.

6. BASELINE

6.1 Project Boundaries

There are no boundary limitations for composting activities.

[Note, [BOLD Carbon \(CH₄\)-SSC](#) does have a 200 km project boundary designed to limit hauling-related emissions for the issuance of carbon credits. Since, BOLD Recycling Credit does not quantify GHGs, this project boundary does not apply.]

6.2 Baseline Selection

The composted organic waste is compared to a singular baseline of inappropriate biological waste disposal that includes landfills, dumps and incinerators.

Organic waste is a rich source of biological nutrients that must be treated properly to produce the organic compost needed to regenerate topsoil.

6.3 Eligible Waste Types

All source-sorted, uncontaminated organic waste types and compostable products that can be composted are eligible. Waste types are classified by local environmental agencies but typically fall under the following categories:

- Wood and wood products
- Pulp, paper and cardboard (other than sludge)
- Food, food waste, beverages and tobacco (other than sludge)
- Textiles
- Garden, yard and park waste
- Empty fruit bunches (EFB)
- Industrial sludge
- Domestic sludge
- Other Organic

6.3. Boundary Clarification on GHG Impacts

For avoidance of doubt, BOLD Recycling Credits do not account for GHG emissions reductions (e.g., CH₄) prevented through organic waste diversion from landfills to composting facilities to avoid double counting. GHG emission reductions are verified separately under the BOLD Carbon (CH₄)-SSC methodology. The focus of BOLD Recycling Credit methodology is on recognizing, tracking, and rewarding circularity outcomes within the recycling supply chain.

6.3. Additionality

The BOLD Recycling Credit (TRC) methodology assumes that all source-separated organic waste that is verifiably recovered through eligible biological treatment (e.g., composting) is additional, unless the jurisdiction has already achieved a 90% diversion rate for organic waste. This threshold reflects the “Zero Waste” performance standard defined by the Zero Waste International Alliance (ZWIA).

This assumption holds regardless of local mandates or existing infrastructure availability, unless independently verified diversion is already occurring outside of BOLD-accredited systems.

The BOLD additionality principle aligns with both:

- **Extended Producer Responsibility (EPR) frameworks**, which recognize all verified recovery actions as additive to the baseline of unmanaged disposal; and

- **Market-based mechanisms** that recognize the role of economic and non-economic barriers in preventing the scale-up of environmentally preferred waste treatment.

While biological treatment is technically viable, it remains rarely practiced at scale. Globally, only a small fraction of organic waste is composted or digested. For example, in Brazil, less than 0.2% of organic waste is biologically treated. Even in advanced economies, organics recycling systems are economically fragile and operationally inconsistent, often failing due to fluctuating market prices for recovered materials and weak enforcement of diversion mandates.

Composting facilities face a range of barriers, including:

- **Financial barriers:** Organic waste has little or no resale value. Composting must compete with landfills and incinerators that charge lower tipping fees but cause higher emissions. Without incentive systems like BOLD Recycling Credits, composting is rarely economically viable.
- **Infrastructure and technical barriers:** Composting facilities require capital investment, skilled labor, and logistics networks that are not easily deployed or sustained in many regions.
- **Policy and enforcement barriers:** Regulations requiring composting are often difficult to enforce, particularly where waste is collected for free by municipalities and where illegal dumping of organics remains widespread.
- **Market barriers:** The compost market is immature in many regions, with limited off-take, low-quality standards, or public resistance to compost use.

Taken together, these constraints confirm that composting is not common practice, faces significant financial and non-financial barriers, and requires market interventions such as the BOLD Recycling Credit system to scale.

Therefore, under this methodology, all composting activity that verifiably diverts organic waste from final disposal is considered additional until a 90% source-separated diversion rate is achieved within a given jurisdiction.

Alignment with ICVCM and CORSIA Additionality Standards

This methodology applies a hybrid approach to additionality that aligns with the Core Carbon Principles (CCPs) of the Integrity Council for the Voluntary Carbon Market (ICVCM) and the eligibility requirements of CORSIA. Specifically:

- A **jurisdictional eligibility threshold** (90% diversion) establishes a system-wide ceiling for credit issuance, ensuring that additionality is maintained until organics diversion becomes common practice at scale. This approach supports early market formation while avoiding over-crediting in fully mature regions.

- This approach supports early market formation while avoiding over-crediting in fully mature regions.
- The **barrier analysis** presented above reflects transparent, evidence-based financial, infrastructure, and policy constraints to scaling composting systems;
- Only **verifiably recovered** organic waste streams are eligible, ensuring that credits are issued only for demonstrable project-level outcomes;
- Diversion is assumed to be **non-additional only where independently verified recovery is already occurring** outside of BOLD-accredited systems.

Together, these elements ensure that BOLD Recycling Credit issuance under this methodology is consistent with internationally recognized standards for environmental integrity, conservativeness, and additionality.

6.4 Baseline Waste Flow

Only source-separated organic waste that is verifiably diverted from final disposal—such as landfill, dump, or incineration—is eligible for crediting under this methodology.

6.4.1 Quantification of Diverted Waste for TRC Issuance

The eligible quantity of waste diverted from baseline disposal is calculated as:

$$Q_Diverted = Q_Received - Q_Rejected$$

Where:

Q_Diverted = Organic waste diverted from landfill, dump, or incinerator

Q_Received = Total source-separated organic waste received at the facility

Q_Rejected = Loads or fractions rejected due to contamination or ineligibility

The Q_Diverted value becomes the basis for BOLD Recycling Credit issuance and may be further adjusted by a verified organic fraction (OF_x), as outlined in Section 8.3.

This approach, while not discounting for existing jurisdictional recycling rates, is conservative in a system-wide sense. Discounting would reduce the financial incentive necessary to shift behavior at scale, particularly in underfunded organic waste systems.

Furthermore, in line with traditional EPR programs, all qualifying activity under this methodology is considered additional, as few mechanisms exist to account for, reward, or

measure the environmental benefits of organic recycling in a traceable, audit-ready format.

6.5 Leakage

Leakage occurs when organic waste intended for recycling is diverted to non-eligible disposal routes—such as landfills, dumps, or incinerators—thereby undermining the environmental benefits of the project.

While recycling facilities accredited under this methodology are required to digitally track and report all waste flows, potential leakage risks may still arise, especially during:

- Sorting and rejection of contaminated waste loads
- Operational disruptions (e.g., facility downtime, transportation delays)
- Misrepresentation or redirection of eligible materials

To mitigate these risks, all recycling and composting operations must be monitored via Carrot's digital MRV system, and non-conformities reported, including the use of a documented sorting factor to determine the organic fraction of incoming waste streams when applicable. Hauling and processing are digitally verified through linked MassIDs, reducing the likelihood of undetected leakage.

Initial project verifications under this methodology have not identified material leakage. Nonetheless, if leakage is detected, it will be reported and addressed in the next methodology revision cycle.

[Note: Projects found intentionally misrepresenting waste flows will be subject to penalties under the [Penalties & Suspensions](#) provisions, with enforcement applying to all supply chain participants linked to the non-compliant actor.]

