

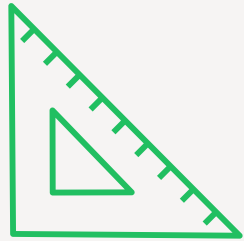


# Investors Can Measure and Maximize Their Climate Impact

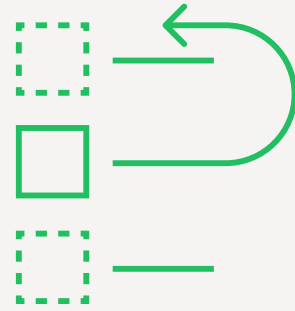
JUNE 2023



# Context and objectives



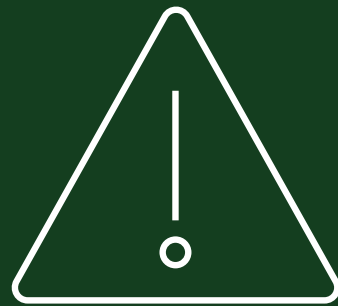
GenZero partnered with BCG to develop a robust and practical framework that incorporates climate impact into the strategy and measurement of decarbonization investments. The framework also facilitates GenZero to achieve its double bottom-line mandate.



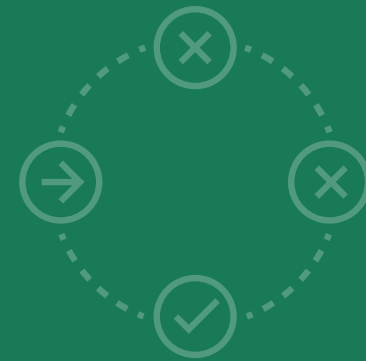
This study highlights the importance of climate impact measurement, shares the key considerations when measuring climate impact, and introduces the GenZero Climate Impact Measurement Framework.



We hope that this study will galvanize greater discussions and action on climate impact measurement among the investment community, as well as foster further convergence on the topic in the market.



# Why climate impact measurement matters



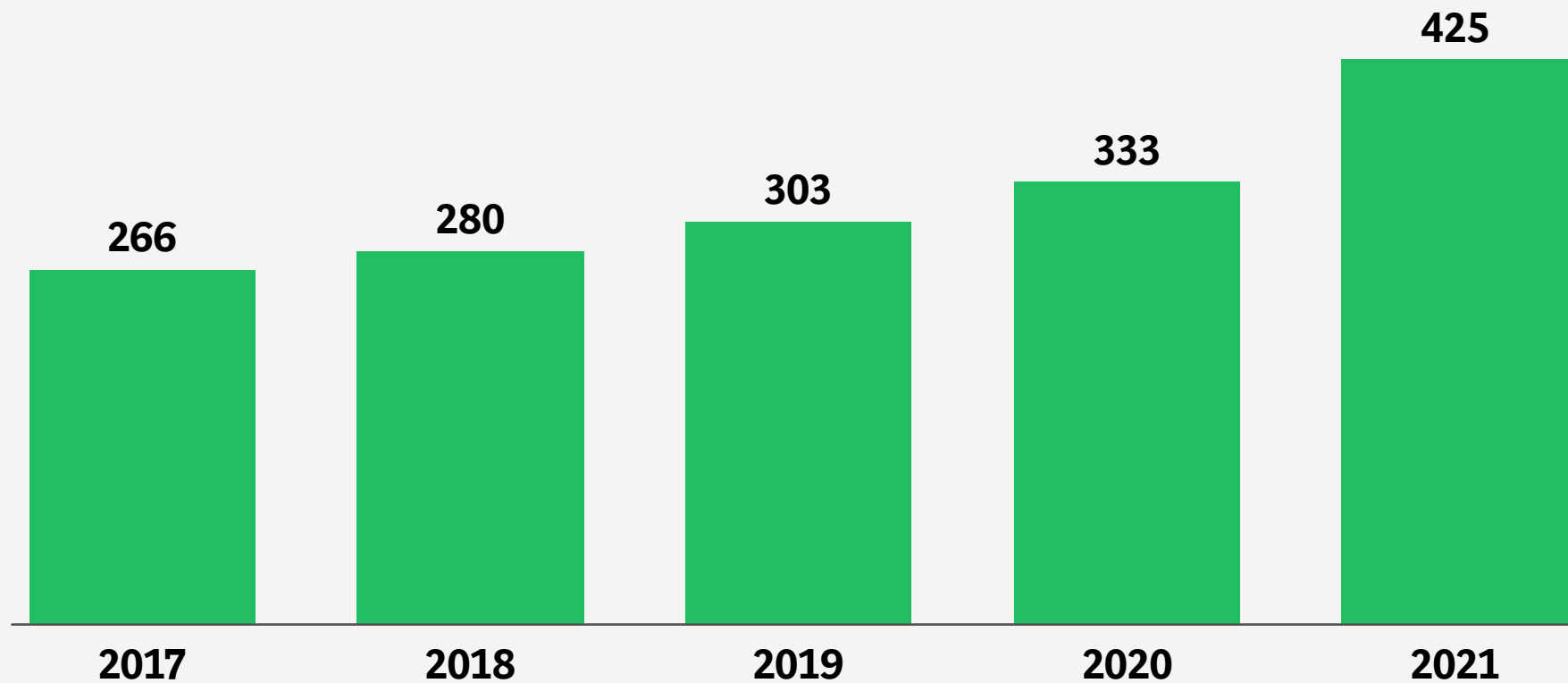
## Four key aspects to consider



## From framework to practice

# More than \$1.5 trillion of private investments went toward climate finance over the past five years

PRIVATE CAPITAL INVESTMENTS IN DECARBONIZATION SOLUTIONS (\$BILLIONS)



Yet, many investors don't know if they are funding the right opportunities

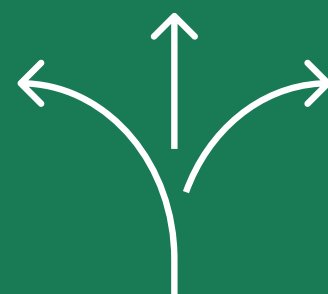
# Climate impact measurement can help private capital investors make informed decisions at each step of the investment process

