SCIENCE-BASED TARGETS

A GUIDE FOR SETTING GREENHOUSE GAS EMISSIONS TARGETS INFORMED BY CLIMATE SCIENCE

WSP | PARSONS BRINCKERHOFF

INTRODUCTION

Climate change, caused by the accumulation of anthropogenic greenhouse gases (GHGs) in the atmosphere due to fossil fuel combustion and land use changes, is a defining challenge of our era. As a result, more frequent extreme weather has significant implications for global economies, ecosystems and quality of life.

Businesses have a critical role to play in the transition to a low-carbon economy by reducing GHG emissions while maintaining economic growth. While 80% of the 500 largest listed companies in the world have adopted GHG emissions reduction targets, most are short-term and incremental, falling short of the emissions reductions required to prevent significant climate change impacts.[1]

New guidance is available for companies to set emissions reduction targets based on climate science and take responsibility for their share of the emissions reductions required to mitigate climate change. In its latest Assessment Report (AR5), the Intergovernmental Panel on Climate Change (IPCC) identified a scenario that will likely limit global warming to an increase of 2°C above pre-industrial levels.[2] This scenario sets a total emissions limit that must not be exceeded over the next decades and forms the basis for science-based emissions reduction targets.[3]

By setting ambitious science-based targets, businesses will benefit from leading the way toward a low-carbon economy and achieve emissions reductions ahead of future requirements.

WHAT ARE SCIENCE-BASED TARGETS?

Companies have conventionally set GHG emissions reduction targets based on regulatory requirements, past performance, peer performance, and/or in response to guidance from industry-specific benchmarks. Often, these targets align with levels of performance that are conservative and reasonably achievable, irrespective of whether the resulting GHG emissions reductions will limit impacts associated with climate change.

SCIENCE-BASED TARGETS START FROM THE PREMISE THAT GLOBAL EMITTERS MUST LIMIT EMISSIONS WITHIN A CERTAIN CUMULATIVE THRESHOLD TO MITIGATE THE WORST EFFECTS OF CLIMATE CHANGE.

In contrast, science-based targets start from the premise that global emitters must limit emissions within a certain cumulative threshold to mitigate the worst effects of climate change. Science-based targets are defined based on a share of the global emissions limit allocated to companies based on factors such as the company's economic productivity, carbon intensity, or a combination of both.

The Science Based Targets Initiative (SBTI, led by CDP, United Nations Global Compact, World Resources Institute and World Wildlife Fund) defines science-based targets as those that are "in line with the level of decarbonization required to keep a global temperature increase below 2°C, compared to pre-industrial temperatures, as described in the Fifth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC AR5)."[4] At the organization-level, science-based targets reflect the company's share of required global emissions reductions.

See Table 1 for a summary of differences between conventional and science-based GHG targets.

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1 Science Based Targets (SBT), 2015, Sectoral Decarbonization Approach: A method for setting corporate emission reduction targets in line with climate science http://sciencebasedtargets.org/wp-content/uploads/2015/05/Sectoral-Decarbonization-Approach-Report.pdf

2 IPCC, 2014, Fifth Assessment Report (AR5), Working Group 3: Mitigation of Climate Change, https://www.ipcc.ch/report/ar5/

3 Science-based target guidance as of January 2016 is based on a 2°C scenario. The United Nations Climate Change Conference in Paris (COP21) in December 2015 reaffirmed the 2°C scenario, but also recommended that governments pursue efforts to limit warming to 1.5°C. Resources may become available in the future providing guidance on the 1.5°C scenario.

