



Leading in the New Reality

Digital Transformation |

CARBON MEASUREMENT SURVEY REPORT 2021

Use AI to Measure Emissions Exhaustively, Accurately, and Frequently

BCG |  **BCG
GAMMA**

Our 2021 survey revealed that many companies have a long way to go when it comes to measuring and reducing emissions

To assess companies' ability to measure and reduce their carbon emissions, BCG collected and analyzed responses from executives at **1,290 organizations** who have full or partial decision-making responsibility for tracking and reducing their emissions

These organizations operate across **nine major industries** around the globe



Key Findings

VISION

- **85%** of organizations are concerned about reducing their emissions
- But only **9%** are able to measure their emissions comprehensively¹
- And only **11%** have reduced their emissions in line with their ambitions in the past five years²
- Overall, respondents estimate a **30% to 40%** average error rate in their emissions measurements

Source: BCG analysis.

Note: Throughout this analysis, greenhouse gas emissions are measured in carbon dioxide equivalents.

¹Comprehensive measurement encompasses the full scope of total emissions (Scopes 1, 2, and 3), including those from upstream and downstream activities.

²We define companies as having met their ambitions if they have realized more than 75% of their emissions-reduction targets.

Two categories of greenhouse gas emissions must be measured, tracked, and reduced



Internal emissions

Emissions produced by a company's own activities, whether:

- Direct (Scope 1), e.g., from company facilities and vehicles, or
- Indirect (Scope 2), e.g., purchased energy for company use

External emissions

Emissions produced along a company's value chain (Scope 3), including:

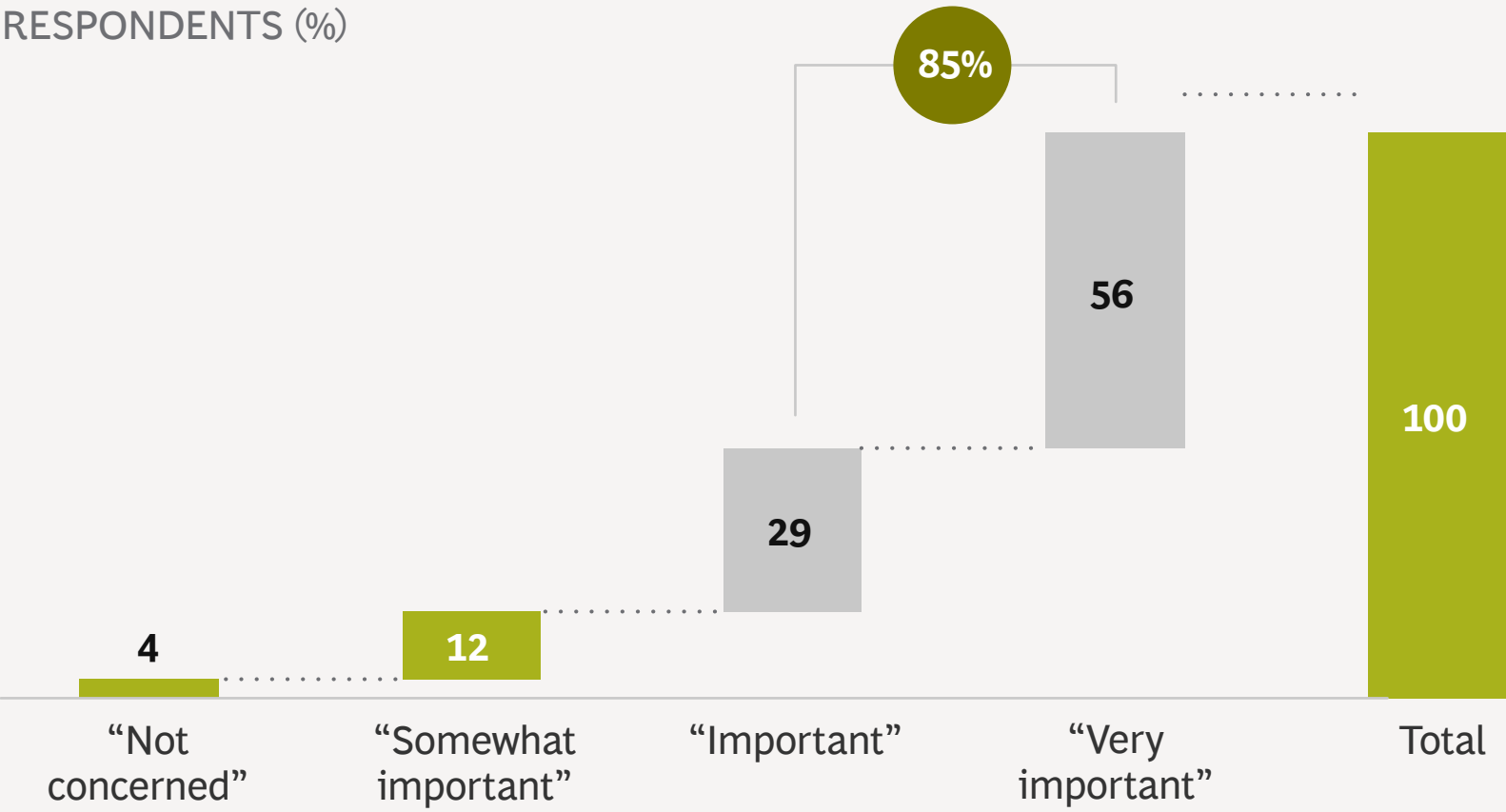
- Upstream activities, e.g., purchased goods and transportation, or
- Downstream activities, e.g., product transportation and distribution, use of sold products, or end-of-life treatment

Total emissions

Companies are deeply concerned about reducing emissions but have difficulty converting ambition into action

Question: How important is carbon emissions reduction to your organization?