6.6 Permanence and Reversal Risks

Permanence refers to the durability of waste diversion outcomes. Reversal risk refers to events that could negate or undo recycling activities after credit issuance.

6.6.1 Permanence Risks

For BOLD Recycling Credit (TRC) projects, permanence risks are minimal. Once organic waste is processed at an accredited composting facility, it is transformed into stable, nutrient-rich compost and cannot revert to untreated waste. Thus, the recycling outcome is irreversible.

6.6.2 Reversal Risks

Although the recycling process is inherently irreversible, some operational risks could delay or compromise intended outcomes:

- Facility damage or disruption (e.g., fires, floods)
- Economic pressures, where composting becomes financially unsustainable despite credit rewards

To address these risks, Carrot requires:

- Biannual recommitment to certification standards
- Independent third-party audits and compliance reviews
- Continuous digital verification of composting operations via MRV
- Issuance of credits only upon verified completion of recycling activity

These safeguards help ensure long-term delivery of verified environmental outcomes.

6.6.3 No Buffer or Insurance Requirement

Unlike other crediting schemes like those in the carbon market, such as carbon sequestration projects that risk re-emission of greenhouse gases, waste recycling through composting is a one-way transformation. Accordingly, this methodology does not require a buffer pool or insurance reserve for issued *BOLD Recycling Credits (TRCs)*.

If evolving market conditions or risk profiles necessitate additional safeguards (e.g., insurance mechanisms or pooled buffers), the methodology's verification infrastructure will enable structured integration without compromising credit integrity.

7. ACCREDITATION

Processors, Recyclers, INTs and NGO beneficiaries must be accredited to participate in the Carrot Network.

In addition to meeting all of the [participation requirements](#), candidates are required to provide additional information through Carrot's RFI (Request For Information) process regarding their business and environmental activities and successfully complete the accreditation process as detailed below.

7.1 Participants

7.1.1 Processors and Recyclers

Processors and Recyclers (Composters) must successfully complete the three stages of the accreditation process to be approved for participation. The three stages include:

1. Complete the Accreditation RFI;
2. Obtain preliminary approval by the Carrot accreditation team;
3. Pass a third-party Audit performed by a recycling (composting) expert in the country where the Participant conducts its work.

The accreditation process will analyze the information as follows.

Processors must:

1. Provide the business licenses and permits that are legally required to conduct recycling activities.
2. Provide the environmental licenses and permits that are legally required to conduct recycling activities.
3. Provide documentation confirming activities are in compliance with local safety laws and the best practices that are employed to manage risk to workers.
4. Describe the current impact of recycling activities on natural ecosystems.
5. Provide an action plan for addressing any potential natural ecosystem contamination that may occur.
6. Describe the processes and technologies utilized for conducting sorting tasks.
7. When sorting is conducted, provide full digital record-keeping of the sorting activities by material type and weight, along with provenance information such as bin, container, and cargo, as well as the corresponding waste transport manifest.
8. Prove that proper pick-up, drop-off, sorting, storage, and shipment of organic material is conducted through digital proofs submitted to the protocol by the Processor's INT. The digital record must specify the amount (in kg) and type of organic waste that was handled, along with the location where it was picked up (Waste Generator or Processor), the Hauler, and the receiving party. (See more details under the section [Mass Logistics, Measurement and Monitoring](#)).
9. Waste transport manifests (*MTRs* in Brazil) will be required as corroboration of digital records for all waste hauling activities in countries where those are available.

Recyclers must meet all of the accreditation requirements belonging to Processors, as well as demonstrate legal standing and professional capability to perform the recycling work.

10. Declare current composting volumes;

11. Provide prior composting volume records to support the declared composting volume amount. (In the case of Brazil-based projects, provide the Certificate of Final Destination (CDFs) that is utilized);
12. Declare the current maximum composting capacity of the facility;
13. Provide a project or business plan demonstrating the facility capacity presented above. Information such as the facility's site area, infrastructure, equipment, personnel, and technologies can be utilized.
14. Describe the aerobic decomposition process utilized (e.g., windrow, other).
15. Provide the average composting period (number of days) for the composting process. The average period cannot be shorter than 60 days or longer than 120 days.
16. Describe the proportion (in weight (kgs)) that the tracked organic waste mass contributes to a compost heap (windrow) as well as the average composition of other organic materials (e.g, green waste.) [Note: Organic waste mix is managed to optimize the quality and velocity of the composting process and the resulting compost quality and its Carbon-to-Nitrogen ratio.]
17. Describe the procedures utilized for measuring and monitoring the quality of the composting process, such as temperature, humidity, aeration, and microbial activity, and test methods for compost quality. (For example: TMECC¹⁹).
18. Describe the location and range of territory covered by the services.
19. Describe the positive social and environmental impacts associated with the activities.
 - a. Indicate whether there are low-income individuals involved in the activities, the number of individuals involved, and their proportion to the total workforce;
 - b. Indicate whether there are individuals who identify themselves as minorities involved in the activities, the number of individuals identified, and their proportion to the total workforce.
 - c. Indicate whether there are individuals who identify themselves as women involved in the activities, the number of individuals identified, and their proportion to the total workforce.
 - d. Indicate whether there are individuals who identify themselves as LGBTQIA+ involved in the activities, the number of individuals identified, and their proportion to the total workforce.
 - e. Indicate if there are local communities that benefit from the activities and describe the context.
 - f. Indicate whether there are environmental benefits to the activity within the area where the service takes place and describe the context.

7.1.2 Carrot Integrators (INTs)

The accreditation process for INTs involves a thorough analysis of the quality and security of data integration conducted through Carrot's APIs. Data verification will be

¹⁹ US Composting Council: Test Methods for the Examination of Composting and Compost ([TMECC](#)).

continuous, and poor data quality or security breaches may lead to penalties and/or permanent removal from the Carrot Network.

7.1.3 NGOs as Beneficiaries of Rewards

The accreditation process for a non-governmental organization will involve the NGO's proving their commitment to the advancement of the circular economy and good legal standing:

1. Submittal of the organization's governing documents
2. Submittal of the organization's tax ID
3. Proof of the organization's good standing to conduct business
4. Proof of the organization's good standing with tax authorities
5. Proof of the organization's mission or purpose to advance the transition to a circular economy;
6. Proof that the organization is apolitical.

Changes to any of the above must be communicated within two weeks of the changes and may result in the loss of privileges for receiving donations and suspension or removal from the Carrot Network.

7.2 Responsibilities

It is the sole responsibility of each candidate to guarantee that the data on the Accreditation RFI (Request for Information) forms is true, accurate, and up-to-date.

The candidate must complete and submit the Accreditation RFI to the Foundation in a timely manner, and all communication should be cordial and purposeful with the goal of completing the process efficiently.

An assessment as to the capabilities of the candidate to conduct its duties will be determined, and only upon approval may the candidate partake in the rewards distributed through BOLD credits.

Candidates understand that additional information may be required even after accreditation approval and agree to allow auditors to perform further verification work and even conduct a non-scheduled on-site visit.

