Climate Investment
Founded by OGCI

CLIMATE INVESTMENT
GHG IMPACT METHODOLOGY 2025

Background

Climate Investment (CI), a specialist decarbonization investor, has been using Greenhouse Gas (GHG) impact estimation in its investment process since its incorporation in 2016. CI has formalized its GHG impact quantification and reporting approach and aligned it with industry best practices via Project Frame. This document summarizes CI's GHG Impact Methodology.

Contents

1. Introduction

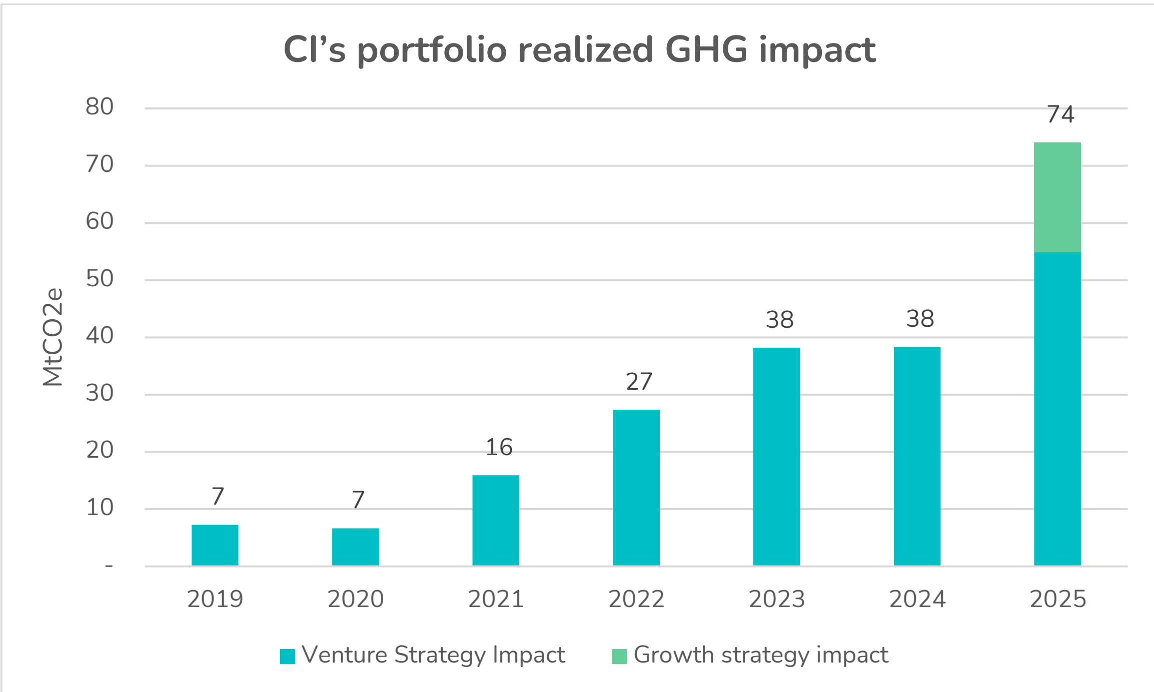
1.1 Purpose of this Paper

Climate Investment (CI) is an independently managed organization founded by members of the Oil & Gas Climate Initiative (OGCI). We made our first investment in 2017 through our inaugural Catalyst Fund I and are now investing out of our second fund - the Decarbonization Acceleration Fund. This paper outlines CI's methodology to estimate and forecast our investments' greenhouse gas (GHG) impact. It provides details on how we track and report the impact of our portfolio, from pre-investment activities to post-investment monitoring and assessment.

1.2 Our Commitment to Climate Impact

CI focuses on accelerating GHG reduction through strategic investments in innovative climate solutions. CI's Catalyst Fund 1 aims to deliver more than 100 million tonnes of realized CO_2e impact annually by 2030 through its portfolio. Estimating GHG impact is a cornerstone of our investment process. It allows us to assess the ability of companies to reduce emissions and select the most promising for investment.

Figure 1. CI Historic Impact



1.3 What is GHG Impact?

We differentiate between GHG *footprint* and GHG *impact*.

GHG footprint refers to the estimation of the operational GHG emissions of an organization, including emissions from their direct operations, such as on-site energy use (Scopes 1 & 2), plus indirect emissions from their supply chain and products (Scope 3). Footprint looks at the organization and its supply chain and does not consider how this company's products or services can help reduce or avoid the emissions of other entities. At CI, while we track[1] our own emissions footprint as a manager and those of our portfolio companies, our major focus is on the impact of our investments.

GHG '*Impact*' refers to the reduction of direct or indirect GHG emissions from using a new product or service when compared to a defined status quo or incumbent. This change can include GHG emissions that are avoided, reduced, recycled, or stored when compared to a baseline scenario. *For example, CI portfolio company Norsepower's Rotor Sails results in lower emissions from a ship or ferry compared to one where the innovation was not used.* Delivery of impact is central to CI's mission, and CI links employee remuneration to achieving the firm's impact targets.

There are currently no formal reporting standards or requirements for this kind of GHG impact, which is sometimes known as "Scope 4". CI co-founded a peer-to-peer group named Project Frame to define and align methodologies for impact quantification. CI proactively contributes to Project Frame - which now interacts with over 360 private investment funds across Private Equity and Venture Capital managing $700B in assets - and aligns with its methodologies. More information on Project Frame can be found at https://projectframe.how/.

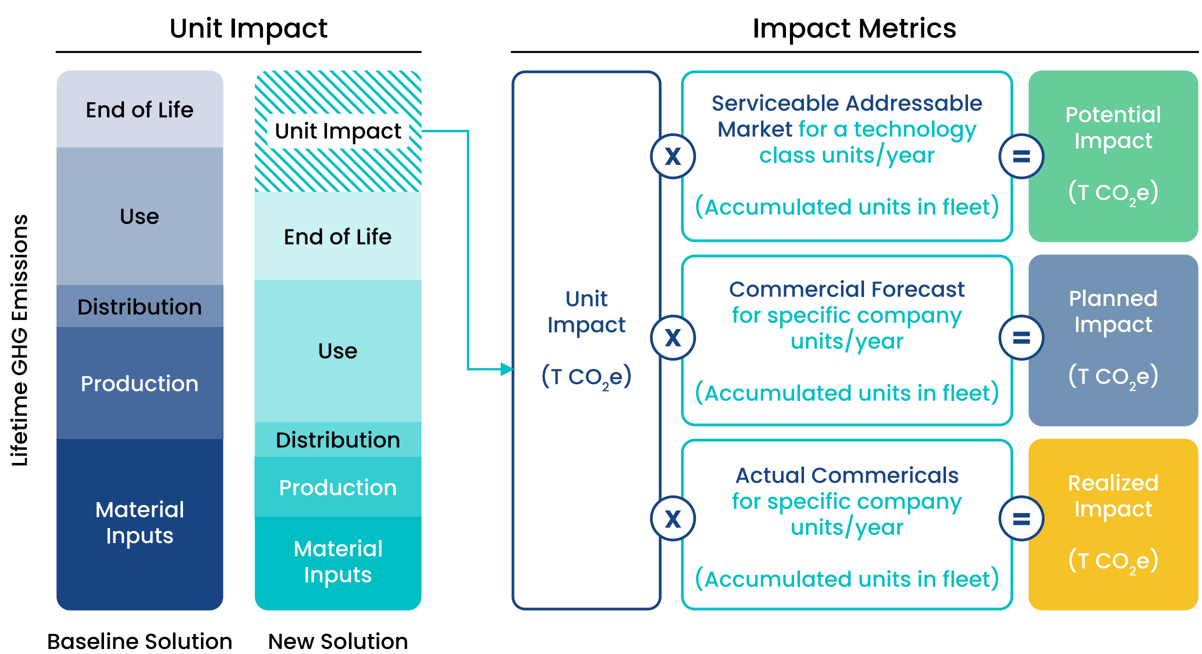
[1] More details of CI's GHG footprint are shared in our impact report

2. Our Approach to GHG Impact Quantification

2.1 Overview of our Methodology

At the simplest level, GHG impact is focused on how a new technology, business model or solution can reduce the emissions of an existing "baseline" solution. Our calculations are based on the concept of unit impact. The unit impact quantifies the difference in emissions between a baseline solution and a new solution at the most granular level, i.e. one unit of product or service. This concept is shown in the left panel of Figure 2, where all the components of the emissions of the new solution are compared against the incumbent; the difference between the two being the unit impact.