4 IPCC, 2014, Fifth Assessment Report (AR5), Working Group 3: Mitigation of Climate Change, https://www.ipcc.ch/report/ar5/

TABLE 1: CHARACTERISTICS OF CONVENTIONAL AND SCIENCE-BASED TARGETS

	CONVENTIONAL TARGETS	SCIENCE BASED-TARGETS
BASIS FOR TARGET	Regulations, past performance, peer performance, industry benchmarks, economic opportunities, what seems reasonably achievable	Equitable share of GHG emissions reductions required globally, based on thresholds identified by climate science (e.g., 2°C warming limit, 450 ppm atmospheric CO_2)
TIME FRAME	Often 5-10 years	5+ years; medium (2030) and long-term (2050) recommended
OUTCOME	May fall short of global reductions required to mitigate climate change	Designed to limit global warming to 2°C and prevent the worst impacts of climate change

WHY SET SCIENCE-BASED TARGETS?

The IPCC Assessment Reports are considered the most comprehensive compilation of the current state of scientific knowledge relevant to climate change. They define carbon limits and the consequences of excessive emissions. Setting targets based on IPCC data allows businesses to position themselves for impending change, with the following benefits:

INNOVATION / Companies are finding ways to strategically delink economic growth and productivity from carbon emissions, ensuring the possibility of future growth regardless of emissions constraints. Target-setting informs business strategy and may lead to the development of new, low-carbon processes, technologies, services, and products. Companies that have already started innovating raise the bar for others to follow suit.

PROFITABILITY / As new technologies are developed for the low carbon economy, companies may capture new revenue streams. Like conventional targets, science-based targets can encourage operational efficiency as well as reductions in material inputs and energy consumption, all of which reduce cost and emissions.

REPUTATION / More companies are realizing the reputational risks and opportunities of their actions in response to climate change and issues related. Corporate sustainability is becoming an expectation. As science-based targets proliferate, organizations that lag behind their peers could face reputational risks from climate-concerned stakeholders.

RISK MITIGATION AND RESILIENCE / Climate science is changing the regulatory and political landscape as more jurisdictions implement GHG control mechanisms, such as cap-and-trade, carbon taxes, mandatory disclosure and other carbon management requirements. Companies that have proactively assessed their carbon risks and understand their emissions mitigation opportunities will be better prepared for these voluntary and mandatory requirements.

SCIENCE-BASED TARGET-SETTING STEPS

A variety of methodologies exist to help companies set emissions reductions targets based on climate science. These methodologies differ both in their complexity and the stringency of their requirements.

The process for setting science-based targets is as follows:

FIGURE 1: SCIENCE-BASED TARGET-SETTING STEPS

GATHER INFORMATION

Science-based target-setting typically requires several company-specific baseline inputs, including: annual GHG emissions, activity level (a measure of output), and projected changes over time. The activity level can be measured by metrics of production (volume of materials produced, dollars of value added, gross domestic product contribution). See Table 2 for a summary of inputs and definitions.

In addition to baseline information, several methodologies require that companies define the sectors they work in and/or state their contribution to national or global gross domestic product (GDP). This information helps to determine what share of the global emissions capacity – the carbon budget – should be allocated to each company in proportion to its economic productivity. Many methodologies use economic intensity metrics as a basis for targets that seek to grow the economy while shrinking carbon emissions. For example, targets can be based on metrics of emissions per unit of economic value added (e.g., $gCO_2e/\$$).

TABLE 2: INPUTS TO SCIENCE-BASED TARGETS

TERM	DEFINITION	EXAMPLE
BASE YEAR	Year against which a reduction target will be set	2015
BASE YEAR GHG EMISSIONS	Emissions in the base year against which a reduction target will be set	51,000 mtCO_2e
ACTIVITY LEVEL	Activity associated with base year emissions level; could include material production (e.g., tons of cement), economic productivity (e.g., dollars of value added), or another variable metric of company activity	$1 million in value added
FORECAST CHANGES	Anticipated changes in company activity levels over time	Anticipated 20% growth in value added between 2015 and 2020
SECTOR	Category or categories in which the company operates; some methodologies use this information to define sector-specific targets based on differing sector characteristics and opportunities	Financial services, commercial real estate, energy generation, manufacturing

SET TARGETS

To set targets, the first step is to select a methodology for calculating a carbon budget. There are a number of methodologies that have been developed by NGOs including the Sectoral Decarbonization Approach, the 3% Solution calculator, and the Context-Based Carbon Metrics calculator. Consider your business goals and characteristics against the available methodologies and select the one that is most relevant to your business. See Appendix A for a comparison of science-based target-setting methodologies.