7.3 Accreditation Period

Successful completion of the accreditation process allows Participants to engage with the Carrot Network for 24 months (2 years) from the date of the last audit.

7.4 Renewal

Accredited Participants, excluding INTs, must renew their accreditation before the completion of 24 months from their last accreditation date. It is the responsibility of each Participant to engage with Carrot's "Operations Team" to ensure their accreditation is successfully completed in time. We recommend that Participants reach out at least 3 months prior to the accreditation expiration date.

Accreditation renewal may be initiated at any time after 3 months from the last accreditation date.

Carrot may use partners to conduct accreditation services.

Accreditation and its renewals may incur a cost for the candidate.

Carrot's accreditation team can be reached at operations@carrot.eco.

7.4.1 Processors and Recyclers

In order to renew the accreditation of Participant status, Processors and Recyclers must complete a full accreditation review, including a third-party audit as described above.

7.4.2 Carrot Network Integrators (INTs)

INTS will not be required to undergo an accreditation recertification for Participant Accreditation, as the analysis of the data and relationship is ongoing.

7.4.3 NGOs

In order to renew the NGO's accredited Participant status and be eligible to receive donations, NGOs must complete a full accreditation review, as described above.

8. MONITORING & MEASURING MASS

8.1 Mass Recording Requirements

At each point of the recycling supply chain, waste mass data, including waste type(s) and amount (kg), must be captured into a digital information system that records the provenance (location and prior Owner) and the Hauler, as well as the destination and new owner (the Receiver). For more information, see [Validators & SOs](#).

The net weight in kg must be properly recorded:

$$\text{Net Weight (kg)} = \text{Gross weight (kg)} - \text{Bin weight (kg)}$$

Organic waste subtypes must be identified. Reference the list of eligible waste types in [Section 6.2 Baseline Selection](#).

All data must be provided with accuracy by qualified personnel holding clearly identified roles and responsibilities under proper supervision. The monitoring process of the activities must encompass steps relating to waste identification, pickup, hauling, delivery, sorting/sortation, and transformation determined through continued measurement of weight.

At a minimum, the final leg of the waste supply chain must be fully documented to report the drop-off of waste at a recycling facility. This includes 1) the identification of the last location where the waste was picked up (a Waste Generator or Processor) along with the responsible individual at the pickup location (the "Holder"); 2) the Hauler that transported the waste mass; and 3) the Recycler's responsible party at the drop-off location (the "Receiver"), who serves as the "[Validator](#)" of the amount, quality, and type of waste received at the recycling facility.

Quality procedures to acquire and manage data must be established, including to account for uncertainty in data and parameters, where applicable.

8.2 Establishing Chain of Custody

Waste mass data submitted to the Carrot Network is codified into unique digital assets called MassIDs and validated by the Holder and Receiver of the waste mass.

Provenance and chain of custody are recorded in MassIDs through supply chain event data that transfers waste responsibility of MassIDs on a first-in-first-out basis in accordance with the rules established by the Carrot Network (for more information, see [MassIDs - Codifying Waste](#) in Carrot's whitepaper).

8.3 Organic Fraction Verification and Sorting Protocols

Projects issuing BOLD Recycling Credits (TRCs) must ensure that only eligible **source-sorted organic waste** is processed and credited. While the methodology prohibits the use of commingled or centrally sorted waste streams, verification is still required to confirm that inbound materials are free of non-organic contaminants.

Project developers must implement sorting protocols at the facility level to:

- **Identify and remove non-organic materials** inadvertently included in source-sorted loads
- **Reject contaminated loads** that do not meet minimum quality thresholds for organic content
- **Document all rejected and diverted loads** for audit purposes

If facilities wish to apply a **sorting factor (Organic Fraction, OF_x)** to account for minor contamination or weight adjustments, the factor must:

- Be based on validated sampling procedures
- Be reviewed and approved by an independent auditor
- Be updated if material inputs or operational practices change

The eligible quantity of organic waste for TRC issuance shall be calculated as:

$$Q_e = Q_{\square} \times OF_x$$

Where:

- **Q_e** = Eligible organic waste quantity
- **Q_□** = Total inbound source-sorted waste
- **OF_x** = Verified organic fraction (value between 0 and 1)

All sampling methods, rejection criteria, and sorting protocols must be documented and made available for verification. Projects using default OF_x values must provide justification based on historical performance.

8.4 The Recycler

While certification of MassIDs involves verification of organic waste (MassIDs) delivered to a recycling facility, the work of composting requires the addition of organic aggregates (other organic waste complements and bulking agents) to compose a compost heap. A combination of nitrogen inputs (food waste and sludge) and carbon inputs (green waste and other organic aggregates) must be obtained to establish the necessary nitrogen-to-carbon ratio for proper decomposition. Therefore, diversion of food waste to composting facilities also drives demand for additional, secondary organic waste aggregates, such as aggregates. Given that most aggregates end up dumped into the environment or buried in landfills and that they also emit methane in a similar proportion to food waste or sludge waste, the work of diverting other organic waste aggregates from landfills is also critically important to combat pollution, contamination and greenhouse gas emissions at landfills. Let's not forget that hauling and landfilling green waste and aggregates is a big cost to municipalities, and private sector-driven composting can reduce this financial burden.

BOLD takes a conservative approach and only permits the calculation of waste diversion based on the tracked waste mass that arrives at a composting facility (primary or aggregates) and is placed into a compost windrow.

8.5 Processors and the Waste Generator

Processors and Waste Generators must prove through a digital record registered in a waste management application (INT) that a specific amount (in kg) of organic waste was picked up at their location by a Hauler and delivered to an accredited Processor or Recycler.

A waste transport manifest (if available in the location) will be required as corroboration of digital records for organic waste pickup at businesses.

In cases where waste weight is not captured digitally using a scale, waste weight reported in official government waste transport manifests may be used.

Waste pickup at residences (households and apartments) will require digitally captured, georeferenced data. If a pickup is conducted without weighing at a residence, then a conservative average can be utilized following verification by an Auditor. (Note: all Waste Generators will be considered as the “Source” of organic waste generation.)

In the case where a Hauler is not identified, the Waste Generator is considered the Hauler, as the responsibility with regard to waste belongs to the Generator or Processor until it reaches another Processor or the Recycler (aka End Processor).

8.6 Sludge (Domestic and Industrial)

BOLD will consider wastewater treatment plants as Waste Generators for this version of the methodology.

[Note: Typically, waste is only considered “solid” once wastewater is treated and the solid waste is isolated and identified as sludge. However, in the future, incentives could be developed to encourage wastewater diversion from landfills to wastewater treatment plants that compost sludge, especially when those are delivered to the facility using tanker trucks.]

8.7 Carrot Integrators (INTs) & Data Rights

It should be noted that all Participant data and corresponding logistics, supply chain, and waste management data are submitted to the Carrot Network through software management applications accredited as Carrot Integrators (INTs) by the Carrot Fndn.

8.8 Data Responsibilities and Protection

Each Participant is responsible for the accuracy of the data that is recorded on the Carrot Network.