Figure 2: The basic impact methodology



The unit impact is then used to calculate total impact of the entity, whether it be the actual impact delivered (*realized* impact), a projection of impact for an individual company or a solution in the future (*planned* impact). We also introduce a third concept: *potential impact*, which focuses on the impact of a general technology class. Potential Impact is the impact a climate technology could have based on a standardized growth trajectory that assumes the proposed solution takes over the Serviceable Addressable Market (SAM). It is often used for very early-stage technologies to assess the overall potential of a new innovation class. A good example is to consider the potential impact of EVs as a technology class relative to the planned impact of one EV player (e.g. BYD) within the market.

We provide specific, detailed methodologies for the top impact contributors in our portfolio in our annual impact report which is available on our website.

2.2 Understanding Different Types of Impact

In our approach to GHG impact assessment, we align with Project Frame's recommendation to categorize solutions based on their 'completeness' in contributing to GHG reduction. This concept of completeness is central to understanding each solution's role within the broader ecosystem of climate impact solutions. It's important to recognize that GHG impact is rarely the result of a singular solution but rather a collective effort of multiple components and processes. At CI, we seek investments in solutions whose impact is significant and as direct as possible.

Categorizing our Portfolio by Impact Type

1. **Direct Product Solutions** are solutions that can be utilized independently and have a direct impact on GHG emissions. They are often stand-alone products, projects or technologies that can be directly linked to emissions reductions. Examples include a more efficient motor, a heat pump, or a carbon capture and storage project. Each product in this category is a complete solution in itself, capable of delivering measurable GHG impact upon deployment.

TECHNOLOGIES

achatesPOWER, aeroseal, Zūm, Cyclic Materials, carbon upcycling, ClarkeValve, GRADIENT, LUXWALL SEE BEYOND, Qnergy, NORSEPOWER, BOSTON METAL, 75F, spruce, TURNTIDE, Urbint, ZincFive

PROJECTS

Elk Hills Carbon LLC, Net Zero Teesside, F2V FLARE TO VALUE, KeyState, NEXT DECADE, QuailRun CARBON, TRACE CARBON SOLUTIONS, WV RESOURCES

2. **Direct Component Solutions** are components or subsystems that are integral to the functionality of a larger system and significantly contribute to its overall GHG impact. Although not complete solutions alone, these components play a crucial role in reducing emissions. An example would be a CO_2 capture technology; it plays a role in the CCUS chain, but you also require transportation and storage to complete the impact. The GHG impact of these components is context-dependent and varies based on how they are integrated into the final product.

TECHNOLOGIES

econic, SOLIDIA, Svante, 44.01

3. **Facilitating/Enabling Solutions** indirectly contribute to GHG reductions by enhancing the effectiveness of direct product or component solutions or by creating conditions that facilitate emissions reductions. In our portfolio, technologies for methane leak detection are facilitators because they enable the identification and redress of methane emissions.

TECHNOLOGIES

andium, converge, ONTRUCK, GHGSAT, INSIGHT M, Kelvin, METRON, ICA-FINANCE, fēro labs, novo, SeekOps, SENSORUP

Further Descriptions of Impact

In addition to the categories above, at CI, we add a further descriptor to our impact evaluation, which describes how the GHG is "saved". This refinement allows us to tailor our impact assessment methodology to the specific characteristics of each technology or solution, ensuring a more precise and relevant evaluation of its GHG impact potential. These categories are:

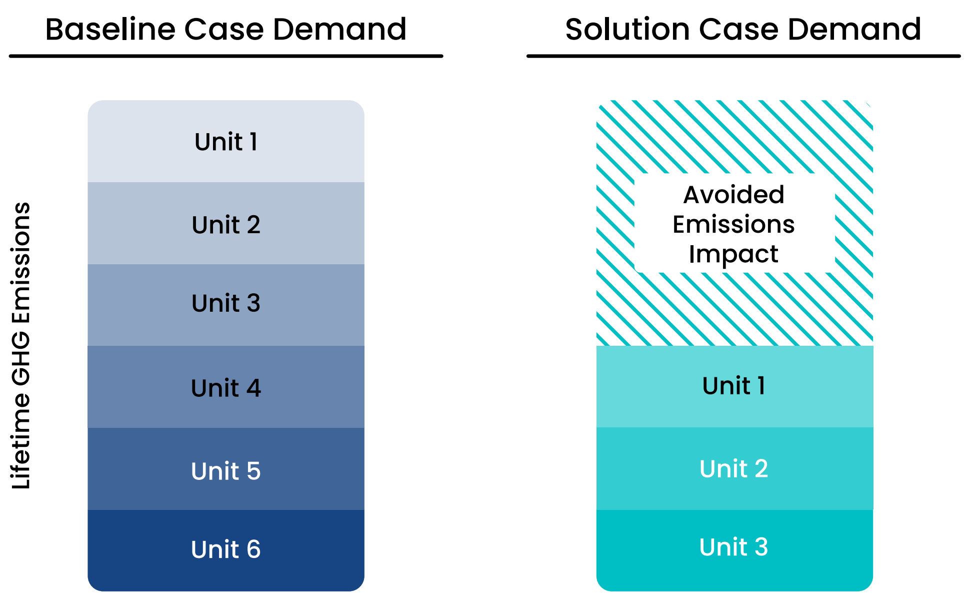
1. **Avoided Emissions Solutions**: innovations that lead to a direct decrease in GHG emissions by replacing or reducing the need for high-emission activities (e.g. ride sharing)
2. **Reduced Emissions Solutions**: technologies or practices that lower the emissions intensity of existing processes or products, thereby reducing the overall emissions per unit of output (e.g. a high-efficiency motor)
3. **Recycled Emissions Solutions**: Solutions that capture GHG emissions and repurpose them into other useful forms, effectively preventing these emissions from entering the atmosphere (e.g. using CO_2 in concrete)
4. **Stored Emissions Solutions**: Technologies or methods that capture and sequester GHG emissions, such as CO_2, preventing their release into the atmosphere for long periods (e.g. geologic carbon sequestration)

In the next section we will expand upon our methodologies against these four categories of impact.

3. Methodologies for GHG Impact Calculation

3.1 Methodology for Avoided Emissions

Avoided emissions cause an immediate drop in GHG emissions by removing or lowering demand for the primary driver of the polluting activity. The emissions from individual units contributing to the demand typically stay unchanged. This concept is illustrated in the chart below:



CI's portfolio includes companies that avoid emissions in a variety of sectors. For example, in transport (OnTruck), industrial energy efficiency (Metron, Fero Labs), commercial building efficiency (75F, Turntide), and power and gas utility networks (Urbint).