Some companies have developed their own target-setting methodologies based on climate science. This requires considering emissions thresholds or required changes identified by IPCC and others, then translating them into company-specific metrics and magnitudes of change over time. Ford Motor Company did this by translating the science-based emissions reduction pathways into emissions efficiency targets (gCO_2e/km) for its future light-duty vehicles.[4]

[4] Ford, The "CO_2 Model": The Science Behind Our Scientific Approach, http://corporate.ford.com/microsites/sustainability-report-2013-14/environment-climate-strategy-targets-model.html

When setting a science-based target, WSP | Parsons Brinckerhoff recommends that companies consider the following:

- Scope – the emissions sources included
- Time frame – the duration of the target period
- Ambition – the slope of the reduction curve
- Type – whether to set absolute targets, intensity targets, or both

Scope

Best practice is to set science-based targets covering company Scope 1 and Scope 2 emissions. Scope 1 emissions are direct emissions from fuel combustion and refrigerant leakage at company operations. Scope 2 emissions are indirect emissions from energy purchased and consumed by company operations, such as electricity. Targets should include all GHGs under the GHG Protocol Corporate Standard.

Scope 3 emissions may or may not be included in science-based target-setting at the discretion of the company or depending on the methodology used. For example, the SBTI requires that companies set targets for Scope 3 emissions when they constitute a substantial portion of the company's overall emissions footprint.[5] Scope 3 emissions from a company's upstream and downstream activities (e.g., supply chain, consumer use of products) can constitute the largest portion of the emissions footprint in some sectors.

Time Frame

Corporate science-based targets are often set with longer-term time frames to encourage enduring commitment to emissions management. Science-based targets reported to SBTI must span at least five years. SBTI also encourages companies to set mid- and long-term targets ending in 2030 and 2050.

Ambition

Science-based targets are designed to sufficiently limit global temperature increases by stipulating maximum emissions for companies. While science-based targets require ambitious reductions, some companies find room for further reductions beyond what is scientifically required. Ambition is also defined by achieving the target sooner than stipulated by science, through more rapid decarbonization.

SCIENCE-BASED TARGETS ARE DESIGNED TO SUFFICIENTLY LIMIT GLOBAL TEMPERATURE INCREASES BY STIPULATING MAXIMUM EMISSIONS FOR COMPANIES.

Type

The SBTI encourages companies to set both absolute and intensity-based targets. Absolute targets are reductions in total emissions, while intensity targets are reductions relative to a denominator such as economic productivity. Absolute targets take full responsibility for the required emissions reductions, regardless of changes in the denominator. Intensity targets can translate into compelling metrics to communicate to stakeholders, such as declining emissions per unit produced or dollar of value added. WSP | Parsons Brinckerhoff recommends setting complementary absolute and intensity targets. For example, set an absolute reduction target with one or more intensity targets to help achieve it.

COMMIT

Some methodologies include a public commitment to a target or time frame. SBTI asks companies to state their commitment and intention to set a science-based target, and then submit a second statement announcing the target once they have set it, within two years of their initial commitment. Companies that have made such commitments may be showcased on SBTI, CDP and the We Mean Business Coalition's websites, as well as other communications, publicly demonstrating their corporate responsibility.

[5] SBT, 2015, Science Based Targets: The Call to Action, http://sciencebasedtargets.org/wp-content/uploads/2015/05/Science-Based-Targets-call-to-action-brochure-web.pdf

REPORT AND REVIEW

Science-based targets should be reviewed on an annual basis to track progress relative to the anticipated emissions reduction path, and to make emissions adjustments and restatements as necessary. Some methodologies encourage companies to report progress and results on an annual basis.