The burden of meeting data accuracy rests with the Participants working together with INTs (Carrot Integrators) that are submitting the data to the Carrot Network.

8.9 Bad Actors, Self-Policing, and Proof-of-Authority

When economic rewards are involved, everyone has a vested interest in ensuring the ecosystem works well. Because MassIDs track the chain of custody and serve as the vehicle for distributing rewards, when they are flagged for suspicious activity or are identified as containing bad data, disqualifying them from being included in credits, everyone associated with the MassID is financially penalized.

In addition, Bad Actors may be temporarily suspended or permanently removed from the Carrot Network, seriously punishing every Participant associated with the Bad Actor and affecting the attractiveness of the service to its customers. This is known as Proof-of-Authority (PoA), a system that ensures actors will do everything in their power to maintain their reputation.

PoA serves as the fundamental building block for self-policing across recycling supply chains. For more information, see the section on [penalties and suspensions](#).

9. CERTIFICATION OF ACTIVITIES

Carrot certifies the arrival of organic waste at professional composting facilities, proving waste was diverted from landfills, incinerators, and the environment, and identifies the good actors.

9.1 The Certification Process

Certification is a comprehensive process that contains the following steps:

1. Development of the methodology in consultation with industry experts and consultants;
2. Accreditation (i.e., accreditation) of Integrators (INTs) providing supply chain and recycling data, along with NGOs in the country of operation who may receive rewards.
3. Accreditation of Processors and Recyclers involved in the given supply chain;
4. Third-party audits of the recycling activities of Processors and Recyclers, conducted by recycling experts;
5. Running of Carrot verification scripts (code) for validating supply chain mass data activities, mass codification and chain of custody;
6. Running of Methodology verification scripts (code) for MassID certification and issuance of carbon credits generated by waste recycled at each Recycler;
7. Publication of data inputs and outputs to a public, immutable database that can be easily accessed and verified by all Participants.

8. Issuance of credits that provide self-verifiable data relating to supply chain activities and distribution of rewards to each Participant.

Once the accreditation processes are complete and all actors are in good standing, the process of mass certification is conducted in a fully digital manner, known as digital Measurement, Reporting, and Verification ([dMRV](#)). Supply chain and recycling activities are digitally recorded and backed with official government documentation for waste hauling and processing.

Carrot's dMRV solutions seek to scale measurement, reporting, and verification of recycling activities for individuals, businesses, and communities around the world with speed and at low cost, thereby meeting the planet's urgent environmental needs while also returning more value to the Participants contributing important environmental work. Data quality is further enforced through a self-policing mechanism that identifies Bad Actors and penalizes those associated with them, known as "Proof-of-Authority" (see [more info](#)).

The Carrot Fndn works with consultants and industry experts to develop this methodology. The certification process is an innovation unto itself and will likely encounter some failures, which the Carrot Network will seek to fix quickly, keep parties informed, and iterate for improvement.

9.2 Allowable Project Period

BOLD credits can be issued from certified MassIDs that extend to January 1 of the prior calendar year, as long as all criteria established under the BOLD methodology are met.

9.3 Recertification

Carrot does not apply a "recertification" process as is commonly practiced in the carbon credit markets. Instead, Carrot requires that Processors and Recyclers renew their accreditation "certification" every 24 months. For more information, see the section on [renewal](#).

10. ISSUING CREDITS & DISTRIBUTING REWARDS

Code-audited MassIDs are packaged into BOLD Recycling Credits that contain the social, economic, and environmental value that was created by the collective work of the Participants.

MassIDs and BOLD Credit IDs can be looked up in Carrot's public registry at <https://explore.carrot.eco/>.

10.1 Credits and Tokenization

A BOLD Recycling Credit is a [Tokenized Recycling Credit](#) (TRC) as defined in the Carrot White Paper. A TRC contains uniquely identified waste mass units (MassIDs), measured in kg, that arrived and were recycled at an accredited composting facility.

Carrot Fndn is under no obligation to sell the TRCs but will apply a best-efforts basis to ensure that all participants recorded in the chain of custody of each MassID are rewarded for their contributions and that a fair value for the benefit realized to society and to the environment is obtained.

Proceeds from the purchase of each TRC will be distributed in the form of stablecoins (e.g., USDC) to each Participant wallet over the blockchain to ensure transparency in the distribution of rewards.

10.2 Rewards Distribution Model

Rewards are distributed in accordance with the contribution weight of each MassID within each Recycling Credit (TRC) and the participant allocations within each MassID.

The smart contract for the BOLD methodology calculates reward amounts based on the Rewards Distribution Policy and distributes tokens that were used to purchase each NFT to contributors's wallets based on the policy at the time of the sale. Rewards distribution percentages can be found at:

<https://whitepaper.carrot.eco/carrot-methodologies/rewards-distribution-policy>.

Participant categories include:

G	Waste Generator
B	Bin Custodian
H	Hauler(s)
P	Processor(s)
R	Recyclers (All Recyclers are also a P)
I	Carrot Network Integrators
A	Author of a Methodology
D	Developer of a Methodology (code provider)
N	Carrot Network

The Carrot Foundation, with the support of its community members, will adjust distributions to optimize participation and recycling rates for different locations around the world.

10.3 Rewards Distribution Discounts for Large Revenue Businesses

Waste Generator businesses that generated more than US\$4 million in revenue in the prior calendar year will have the rewards attributed to them reduced by 50% so as to not discourage credit buyers from buying credits that have a portion of the rewards being distributed to large corporations. While some may disagree with any amount of proceeds from the credit going to large businesses, a financial incentive is still important to encourage participation.

The portion of the credit that was discounted from large businesses will be directed to a digital wallet managed by the Carrot Fndn to be donated to Non-Governmental Organizations (NGOs) involved in advancing circular economy activities in the country where the Recycler is located.

For country-specific reward discounts for large revenue businesses, see the “Reward Distribution Discounts” section within the [Rewards Distribution Policy](#) of the Carrot White Paper.

10.4 Exemption from Large Business Qualification

All Waste generator businesses will be considered by default to be large businesses generating more than US\$4 million in revenues per year. Waste Generators wishing to obtain medium or small business status will need to request a business size adjustment and provide documentation proving their revenue status. Prior calendar year financial status will be permitted.

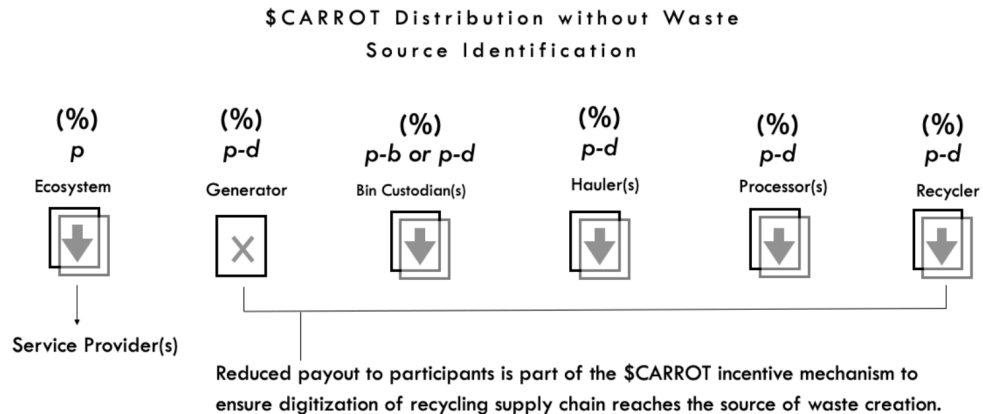
An email request for business size adjustment can be submitted to: operations@carrot.eco.