Portfolio construction

Investment decisions

Performance measurement

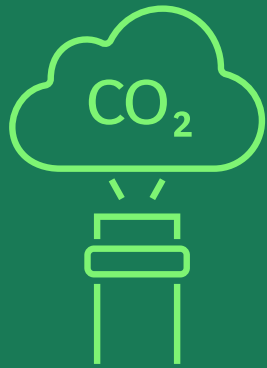
Reporting



Assess the **potential** climate impact of individual investment opportunities or a portfolio

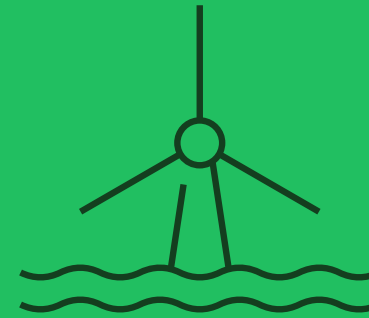
Measure the **realized** climate impact of individual investments or a portfolio

Climate impact measurement is distinct from carbon accounting because it assesses the amount of carbon removed, reduced, or avoided



### Carbon accounting

- Assesses the carbon emissions of a company or an investor
- Tracks the carbon produced
- Focuses on Scope 1, Scope 2, and Scope 3 emissions



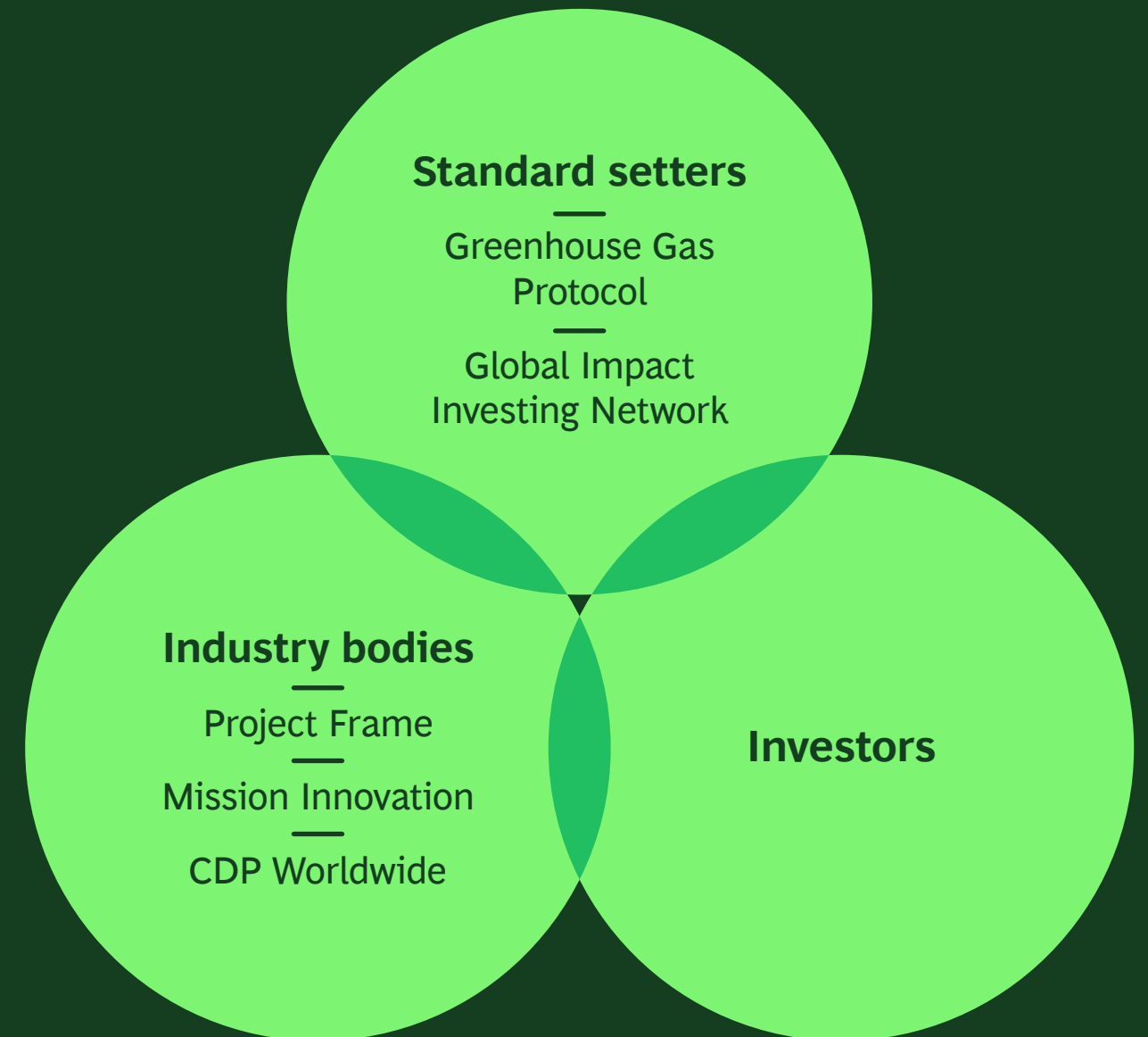
### Climate impact measurement

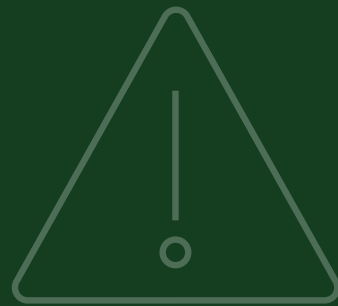
- Assesses the positive carbon impact of a company or an investor
- Tracks the carbon removed, reduced, or avoided
- Focuses on the direct, indirect, and transformational impacts

**Climate impact measurement** is still a nascent topic in the investor community, but it is gaining importance

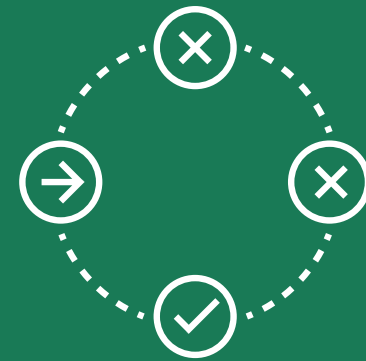
**Source:** BCG and GenZero analysis.  
**Note:** This is a sample only.