RESPONDENTS (%)



Only 11%

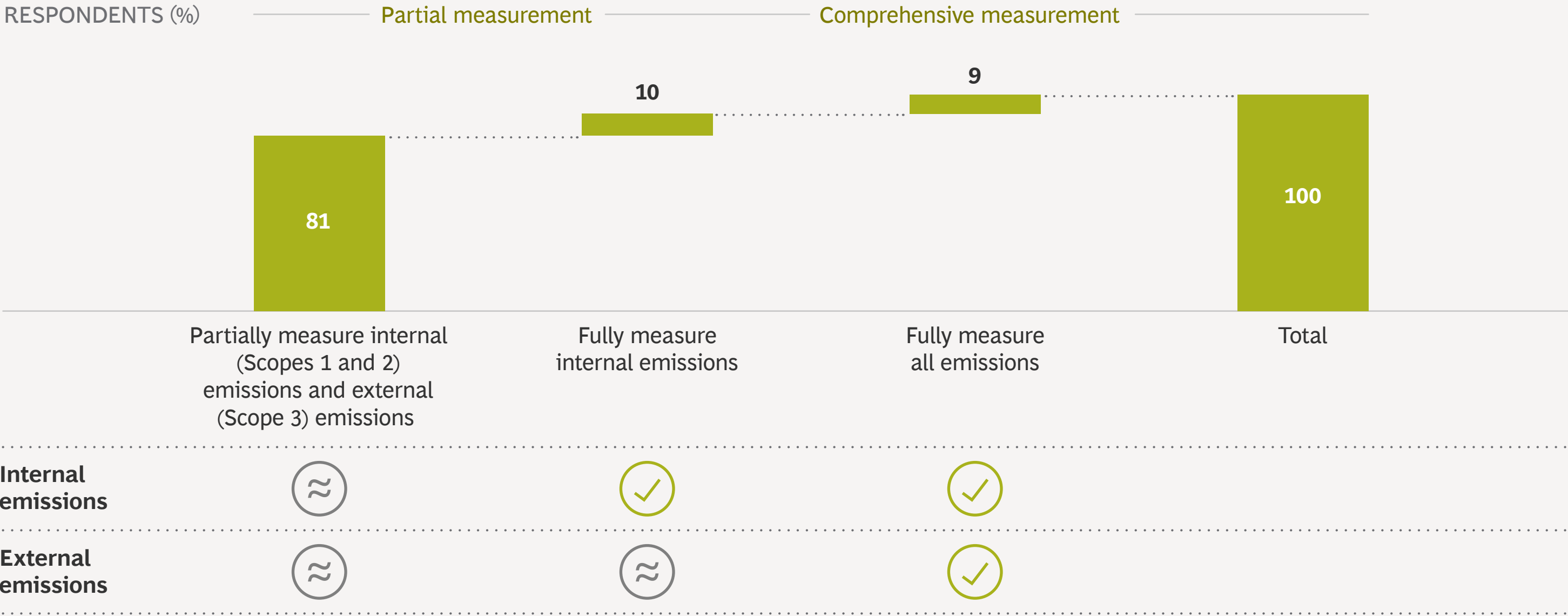
have reduced their emissions in line with their ambitions over the past five years¹

Source: BCG Carbon Measurement Survey, 2021.

Note: Figures do not sum to 100 because of rounding.

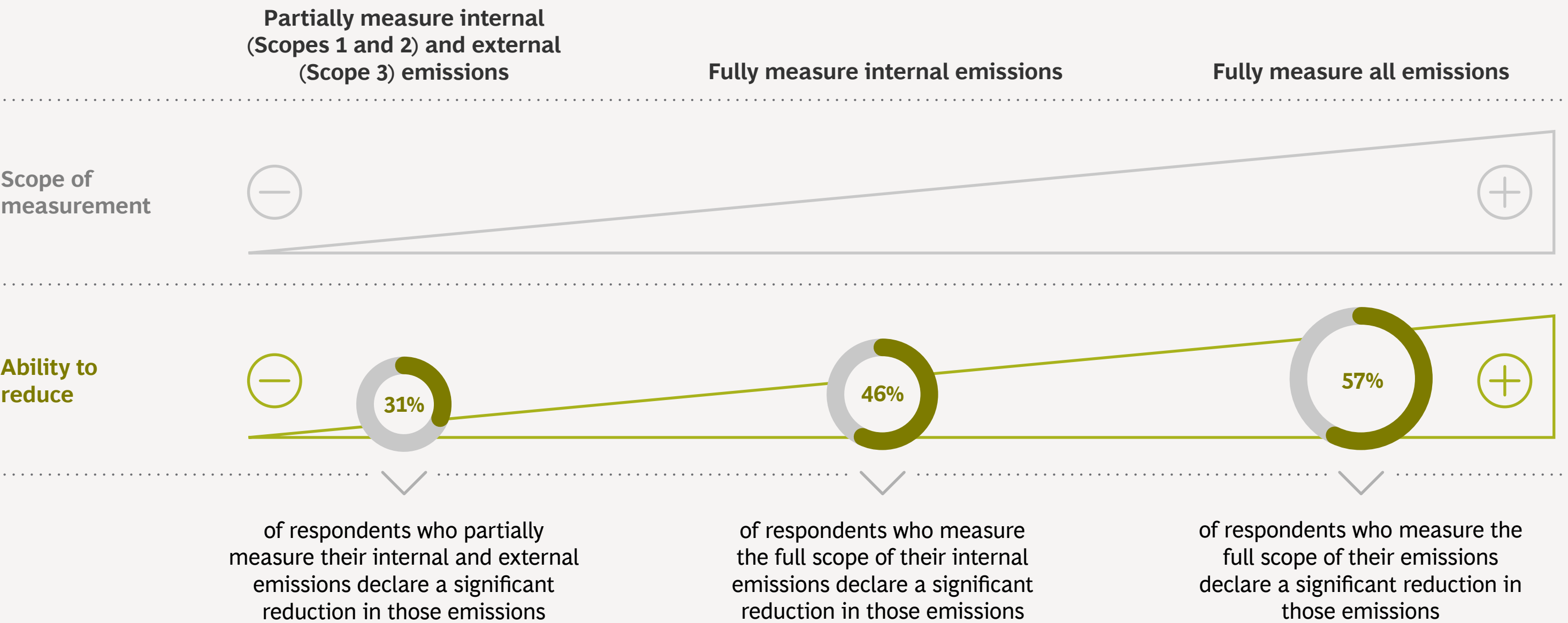
¹We define companies as having met their ambitions if they have realized more than 75% of their emissions-reduction targets.