10.5 The Incentive Mechanism for Full Supply Chain Digitization

Unfortunately, recycling supply chains rarely record the chain of custody in digital fashion through to the source where waste is created. Waste Generators are left unsure whether their sorting efforts are yielding environmental results (“Is my waste actually being recycled?”) or if it is worth paying for such services. In addition, there is no incentive to sort when free pick-up is available, even if it is being sent to a landfill or dump. For more information, see [Reaching the Source of Waste Creation](#).

The Carrot Network applies an incentive mechanism to encourage recycling and composting service providers to digitize their supply chains all the way to the source of waste creation in order to bring clarity and rewards to the Waste Generator, who is the key player in making sure waste is sorted properly as soon as it is created.

A discount is applied (see Distribution Discount under the [Rewards Distribution Policy](#) section of the whitepaper) to the rewards that Recyclers, Processors, Haulers and Bin Custodians receive when the Generator is not identified digitally and the full chain of custody can't be established.



The rewards that would be paid out to service providers if the Waste Generator were identified, as well as the portion allocated to the Waste Generator are retained by the Network for use by the Carrot Foundation to support growth in the network. More information can be found at [Waste Source Not Identified](#).

10.6 Recognition of Ecosystem Ideology

It is important that Credit Buyers recognize that the purchase of credits serves to support a community of individuals and businesses working together as an ecosystem to perform a specific and important environmental task. This means that it is possible that rewards may be distributed to companies that the buyer may view as not sharing the same values or even to competitors.

It is important to have an ecosystem mindset and understand that the same may occur in reverse; a different Credit Buyer could be purchasing credits that distribute rewards to the company in question for its composting work and that the Credit Buyer wishes they were going to a different company.

10.7 Token Retirement to Carrot Registry

Buyers of BOLD Recycling Credits can “retire the Credits to Carrot’s Public Registry to prove permanent ownership. Holders of BOLD should only report their environmental

contribution once the credits are retired and can no longer be transferred. More information is available at the [Carrot Registry \(EPR/ESG\)](#).

10.8 Forward Contracts

The foundation may sell BOLD credits in non-transferable forward contracts for future delivery of credits that will contain full, realized environmental gains. Selling forward contracts is a mechanism to help finance the transition to a circular economy. Recyclers, INTs, and other service providers gain clarity in the potential rewards that can be generated and are incentivized to invest time and effort to become part of the ecosystem.

10.09 Refunds

Given the early stages of the development of the Carrot Network, refunds on credits sold or requests for exchanging Tokenized Recycling Credits will not be met at this time.

We expect the reason for such requests to most likely involve possible bad data regarding MassIDs. Given the complexity of reverse engineering TRCs after they are sold to address a MassID, the Carrot team prefers to agree with Buyers on a no refund or replacement policy for the time being.

Given the quality of the data that is being collected and the safeguards put in place, the risk of bad data is expected to be extremely low.

11. RECOGNITION OF CO-BENEFITS

The BOLD Recycling Credit generates significant social, environmental, and financial co-benefits that extend well beyond the recycling of organic waste. These co-benefits represent real and measurable impacts associated with the recycling of each ton of organic waste and may be monetized or valued independently of the TRC issuance process.

Some of the co-benefits that may be monetized include, but are not limited to: public savings through reduced hauling and disposal of waste, reduced healthcare costs from pollution, improved recycling supply chain performance due to lower contamination, GHG reductions from higher recycling rates, and green job creation.

A **valuation framework** exploring their potential economic and environmental value is included in **Appendix 18.1**, consistent with lifecycle benefit recognition and Extended Producer Responsibility (EPR) principles.

For a comprehensive list of co-benefits, see the sections below on “the good, the bad, and the ugly.”

[For avoidance of doubt: landfill methane emissions may not be credited or monetized under this methodology, as they are covered under a separate methodology— BOLD Carbon (CH₄)-SSC. Other methodologies may be developed to monetize related climate co-benefits such as reduced fertilizer use due to the use of compost or soil carbon sequestration from compost through improved Net Plant Productivity. These would also be noted for exclusion in the future.]

11.1 Avoiding the “bad and the ugly”:

Composting helps to:

- Reduce methane emissions at landfills and dump sites.
- Reduce contamination of recyclables and improve sanitary and health conditions for sorters, the combination of which can boost recycling performance by 2X–5X in recycling centers.
- Reduce raw material extraction. Better recycling performance preserves natural resources that future generations can use, protects habitat and eliminates carbon-intensive activities associated with extraction, hauling and processing raw materials.
- For municipalities, reduced costs associated with healthcare and reduced volumes of waste sent to landfills and incinerators impact the bottom line directly. Collection and Hauling costs are reduced immediately, as are tipping fees at landfills and incinerators, which are charged on a per-ton basis for the waste deposited. Costs associated with new landfills are pushed into the future, or even eliminated, as landfill life expectancy is extended.
- Reduce organic waste in landfills and incinerators, which lessens health and environmental costs associated with contamination of soil, water, and air.
- (For more on the “bad”, see [Recycling Systems are Broken.](#))

11.2 Increasing “the good”:

Some of the benefits of composting include:

- Compost, the output from the work of composting biological waste, is an incredibly valuable, natural, nutrient-rich byproduct that is critical to restoring topsoil and protecting our future food security. According to some at the UN, topsoil and food security are an even bigger problem than climate change.
- Compost provides nutrients to the soil, reducing the need for fertilizers and associated costs.
- Compost captures and holds moisture in the soil, reducing the costs of irrigation and the strain on water resources.
- Compost stimulates life in the soil, increasing resilience to pests and reducing the need for pesticides and associated costs.
- Compost significantly reduces the use of chemical fertilizers and pesticides, which are derived from fossil fuels and carry carbon-intensive supply chains.

- Healthy and nutrient-rich topsoil improves plant growth and photosynthesis performance, removing more carbon dioxide from the atmosphere and “sinking” it underground in its roots. The contribution is profound. Composting transforms current biological waste treatment solutions from a net carbon emitter to net carbon sequester (becoming carbon negative.)
- Composting recycles nutrients and carbon for agriculture, which in turn produces food that is consumed and transformed into organic waste. Thus, composting plays an important part in the carbon cycle and in the circular economy.
- Composting is a green jobs generator, yielding ~3.5 direct green jobs for every 1 job at a landfill or incinerator. And indirectly, by cleaning up recyclable and reuse streams, composting can generate many more green jobs in the recycling, remanufacturing, and repair fields, representing total relative job potential of 290.5 green jobs for every one job at a landfill or incinerator, according to Gaia²⁰.