Ahead of the United Nations Climate Change Conference in Paris (COP21) in December 2015, over 100 companies committed to setting science-based targets via the process outlined by SBTI. To date, 10 companies have had targets approved by SBTI[6] and others have announced targets that consider climate science. Examples of these targets are included in Table 3.

TABLE 3: EXAMPLE SCIENCE-BASED TARGETS

COMPANY	SECTOR	SCIENCE-BASED TARGET	METHODOLOGY
AUTODESK	Information Technology	Reduce carbon intensity by 9.08% each year from 2010-2020 from a 2009 base year	Corporate Finance Approach to Climate-Stabilizing Targets (C-FACT)
BT GROUP	Telecomms	Reduce Scope 1, 2, and 3 emissions per unit of value added (kgCO_2e/$) by 80% by 2020 from a 1996 base year	BT-developed Climate Stabilization Intensity (BT-CSI) model
ENEL	Utilities	Reduce Scope 1 emissions 25% per kWh by 2020, from a 2007 base year and operate at carbon neutrality by 2050	Eurelectric Initiative
FORD MOTOR COMPANY	Automotive Products	Reduce Scope 1 and 2 emissions by 30% per vehicle produced (mtCO_2e/vehicle) by 2025 and Scope 3 emissions from vehicle use by 48% per kilometer (gCO_2e/km) by 2030 from a 2010 base year	Ford-developed CO_2 stabilization pathway model based on the Model for the Assessment of Greenhouse Gas Induced Climate Change Developed by the National Center for Atmospheric Research
KELLOGG COMPANY	Consumer Staples	Reduce absolute Scope 1 and 2 emissions by 65% by 2050 and Scope 3 emissions by 20% by 2030 and 50% by 2050 from a 2015 base year	Kellogg-developed method based on the IPCC framework and data tested through the Sectoral Decarbonization Approach (SDA) and 3% Solution
L'OREAL	Consumer Staples	Reduce absolute Scope 1 and 2 emissions by 50% by 2015 and 60% by 2020 from 2005 base year	Sectoral Decarbonization Approach (SDA)
MARS	Consumer Staples	Reduce absolute Scope 1 and 2 emissions from direct operations by 25% by 2015 from a 2007 base year and eliminate these emissions by 2040; work on addressing Scope 3 emissions which constitute up to 86% of the company's GHG footprint	Mars-developed method based on IPCC-recommended 80% reduction by 2050
NRG ENERGY INC	Energy	Reduce absolute Scope 1, 2, and 3 emissions by 50% by 2030 and 90% by 2050 from a 2014 base year	Based on IPCC-recommended 80% reduction by 2050
SONY	Consumer Discretionary	Reduce Scope 1,2, and 3 emissions from operations by 42% from a 2000 base year by 2020 and reduce environmental footprint to zero by 2050, requiring a 90% reduction in emissions over 2008 levels by 2050	Based on IPCC-recommended 41%-71% reduction by 2050, from a 2010 base year
THALYS	Industrials	Reduce Scope 1, 2, and 3 emissions per passenger kilometer by 41.4% by 2020 from a 2008 base-year	Sector-specific approach developed in collaboration with WWF, based on IPCC data

[6] SBT, 2015, 114 Companies Commit to Set Ambitious Science-based Emissions Reduction Targets, Surpassing goal http://sciencebasedtargets.org/2015/12/08/114-companies-commit-to-set-ambitious-science-based-emissions-reduction-targets-surpassing-goal/

INTERVIEW WITH ERIC CHRISTENSEN

Eric Christensen is a Practice Leader on WSP | Parsons Brinckerhoff's Sustainability and Energy team, and serves on the Technical Advisory Group of the SBTI.

WHY ARE SCIENCE-BASED TARGETS NEEDED?