Measurement is the key roadblock, with 91% of companies failing to measure the full scope of their emissions



Source: BCG Carbon Measurement Survey, 2021.

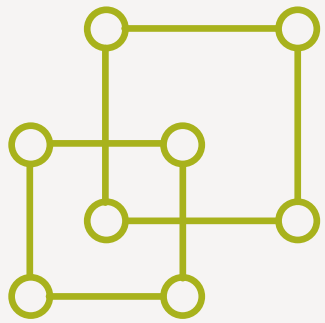
The better a company measures its emissions, the more it can reduce them



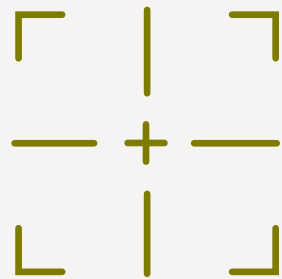
Source: BCG Carbon Measurement Survey, 2021.
Note: We define respondents who have realized more than 50% of their emissions-reduction ambition over the past five years as having made a significant reduction.

Companies are not measuring emissions appropriately

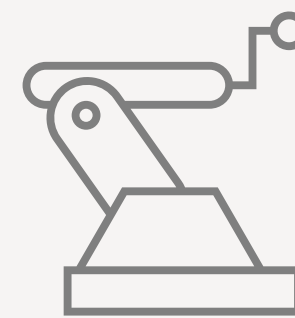
They are failing to:



Measure
exhaustively

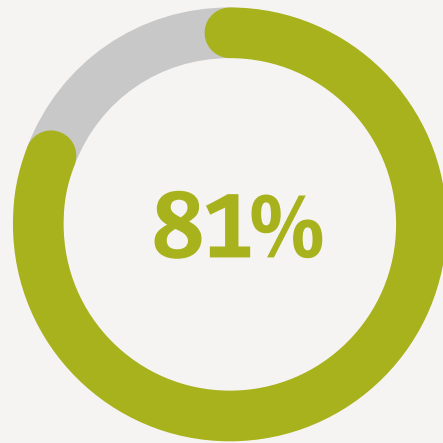


Measure
accurately

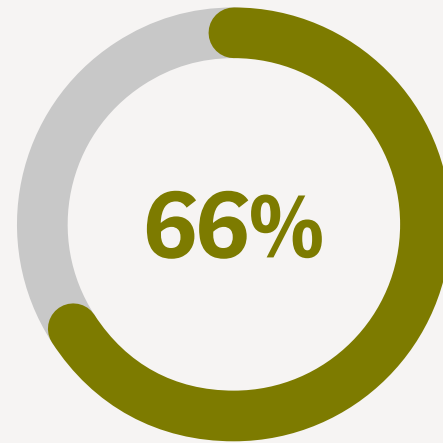


Measure
frequently and
automatically

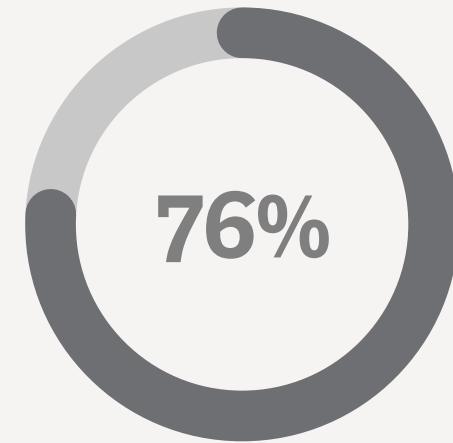
Companies are not measuring their emissions exhaustively



of respondents omit some of their internal emissions in their reporting



do not report any of their external emissions, although these emissions account for about 90% of the average company's total



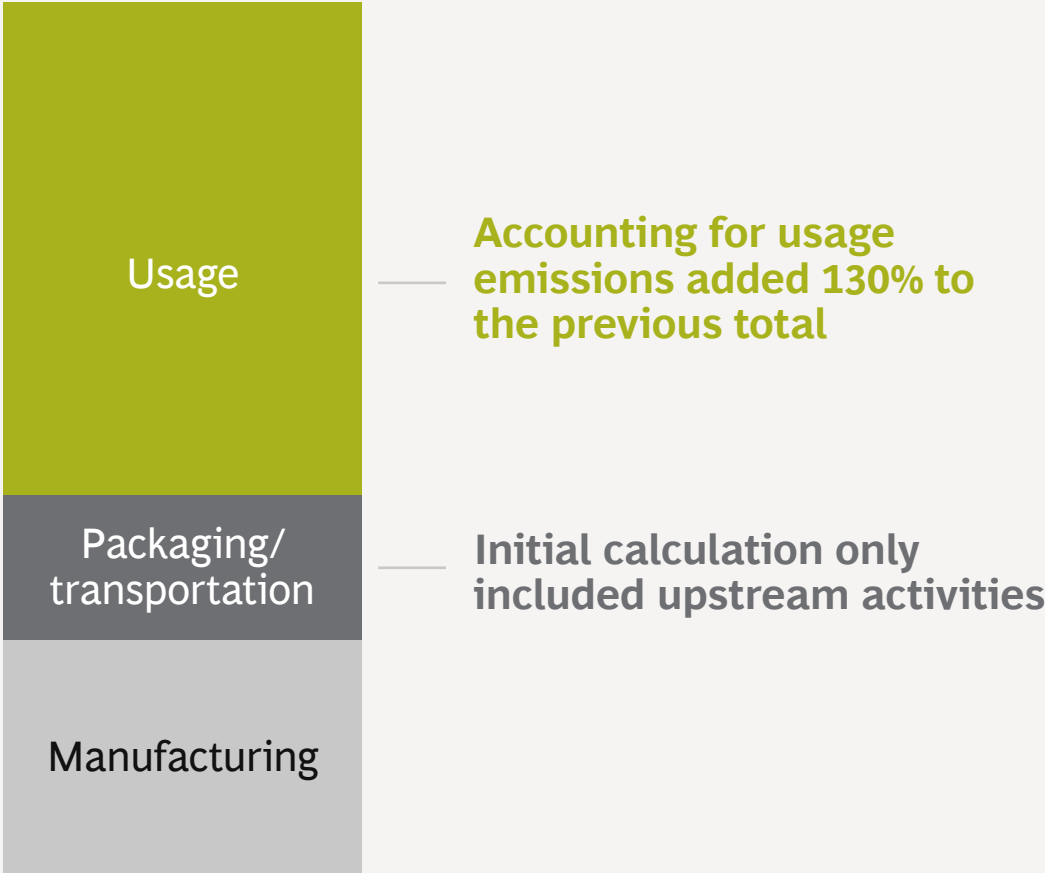
of respondents say they are unable to measure the full carbon footprint of their products and services, including product usage and end-of-life impact