12. ENVIR., SOCIAL & ECONOMIC ACCOUNTING

BOLD is a Tokenized Recycling Credit (TRC) that corroborates, with a high degree of certainty, that an amount of organic material mass (measured in kg) was composted (recycled). For more information on TRCs, see the section in the whitepaper on [Recycling Tokens](#).

BOLD recycling credits **confirm investment in a system change solution** that aims to build a more sustainable and equitable planet by transitioning from a carbon-intensive and wasteful linear economy towards a waste-free, resource-efficient, low-carbon, circular economy.

Holders of retired BOLD Recycling Credits obtain valuable investment proofs in recycling offsets that can be used in voluntary or regulated (if approved) Extended Producer Responsibility programs. The holder can also, within reason, make claims to additional social and environmental co-benefits that were generated, excluding the GHG emissions that were prevented at landfills. Certification of methane emissions reductions is verified and certified by a separate methodology. See [BOLD Carbon \(CH4\)](#).

The co-benefits associated with GHG emissions reductions can be utilized in pricing negotiations or communication by the holder of the BOLD Recycling Credit.

If a BOLD Recycling Credit Buyer uses the BOLD TRC for official GHG accounting or in market communications, it will be [penalized and potentially suspended](#) from purchasing credits in the future.

²⁰ Gaia: Zero Waste and Economic Recovery - [The Job Creation Potential of Zero Waste Solutions](#)

Finally, supply chain contributors (Waste Generators, Haulers, Processors and Recyclers) who contribute to the issuance of BOLD Recycling Credits by sorting, hauling and processing organic waste cannot make waste offsetting claims, as they are not the holders of the retired credits. Supply chain participants can only make claims to “having contributed” to reducing the waste that was measured and verified by the ecosystem. If a supply chain participant makes such claims, they will be penalized and potentially suspended from participating in the crediting program going forward.

13. Verification and Audit Procedures

All projects participating in the certification process of BOLD Recycling Credits (TRCs) must undergo third-party audits conducted by Carrot-accredited auditors as part of the Participant Accreditation process. These audits verify the accuracy of submitted data, adherence to eligibility requirements, and compliance with monitoring and reporting protocols.

13.1 Auditor Independence

Auditors must be accredited by the Carrot Foundation. Except in the case of an initial audit provided by Carrot to onboard new projects, auditors must not be compensated by Carrot, nor may they receive any percentage of BOLD Recycling Credit rewards. This ensures independence and impartiality in the verification process.

All auditors must declare any potential or actual conflicts of interest. Audits must be conducted at minimum every 24 months or in response to flagged anomalies detected through the digital monitoring system (dMRV).

13.2 Mutual Recognition of Accreditation under BOLD Carbon (CH₄)-SSC

Participants accredited under the BOLD Carbon (CH₄)-SSC methodology are automatically eligible to participate in the BOLD Recycling Credit (TRC) system, without the need for separate accreditation or audits under this methodology—provided that their operational scope and participating entities remain materially the same.

This mutual recognition allows verified actors to issue BOLD Recycling Credits for composting activities already tracked and audited under the BOLD Carbon (CH₄) protocol, using Carrot’s digital monitoring, reporting, and verification (dMRV)

infrastructure. This avoids duplicative verification requirements and reduces compliance costs while maintaining the environmental and data integrity of both systems.

Carrot reserves the right to request updated documentation or initiate targeted audits if material changes in project structure, participant roles, or anomalies in dMRV data may affect the integrity of TRC issuance.

14. OFFSETS AND GREENWASHING

The use of offsets as a form of investing in systems that reduce negative externalities is a fundamentally important practice, even if it is still in its early stages globally. Critics of such schemes argue that offsets are nothing more than a form of greenwashing where large companies can buy credits at a low price and keep polluting, in essence getting a “free lunch” while not actually being encouraged to shift to cleaner practices. Such critiques are fair when the Credit Buyer realizes outsized marketing value compared with the actual investment made.

The other side of this coin is that any amount of investment in pollution prevention systems is incredibly valuable in building the systems needed to transition to a more sustainable planet. “Offsetting” is a fundamentally effective idea, as it attributes the cost of cleanup to the companies that are commercially benefiting from the pollution being created, and the purchase of offsets, when executed properly, can drive community action on waste reduction through better sorting and contracting of performant recycling services. More regulation can ensure that all companies are “offsetting” a “fair” portion of the pollution they are creating and paying a fair price. For an example, see “The Environment Exchange” attributions for [“Who is responsible for how much?”](#) in the UK. Extended Producer Responsibility programs, which measure the amount of waste that a company produces and requires offsetting a portion of their waste, offering great promise. The ideal scenario would be to establish a minimum floor price for credits agreed upon by market participants in order to prevent greenwashing. Second, increased adoption of EPR programs and enforcement would lead to price increases to the point where companies would be financially incentivized to switch to more sustainable product design, material choices, and business models (such as Product-As-A-Service). The cost will ultimately be transferred to the consumer, but all companies will then compete to develop products and provide services that pollute less.

The Carrot Network, functioning as a digital ecosystem, will enable EPR programs to scale quickly all over the world. In fact, BOLD Recycling Credits serves as an important tool to help local regulators launch EPR programs for organic waste treatment (in particular for food waste, compostable packaging and materials.)

15. PENALTIES & SUSPENSIONS

In the event of any irregularities in activities or in reporting of data relating to a supply chain Participant, flagged as a potential “Bad Actor”, Carrot Fndn or an accredited independent third-party Auditor, may suspend the Participant immediately from involvement in the BOLD methodology and participation in the issuance of certificates and/or credits related to it. Participants associated with any Bad Actors may also be suspended immediately. Additional information may be requested from all of the Participants involved until sufficient clarification has been provided in order to determine how long the penalty may be or if and when the Participant may be reinstated. Carrot Fndn has no obligation to return the value associated with the credits sold while Participants have been penalized, and the burden rests on each Participant to ensure that the data provided is accurate.

If any participant fails to provide a response to the request for information within 30 days, the participant may be permanently disqualified from participating in the BOLD Recycling Credit methodology for the issuance of credits.

For the period in which the activities in question failed to meet the requirements of the BOLD methodology, participants will not receive any rewards from BOLD Recycling Credits.

During the period of non-compliance, BOLD Recycling Credits issued prior to this period involving the Bad Actor will not be sold until the situation is resolved.

In the event of fraud being identified for any of the requirements of the BOLD Recycling Credit methodology, the participant will permanently lose their Accredited status, and applicable legal measures will be taken.

Any evidence of intentional practices that negatively impact the well-being of local communities or of natural ecosystems will serve as solid justification for permanent exclusion from participating in the BOLD methodology, other protocols utilized by the Carrot Fndn, and removal from the Carrot Network itself.

Legal action may be taken by the Carrot Fndn against the party for any damages done to the Foundation or its network.