Target-setting is one of the most important aspects of effective GHG management. Some general benefits of setting targets are that they help to:

- Focus a company's attention on efforts needed to reduce emissions
- Act as a rallying point that can get all levels of the company involved
- Frame the concept of sustainability in more tangible terms, encouraging employees to feel involved in the company's sustainability program
- Demonstrate a company's commitment to reducing its impact on the global climate, which can benefit employee recruitment and retention and customer relationships
- Differentiate a company from its peers

There are two key benefits specific to setting a science-based target. First, such a target can help align individual company efforts with the broader recommendations made by the IPCC. Second, following a defined target-setting methodology can add structure and credibility to the target-setting process. One weakness of science-based target-setting methodologies is that they do not necessarily account for limitations the individual companies or sectors may have in making the reductions.

> USING A SCIENCE-BASED APPROACH ENSURES THAT THE TARGET IS ALIGNED WITH ACCEPTED CLIMATE SCIENCE TO ACHIEVE THE DESIRED OUTCOME OF LIMITING CLIMATE CHANGE IMPACTS.

Several factors have recently raised the profile of science-based targets: the release of the IPCC AR5, the development of the Science Based Targets Initiative and the support it has gained, and the inclusion of questions related to science-based targets in the 2016 CDP Climate Change information request.

The target that results from science-based target-setting is not necessarily different in ambition or ability to drive reductions than a target set in a different way. A company could arrive at a very aggressive reduction target using a variety of approaches. However, using a science-based target approach does ensure that the target is aligned with accepted climate science to achieve the desired outcome of limiting climate change impacts.

HOW WILL SCIENCE-BASED TARGET-SETTING INFLUENCE HOW COMPANIES MANAGE THEIR GREENHOUSE GAS EMISSIONS?

Part of the target-setting process is to assemble the appropriate team of individuals to define and approve the target. In our experience, it is best to have a cross-functional team that involves individuals in sustainability, energy, facilities, operations, and other areas. A multi-disciplinary team generates engagement and buy-in from different areas of the business and contributes to a better target.

Developing a high-quality greenhouse gas inventory is essential for accurate tracking of progress toward the target over time. Some companies feel most comfortable having a few years of inventory data gathered prior to setting the target. Other companies use the target-setting process as the launch of the inventory. We have seen both approaches be successful.

In 2016, CDP will begin asking responding companies if they have set science-based targets, so a company with such a target will have the opportunity for an improved CDP score in the future. Programs such as the Climate Leadership Awards provide recognition to companies that have set aggressive targets.

WHAT'S NEXT?

The development of science-based target-setting methodologies and tools is evolving rapidly. The SBTI launched the draft Sectoral Decarbonization Approach (SDA) methodology for comment at Paris Climate Week in May 2015, and as of January 2016, 116 companies have already committed to setting science-based targets. Science-based target setting was a side topic at COP21, and with the landmark agreement reached by representatives of 195 nations, reducing global GHG emissions will only become a more prominent focus for companies in developed and developing nations alike. As governments and businesses transition from commitment to action with regard to global climate change, establishing science-based emission reduction targets will become more commonplace.

Post-COP21, we expect that science-based targets will gain rapid traction in corporate carbon management. Historically, CDP's Climate Change information request has awarded points to leaders' scores for actions like carbon disclosure, target-setting, and performance improvement. In 2016, points will be awarded to businesses that have adopted science-based targets, so setting such targets will help boost a company's score, demonstrating climate leadership.

Science-based target-setting for businesses is relatively new. It is expected that this approach to carbon management will only gain prominence in the future, as recent events have already shown.