Multiple parties are working on climate impact measurement, but there is no clear convergence on guidance yet





## Why climate impact measurement matters



## Four key aspects to consider



## From framework to practice



# Four key aspects to consider when measuring climate impact

1

Is all impact created equal?



Direct climate impact



Indirect climate impact



Transformational climate impact

2

How much impact should we claim?



Ownership share



Value chain contribution

3

What is the right time frame to use?



Holding period versus lifetime value

4

Are larger volumes always better?



Tradeoffs between quality, quantity, and cost over time

# 1. IS ALL IMPACT CREATED EQUAL?

## Three distinct types of climate impact

### Direct climate impact

#### DESCRIPTION

Investments in companies whose solutions (products or services) **directly reduce or avoid emissions**

#### EXAMPLE

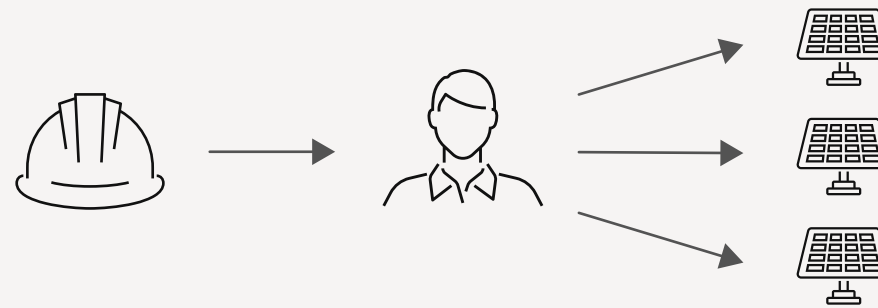
Reforestation projects and solar power plants



### Indirect climate impact

Investments in companies that provide **enabling infrastructure or technology**

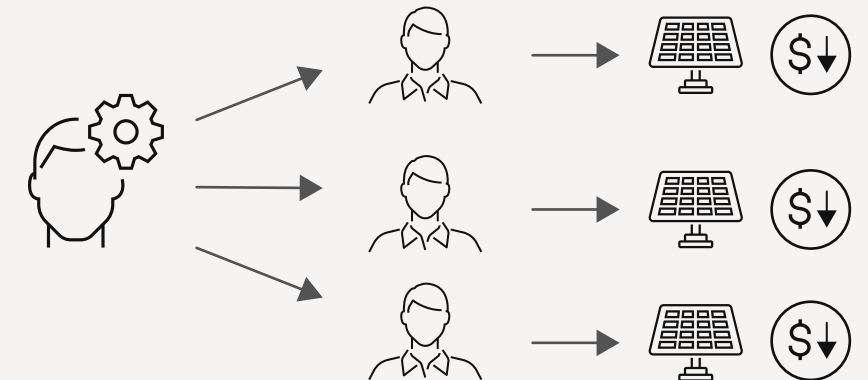
An exchange that helps transact carbon credits from a reforestation project or a company that distributes solar panel components



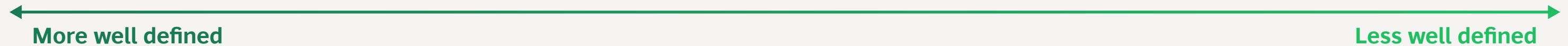
### Transformational climate impact

Investments in companies that develop **next-wave technologies or solutions** or in companies that contribute to a **more favorable market** for these solutions

More effective soil-carbon monitoring solutions or more efficient photovoltaic cells



#### MARKET CONSENSUS



## 1. IS ALL IMPACT CREATED EQUAL?

# Three distinct types of climate impact investment



**Voices from  
the industry**

We have a similar approach where we distinguish between direct, enabling, and systematic climate impact. As an organization, we think it's crucial to have a standardized structure in place on definitions. By nature, measuring and assessing impact becomes more complex as you move from direct to enabling to systematic impact.

LIGHTROCK CLIMATE IMPACT FUND

## 2. HOW MUCH IMPACT SHOULD WE CLAIM?

# Taking into account ownership share

### Ownership share

What is the fair share of impact to claim given the level of investment in a company?

*Example: Five private equity funds invest in a solar panel operator; each has a 20% ownership share*



#### Approach 1: Impact claim is based on investment contribution

*Example: Each private equity fund claims 20% of the climate impact of the company*

- + Captures a more defensible and attributable share of the impact
- + Aligns with industry best practices and with where the market is moving
- + Reduces double counting in the climate impact universe
- Requires calculation; can be complex depending on the ownership model
- For forward-looking calculations, requires projecting changes in ownership share

#### GenZero approach



#### Approach 2: Impact claim is based on total impact without adjustment

*Example: Each private equity fund claims 100% of the climate impact of the company*

- + Simpler, with no need for additional adjustment from the reported impact
- + Fewer assumptions are needed when projecting a forward-looking view
- Does not capture the attributable share of impact
- Is not aligned with industry best practices and with where the market is moving
- Contributes to the global double-counting issue in the climate impact landscape

## 2. HOW MUCH IMPACT SHOULD WE CLAIM?

# Taking into account value chain contribution (1/2)

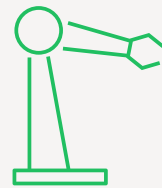
Value chain contribution is key to measuring indirect climate impact, but there is no consensus on the approach

*Example: Three stakeholders are involved in the solar panel value chain*

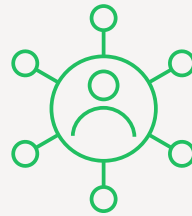
How much climate impact should be attributed to each stakeholder?



