

# Defining Net-Zero

Addressing climate change requires a clear, bold explanation of our shared global goal



**Peter Boyd and Casey R. Pickett**

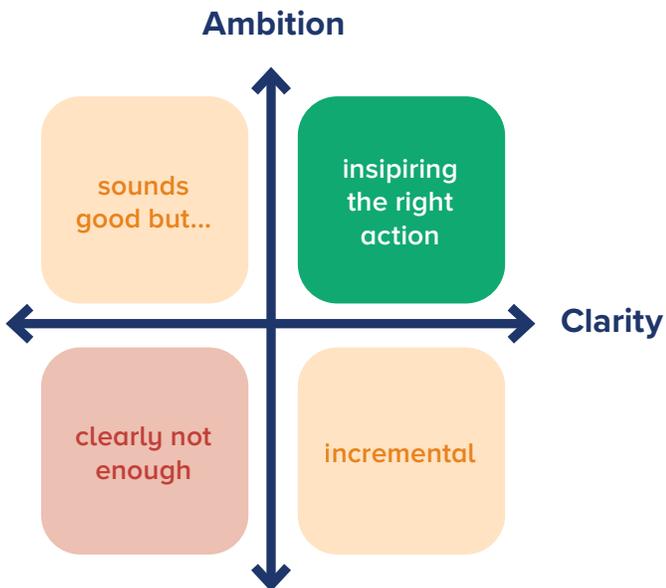
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## Executive Summary

### Every company needs its own clear and ambitious goal for the world to meet its carbon goal

Reaching the goals of the 2015 Paris Agreement will require ambitious actions from all sectors and levels of our society. But just as a college graduate in a job interview falls short when describing life goals as simply “success,” any Chief Sustainability Officer also falls short when simply citing “a net-zero world” as a strategic goal. High ambition alone could almost be considered a sleight-of-hand trick. At the other extreme, a crystal-clear set of cautious environmental improvements is not bold enough in this time of emergency. How to steer between the rut of clear but moderate ambitions and the sheer wall of green perfection? Along with raising climate ambition, we suggest dedicating brainpower to improve the *clarity* of climate goals to meet the Paris Agreement’s aim of net-zero global emissions by mid-century.



Start by considering what “net-zero carbon emissions” conjures in your mind. The idea may feel clear enough at a global scale: carbon output has fallen to a level in balance with natural and engineered means of absorption. What matters ultimately is that the world achieves net-zero emissions. In that sense, no single organization’s emissions matter all that much. Yet to reach and then surpass net-zero emissions globally, most entities need to be on a reduction and removal path that pulls down the trajectory of global emissions. If entities think their emissions do not matter, we are all in trouble. In this sense, each of our emissions are, in fact, important<sup>1</sup>. But what does the world’s carbon budget imply for a single factory’s output, or a software company’s electricity use, or a landlord’s capex? All this can get murky fast. This is why we argue for a consistent definition of ‘Net-

Zero’ that organizations, companies, cities, and countries can use. If we are to maximize the probability of a just transition to a sustainable society, all actors have to explain what they mean by ‘net-zero’ in addition to their intended *deadlines and paths*.<sup>2</sup>

<sup>1</sup> *Democracy* may serve as a useful analogy. Many who live in a democracy value the system and their right to vote but realize that their single vote cannot sway an election. The right, and indeed the duty, to others is still considered vital.

<sup>2</sup> This paper focuses on clarity of definition. This is a crucial early step. It is equally important to develop a clear path of climate action: what actions, when, and how?

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In that spirit, we suggest four measurable criteria for any undertaking of ‘net-zero’ (lower case indicating anyone using the term) to be worthy of capitalizing to ‘Net-Zero’. In our refreshed and robust definition, a strategy for ‘Net-Zero’ greenhouse gas emissions earns its capital letters if it is: **Fully-Scoped, Science-Based, Paris-Agreement-Compliant, and Cumulative**.