16. QUALITY ASSURANCE AND QUALITY CONTROLS

As a tech-enabled dMRV solution, the BOLD methodology and the Carrot Network work in conjunction to digitally measure, report, and verify environmental contributions created through the activities of supply chain Participants collaborating to recover waste for recycling.

Because waste is tangible and easily measured, supply chains can be monitored, and the recycling activities performed by Recyclers are consistent and verifiable with a high degree of certainty. The quality of environmental reporting can be very precise, especially when conducted in full digital fashion. [Note: The Carrot Network encourages full digitization by utilizing its "[Incentive Mechanism for Full Supply Chain Digitization](#)."]

Quality assurance and controls on the Carrot Network involve a set of solutions, including: the identification of all participants (KYC), accreditation of the key actors (Recyclers, Haulers, Processors, INTs and NGOs), verification of a Recycler's work through independent audits, supply chain data processing, scripts for Mass audits, methodology verification, and issuance of credits, utilization of Proof-of-Authority to identify and penalize bad actors, tracking of reward distribution through the use of blockchain network transactions, the use of immutable records in a decentralized peer-to-peer public network, and non-fungible tokens for retiring credits in a manner that cannot be transferred, among others.

As a digital solution, quality controls will improve over time as larger data sets are utilized and verification models advance. Governance over the network will be progressively decentralized to local and global communities so that the technology can be adapted to suit the needs of specific local markets. Data is made publicly available with controls for privacy and confidentiality so that trust can be established between Participants in a manner that was not possible before the advent of blockchains.

Lastly, the technological solution and economics of the Carrot Network were designed to not interfere with or compete with the services and products created by the Participants in the recycling and waste management markets. Carrot is additive to all Participants and shares the proceeds from the sale of credits with all identified stakeholders, thereby making it inclusive and scalable globally.

17. UNCERTAINTIES

Uncertainties are common with new products and technologies that challenge the status quo.

We will list some of the uncertainties below:

17.1 Market

- The global community has not yet realized the importance of transitioning to the circular economy and understood that it has the potential to become the most important decarbonization tool available to the world. The connection between better resource management and reduced global GHG emissions, for most, is still not clear.
- While some recycling supply chains are digitized and well documented, the vast majority of waste hauling, processing, and recycling activities globally are not.

Digitization, support from regulators, and economic incentives will take time to take hold.

- Companies typically do not measure their waste and carbon emission footprints, especially relating to waste diversion and scope 3 emissions, respectively. Many still don't understand the positive impact that can be generated for their businesses by engaging with their customers and communities at large to address environmental and social challenges collectively (e.g., waste offsets that distribute rewards across recycling supply chains.)
- Municipalities and governments lack the resources, expertise, and technologies to address linear economy problems and will need to recognize their new roles as limited stakeholders within a dynamic circular economy.
- Extended Producer Responsibility (EPR) programs are still in their infancy, and most are conducted without the use of technology. The utilization of recycled material purchase receipts (e.g., Packaging Recovery Notes) to prove financial contributions has proven to be easily manipulated, and payments to a single actor at the end of the supply chain do nothing to change the behavior of Waste Generators with respect to sorting waste properly.
- EPR programs for food producers are an innovation in themselves. While they are very much needed, the introduction of such programs will face resistance and take time.
- Without a floor price on credits, companies can purchase credits

17.1 Technology

- Blockchain is a disruptive technology that will change the way many businesses transact with their customers and do commerce with each other over the internet. While blockchains have been around for more than 15 years, they are still in their infancy. The promise for greater transparency, security, and trust is clear, but failures still exist. In addition, the concept of ownership within blockchain networks, where Participants obtain a stake in the network, partake in its governance, and shape its future, remains foreign to most and will take time to implement.
- Carrot's models for supply chain verification and audits are still in their early stages of development. They will improve significantly and rapidly, especially with the use of AI, but some failures can be expected.
- The development of Proof-of-Authority solutions that identifies Bad Actors and penalized them and those associated with the Bad Actor are also still in the early stages of development. While PoA will become one of the most important tools for ensuring quality data is provided at a global level, it still remains to be tested at scale.

17.2 Adoption

- While the Carrot Network and BOLD Recycling Credit have been designed to add value to all Participants, it remains to be seen if enough value will be

distributed to each Participant to ensure that they take part. In addition, many environmentalists critique the use of offsets, claiming that they only serve as a license to pollute. The price of credits will need to factor in both the value that is being created for each participant as well as successfully drive waste reduction and substitution, very likely necessitating the establishment of a floor price.

- Owning a digital wallet will soon become as ubiquitous as having an email address, a cell phone number, or a corporate bank account. However, its use is still in its early stages. Concerns over financial regulation and self-custody of assets remain real, despite the added security and transparency they provide.
- The demands for a user to engage with the network have been designed to be minimal. Waste Generators, Haulers, Processors, and Recyclers only need to provide a wallet address in order to receive their rewards. Recycling Credit Buyers will need a more tailored experience to assist in the purchase of credits and to demonstrate proof of environmental contributions realized.

18. COMMITMENT TO THE MARKET

Carrot Fndn commits to doing its best to price and sell credits in accordance with the environmental, social, and societal contributions that the activities verified within the BOLD methodology realize. In time, Carrot intends to sell credits on the open market in order to allow the market to set the price for its credits.

Carrot Fndn commits to doing its best to fairly distribute rewards among Participants, while understanding that Participants will often not agree with the allocation that is awarded to them (see [rewards distribution model](#)), as well as any discounts to distributions that are applied to encourage further digitization of waste supply chains (see [Incentive Mechanism](#)).

The Foundation commits to moving these decision-making processes to its community over time in order to make these processes inclusive of both local and global stakeholders.

19. APPENDIX

19.1. BOLD CREDIT VALUATION EXERCISE

To determine the economic value of 1 ton of organic waste arriving at a professional composting facility with the reasonable expectation that it will be properly composted, one must understand the full cost to society of the status quo, which involves burying waste at a landfill or dump. One must also consider the additional investment needed for sorting, storing, hauling, and composting organic waste, as well as the equipment, dedicated logistics network, facilities, and skilled personnel required to compost organic

waste properly. The BOLD (Breakthrough Organic Landfill Diversion) Recycling Credit is a critical circularity and climate financing solution designed to break this vicious linear cycle and open a path to the circular economy. Its price is the determining factor in successfully accomplishing this goal and ensures that all Participants are sufficiently compensated and/or incentivized to work together.

The pricing exercise below attempts to establish a **minimum price** for the BOLD Recycling Credit from food waste composting, utilizing non-controversial and easily quantifiable contributions, without attempting to cover all of the benefits that can be observed in the [Co-Benefits](#) sections. We also opt for the lowest value of any estimate range to remove any risk of overestimation while ensuring that the critical valuation categories are considered.

Below, we delve into a valuation exercise that attempts to value the minimum price of 1 ton of food waste diverted from landfills in Brazil. It should be noted that Brazil's current recycling rate is approximately 4%²¹ and that the country is ranked 114th out of 124 countries that have reported waste management data²². Brazil's rate of organic waste treatment is ~0.2%.