Raw material  
miner



Solar panel  
manufacturer



Distributor and  
installer

Our approach considers varying degrees of attribution along the value chain

- Evaluate and report indirect climate impact **separately** from direct climate impact
- Calculate indirect climate impact by applying different value chain attribution factors
- Assess what value chain attribution is required for the investment to be attractive
- Consider if that value chain attribution is realistic

There is alignment in the market about the need to distribute impact among stakeholders, but there is no consensus on the approach

## 2. HOW MUCH IMPACT SHOULD WE CLAIM?

# Taking into account value chain contribution (2/2)



**Voices from  
the industry**

We do not allocate the impact of our enabled impact between actors along the value chain—all of them play an enabling role and all are needed. However, within our portion of the value chain—providing financing—we allocate enabled savings proportionate to our ownership share.

ENERGY IMPACT PARTNERS

### 3. WHAT IS THE RIGHT TIME FRAME TO USE?

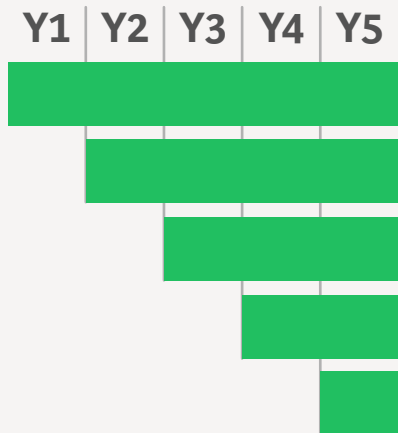
## Opportunity to anchor around holding period or lifetime impact (1/2)

### Holding period impact

#### EXAMPLE

Climate impact of solar panels generated during the holding period

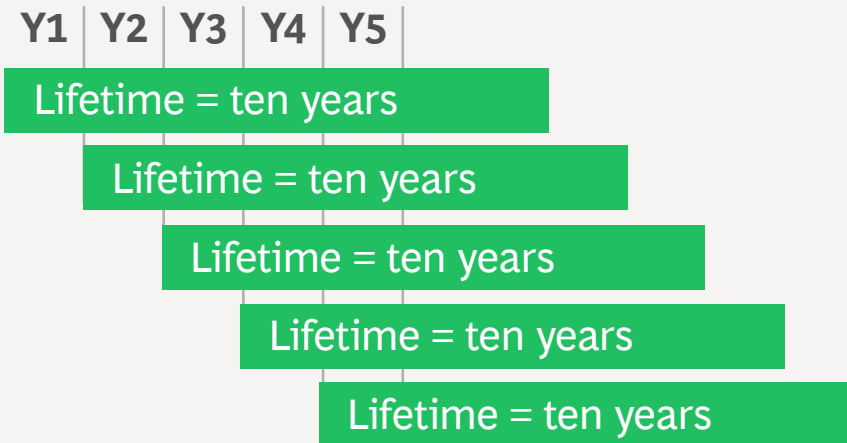
— Holding period — | — After exiting —



### Lifetime impact of products sold during the holding period

Lifetime impact of all solar panels sold during the holding period

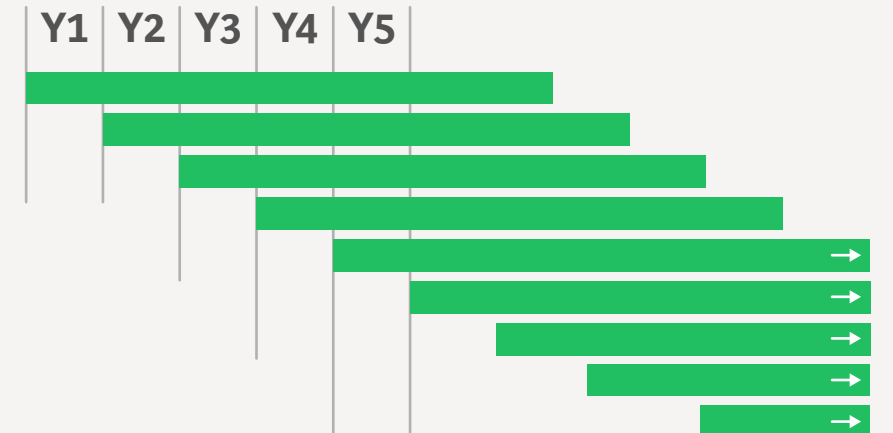
— Holding period — | — After exiting —



### Lifetime impact

Impact of all solar panels sold during the lifetime of the company

— Holding period — | — After exiting —



### GenZero approach

Source: BCG and GenZero analysis.

Note: Y = year.

### 3. WHAT IS THE RIGHT TIME FRAME TO USE?

## Opportunity to anchor around holding period or lifetime impact (2/2)



**Voices from  
the industry**

By investing in the climate solutions of the future, Decarbonization Partners aims to make a long-lasting contribution to the global energy transition on behalf of our clients. We forecast a company's potential decarbonization outcome during the fund life as well as its longer-term impact as the company grows in scale. This measurement framework helps us to put our growth capital to use by supporting early-stage companies that we have strong conviction will successfully evolve through pilot to commercial scale and in doing so contribute materially to global decarbonization efforts.