Companies often overlook usage emissions

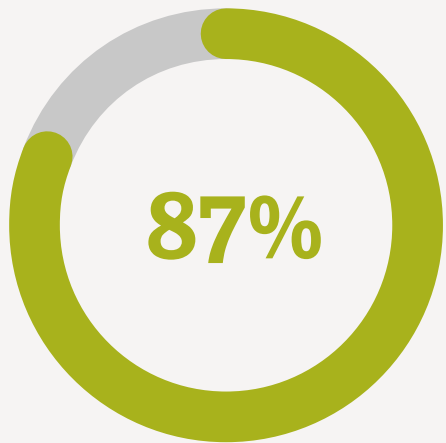
130%

Emissions at a US housewares retailer were 130% higher in its largest product category than initially measured once usage emissions for ovens and microwaves were included

EMISSIONS SOURCES



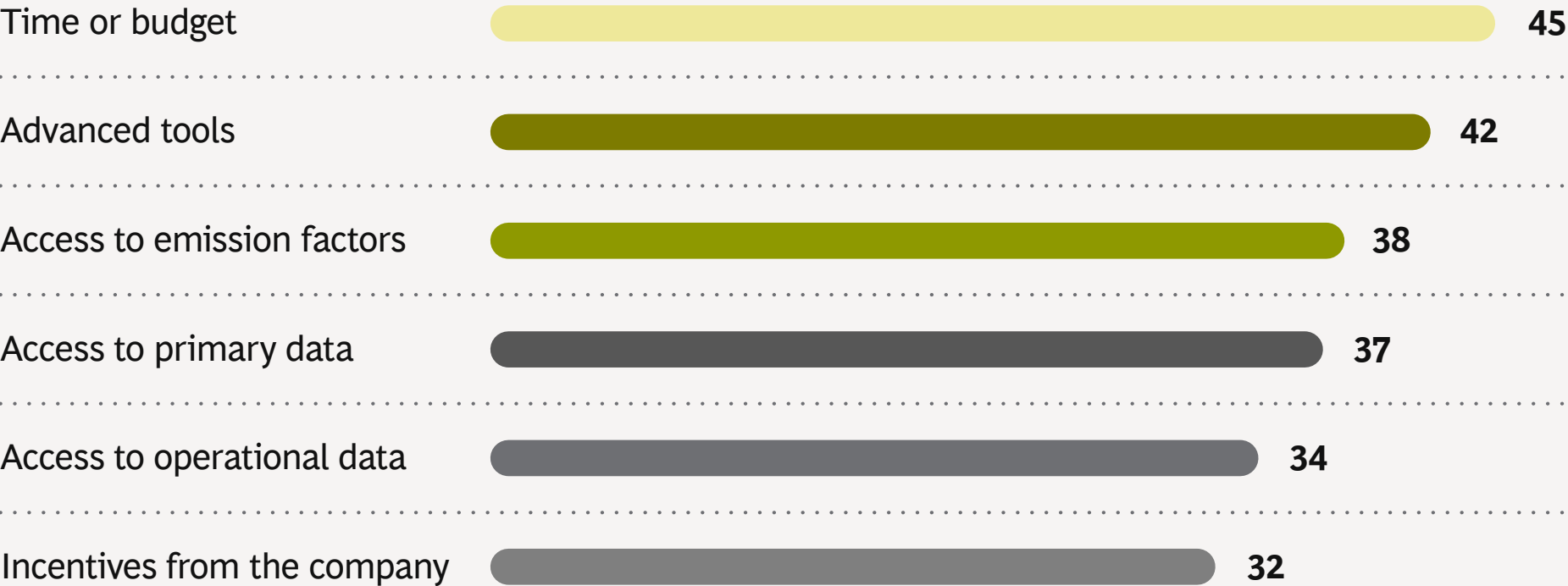
Companies want to broaden their reporting but still have barriers to overcome



of respondents want to increase the scope of their reporting

Companies lack the following resources needed to broaden their reporting

RESPONDENTS (%)



Source: BCG Carbon Measurement Survey, 2021.
Note: Respondents were able to give more than one answer.