Each descriptive term imparts a dimension of clarity. ‘Net-Zero’ can be a powerful and useful goal at the sub-global level if the entity embraces a concept of ‘Net-Zero’ that is:

- 1 **Fully-Scoped:** articulating the entity’s defined scope of responsibility. This should include all greenhouse gas emissions from scope 1 (owned and controlled sources); scope 2 (indirect and purchased sources); and scope 3 (value chain—both upstream and downstream);<sup>3</sup>
- 2 **Science-Based:** incorporating a destination-based<sup>4</sup> target for ‘Net-Zero’ that demonstrates the actor is assuming bold, appropriate responsibility for emissions reductions consistent with the Paris Agreement and *at least* proportional to its contribution to climate change;
- 3 **Paris-Agreement-Compliant:** specifying if and to what extent carbon credits and external investments in carbon removal factor into the strategy. Any offsetting investments should be linked to the global carbon budget as defined in the Paris Agreement;
- 4 **Cumulative:** accurately acknowledging the entity’s historical emissions of greenhouse gases, not just their current level.

We have three hopes for this work. First, it should help entities shape climate goals with more precision. Second, the descriptive adjectives above might eventually become core to the general understanding of the term, ‘Net-Zero’ such that when an entity is on track to achieve ‘Net-Zero’, stakeholders would know that it is considering and accounting for all four factors above. Our third hope is that ambitious, clear targets lead to an orientation that helps actors become “Climate Positive” rather than just aiming for ‘Net-Zero’. “Climate positive” is an increasingly-used alternative to “carbon negative” that emphasizes the benefits of aggressive climate action. ‘Net-Zero’ would then survive as a well-defined marker that many actors leave behind—ideally well before 2050. (In the lead-up to the next global climate talks in Glasgow, the UN champions of the “Race To Zero” campaign are calling for net-zero targets “in the 2040’s”). Ultimately, we hope that a clear, ubiquitous definition will help guide the world’s transition past ‘Net-Zero’ to true sustainability and a climate-positive, restorative back-half of the century.

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3 US EPA. n.d. “Scope 3 Inventory Guidance.” Accessed June 3, 2020. <https://www.epa.gov/climateleadership/scope-3-inventory-guidance>.

4 By “destination-based” we mean to distinguish an absolute target from a relative one. Many climate targets are relative, for example, “80% less emissions than our 1990 baseline.” Relative targets do not tell a reader if their achievement is consistent with a world in carbon balance. Destination-based targets do.

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## Ambition and Clarity at the Global Level

To get to clarity, let's describe where the concept now sits. The Paris Agreement, agreed in 2015 and ratified the following year, created a vital destination-based target for the world. It set the objective of "Holding the increase in the global average temperature to well below 2 degrees Celsius above pre-industrial levels and to pursue efforts to limit the temperature increase to 1.5..." by achieving "...a balance between anthropogenic emissions by sources and removals by sinks of greenhouse gases in the second half of the century, on the basis of equity, and in the context of sustainable development and efforts to eradicate poverty."<sup>5</sup>

While the first phrase, from Article 2, outlines the temperature target, Article 4 effectively defines net-zero greenhouse gas emissions as reducing human-caused emissions to the level that natural climate solutions and other methods of CO<sub>2</sub> storage and removal can effectively absorb. It succinctly describes a global state of ecological balance, even if the results of *past* emissions have not been fully absorbed. If this state is achieved by mid-century, and if emissions decline further to net-negativity in the back half of the century, maintaining a 1.5 °C world becomes likely.<sup>6</sup>

Paris-Agreement goals build on strong conclusions from the Intergovernmental Panel on Climate Change's recent assessment<sup>7</sup> and the US Government's own 4th National Climate Assessment.<sup>8</sup> A recent report just released in *Bioscience*<sup>9</sup> listing 11,000 scientists as contributing authors was equally unequivocal. We must adjust course dramatically and achieve net-zero emissions by 2050 if we are to avert the worst impacts of climate change and remain on target for 1.5 °C of warming. These global goals transmit across language, culture and ideology. They are vital to the transition to a sustainable world, but their applicability and measurability tend to burn off on impact as they enter a single enterprise.