An illustration of an 'avoid' solution is that of a ride-sharing service that reduces the total number of miles driven in private vehicles. An example from CI's portfolio is OnTruck. OnTrucks's solution optimizes logistics and reduces the miles trucks travel using their system, avoiding the emissions of travelling the extra distance. This is distinct from the impact of a more efficient engine or electrification that reduces the GHG intensity of each mile which would be "reduce" in CI's categorization.

The complexity in this category arises from understanding the counterfactual – i.e., the emissions trajectory without the new technology. Companies like Fero Labs (an Industrial AI company) measure pre-implementation baselines, which enables the use of clear datasets for estimating GHG impact.

3.2 Methodology for Reduced Emissions

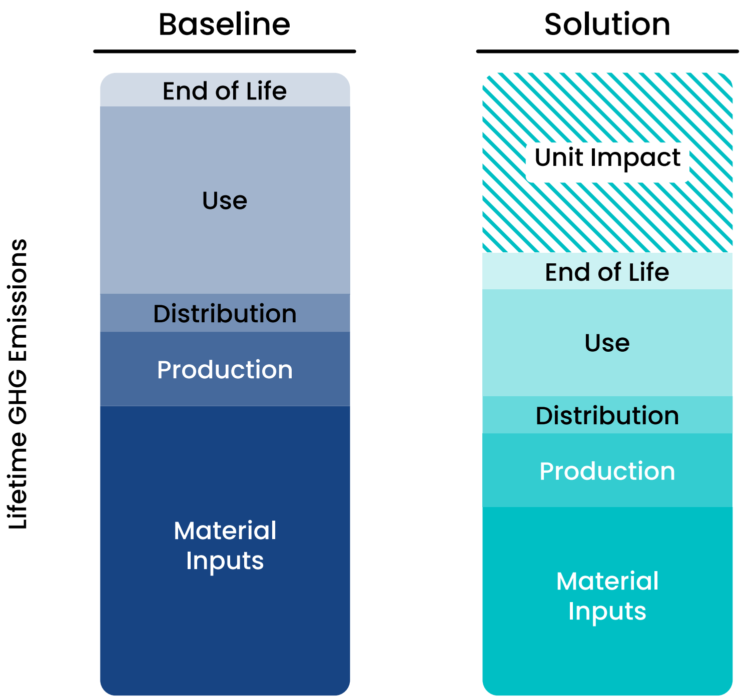
Companies that reduce emissions improve the GHG intensity of products or services without affecting the primary driver (or demand) causing the emissions.

This category breaks into two further categories:

1. A technology or service which is more efficient or has a lower GHG footprint than the standard baseline technology it replaces
2. Technologies that detect and measure GHG emissions that are then mitigated by the emitter.

1. Impact of a technology or service which is more efficient or has a lower GHG footprint than the incumbent.

A classic example of a 'reduce' company would be changing out gas-fired residential heating systems with electric heat pumps, such as our investment in Gradient. The CI portfolio has a range of other technologies in this category, including in transport (Achates, Norsepower), steel (Boston Metal), cement and concrete (Solidia), oil and gas (Qnergy, Clarke Valve), and battery storage (ZincFive). This type of solution is typically a direct product or component as the technology drives the efficiency gains over the baseline. In most cases these technologies will reduce emissions from the "Material Inputs" stage or "Use" stage. A reduction in emissions at the "Use" stage is typically a result of lower energy consumption and can result in interesting dynamics when assessing the impact of reduction in grid electricity usage over time, as discussed in the below case study.



Accounting for efficiency in a decarbonizing grid - *Avoided embedded grid infrastructure emissions*

Many energy efficiency technologies cause an immediate drop in GHG emissions by removing or lowering demand for electricity - the primary driver of the polluting activity. In most cases, this electricity is taken from the grid. The impact of these technologies can therefore be calculated as the product of the reduction in electricity consumption (kWh) and the grid carbon intensity (T CO_2e/kWh).

However, as electricity grids decarbonize, the size of the GHG saving reduces over time. The IEA has forecasted that global grid carbon intensity (GCI) will decrease over the next decades from 460 gCO_2/kWh in 2022 to 303 gCO_2/kWh in 20230 and 131 gCO_2/kWh in 2050 under its Stated Policies Scenario.(IEA WEO – Table A.5a: World economic and activity indicators). This decreasing GCI means that one unit of energy saved in 2024 generates less impact than one unit of energy saved in 2050. If the energy efficiency technology is implemented in a region with a fully decarbonized grid (0gCO_2/kWh), then implementing energy efficiency technologies would generate 0 impact.

We believe this is only part of the story! This approach focuses only on the operational emissions savings by only taking into account the electricity saved. However, reducing electricity consumption will also reduce the requirements for new grid infrastructure and generating capacity, as well as the associated embedded carbon emissions.
These avoided embedded emissions should also be taken into account and can be modelled through the following steps:

Step 1 – Unit impact for the avoided infrastructure

Avoided embedded emissions CO_2 unit impact = embedded carbon emissions of new energy production capacity, storage (most likely batteries), and grid transmission (T CO_2e/kWh)

The mix of new electricity generation sources can be estimated using IEA forecasted changes in global grid electricity generation mix (forecasted until 2040 here). The embedded carbon emissions of new energy production capacity is a weighted average of the mix of new electricity generation capacity and the embedded CO_2 of those technologies. We can then add the embedded emissions for batteries and grid connections that will be needed to accommodate the new electricity generation sources.

Calculations should take into account regional specific differences in technology and grid infrastructure deployment. At a global level, CI estimates that the embedded emissions CO_2 unit impact equals approximately 43gCO_2/kWh. This is equal to approximately 10% of the global grid generation carbon intensity of about 427gCO_2e/kWh in 2024 according to the IEA.

Step 2 – Estimate the reduction in energy usage

Energy saved (kWh) = Baseline energy usage – Solution energy usage

The reduction in electricity usage is the difference between the baseline electricity consumption and the actual or expected consumption with the new solution.

Step 3 – Total impact

*Impact from avoided embedded infrastructure emissions = Energy saved (kWh) * Avoided embedded infrastructure emissions CO_2 unit impact (T CO_2e/kWh)*

Operational CO_2 unit impact = carbon intensity of the grid (T CO_2e/kWh)

*Total impact (T CO_2e) = Energy saved (kWh) * (Operational CO_2 unit impact (T CO_2e/kWh) + Avoided infrastructure embedded emissions CO_2 unit impact (T CO_2e/kWh))*

Using this methodology, even if the operational CO_2 unit impact is 0 due to a fully decarbonized grid, energy efficiency technologies will still generate impact equal to the Impact from avoided embedded infrastructure emissions.

Efficiency technologies and rebound effects

It is important to note that efficiency improvements can in some circumstances lead to a ***rebound effect (also known as Jevons paradox)***, where the increased efficiency lowers the cost of the activity or service, leading to increased consumption or demand. This increase in consumption could offset some or all of the emissions reductions gained from the efficiency technology. Therefore, when assessing the impact of efficiency technologies, it's important to consider potential rebound effects, as well as policies and measures to mitigate them.

2. Technologies that detect and measure GHG emissions (or provide other services) that enable emitters to find and fix fugitive emissions

This methodological approach was developed around methane detection, which is a critical component in CI's portfolio. However, it would equally apply to other GHG emission detections; such as CO_2 and CFCs. This type of impact falls under Project's Frame's facilitator/enabler category. Methane detection enables operators to mitigate leaks that would have previously gone unnoticed for extended periods. However, detection alone does not fix the leaks and relies upon further operator action to do so. CI currently has four investments in this space, which detect methane from satellites (GHGSat), aircraft (InsightM), drones (SeekOps) and ground-based sensors (Andium). CI has also invested in SensorUp, a platform integrating emissions data sources to offer a methane emissions management software. This impact category is the most complex to quantify, and CI has worked extensively with portfolio companies to develop a robust and conservative approach.