Companies are not measuring their emissions accurately

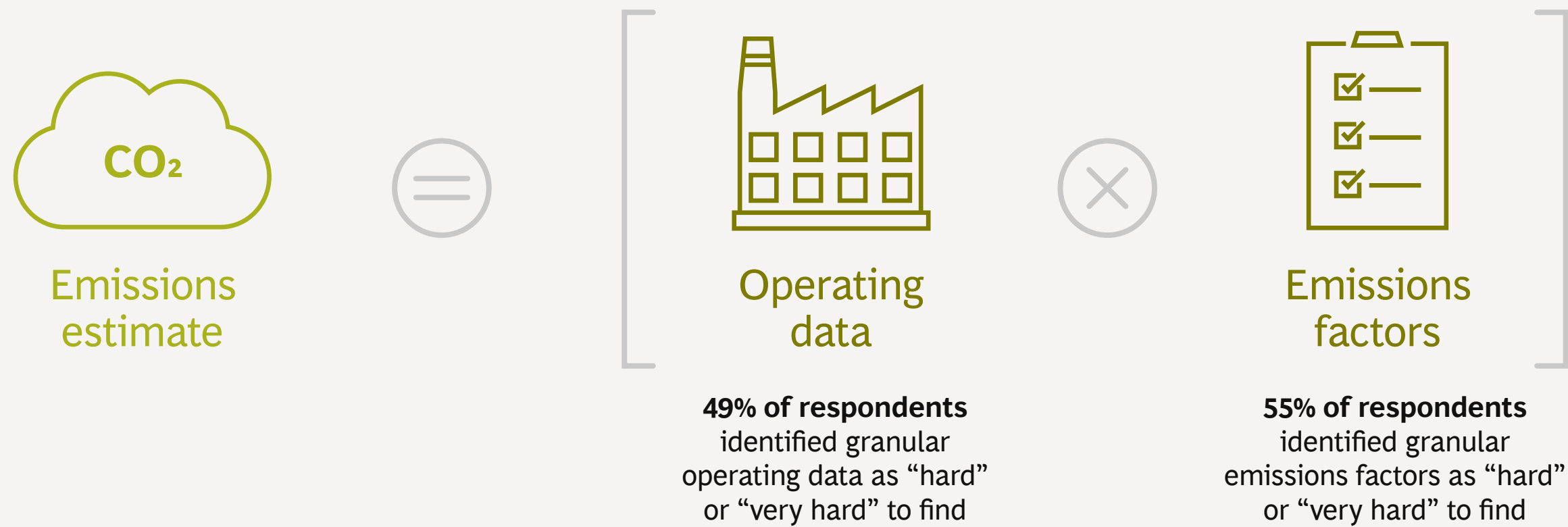
Our respondents estimate a 30% to 40% average error rate in their emissions measurements

TOTAL EMISSIONS BASELINE

0



The root cause of poor accuracy lies in the collection of granular data and emissions factors



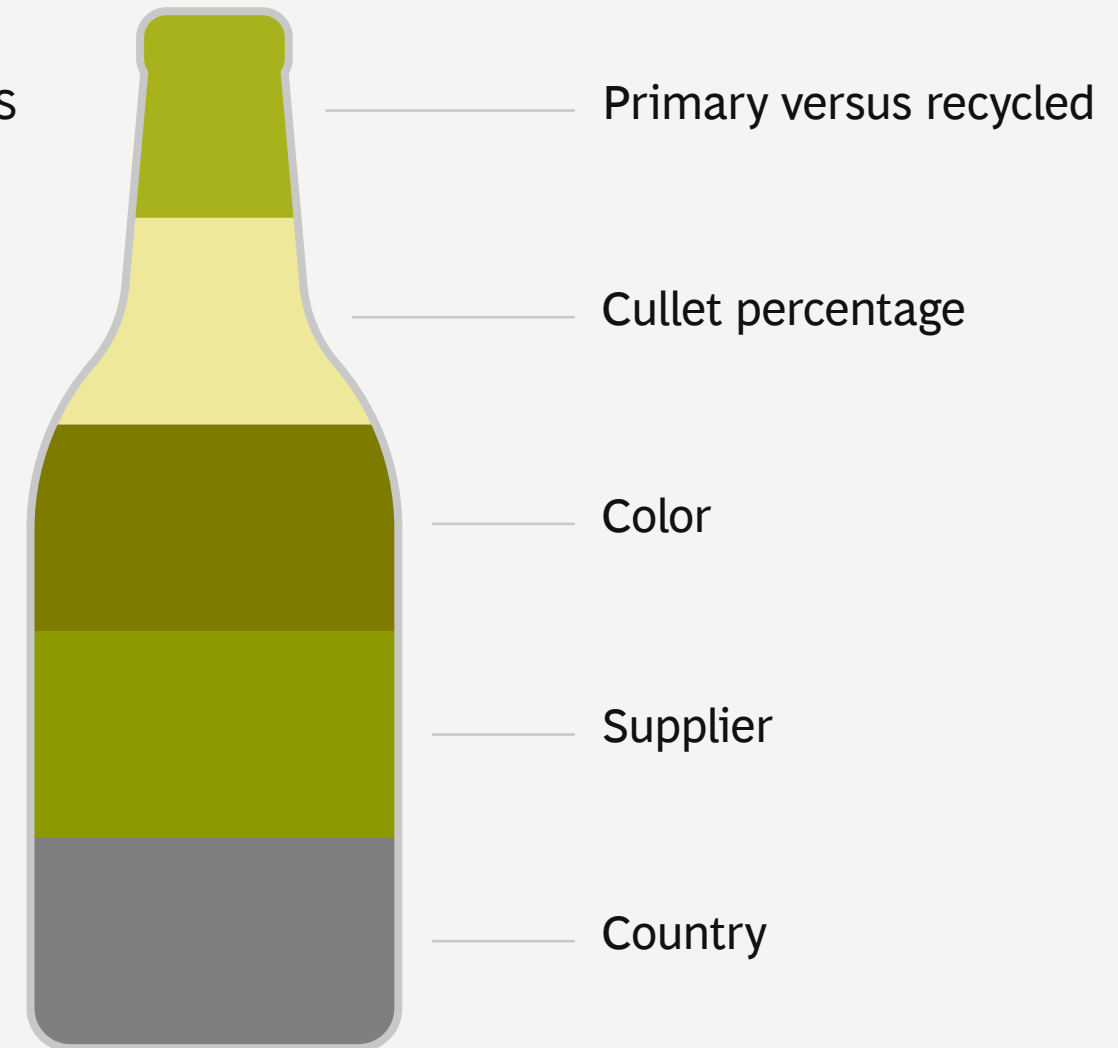
22% In addition, only 22% of respondents are working with most (more than 50%) of their third-party clients and suppliers to obtain external emissions data

Companies that do not break down emissions by input greatly underestimate the total