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- 5 UNFCCC. 2015. "Paris Agreement." 3–4. Accessed June 3, 2020. [https://unfccc.int/sites/default/files/english\\_paris\\_agreement.pdf](https://unfccc.int/sites/default/files/english_paris_agreement.pdf).
  - 6 Rogelj, J., Luderer, G., Pietzcker, R. et al. 2015. "Energy system transformations for limiting end-of-century warming to below 1.5 °C." *Nature Climate Change* 5: 519–527. <https://www.nature.com/articles/nclimate2572>.
  - 7 IPCC, 2018: Global warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty [V. Masson-Delmotte, P. Zhai, H. O. Pörtner, D. Roberts, J. Skea, P.R. Shukla, A. Pirani, W. Moufouma-Okia, C. Péan, R. Pidcock, S. Connors, J. B. R. Matthews, Y. Chen, X. Zhou, M. I. Gomis, E. Lonnoy, T. Maycock, M. Tignor, T. Waterfield (eds.)]. In Press. <https://www.ipcc.ch/sr15/>.
  - 8 U.S. Global Change Research Program. 2018. "Fourth National Climate Assessment." Vol. II. <https://nca2018.globalchange.gov/downloads/>.
  - 9 Ripple, William J., Christopher Wolf, et al. 2020. "World Scientists' Warning of a Climate Emergency." *BioScience* 70, no. 1 (January): 8–12. <https://academic.oup.com/bioscience/advance-article/doi/10.1093/biosci/bizo88/5610806>.

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## Ambition and Clarity Beneath the Global Level

From the volume of ‘net-zero’ commitments, of course, you would hope each proclaimer knew what the term meant for their operations. Across the world, the volume of climate commitments has been growing rapidly for the past decade, among states, provinces, companies and municipalities of all sizes. The We Mean Business coalition has encouraged and recorded private-sector commitments since 2015. At time of writing, over 1,200 companies have made public climate commitments across a series of well-developed categories. City mayors have been doing the same through forums such as the Global Covenant of Mayors for Climate & Energy and C40. In the former, 9,000 municipalities could potentially achieve savings of 1.4–2.8 gigatons CO<sub>2</sub> equivalent versus Business as Usual if their combined pledges are achieved.

Where does ‘net-zero’ net out in these commitments? Some of these commitments clearly articulate goals, techniques and timing. Many do not. Some of the commitments include room for flexibility, often by design, to create a wide net of inclusivity and attract more signatories. Well and good; but with four UN climate conferences behind us since Paris and the next important gathering in Glasgow delayed a year to 2021, it is time to tighten definitions—especially concerning the mid-century destination of net-zero. That starts with taking stock of the definitions leaders use for climate action.

## The Many Flavors of Climate Action

Climate-action targets currently come in various flavors. The variety can inspire and pace emissions reductions, but it can also cloud an entity’s contribution to the Paris Agreement goal. Some entities frame their commitment in terms of freedom from fossil fuels. Others use energy efficiency targets, or renewables as a percentage of energy consumption. While honorable and helpful, these goals are imprecise subsets of a comprehensive ‘Net-Zero’ goal. While organizations will likely continue to announce goals in this way, movement leaders can learn to adjust them to the four-point capitalized ‘Net-Zero’ threshold.

Such single-flavor definitions can be pragmatic and effective for motivating action. Steve Howard, while serving as IKEA’s Chief Sustainability Officer, deployed a powerful example of a narrow goal in IKEA’s RE100 announcement.<sup>10</sup> He knew that 100% renewable energy was a crucial goal for such a big organization. “If we used a 90% or 80% target, too many people could think they qualified for being in the 10% or 20%. With a 100% goal, we know we are all in, with no excuses or exceptions.”<sup>11</sup> That makes

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<sup>10</sup> RE100. n.d. IKEA renewable energy commitment. Accessed June 3, 2020. <http://there100.org/ikea>.