The following two panels break down this methodology into two cases:

- 1 - **Intermittent leaks**: characterized not only by their significant size and impact relative to background/operational/systemic leaks, but also by their unpredictable and irregular occurrences.
- 2 – **Systemic leaks**: leaks that occur throughout an entire system or asset and occur on a regular basis due to the operation of the system or asset and the associated processes involved. Systemic improvement refers to comprehensive and coordinated efforts to enhance the performance and outcomes of an entire system over a long period of time, rather than focusing on isolated parts. In the case of methane detection, systemic improvements might result from the collection of data on leaks due to operational processes, resulting in the operating company gaining a better understanding of points of failure and improving predictive maintenance, leading to fewer leaks.

Methane detection – Intermittent leak quantification

Step 1 - Detection

The first step is to measure the methane emissions themselves. Methane detection companies combine the raw methane measurement with location and meteorological data to provide information on leak rates (e.g., in Kg per hour) by geographic location or asset. The basic emissions calculation processes are well-developed and peer-reviewed (GHGSat & InsightM). The companies also calibrate their sensors and measurements with both known and blind releases of methane. These studies provide confidence in the underlying data, although CI recognizes that there is measurement uncertainty that cannot be removed.

Step 2 – Communication of observed leaks and confirmation of mitigation

For an observed, measured emission to count toward realized impact, the portfolio company needs to communicate the measured emission to its owner and then confirm that the owner of those emissions took action to reduce or remove the emission from its operation. CI's portfolio companies typically share a survey with their customers to get information on whether the leak was fixed as a result of their intervention.

Sharing such a survey with customers is the preferred way to confirm mitigations, and companies are getting more sophisticated in managing and sharing the data surrounding detection and mitigation. Indeed, one of our latest investments, "SensorUp", offers data platforms to enhance the management of methane leak detection and repair, enhancing the interface between measurement companies and operators and enabling better reporting.

Where there is no customer feedback, the portfolio company needs to measure the absolute drop in emissions at the same sites over time and estimate the reduction of emissions based on measurement. In this case, to claim impact the measurement company must show that:

1. The identified emission was unusually large; significantly higher than previous assessments and/or above expected emissions under normal operating conditions.
2. Leak data was provided to the client / asset operator.
3. A site / asset re-assessment has shown with confidence that the one-off event has been resolved. A client/operator's previous fix rates based on the asset type and/or geography may be used if they have communicated no changes in leakage maintenance practices.

Impact is reported as the difference in the emissions rate from its initial identification and the final rate over the relevant time period as set out in step 3 below.

Step 3 – Quantification of enabled emissions reduction

Upon successful detection and verification of the leak's resolution, the next step entails quantifying the impact the detection company achieves. This process involves two distinct components: determining the baseline scenario leak duration and defining the timeline for the impact attribution by the portfolio company.

The baseline scenario for methane detection is the length of time the leak would have lasted without the intervention of the detection company. Leaks do not go on indefinitely in the baseline scenario; in most countries, there are underlying inspection and leak detection regimes in place that we assume would eventually find the leaks. An assumption is made that, on average, the emission was avoided for half the time between its first detection and the assumed time it would have taken to find the leak in the underlying or previous inspection regime.

The mitigation start date is assumed to be the last positive leak observation date. Once the start date and mitigation and the length of mitigation based on the type of customer is established, the impact is allocated to the relevant reporting period.

There should be continued assessments of leakage rates of the asset. If the leakage rates start to increase, then the recording of impact should cease for that asset/mitigation at the time of observed increase.

It is also important to note that if flaring (or other forms of combustion) is the methane-mitigation action, the company must factor in the carbon dioxide emissions the flare creates in the impact calculation.

Methane detection – Systemic leaks quantification

Step 1 – Setting a baseline

Operating companies need to set a baseline emission rate over a specified period of time. Here, baseline emissions refers to the typical methane leaks that occur at a low level, but on a consistent basis from operations. The aim of this initial assessment period is to gain an understanding of the baseline leakage rate of an asset over multiple periods, not to fix specific leaks. To ensure conservatism, filters are used to remove any unusually large or intermittent data from the systemic impact calculation which would be treated as described above. One CI portfolio company assumes emissions >1,500 MCF/d are unusual events that are not good indicators of systemic performance, although this filter should be adjusted based on the client, asset, technology used.

This data can then be used by operators to improve their operational procedures in order to reduce methane leaks.

Step 2 – Assessing the decrease in systemic emissions

After a specified period of time, the operating asset must be reassessed using the same processes and technologies. This new assessment must account for changes in operating/production characteristics to ensure a fair comparison.

The systemic improvement can be calculated as: *Initial baseline methane leakage rate – New updated leakage rate*

Step 3 – Attributing Impact

We cannot simply look at the difference between the first baseline assessment and second assessment. To ensure the changes are systemic and that there is truly additional impact that will continue after the second assessment, we need to see one of two forms of proof:

a) Customer Feedback Approach – we prefer to see customer confirmation of the systemic improvement, namely:

- The customer verifies the emissions measurements, and
- Confirms that there are new formalized processes implemented following the initial baseline review that resulted in a decrease in emissions and that will continue to remain in place after the second assessment, and
- Confirms there are no major differences in the operating/production characteristics of the tested asset, or that if there are, they have been accounted for.

b) Measurement Approach – Where there is limited customer feedback, a site should be able to show a significant downward trend in the emissions over a time frame consistent with systemic change. For example, a series of revisits/reassessments covering the same assets and scope where each was showing a lower leakage rate than the first to provide confidence that emissions have been mitigated. Other statistical measure may be used if they show, with confidence, a downward trend in emissions.

For both a and b, the systemic improvement is calculated as: *Initial leakage rate – Average of last three leakage rate*.

The reduction is then applied over the appropriate time period. There should be continued assessments of leakage rates of the asset. If the leakage rates start to increase, then the recording of impact should cease for that asset/mitigation at the time of observed increase.

Assumptions and Limitations

This methodology requires a strong relationship with asset operators who are willing to assess assets on a frequent basis and report on the outcomes of those assessments, as well as the mitigation action and process improvements they have implemented following the assessments.