45%

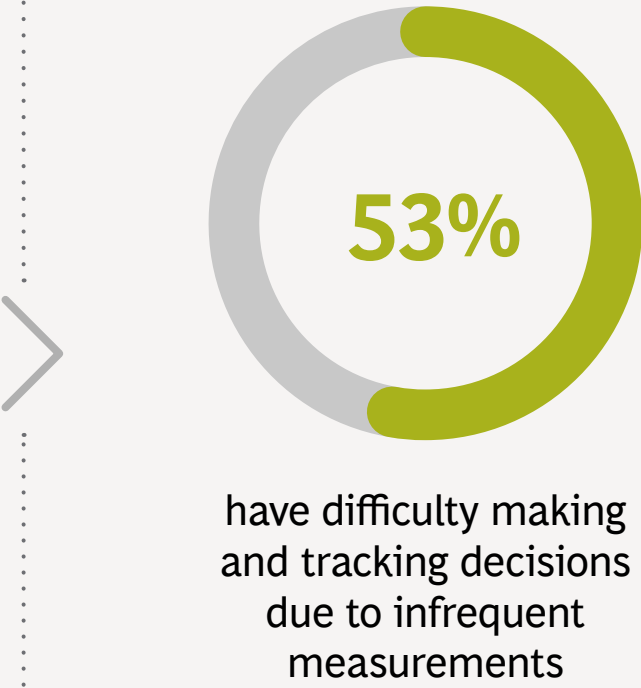
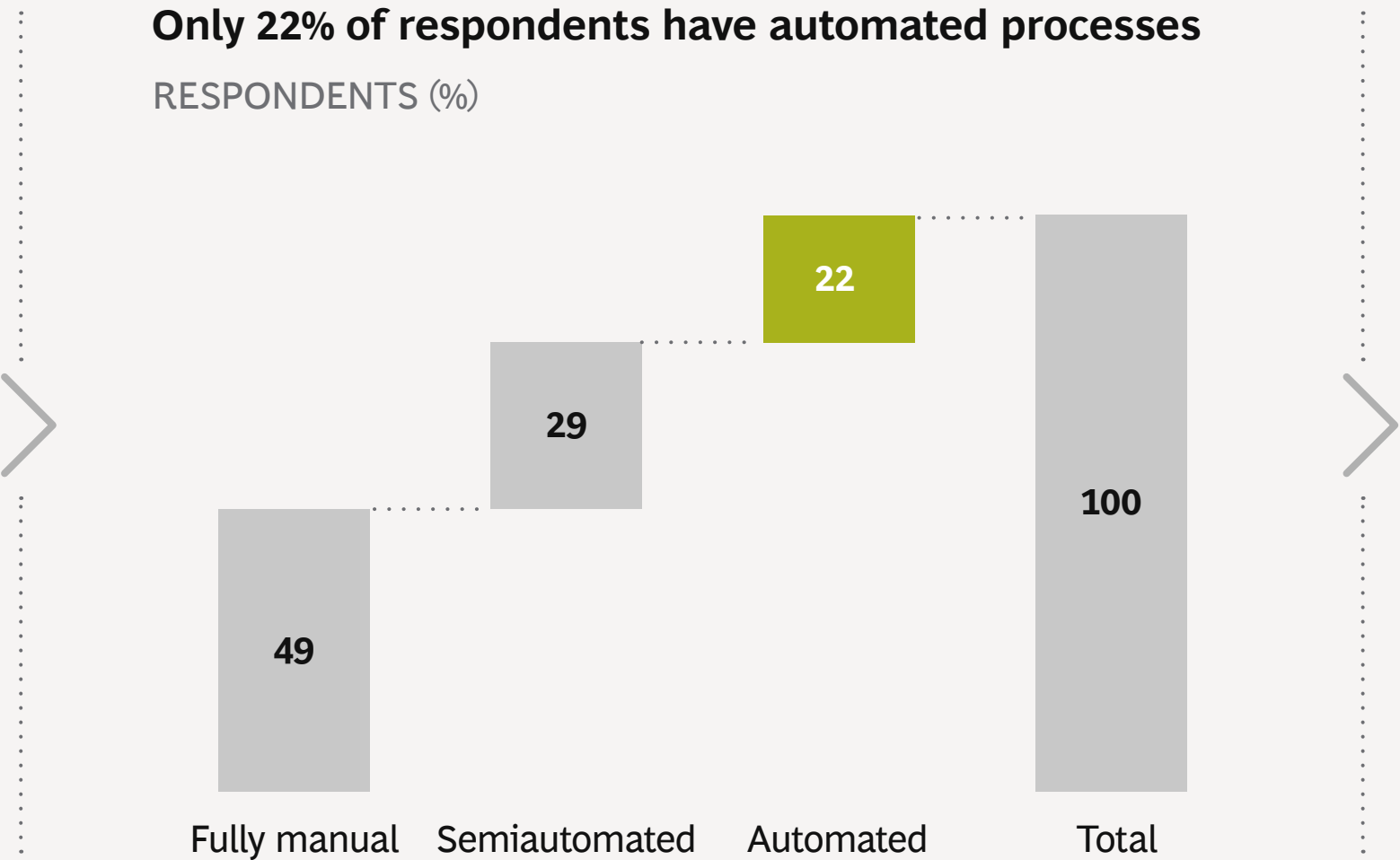
A spirits company found that its glass-based emissions were 45% higher than initially measured when broken down by input

SAMPLE EMISSIONS
BREAKDOWN

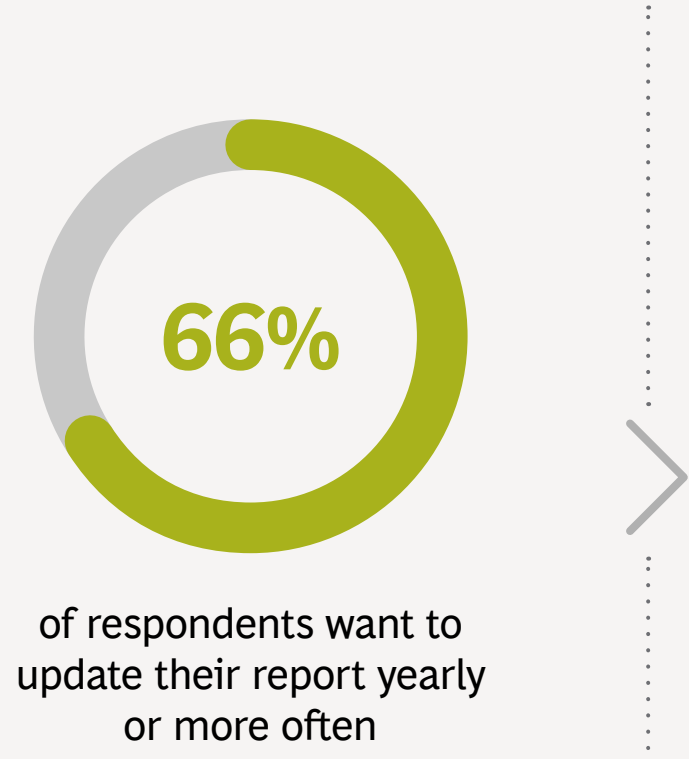


Companies are not measuring their emissions frequently and automatically

86%
of companies still
record and report their
emissions manually
using spreadsheets