<sup>11</sup> Steve Howard. 2015. Speech at We Mean Business Coalition conference.

for credible messaging and galvanizes action within IKEA, but like other standalone commitments, it leaves the rest of the world to assemble their own equipment for reaching net-zero emissions.

‘Carbon neutral’ is another term widely used to define climate action targets, often understood as a synonym of ‘net-zero,’ yet the terms normally imply a crucial difference. A ‘net-zero’ target communicates the entity is focusing on reducing its own emissions as a key element of its goal. ‘Carbon neutrality’ communicates that an entity has paid for emissions reductions by other entities, or ‘offset’ its emissions, without necessarily reducing its own emissions or changing its own behavior in a substantive way. To get to our formulation for ‘Net-Zero,’ a carbon-neutral enterprise needs to act decisively to cut all scopes of emissions and only consider off-site investments to neutralize the residual emissions balance they could not reduce on their own.<sup>12</sup>

Clearly defining what “net-zero by mid-century” means for a nation is hard, and it is even harder for states, cities and organizations. The UK became the world’s first major economy to put a ‘net-zero by 2050’ target into law, defining ‘net-zero’ as “reducing UK’s emissions so they are less than or equal to the emissions the UK removes.”<sup>13</sup> In the corporate realm, leaders of The B Team were among the first to pledge a ‘net-zero by 2050’ target in 2015 with an accompanying definition. Their open letter to the UNFCCC<sup>14</sup> included their definition, though it was arguably too long and left much room for flexibility.<sup>15</sup> While laudable for their ambition and leadership, these definitions (and others) seem ready for four clarifying descriptors to improve and tighten the definition of ‘Net-Zero’ for all.

## Clarifying Descriptors for Net-Zero

### 1: ‘Fully-Scoped’

The power of a net-zero target springs from its flexibility. It should apply at all levels, from the globe down through nations, organizations and cities, to projects, households and individuals. For the world to achieve global net-zero emissions, all relevant entities should assume responsibility for direct emissions

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<sup>12</sup> This implication is the perception of the authors and we acknowledge this is neither a proven nor self-evident fact. Perhaps there is follow-on research to analyze, e.g., How many articles mentioning ‘carbon neutral’ targets have extensive coverage of mitigation actions vs articles mentioning ‘Net-Zero’ ambition?

<sup>13</sup> Twidale, Susanna. 2019. “Britain’s new net zero emissions target becomes law.” *Reuters*, June 27, 2019. <https://www.reuters.com/article/us-climate-change-britain/britains-new-net-zero-emissions-target-becomes-law-idUSKCN1T5155>.

<sup>14</sup> The United Nations Framework Convention on Climate Change secretariat is the United Nations entity tasked with supporting the global response to the threat of climate change.

<sup>15</sup> Branson, Richard, Jochen Zeitz et al. 2015. “B Team Open Letter Calls for Bold Climate Action at COP21 in Paris.” February 5, 2015. Accessed June 3, 2020. <https://bteam.org/our-thinking/news/b-team-open-letter-calls-for-bold-climate-action-at-cop21-in-paris>.

caused by sources they own and control (scope 1), and indirect emissions from sources purchased to create those emissions—typically electricity and heat generation from utilities (scope 2). Scope 3 emissions are created by upstream and downstream activities an entity does not own or control that are related to its products and services.

If every entity in the world achieves net-zero emissions for scopes 1 and 2, the world should expect to realize an equilibrium among sources and sinks of emissions. But this leaves no margin for error. A more airtight approach would acknowledge that some entities are not targeting boldly enough and would task those that can act more assertively with responsibility for scope 3. For example, Unilever’s “Wash at 30” campaign arose from internal analysis that showed most of their ‘full-scope’ emissions were caused by consumers *using* their products—in this case washing with hotter water than needed to clean clothes given the detergent technology Unilever now provides.