APPENDIX

COMPARISON OF SCIENCE-BASED TARGET-SETTING METHODOLOGIES

METHODOLOGY	REQUIRED COMPANY INFORMATION	STEPS	NOTES
Sectoral Decarbonization Approach (SDA)	• Activities and sectors • Activity levels • Commitment period • Annual activity growth rate • Electricity use • GHG emissions	1. Select base-year and target-year 2. Identify company sector(s) 3. Forecast activity in base year and target year 4. Estimate carbon intensity using Scope 1 and Scope 2 base year emissions 5. Estimate target intensity based on 2°C sector intensity using equations provided in the SDA 6. Estimate the absolute carbon budget by multiplying target intensity by forecast activity in the target year 7. Update target periodically to reflect changed company information and assumptions	• Developed by CDP, WRI, WWF and Ecofys • Assumes a global carbon budget of 1,055 Gt through 2050 based on scenarios aimed at limiting global warming to 2°C as developed by IEA and IPCC AR5 • Model allocates this budget as targets to companies within a sector, based on the sectoral contribution to the global GHG footprint, and the company's contribution to the sector's GHG footprint, as well as the company's activity and economic productivity; the model sees companies' carbon intensities converging on the target intensity for the sector by 2050 • Best suited to homogeneous, energy-intensive sectors such as: electricity generation; iron and steel; chemicals; aluminum; cement; pulp and paper; road, rail and air transport; and commercial buildings • Only applies to certain sectors; based on assumptions about economy that may change over time; included sectors represent up to 87% of global carbon budget up to 2050
3% Solution	• Sector(s) of operation • Emissions % by sector (if company represents more than one sector) • Base year • Base year total emissions • Expected change in company's market share from base year to 2020	• Input company information into online tool to calculate target	• Developed by WWF and CDP • Focuses on potential profits by achieving a science-based target

METHODOLOGY	REQUIRED COMPANY INFORMATION	STEPS	NOTES
BT's Climate Stabilization Intensity Target (BT-CSI)	• Emissions • Company's contribution to world gross domestic product (value added)	• Target is 9.6% reduction in emissions per unit of value added per year	• Target is calculated based on converging scientific consensus that developed nations must reduce emissions by 80% by 2050 from 1990 baseline in order to stabilize the climate, as well as current GDP growth rate of 5.9% per year
Corporate Finance Approach to Climate-Stabilizing Targets (C-FACT)	• Base year carbon footprint • Company's contribution to GDP • Carbon intensity ratio ($kgCO_2$/GDP contribution) • Company's forecast contribution to GDP • Carbon intensity reduction rate based on 2050 Climate Stabilization Target	1. Calculate required company information (base year carbon footprint, contribution to GDP, carbon intensity ratio, forecast contribution to GDP, derive carbon intensity reduction rate) • IPCC 2050 Climate Stabilization Target for developed nations requires an 85% absolute reduction 2. Publicly commit to achieve the target within a specified time frame 3. Annualize the target over the commitment time frame to derive annual targets 4. Update the model annually; update targets as necessary; publish annual performance results	• Developed by Autodesk; may be used to set city-level science-based targets

METHODOLOGY	REQUIRED COMPANY INFORMATION	STEPS	NOTES
CSO's Context-Based Carbon Metrics	• Company's value-added contributions to GDP • CO_2e emissions • Variable used for intensity measures (e.g., units of production)	• Input company information into provided tool to calculate company's annual allowable emissions	• Allowable emissions are calculated based on a scenario to limit climate change presented in AR5
GEVA – GHG Emissions per Unit of Value Added	• GHG emissions per unit of value added (GEVA)	• Target is 5% reduction per year in GEVA	• Based on the assumption that the global economy continues to grow at the historical rate of 3.5% per year

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At WSP | Parsons Brinckerhoff, we work closely with our clients to shape strategic and sustainable approaches to improving business performance and reporting in a carbon conscious economy. We help our clients quantify and report GHG emissions and identify, evaluate, and implement cost effective means to achieve GHG reductions. We also assist our clients in participating in voluntary GHG management programs and complying with mandatory GHG regulations. Our sustainability and energy team has a proven track record with many organizations, several of which we have worked with for more than a decade. We have been providing these services since 1995 and have assisted over 100 clients develop GHG inventories, including recent support advising on inventory changes required by the Scope 2 guidance.

WSP | Parsons Brinckerhoff's GHG management services are complemented by technical capability in sustainable energy, climate preparedness, and sustainability strategy, positioning us to manage a diverse array of sustainability issues for clients across sectors. Investigate our sustainability and energy capabilities at **www.wsp-pb.com/sustain**.

For more information on setting science-based targets or WSP | Parsons Brinckerhoff's sustainability and energy services, please contact our team:

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