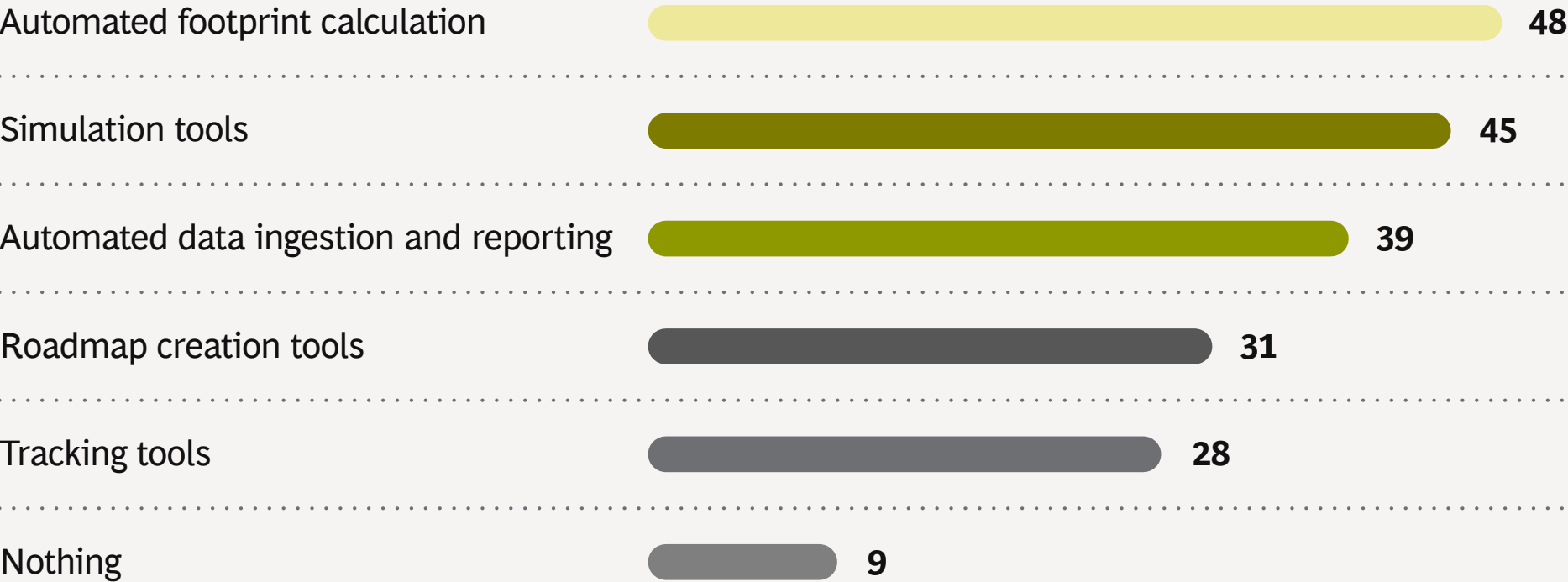


Companies want to be able to measure more often, but this will require new AI-based tools



Question: What are you missing today to get to the next level?

RESPONDENTS (%)



Source: BCG Carbon Measurement Survey, 2021.
Note: Respondents were able to give more than one answer.

AI can help companies get to the next level of measurement and support them on the journey to reducing their emissions

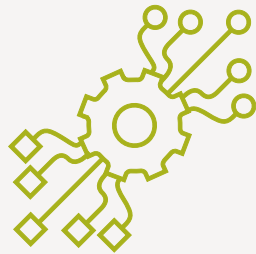
Emissions-reduction journey	Companies can use AI to:
Measure exhaustively, accurately, and frequently	<ul style="list-style-type: none">Automate data retrieval, cleaning, and matchingMake inferences about emissions produced along the value chainExtrapolate missing data
Set targets and identify the best initiatives for emissions reduction	<ul style="list-style-type: none">Simulate reduction initiatives and impactCreate optimized roadmaps
Ensure delivery	<ul style="list-style-type: none">Manage initiatives and large-scale programsTrack and report in real time
Be part of the reduction	<ul style="list-style-type: none">Perform direct, real-time optimization on processes that consume a lot of power, e.g., in facilities and for freight routing and loads

Companies have used AI to achieve the following emissions-reduction goals



One company accelerated its journey to net zero by using a simulation tool to prioritize retail initiatives...

...which allowed it to move up its net-zero target by 10 years, from 2050 to 2040



Another company used AI to optimize processes at a cement plant...

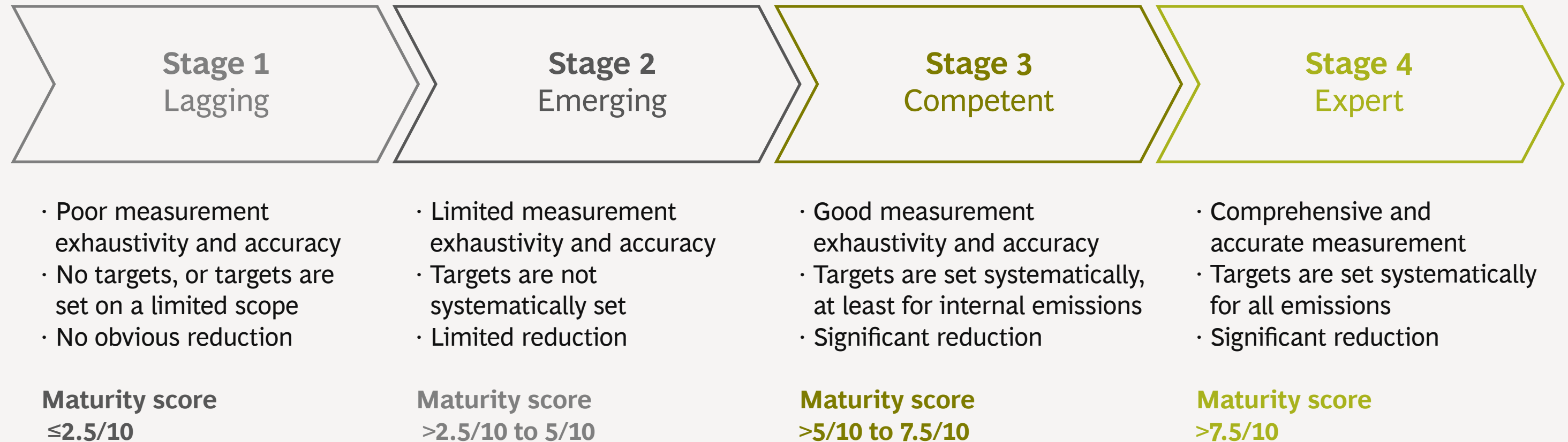
...which contributed to a 20% reduction in the company's industrial carbon emissions