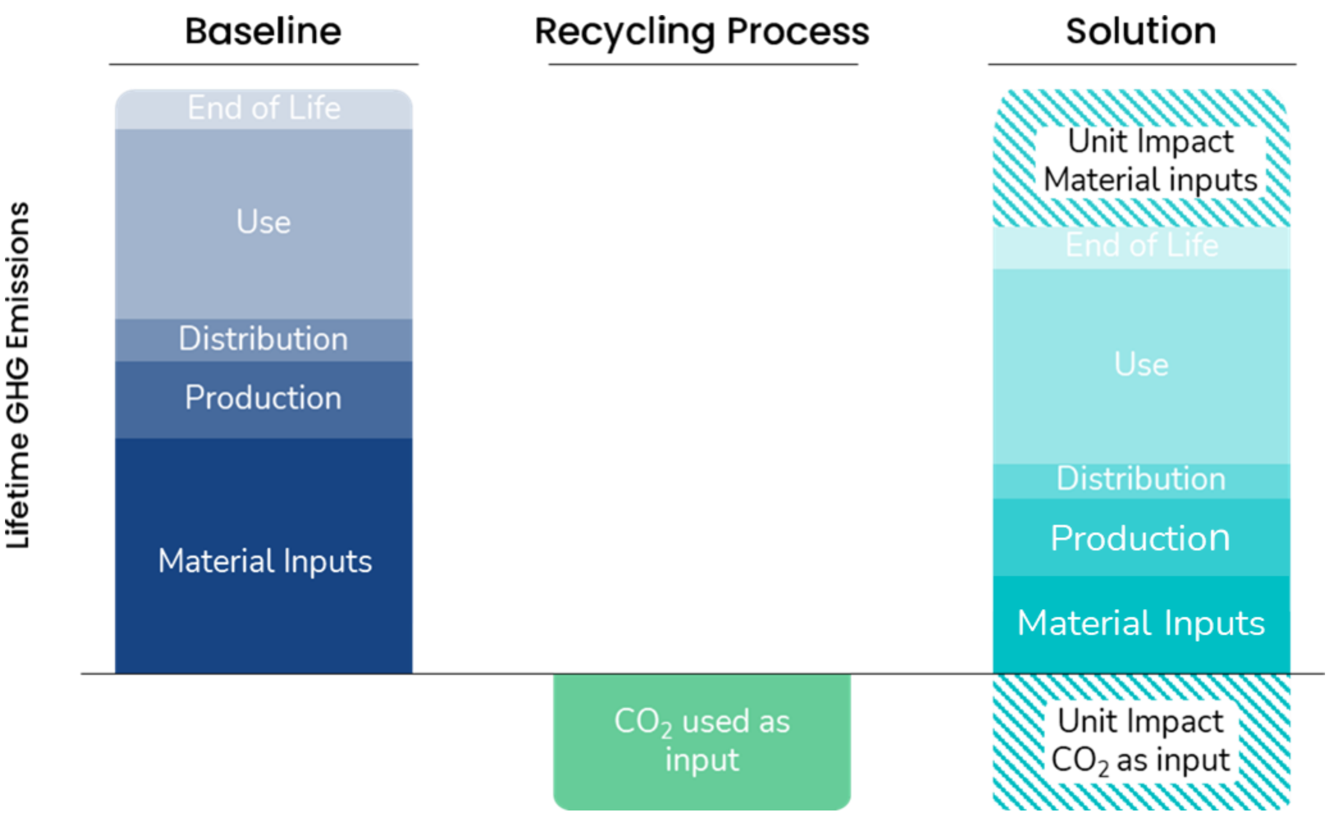
3.3 Methodology for Recycling Emissions

Technologies which permanently utilize or re-purpose GHG emissions are classified as 'recycle' impact. Typically, the recycling technology combines the GHG chemically or physically with another material to convert it into something reusable, in which the GHG is trapped, hence preventing the emissions from entering the atmosphere. In these cases there are often two sources of impact:

- Reduction of embodied emissions from the virgin raw materials resulting from the use of the recycled GHG.
- Long term storage of the GHG itself.

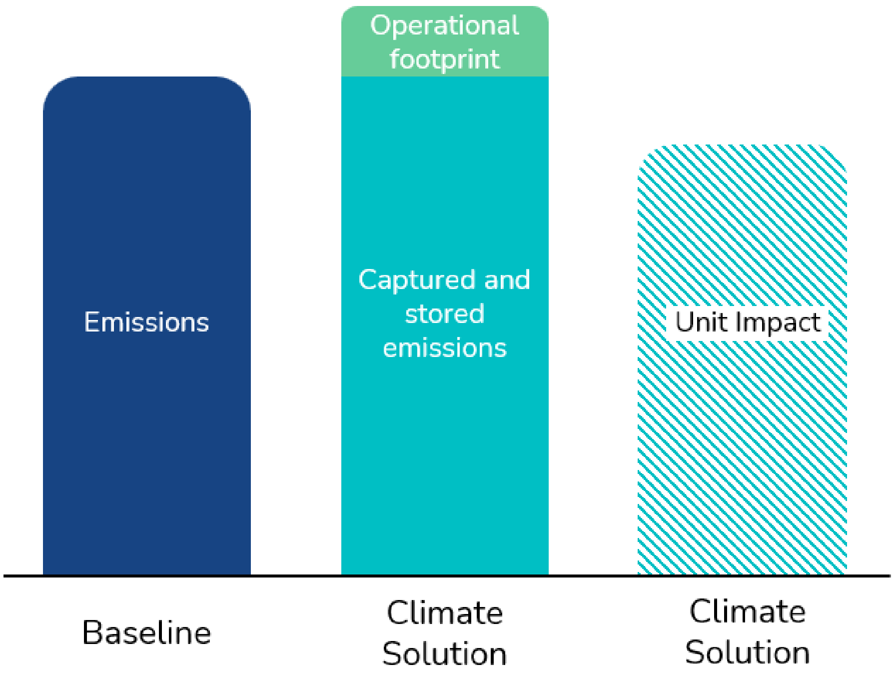
CI's portfolio currently has methane and carbon dioxide-related investments in the 'recycle' category. The carbon dioxide investments are a polyol company (Econic) and two CO_2/concrete curing technologies: Solidia and Carbon Upcycling Technologies (Carbon Upcycling). The methane investment is in a company that develops projects to capture flare gas for new purposes (F2V).

It's important to note that the recycling process introduces energy inputs and, consequently, new emissions. Adjustments must be factored into the unit calculation to account for any emissions stemming from the recycling process – illustrated in the chart below:



3.4 Methodology for Storing Emissions

Technologies or projects can deliver direct GHG emissions avoidance via capture and permanent storage. The basic methodology for the 'store' category is to quantify the captured and stored emissions; the emissions of the process used to capture emissions (known as parasitic load) are netted off.