Volkswagen, bouncing back from their diesel-emissions scandal, presented at World Climate Summit 2019 a fully comprehensive value chain analysis showing that only 15% of their targeted emissions reductions to comply with the Paris Agreement are from their vehicle production and supply chain. Meanwhile, emissions from the fuel supply and customers driving vehicles accounted for 79%. For Volkswagen, assuming responsibility for scopes 1–3 is propelling a more ambitious corporate strategy (with cleaner, electric-powered cars at its heart) and in turn a beneficial impact on world CO<sub>2</sub> emissions. We define “Fully-Scoped” as assuming responsibility for scopes 1–3 upstream and downstream.<sup>16</sup>

While scope 1, 2 and 3 emissions warrant discussion here, ‘Fully-Scoped’ should include all greenhouse gases<sup>17</sup> and not just carbon dioxide. We recommend that this is made explicit within the concept of ‘Fully-Scoped’: i.e., all activities, all gases.

## 2: ‘Science-Based’

Science-Based Targets “provide companies with a clearly defined pathway to future-proof growth by specifying how much and how quickly they need to reduce their greenhouse gas emissions<sup>18</sup>.” The targeting process involves a widely-accepted methodology from the World Resources Institute, CDP,

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<sup>16</sup> US EPA. n.d. “Greenhouse Gases at EPA.” Accessed June 3, 2020. <https://www.epa.gov/greeningepa/greenhouse-gases-epa>.

<sup>17</sup> Greenhouse gases are “any gas that has the property of absorbing infrared radiation (net heat energy) emitted from Earth’s surface and reradiating it back to Earth’s surface, thus contributing to the greenhouse effect. Carbon dioxide, methane and water vapour are the most important greenhouse gases. (To a lesser extent, surface-level ozone, nitrous oxides, and fluorinated gases also trap infrared radiation.)” Encyclopedia Britannica. n.d. “Greenhouse gas.” Accessed June 3, 2020. <https://www.britannica.com/science/greenhouse-gas>.

<sup>18</sup> Science Based Targets. n.d. “What is a Science Based Target?” Accessed June 3, 2020. <https://sciencebasedtargets.org/what-is-a-science-based-target/>.

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UN Global Compact and World Wildlife Fund to calculate reduction pathways for different sectors. That methodology apportions the Paris Agreement's emissions-reduction goals to each entity according to their capacity to reduce. The methodology helps organizations calculate the emissions reductions to target in accordance with any of three aligned approaches: A sector-based division of the global carbon budget; an absolute approach based on emissions reductions required; and an approach that uses an entity's relative economic contribution to determine its emissions reduction target. As of December 2019, over 740 companies had committed to science-based targets.

Science-based targets are also aligned to the pursuit of business opportunity. At the World Climate Summit 2019, McKinsey & Co. laid out four critical areas of emissions reduction: Energy efficiency; electrifying power demand while shifting to a zero-carbon grid; eliminating deforestation and restoring/ reforesting land at scale; and addressing non-CO<sub>2</sub> greenhouse gases (predominantly NO<sub>2</sub> and methane from crops and cows).<sup>19</sup> While not all four of these areas are applicable to every actor, when coupled with science-based targets their framework (and others similar) can help most entities navigate the actions to take and assume their appropriate share of the global emissions-reduction goal.

This sets up a model approach for actors to measure their impact. Keeping global temperature rise under 1.5°–2° C requires leaders to focus their slide decks and strategies on both the *total* amount of global emissions reductions and detailed accountability for each actor's *share* of the total. To say an entity's net-zero target or pathway is science-based communicates that the entity has considered its appropriate obligations under the Paris Agreement and has set its emissions-reduction target accordingly.

As leaders sharpen their perspective on what their organizations must do, they can also help improve the Science-Based Targets Initiative. Unlike countries' submissions to the UNFCCC, under science-based targets, companies set and measure their own carbon inventory levels and can adopt their own standards that may be at odds with methods laid out in the Paris Agreement. Science-Based Targets are not yet subject to independent verification—another difference that should be corrected to align more tightly with the Paris Agreement.