A wine and spirits producer created an optimal working roadmap with prioritized initiatives...

...which gave the company the ability to bridge a 50% gap between its initial plans and ultimate target

Companies mature through four general stages of emissions measurement and reduction

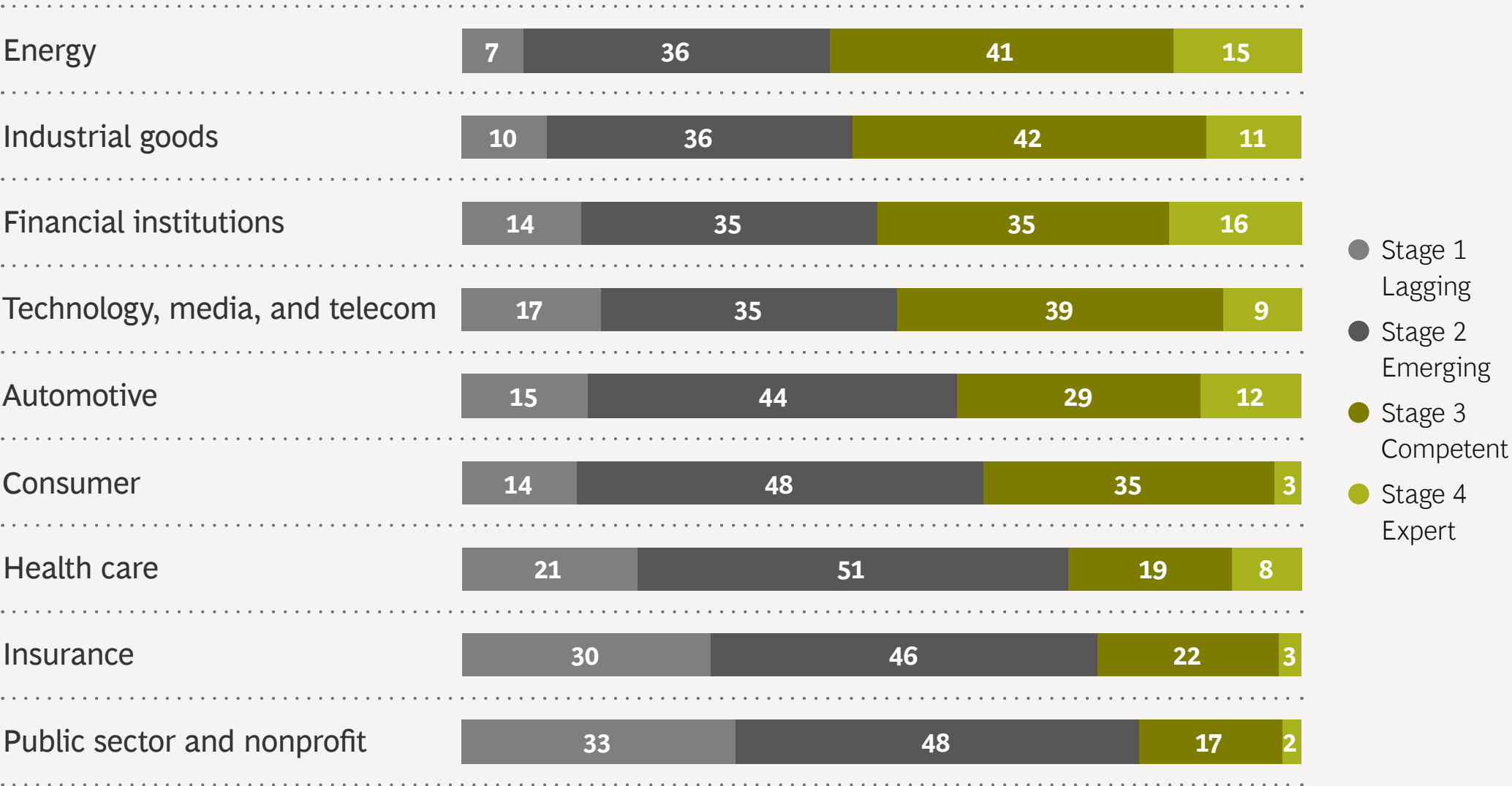


Sources: BCG Carbon Emissions Survey, 2021; BCG analysis.

Note: An organization's maturity score is determined by the average of various dimension-specific scores based on survey answers about emissions measurement (exhaustivity, accuracy, automatization, and frequency) and reduction (concern, target settings, equipment, and actual reduction). Across all organizations, the average dimension-specific score is 4.7.

Maturity levels vary by industry, determined largely by regulation and the relative focus on sustainability

PROPORTION OF ORGANIZATIONS (%)



- As expected, the **energy and industrial goods** industries are leading in maturity because of heavy regulation and the market’s high expectations of them
- **Financial institutions** also have high maturity levels, as explained by their history of strong compliance and risk management
- The **relative immaturity** of other industries represents a lack of sector-specific regulation and the nonprioritization of emissions reduction

Source: BCG analysis.
Note: Figures may not sum to 100 due to rounding.