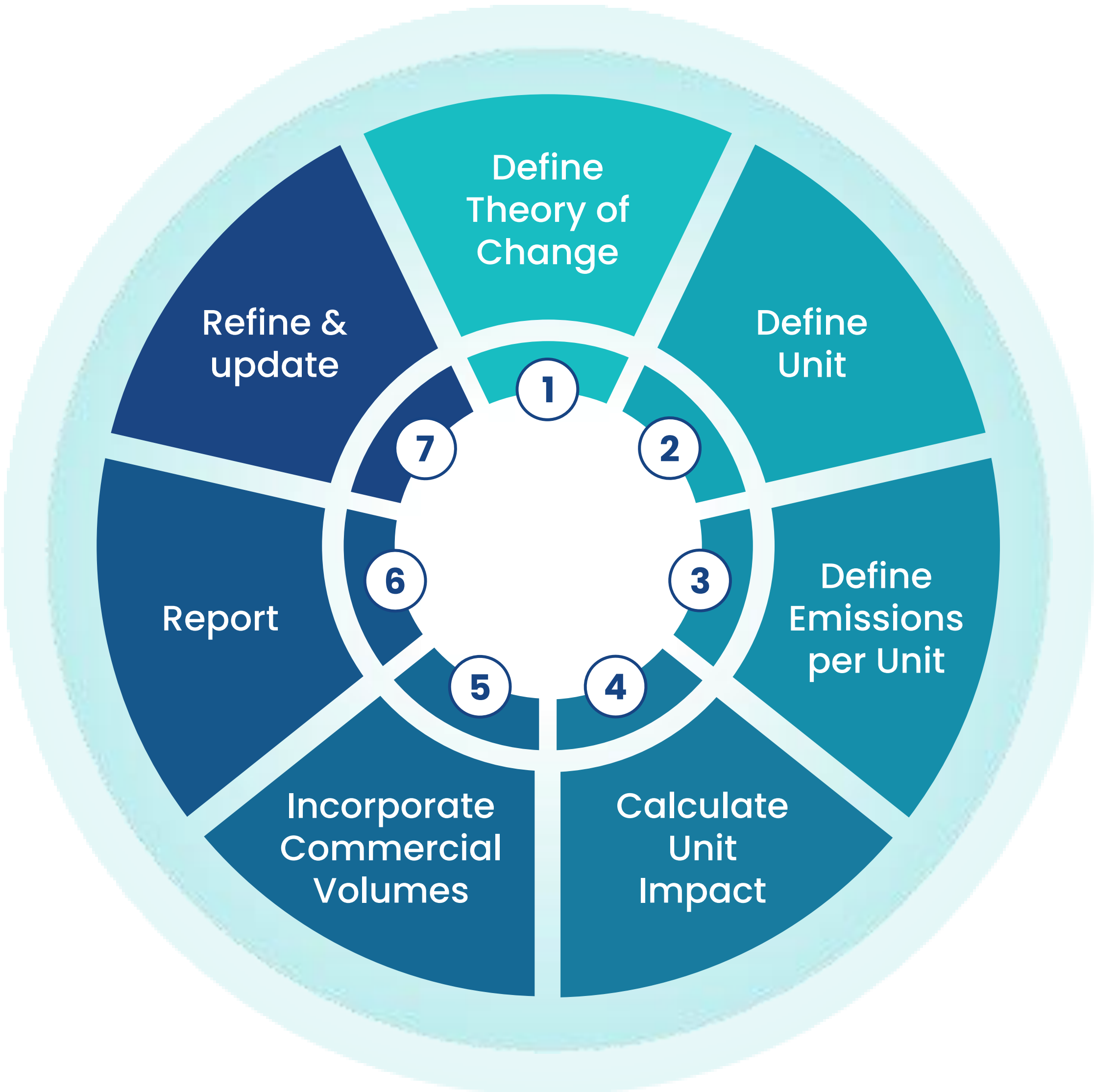


Technologies and projects in the 'store' category typically assess their impact as a key aspect of their business case. They conduct internal calculations during their development process. CI will work with the portfolio company to ensure their calculations align with our methodologies.

CI's portfolio includes technologies and projects in the 'store' category. The technology investment is in Svante, whose technology captures carbon dioxide from flue gas. CI has invested in projects directly (Net Zero Teesside, Wabash Valley Resources, Elk Hills Carbon, Quail Run Carbon, Next Decade, KeyState) along with project developers (Trace). These projects all involve carbon dioxide capture and storage in different industrial settings. As such, impact estimates are based on the project design and engineering estimates of the operational capacity of the project. For project developers like Trace, CI adds a probability of completion factor to give a risked view of the impact for each project in the developer's pipeline.

3.5 Detailed Impact Workflow

CI follows an impact workflow that aligns with Project Frame's guidance, laying out a step-by-step process for quantifying GHG impact.



Step 1 – **Define Theory of Change**

Analyze how a proposed innovation can reduce GHG emissions throughout its lifecycle. We evaluate the product's entire value chain, from raw material sourcing and manufacturing to end-of-life disposal or recycling. This evaluation includes identifying the various points in the chain where emissions can be reduced and the degree of impact achievable. For instance, in assessing an electric vehicle manufacturer, we consider not only the direct emissions from vehicle operation but also the emissions from battery production and end-of-life battery disposal. We use the 'Effects Table' document to describe how a company influences emissions properly.

An example theory of change for an EV can be seen below:

	LCA Steps	Element of Impact	Theory of change	Baseline	Sector Affected	Technology Trend	Decrease / Increase
			Describe how this **element** is contributing to GHG emissions or atmospheric GHG levels	Describe the incumbent or status quo solution used as the reference for comparison	What Industry/Sector is associated with the emissions affected by this element?	Does the incument remain **constant, improve or decline** over the investment horizon (Static or Dynamic baseline?)	Describes the direction of emissions allowing for pros and cons to be considered:
Embedded	Raw Material Extraction	Element 1	Carbon footprint of raw materials used in battery	ICE vehicles that do not have large lithium-ion batteries	Mining	Improve	Increase
Embedded	Manufacturing & Processing	Element 2	Carbon footprint of making the battery	ICE vehciles that do not have large lithium ion batteries	Industry	Improve	Increase
Embedded	Transportation	Element 3	No change	Transportation from manufacturer to user remains the same	Transport		
Operating	Usage (Charging)	Element 4	Charging the electric vehicle from the grid has emissions related to it	ICE vehicle with no need to charge a battery	Power Generation	Improve	Increase
Operating	Usage (Driving)	Element 5	The emissions per mile driven by an EV are much less carbon intensive than those driven by ICE vehicles	ICE vehicle	Transport -Road:	Improve	Decrease
End-Of-Life	Waste Disposal	Element 6	Battery end of life treatment	ICE vehicle with no need to recycle a large battery	Industry	Improve	Increase

Step 2 – **Define Unit**

Select a core functional unit that the business being analyzed can easily track and report. The basic unit of innovation should be comparable to the baseline it replaces. A baseline refers to the counterfactual scenario of emissions that would have occurred in the absence of the new climate solution. For instance, if a low-carbon steel producer creates one tonne of steel, this would be compared against the baseline of a tonne of steel made using a traditional blast furnace.

Step 3 – **Define Emissions per Unit**

Quantify the emissions associated with the innovative solution and the baseline (conventional) technology. This involves gathering and analyzing emissions data across the entire product or service lifecycle, including both direct and indirect emissions. We utilize a variety of data sources, such as technical reports from the companies themselves, third-party lifecycle assessments, and industry-standard emissions databases.

Step 4 – **Calculate Unit Impact**

Calculate the difference in GHG emissions per unit between the baseline technology and the innovative solution. This calculation provides a clear and quantifiable measure of the emissions impact attributable to the innovation. It's a critical step in evaluating the efficacy of the innovation in reducing GHG emissions compared to existing solutions.

Step 5 – **Incorporate Commercial Volumes**

Extend the unit impact analysis to an enterprise-scale by incorporating the commercial volumes of the innovation. This means translating the per-unit emissions impact into total emissions impact for the company based on actual or projected sales volumes or, in some cases, the operational fleet size. This approach allows us to estimate the real-world impact of the innovation as it scales up in the market.

Step 6 – **Report**

Annually, we collect data on the actual impact achieved by our investments and compare it against the targets set at the beginning of the year. This data collection is followed by a rigorous review process, where we ensure the accuracy and reliability of the reported data. Finally, the data undergoes a limited assurance review by a third party.

Step 7 – **Refine and Update**

In response to the findings of the assurance review and any new developments in impact reporting standards or methodologies, we continually refine and update our approach. This ensures that our methodology stays relevant and accurate and incorporates the latest best practices in GHG impact assessment. Through this workflow, we seek to ensure that our GHG impact assessments are robust, transparent, and aligned with the highest industry standards including Project FRAME, GHGProtocol, and Impact Convergence Project.

4. Realized Impact Reporting

We run an annual data collection and assessment process to prepare for our impact reporting. Key steps include:

Developing annual targets

Every year, CI develops annual forecasts for each company in the Portfolio based on their latest financial projections and unit impact data.

Monitoring performance

Progress on realized impact is monitored during the year. Each quarter, CI has an informal "check-in" with portfolio companies, and at the half-year point, receives first-half actuals from each portfolio company and makes any necessary adjustments to the full-year forecasts. This process allows the CI team to consider any further support a portfolio company may need to achieve its impact goals.