**DECARBONIZATION PARTNERS**



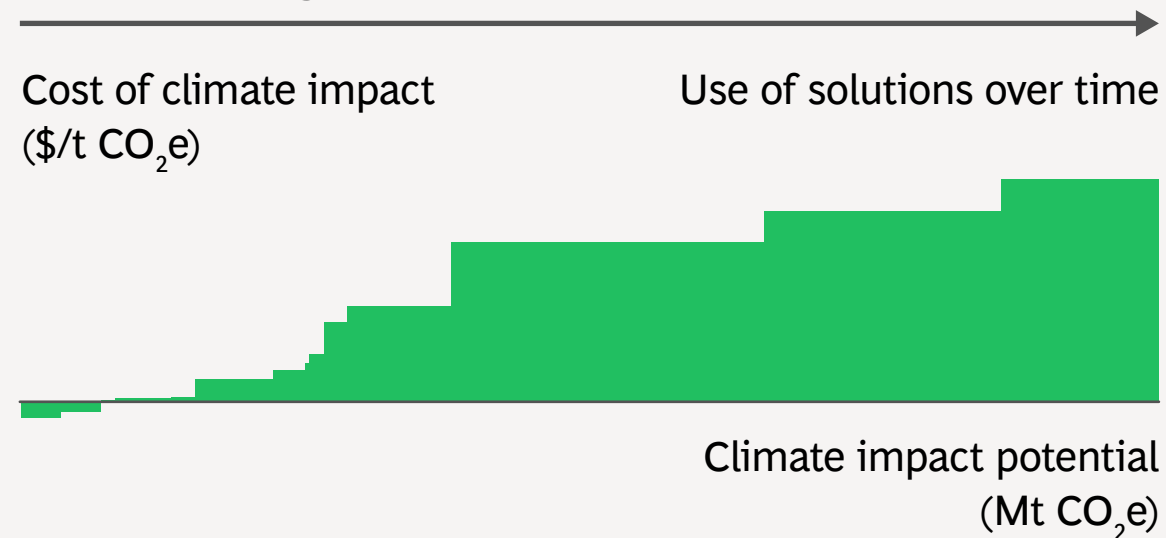
#### 4. ARE LARGER VOLUMES ALWAYS BETTER?

## Implications of moving up the abatement cost curve

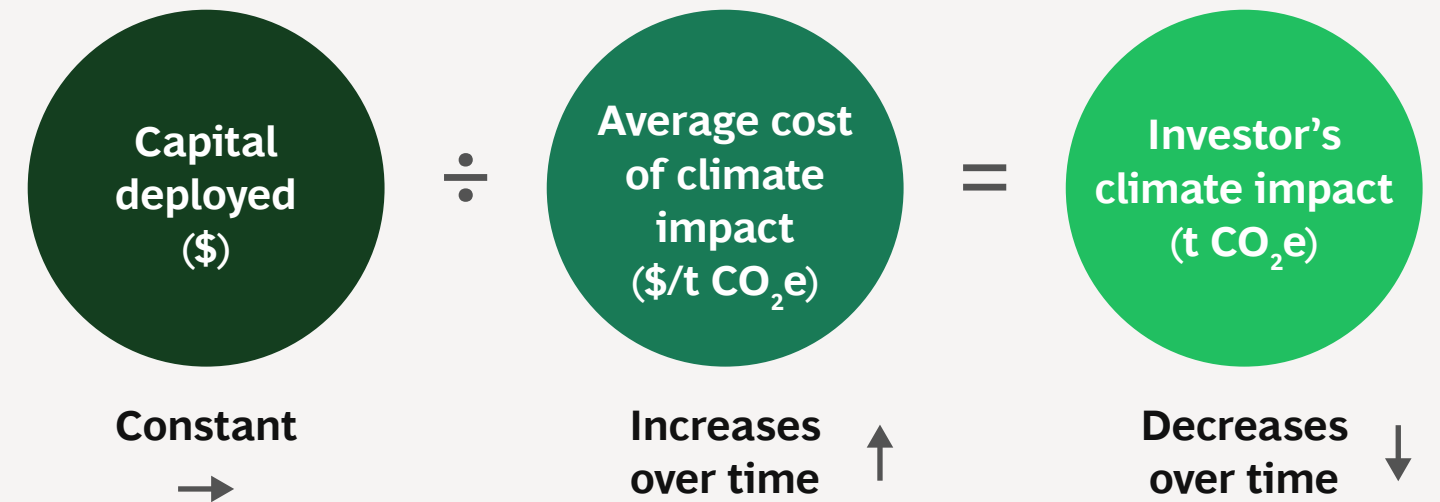
### Marginal costs of achieving positive climate impact may increase over time

Achieving incremental carbon reductions or removals over time requires progressively more complex and costly solutions, which are reflected in the increase of carbon prices over time

#### Example: Marginal abatement cost curve



This rising cost curve will decrease an investor's incremental climate-impact volumes if capital is kept constant

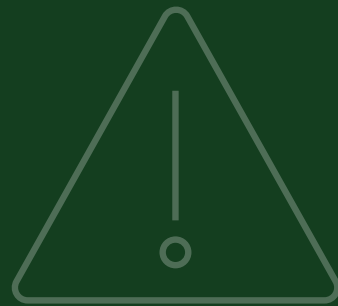


The idea that carbon mitigation is getting more costly over time is a well-established fact in the investor community and a common feature of investing in carbon solutions, rather than a bug.

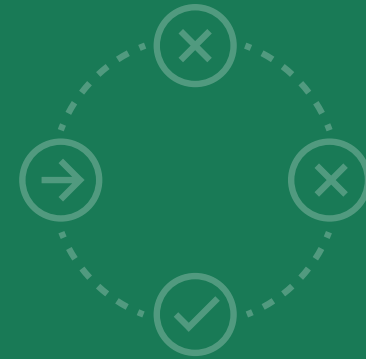
LEADING CLIMATE IMPACT INVESTOR

Source: BCG and GenZero analysis.

Note: t = tonne; CO<sub>2</sub>e = carbon dioxide equivalent; Mt = megatonne.



## Why climate impact measurement matters

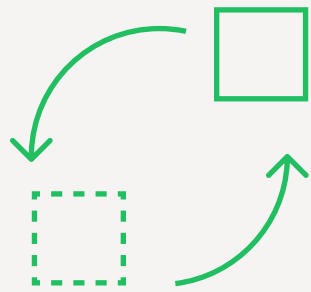


## Four key aspects to consider



## From framework to practice

# Four guiding principles for the GenZero Climate Impact Measurement Framework



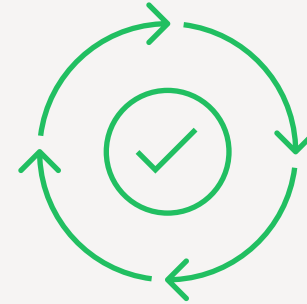
## **Adaptability**

Easy to adjust to evolving industry consensus



## **Defensibility**

Fair and transparent methodology that holds up to public scrutiny



## **Simplicity**

Can be calculated by investment teams themselves



## **Explainable**

Understood and used by investment committees and stakeholders to make better decisions

# Actions and progress over perfection



## Voices from the industry

We all have a role to play to ensure a livable climate. Today, investors around the world have heard this call to action and are working to update their decision making processes in service to the planet. However, assessing how the decisions we make today will impact the future is difficult, complex work. That's why Project Frame is dedicated to working together to tackle forward-looking GHG impact with humility, while prioritizing transparency and accountability.