BOLD (Breakthrough Organic Landfill Diversion) credit pricing exercise	
Logistics Services Costs	
The public sector in upper-middle-income countries (e.g., Brazil) spends on average US\$50–100/ton to collect and transfer waste and US\$20–65/ton for landfilling²³, or at least US\$70.00 and at most US\$165.00. Total = US\$70 /ton.	
CO ₂ e Avoided through Recycling of other Materials	
If we assume that food waste sorting from recyclable materials yields the full potential of recycling recyclables, we can determine that 0.32 tons of recyclables became available for recycling based on Brazil's waste production by type and the organic portion relative to it. If we multiply each unit of recyclable waste by 4%, which is the country's recycling rate, and then assume that only half of that potential is being used, we can use the US Environmental Protection Agency's (EPA) Waste Reduction Model (WARM) Tool, Version 15, to convert waste types to CO₂e and then multiply the totals for each type of recycled	

²¹ World Bank - What a Waste 2.0 [Report](#)

²² World Bank - What a Waste 2.0 [Report](#)

²³ World Bank - What a Waste 2.0 [Report](#) p.104

waste by the current price of \$50.00 for carbon. The result is a CO₂e mitigation value of US\$21.43 per ton.

Total = US\$21.43 /ton

Value of Recycled Waste from a Recycling Credits Market

If we consider, at this stage of recycling development globally, that the work of diverting recyclable materials from landfills is equal for the planet and to society wherever it occurs, and we apply the pricing for that recovery from an established and arguably well-functioning market (UK's [t2exchange](#)), then we can determine the full value of recycled waste mass for each material type that can be reasonably recovered. If we multiply each sorted recycled mass amount by the country discount, apply a 50% discount to the potential of full mass recovery, and then multiply the mass amount by the average price per ton of each material type (i.e., Packaging Recovery Notes) traded in 2022, we obtain a US\$22.64 value of recovered recyclables for every 1 ton of Food Waste sorted and composted.

Total = US\$22.64 /ton

(Note: the Carrot Fndn cannot guarantee that a Recycling Credit (or Packaging Recovery Note) was not sold for some amount of recycled waste that was avoided through the work of composting, although we think the risk is extremely low in a country that recycles 4% of its waste, an amount that has already been discounted within the estimated waste mass recycled.)

Healthcare Cost Savings

According to the International Solid Waste Association (ISWA²⁴), healthcare costs in Brazil related to poor waste management are US\$370 million each year, or US\$10–US\$20 per ton. The Foundation's own calculation, based on the total healthcare costs, estimates US\$4.63 per ton, and we choose to use our more conservative figure.

Total = US\$4.63 /ton

Green Jobs

It is no surprise that removing waste from landfills and recovering it for use by the economy is a significant green job creator. We utilize GAIA's²⁵ model for green job generation and calculate that for every 1 ton of food waste diverted, 0.6 jobs are created. However, we were not able to accurately quantify the dollar value of a green job in Brazil and, for this

²⁴ International Solid Waste Association study on healthcare costs in Brazil from waste - [Exame Article](#)

²⁵ Gaia: Zero Waste and Economic Recovery - [The Job Creation Potential of Zero Waste Solutions](#)

reason, excluded it from the exercise.

Total = US\$?

Estimated Carbon Capture & Storage

Compost, the end product of composting work, is a nutrient-rich soil aggregate that is a very valuable resource (see the [Co-Benefits](#) section for more information). When compost is applied to the soil, it improves plant productivity and enhances the removal and storage of carbon sunk in soils by 25-70%²⁶. While the carbon markets attach great hope in this area for Carbon Dioxide Removal (CDR), additionality is difficult to measure given the variation in results in different climates and soil and plant types. Calculating the compost production from a ton of Food Waste composted in a conservative manner (10%) and also applying the low-end carbon capture potential of 25%, while using a carbon price of US\$50.00 we can estimate a carbon removal value of at least US\$6.25 per ton. We chose, however, to exclude the carbon removal value from this exercise given its controversial topic, and we hope to not distract from the other valuable results that waste diversion and carbon reduction bring. The debate between carbon removal and reduction often results in parties choosing sides. We instead believe both are valuable applications and should be addressed in conjunction, in the spirit of “all options should be on the table.”

Total = US\$6.25 per ton

Total Sum Value (in US\$ of 1 ton of Composted Food Waste) = US\$118.70

19.2 Implications for the Waste Market

As presented in the example above, a BOLD Recycling Credit sold at US\$118.70 per ton in Brazil offers a breakthrough in the economics of the waste management market, helping a Waste Generator cover the difference in cost between composting organic waste and landfilling with an additional US\$35.61 (or R\$267.07) per ton rebate. For Waste Generators that generate more than US\$4 million in revenue, 50% of the reward will be directed to NGOs that are working to advance the circular economy.

Recycling service providers (Haulers, Processors and Recyclers (Composters), would receive an additional \$47.48 (or R\$356.08) per ton, 40% of the value of the credit, injecting important capital into the sector, paid on a success/outcomes-based model and in a manner that would attract even further investment.

²⁶ Ryals and Silver: [Effects of organic matter amendments on net primary productivity and greenhouse gas emissions in annual grasslands](#)

19.3 The Effective Price

It should be noted that the effective price of a Recycling Credit on a per-ton basis in EPR schemes is far lower than the listed price. The reason for this is that Producers are only required to contribute a portion of the “product waste” they put into the market.

For example, if a Consumer Packaged Goods company needs to offset 10% of the total amount in weight of waste that it produced, then it is effectively paying 10% of the price of a credit per ton of food produced ($\$118.70 \times 0.10 = \11.87). **This is the effective price the CPG is paying the ecosystem to help make sure its waste is recovered and composted properly.** But unlike packaging EPR offsets, food products are also largely consumed; therefore, the percentages that each company would need to contribute in offsets, relative to the total volume of food products sold, should be very small, exacerbating even further that this would add a very small additional cost to the producer but would lead to a meaningful improvement in food waste diversion from landfills and composting. Lastly, EPR schemes share the cost of product waste among upstream participants, the Production value chain, reducing even further the percentage each company needs to purchase.

A well-designed EPR program in the food waste industry can yield a significant positive impact, requiring very small investments on a per-ton basis of food produced by Producers that would collectively represent significant resources to support post-consumer and post-industrial food waste recovery and biological treatment. A good reference for what could be done in this sector could be the US Composting Council (USCC) and Biodegradable Products Institute’s (BPI) EPR Guidance for Compostable Products²⁷.

Percent contributions are determined by regulators in partnership with PROs (Producer Responsibility Organizations.)

20. DOCUMENT HISTORY

Version	Date (yyyy/mm/dd)	Status
v0.5	2023/12/01	Peer Review and Beta testing with early partners
v1.0	2024/03/12	Public Consultation and Beta testing with innovative companies
v1.01	2025/08/06	Improvement following feedback, correction and lessons learned from working on the BOLD Carbon (CH ₄)-SSC credit.

²⁷ USCC & BPI - EPR Guidance for Compostable Products - [paper](#).