Data Collection

Realized impact figures for the reporting year are generated in Q1 of the following year. The actual sales or installed capacity figures are taken from the investees. Once the impact is calculated, a meeting is held with each portfolio company to ensure that all received data is understood. This initial data is aggregated to the portfolio level. CI does not publicly report impact at the portfolio company level. CI uses a software package called KeyESG to collect all of its impact and ESG data.

Assurance

Before the impact data is published, the realized impact is subject to a limited assurance review with a third party. The reported realized impact between 2022 and 2024 inclusive was subject to Limited Assurance by EY, and EY will be performing the review on our 2025 data.

5. Guiding Principles

This section outlines the guiding principles that inform CI's GHG impact quantification and reporting approach.

5.1 Climate Impact Focus

CI was established to deliver GHG impact, and our metrics have been dedicated to that focus. The methodology described in this report is only suitable for GHG impact quantification. However, CI considers and tracks broader ESG metrics in line with the ESG Data Convergence Initiative (EDCI) guidance and as part of the requirements of our commitment to broader sustainability goals and the Principles for Responsible Investment (PRI); details can be found in our Responsible Investment Policy.

5.2 Transparency and Accountability

Transparency and accountability are cornerstones of our GHG impact forecasting methodology. We understand the crucial role of clear communication and verifiable data in fostering trust and credibility in our impact assessments.

- **Open Communication**: We share the methodologies behind emissions reduction figures in our annual reporting. This openness allows stakeholders to understand and validate our approach.
- **Documentation and Verification**: All calculations and methodologies are well-documented. We conduct third-party assurance reviews to verify our impact calculations, ensuring our methods withstand rigorous scrutiny.
- **Consistency and Comparability**: Use standardized methodologies where possible to ensure consistency and comparability of GHG impact assessments across different investments and projects.

5.3 Continuous Improvement

CI seeks to continually improve on its impact methodology for example:

- **Lifecycle Consideration**: Our methodology includes a comprehensive view, considering the entire product or service lifecycle – from production to disposal or recycling. This approach ensures that we account for all relevant emissions sources and sinks.
- **Focus on Material Impact**: For efficiency we prioritize the most significant impact factors in our assessments, identifying and quantifying elements that substantially affect GHG emissions.

- **Adaptability and Flexibility**: We maintain a flexible approach that allows for the incorporation of new technologies, market changes, and regulatory developments, ensuring that our quantifications remain relevant and effective.
- **Continuous Improvement**: We commit to continuously improving our forecasting methodologies through regular review, updates based on new information, and lessons learned from past assessments.

In the sections below we discuss some of the most important parameters around our approach to the estimation and reporting of impact.

5.4 Baseline Selection

Selecting an accurate baseline is critical to the integrity of our GHG impact forecasting. The baseline serves as the reference point against which the impact of the innovation is measured.

- **Sector Baselines**: As a policy we use industry average baselines which are relevant for the company being analyzed. This avoids a company making unsubstantiated claims that its product will displace the highest emitting marginal producer of the incumbent solution. The use of a different "non-average" baseline will only occur if company data can substantiate that its products are not replacing the "average".
- **Geographic Baselines** It is also important to consider geography when selecting a baseline. The geographical baseline chosen should align with the focus areas of the business being considered.
- **Static vs Dynamic Baselines**: A baseline can be either static, remaining constant over time, or dynamic, changing over time. The choice between the two depends on the variables analyzed. In cases with high-quality data on industry growth and trends in a rapidly changing sector, a dynamic baseline is appropriate. Conversely, if there is limited data on industry growth or the sector is expected to remain stable, a static baseline is sufficient. Impact analyses often involve multiple variables and may require a combination of dynamic and static baselines. At CI, we consistently update our baselines to incorporate current data and emerging trends.
    - An example of a dynamic baseline used by CI is the carbon intensity of the electricity grid. The IEA has forecasted that global grid carbon intensity (GCI) will decrease over the next decades from 511 gCO_2/kWh in 2023 to 355 gCO_2/kWh in 2030 and 131 gCO_2/kWh in 2050 under its Stated Policies Scenario (IEA 2024 WEO). We will use regional specific grid carbon intensity forecasts where possible for greater accuracy. We may also apply the avoided embedded grid emissions methodology where energy efficiency technologies are involved.

5.5 Portfolio Impact Reporting & Attribution

Reporting

When reporting publicly, we report on the total impact of our portfolio of investments over the whole year – i.e., the sum of 100% share of the GHG reduction delivered by each company and project investment for 12 months. This metric may include impact from the portion of the year prior to CI investment but ensures complete alignment with company reporting. We believe this is a clear and simple metric which avoids year-to-year fluctuations which could be driven by changes in the cap-tables of our investees. We do not publish “equity-weighted” impact data because we do not claim the impact generated by our portfolio companies as our own.

We will also continue to report on the impact of portfolio companies after they have exited the CI portfolio through to the end of our fund life. While this may pose some challenges around data gathering, access, and transparency, we remain committed to maintaining the same level of rigor in our impact reporting. We provide more details below.

CI is a multi-fund manager, and as such, we must therefore be specific and transparent when reporting on the impact of our different funds. To ensure clarity and avoid confusion, we will always specify the relevant fund name when reporting the GHG impact from that fund (for example, “*CF1* portfolio companies’ impact”). When referring to the aggregated impact across all of our funds, we will use the term “*CI*’s portfolio companies’ impact”.

As a firm we continue to monitor guidance and best practices for impact attribution particularly considering the potential challenge of attributing impact to different forms of investors (equity, debt, grants, etc.) and this will guide future reporting.

CI does not claim any of the GHG impact achieved by our portfolio companies as our own, nor can CI convert this impact directly into carbon credits. Our primary objective is to provide transparent and accurate reporting on the performance of our portfolio as a whole.

Treatment of licensing agreements

Impact From Licensing Agreements - When a CI portfolio company licenses its technology through a licensing agreement, it can be challenging to measure the climate impact accurately. This is because the portfolio company does not directly control the deployment or use of the licensed technology. To address this, CI will use the following approach for estimating the impact of licensing agreements:

- **Attribution:** Impact generated by the licencing agreement will be attributed to the portfolio company.
- **Data Collection:** The portfolio company will be required to gather data on the licensee's planned or realized deployment of the licensed technology. This data should include the

number of units deployed, the geographic location of deployment, and any relevant operational parameters that may influence the impact calculation.

- **Impact Calculation:** The GHG impact will be calculated using the same methodologies outlined for other impact types, considering the specific characteristics of the licensed technology and the deployment context. This includes determining a relevant baseline, calculating unit impact, and incorporating the licensee's deployment data.

CI will strive to minimize uncertainty by working closely with portfolio companies and licensees to gather robust data and refine its methodologies. By implementing this approach, CI aims to provide a more comprehensive assessment of the climate impact generated by its portfolio, including the indirect impact achieved through technology licensing.

Treatment of sold business units / divestiture

When a portfolio company sells a business unit / subsidiary the unit does not stop generating impact. CI will continue to report impact from sold business units where possible, although this may be even more challenging than reporting impact from licencing agreements given the lack of access to impact data from the sold business unit.

- **Attribution:** Impact generated by sold business units will be attributed to the portfolio company.
- **Data Collection:** Collecting data from sold business units might become difficult after the sale, especially if clear data access agreements weren't established during the exit process. Obtaining the necessary data from the divested unit for timely inclusion in impact reports may also be challenging.
    - Where possible, CI will request the inclusion of provisions in the sale agreement that guarantee continued access to impact data for the divested unit to enable accurate tracking of impact.
    - If direct data is not available CI will estimate impact from these units using publicly available proxy data – e.g. company revenues.
    - If neither direct or proxy data are available, we will use the latest planned impact forecast developed in alignment with the latest financial projections and modeling conducted prior to the portfolio company's exit.
- **Impact Calculation:** The GHG impact will be calculated using the same methodologies outlined for other impact types, considering the specific characteristics of the sold technology and the deployment context.