KERI BROWDER, DIRECTOR OF PROJECT FRAME AT PRIME COALITION

Source: BCG and GenZero analysis.

Note: GHG = greenhouse gas.

# A distinct measurement approach for each impact type



## Direct climate impact

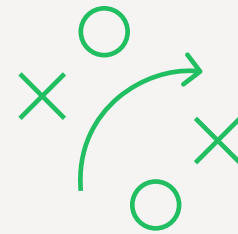
### Impact measurement

- Qualitative impact assessment
- **Quantitative impact measurement**

### Decision making

**Targets are used as a reference for decision making**

### Impact reporting



## Indirect climate impact

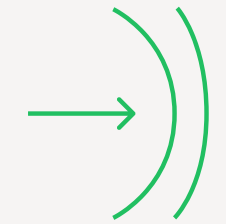
### Impact measurement

- Qualitative impact assessment
- **Quantitative impact measurement based on sensitivity analysis**

### Decision making

Sense check the quantitative impacts; decision making is led by the investment thesis

### Impact reporting



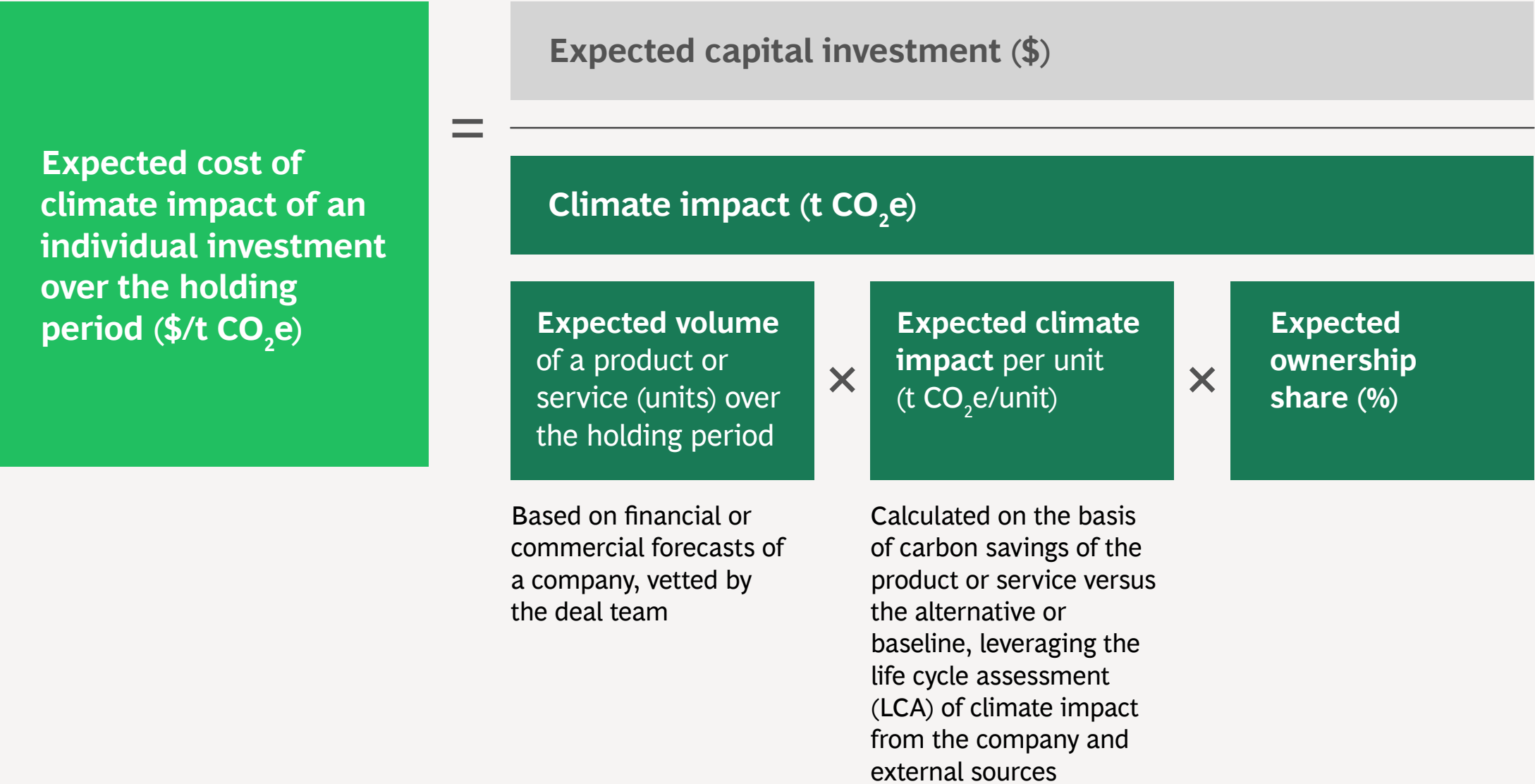
## Transformational climate impact

Qualitative impact assessment

Ensure the transformational potential of the opportunity; decision making is led by the investment thesis



# Direct climate impact: Measurement approach



**Qualitative assessment of quality standards; quality criteria specific to the sector and subsector**

For example, for nature-based solutions, ensure that projects are in line with core carbon principles (CCPs)

Source: BCG and GenZero analysis.  
 Note: t = tonne; CO<sub>2</sub>e = carbon dioxide equivalent.

# Direct climate impact: Example (1/2)

## Investment opportunity

Potential investment in a developer of reforestation projects

- Investment amount: \$30 million
- Ownership share: 80%
- Planned holding period: ten years
- Expected climate impact during the holding period: 2.5 Mt

## Climate impact calculation

Expected cost of climate impact over a ten-year holding period

Capital investment: \$30 million

Climate impact: 2 Mt CO<sub>2</sub>e

Expected climate impact over the holding period: 2.5 Mt CO<sub>2</sub>e

×

Ownership share: 80%

\$15 per tonne of CO<sub>2</sub>e

Source: BCG and GenZero analysis.

Note: CO<sub>2</sub>e = carbon dioxide equivalent; Mt = megatonne. The example is for illustrative purposes only.

# Direct climate impact: Example (2/2)

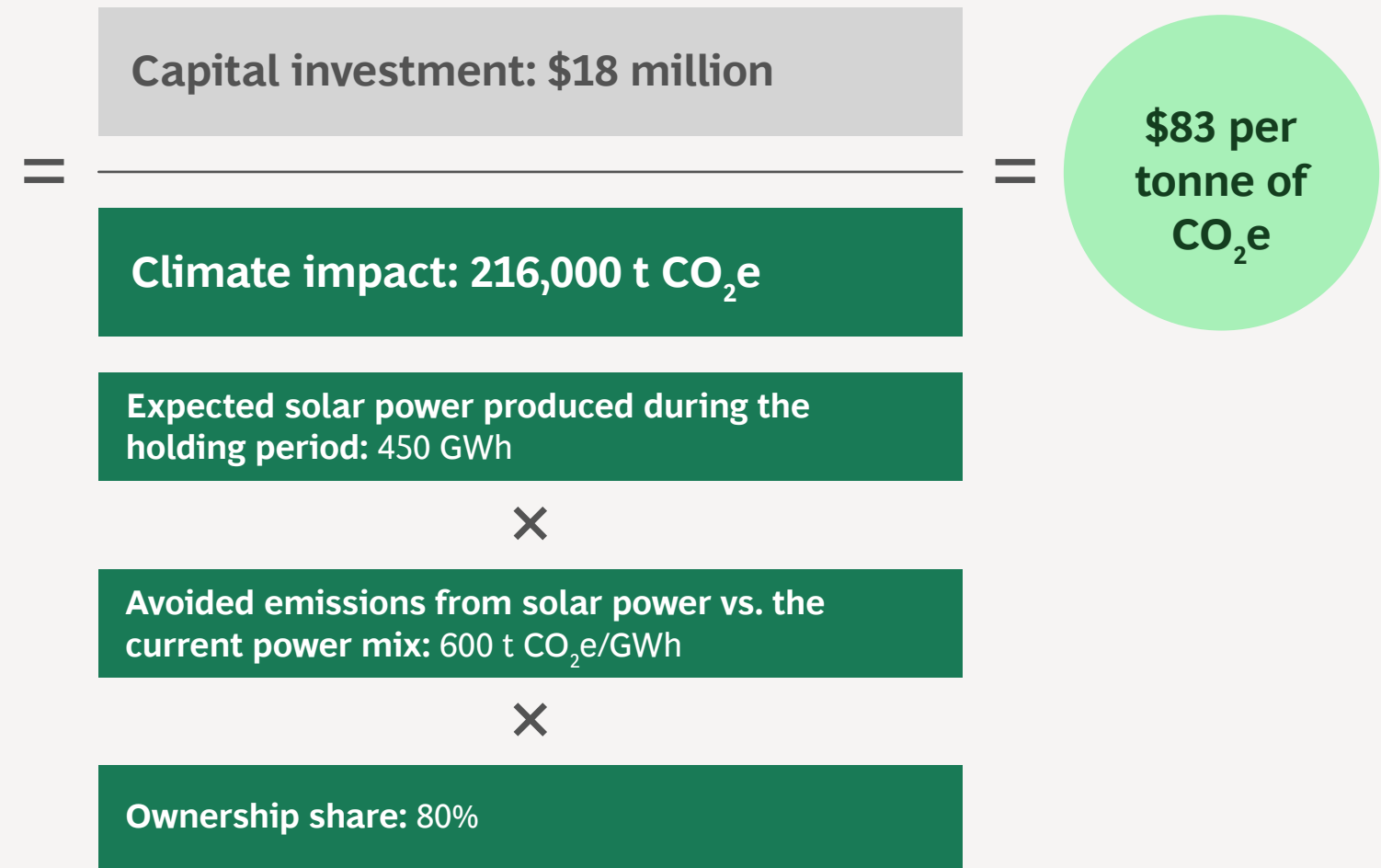
## Investment opportunity

Potential investment in an operator of solar power plants

- Investment amount: \$18 million
- Ownership share: 80%
- Planned holding period: ten years
- Expected solar power produced during the holding period: 450 GWh
- Cradle-to-grave emissions from producing 1 GWh of power through solar PV: 50 tonnes of CO<sub>2</sub>e
- Cradle-to-grave emissions from producing 1 GWh of power in the current power mix: 650 tonnes of CO<sub>2</sub>e

## Climate impact calculation

Expected cost of climate impact over a ten-year holding period



Source: BCG and GenZero analysis.

Note: t = tonne; CO<sub>2</sub>e = carbon dioxide equivalent; GWh = gigawatt hours; PV = photovoltaic. The example is for illustrative purposes only.



# Indirect climate impact: Measurement approach

Our approach assesses indirect climate impacts using sensitivity analysis and considers varying degrees of attribution

VALUE CHAIN  
ATTRIBUTION

EXPECTED CLIMATE  
IMPACT ATTRIBUTION

100%

Total impact

50%

50% of total impact

25%

25% of total impact

10%

10% of total impact

Is it still an attractive investment with only a 10% to 25% climate impact attribution?