5.6 Global Warming Potential

CI reports impact in carbon dioxide equivalent or CO_2 equivalent. This metric measure is used to compare the emissions from various greenhouse gases based on their global warming potential (GWP) by converting amounts of other gases to the equivalent amount of carbon dioxide with the same global warming potential.

CI uses GWP factors from the IPCC AR6 at the 100-year time frame. These can be seen below:

Greenhouse Gas (GHG)	**GWP – 100**
Carbon Dioxide	1
Methane (Fossil Origin)	29.8
Methane (Non-Fossil Origin)	27
Nitrous Oxide	273
Ethane	0.437
Propane	0.020
Butane	0.006

5.7 Low Carbon Procurement

In cases where companies assert that part of their impact comes from acquiring low-carbon inputs, like renewable energy, CI will credit this impact to the company if the low-carbon input is additional. For example, if new renewable energy capacity is constructed explicitly for the company's use. A depot for electric buses would be given credit for low-carbon procurement if the depot had specifically constructed renewable energy generation infrastructure; it would not be given credit if it was simply purchasing renewable energy from a utility provider.

CI would also give credit to a company for catalyzing low-carbon procurement. An example of catalyzing low-carbon procurement would be creating a market for the low-carbon fuel in question. For instance, if a project is the first in a region to procure responsibly sourced natural gas as an input into its process, it will be deemed catalytic and given credit.

CI aligns with the EU green taxonomy for the procurement of low carbon electricity. For example, the EU green taxonomy has provided strict conditions under which electrolysers can claim the use of renewable or low carbon electricity to produce “green” hydrogen, here. It requires:

- **Additionality**: The renewable energy production installation must be new, meaning it should not have come into operation earlier than 36 months before the hydrogen plant. This ensures that the hydrogen is produced from additional renewable energy capacity, not from pre-existing installations.
- **Temporal Correlation**: The renewable electricity used for hydrogen production must be generated at the same time as the hydrogen production.
- **Geographic Correlation**: The renewable energy production installation should be located in the same region as the hydrogen plant to ensure that the electricity used is indeed renewable and not lost in transmission.
- An exception can be made if the electricity is consumed during an imbalance settlement period and the hydrogen producer can show that it reduced the need for downward redispatching of renewable electricity generation.

5.8 Double Counting

CI has invested in companies that mitigate emissions within the same industry along the same value chain. In these situations, CI is diligent in ensuring that the reported realized impact does not double count mitigations. An example of this is methane mitigation; CI has companies that detect methane, which would not have been detected in the absence of the technology. These detected emissions are then mitigated. CI's detection portfolio sends surveys to their customers asking about leak mitigations. If an InsightM customer were to tell the company a leaky valve was replaced with a Clarke Valve product, then CI would adjust its total impact to remove the double counting. As far as we know, no double counting risks have arisen in our reporting to date; however, as CI's portfolio companies grow, it will likely become an occurrence. CI will be diligent to avoid double counting in high-risk areas such as methane detection and mitigation via close collaboration and detailed reporting from the portfolio companies and removal of double counting at the portfolio level.

5.9 Realized Impact Restatement Policy

Over time, a company's unit impact may vary, and errors in previously reported realized impact data might emerge. This could necessitate a re-evaluation of the realized impact for prior years. In such cases, CI should restate any previously disclosed figures if the change in impact for any company is greater than 20% and exceeds 0.5 MT CO_2e.

6. Glossary

- **Avoided Emissions**: The reduction in life cycle emissions between a baseline scenario and an alternate low-carbon product, service, or portfolio.
- **Baseline Scenario**: The trendline of projected GHG emissions without a specific innovation or intervention, serving as a comparison against emissions from an innovation.
- **ESG (Environmental, Social, and Governance)**:
  - **Environmental Factors**: Issues related to the quality and functioning of the natural environment and natural systems.
  - **Governance Factors**: Issues related to the governance of companies and other investee entities.
  - **Social Factors**: Issues related to the rights, well-being, and interests of people and communities.
- **Global Warming Potential (GWP)**: A measure of how much heat a GHG traps in the atmosphere compared to carbon dioxide over a specific period, usually 100 years.
- **Greenhouse Gas (GHG) Emissions**: Gases that absorb infrared radiation, trapping heat in the atmosphere. Key GHGs include carbon dioxide, methane, nitrous oxide, and others.
- **GHG Impact**: The expected direct or indirect change in GHG emissions resulting from an innovation compared to a defined status quo or incumbent.
- **LCA (Life Cycle Assessment)**: A methodological framework for assessing the environmental impacts associated with all the stages of a product's life, from raw material extraction through materials processing, manufacture, distribution, use, repair and maintenance, and disposal or recycling.
- **Low Carbon Procurement**: The process of acquiring goods and services with a lower carbon footprint, including actions that create new markets for low-carbon solutions or utilize additional renewable energy sources.
- **Materiality**: The assessment of the relative importance of an issue (such as GHG emissions) to an organization's financial performance, operational efficiency, or sustainability goals.
- **Planned GHG Impact**: The anticipated normalized annual reduction in GHG emissions expected from a project or innovation based on a forecasted scenario of its implementation and adoption.
- **Potential GHG Impact**: The maximum normalized annual reduction in GHG emissions that could be achieved if a project or innovation is implemented and adopted on the broadest possible scale.

- **Realized GHG Impact**: The actual normalized annual reduction in GHG emissions that occurs directly from a project or innovation, measured following its implementation.
- **Rebound effect**: refers to the phenomenon where efficiency improvements lead to increased resource consumption, partially or fully offsetting the expected benefits of the initial efficiency gain.
- **Responsible Investment**: The integration of ESG considerations into investment management and ownership practices based on the belief that these factors impact financial performance.
- **Scope 1 Emissions**: Direct GHG emissions from sources controlled or owned by an organization.
- **Scope 2 Emissions**: Indirect GHG emissions from the purchase of electricity, steam, heat, or cooling by an organization.
- **Scope 3 Emissions**: Indirect GHG emissions from activities in an organization's value chain, not owned or controlled by the organization.
- **Screening**: Applying filters to financial instruments based on predefined criteria, which may include ESG incorporation approaches like positive, norms-based, or negative screening.
- **Total Carbon Emissions**: The total GHG emissions associated with a portfolio, expressed in tonnes of CO_2e.
- **Unit Impact**: The normalized annual difference in GHG emissions per unit between the baseline technology and the innovative solution, quantifying the innovation's specific GHG impact annually.

7. Useful Documents

Document	Link
2023 Impact Report	https://www.climateinvestment.com/cireport2023
CI Responsible Investment Policy	https://cdn.climateinvestment.com/app/uploads/2023/08/Climate-Investment-Responsible-Investment-Policy-August-2023.pdf
GHGProtocol	https://ghgprotocol.org/estimating-and-reporting-avoided-emissions
Venture Capital Alliance (VCA)	https://ventureclimatealliance.org/
Project Frame	https://projectframe.how/
Impact Convergence Forum for Private Equity (ICF)	https://www.linkedin.com/company/impact-convergence-forum/
World Business Council for Sustainable Development (WBCSD) **Avoided Emissions & Climate investing: A guide for investors and businesses**	Avoided Emissions & Climate Investing: A Guide for Investors and Businesses | WBCSD