# Indirect climate impact: Example

## Investment opportunity

Potential investment in an exchange and marketplace for voluntary carbon credits

- Investment amount: \$20 million
- Ownership share: 20%
- Planned holding period: ten years
- Expected volume of voluntary carbon credits traded on the platform over the holding period (the equivalent to enabled climate impact): 20 Mt

## Climate impact calculation (at 100% value chain attribution)

Expected cost of climate impact  
over a ten-year holding period

=

Capital investment: \$20 million

Expected climate  
impact over  
holding period:  
20 Mt CO<sub>2</sub>e

×

Ownership  
share: 20%

=

\$5 per tonne of CO<sub>2</sub>e

## Sensitivity analysis

(at different value chain attributions)

VALUE CHAIN ATTRIBUTION	EXPECTED COSTS OF CLIMATE IMPACT (\$/t CO <sub>2</sub> e)
100%	5
50%	10
25%	20
10%	50

At 10% to 25% value chain attribution, the expected costs of climate impact over a ten-year period are \$20 to \$50 per tonne of CO<sub>2</sub>e. Is this still an attractive investment?

Source: BCG and GenZero analysis.

Note: t = tonne; CO<sub>2</sub>e = carbon dioxide equivalent; Mt = megatonne. The example is for illustrative purposes only.

# Transformational climate impact: Measurement approach

## Transformational climate impact criteria

### Key question

Is the investment truly transformational in nature?

### Three key assessment criteria:

- Intentionally transformational
- Strictly additional
- Novel market

## Total addressable carbon emissions

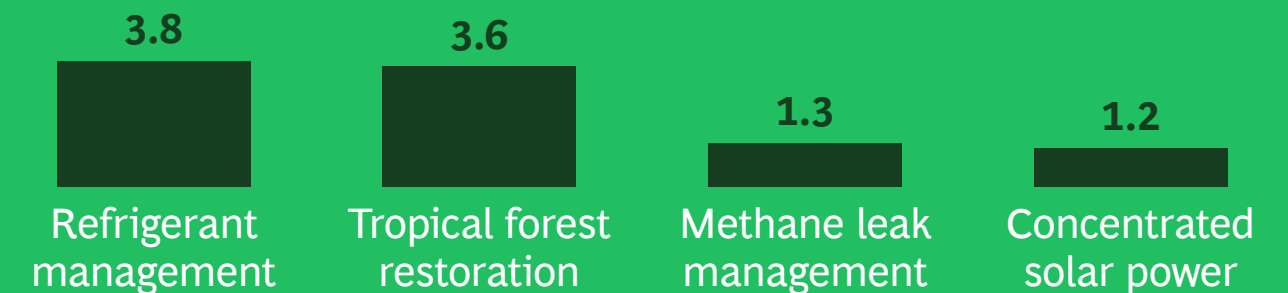
### Key question

What is the potential climate impact of the market that the investment is aiming to accelerate?

Calculation of total addressable carbon emissions of technology in a steady state

### Examples

Potential climate impact at a steady state (Gt CO<sub>2</sub>e per year)<sup>1</sup>



**Source:** BCG and GenZero analysis.

**Note:** Gt = gigatonne; CO<sub>2</sub>e = carbon dioxide equivalent.

<sup>1</sup>Project Drawdown's steady state estimate as 1/15 of cumulative 2022–2050 impact.

# Transformational climate impact: Example (1/2)

## Investment opportunity

Potential investment in a startup that develops a novel measurement, reporting, and verification technology for soil carbon sequestration

- Investment amount: \$5 million
- Planned holding period: five years
- Technology aims to measure the carbon content of soil in a more accurate and cost-effective manner, which will increase viability of soil carbon projects
- The technology will likely take eight to ten years to mature

## Transformational climate impact criteria

### Intentionally transformational

An investment in the startup is intended to significantly accelerate the market for soil carbon projects by improving the measurement and credibility of such projects

### Strictly additional

As a first of its kind technology, the technology removes a key market-growth barrier (monitoring, reporting, and verification in this sector)

### Novel market

The company supports the development of the novel market of soil carbon projects

## Total addressable carbon emissions estimation

The technology has the potential to enable a market with 2 to 6.5 gigatonnes of CO<sub>2</sub>e per year in a steady state

**Source:** BCG and GenZero analysis.

**Note:** CO<sub>2</sub>e = carbon dioxide equivalent. The example is for illustrative purposes only.

# Transformational climate impact: Example (2/2)

## Investment opportunity

Potential investment in a startup that develops new, more efficient photovoltaic cells

- Investment amount: \$5 million
- Planned holding period: ten years
- Technology will increase the power output of solar panels by 20%
- Technology is still at a nascent stage and will only be market ready in 10 to 15 years

## Transformational climate impact criteria

### Intentionally transformational

The startup has been founded and fully focused on developing more efficient photovoltaic cells; the company needs external funding to continue its R&D

### Strictly additional

The company is the first and only of its kind that develops such a technology; no other technology can unlock similar types of improvements

### Novel market

The company supports the research and development of a new technology under development

## Total addressable carbon emissions estimation

The technology has the potential to avoid 0.6 to 1.2 gigatonnes of CO<sub>2</sub>e per year in a steady state

**Source:** BCG and GenZero analysis.

**Note:** CO<sub>2</sub>e = carbon dioxide equivalent. The example is for illustrative purposes only.



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### **About GenZero**

GenZero is an investment platform company focused on accelerating decarbonisation globally. Founded by Temasek, we seek to deliver positive climate impact alongside long-term sustainable financial returns by investing in opportunities with the potential to be nurtured into impactful and scalable solutions.

Driven by a common purpose to decarbonise for future generations, we recognise the need for a holistic and integrated approach to achieve a net zero world. At GenZero, we adopt a flexible investment approach across three focus areas to drive climate impact: (i) nature-based solutions that help protect and restore our natural ecosystems while benefiting local communities and biodiversity; (ii) technology-based solutions that deliver deep decarbonisation impact; and (iii) carbon ecosystem enablers which refer to companies and solutions that support the development of an effective, efficient, and credible carbon ecosystem.

For more information on GenZero, visit <https://genzero.co/>

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