### 3: 'Paris-Agreement-Compliant'

In many sectors, leaders will need to purchase carbon credits, or invest in negative emissions technologies, in order to offset the emissions they cannot reduce on their own account. These outside-entity investments *can* help us all along the journey to a net-zero world *if* they are tied to the global carbon budget. To achieve this, the credit needs to be counted in the appropriate nation's single, unified Greenhouse Gas Inventory. Only then will the credit be netted against the nation's other carbon sources

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<sup>19</sup> McKinsey & Co. Presentation at World Climate Summit 2019, building on their 1.5° scenario work and "Global Energy Perspective 2019." Accessed June 3. [https://www.mckinsey.com/~media/McKinsey/Industries/Oil and Gas/Our Insights/Global Energy Perspective 2019/McKinsey-Energy-Insights-Global-Energy-Perspective-2019\\_Reference-Case-Summary.ashx](https://www.mckinsey.com/~media/McKinsey/Industries/Oil%20and%20Gas/Our%20Insights/Global%20Energy%20Perspective%202019/McKinsey-Energy-Insights-Global-Energy-Perspective-2019_Reference-Case-Summary.ashx).

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(e.g. logging and carbon-emitting factories) and sinks (e.g. forest preservation, afforestation, etc.); and only then will there be a unified picture of reality at the global level.

When compliant with the Paris Agreement, carbon credits have an important part to play in global emissions reduction. Some sectors, even if they are on track to meet Science-Based Targets, will not achieve net-zero on their own. They will need to supplement their reductions. Ask any hardworking CSO in metals, mining and shipping, and you may hear about algorithms and incentives to drive aggressive emissions reductions while cost-effective technology to reduce emissions to zero are not yet in sight. Some industrial entities will require always-on connectivity to a power grid that may remain above zero-carbon. At that remove, such emissions sit outside the organization's control. So, an outfit that selects high-quality verified carbon credits from reputable sources can achieve measurable carbon impact.

The main sources of carbon removal—soil, plants, and engineered systems that absorb and hold pollutants—warrant measurement. In a net-zero world, natural carbon sinks can balance remaining human-caused emissions. Smaller industrial economies with efficient infrastructure and production capacity, and developing countries with large natural resources, such as rainforests, can remove more carbon from the atmosphere than they emit—making them “climate-positive.” Several sectors can become “climate-positive,” especially if emissions reductions are funded by offset investments from hard-to-abate sectors. If done carefully, carbon credits can enable countries, companies and communities to be carbon neutral, ensuring their emissions are balanced by another entity's real CO<sub>2</sub> reductions.

Most organizations fund these sinks, though, by purchasing carbon credits in a flawed marketplace. Our mission to exhort leaders to define their climate path does not qualify us to prescribe fixes; there are others that do this well. However, encouraging directions announced at COP25—e.g. by REDD.plus—point to some fixes on the horizon. Today, double-counting thwarts credits' verifiability. When a country issues a carbon credit, it should be clear which country's nationally-determined contribution is affected by the recorded reduction. The reduction should appear in the donor's ledger or the ledger of the country where the project takes place, but not as a credit to both countries. We suggest if the purchaser of Paris Agreement-compliant credits—say, Norway using its state funds to pay for afforestation in Gabon—is retiring enough credits to offset their defined activity, then they could be considered carbon neutral while on a trajectory toward 'Net-Zero'.

Different approaches will affect nationally determined contributions in different ways. Instead of purchasing carbon credits, a company could create quantifiable projects themselves, (think tree plantings) or investments in negative emissions technologies, to remove carbon dioxide from the air. While these emissions-reduction activities could appeal to that company more than purchasing carbon credits, they might not be captured in the relevant nation's nationally determined contribution as part of the Paris Agreement, and therefore would not contribute to global carbon budget accounting. To encourage consistent measurement toward the global goal, the full definition of 'Net-Zero' requires an entity to say explicitly to what extent it is relying on carbon credits and external investments, to what standards

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these credits are verified, and to which nationally-determined contributions they apply. Then they will be counted in the global carbon budget compliant and in line with the Paris Agreement.

## 4: ‘Cumulative’

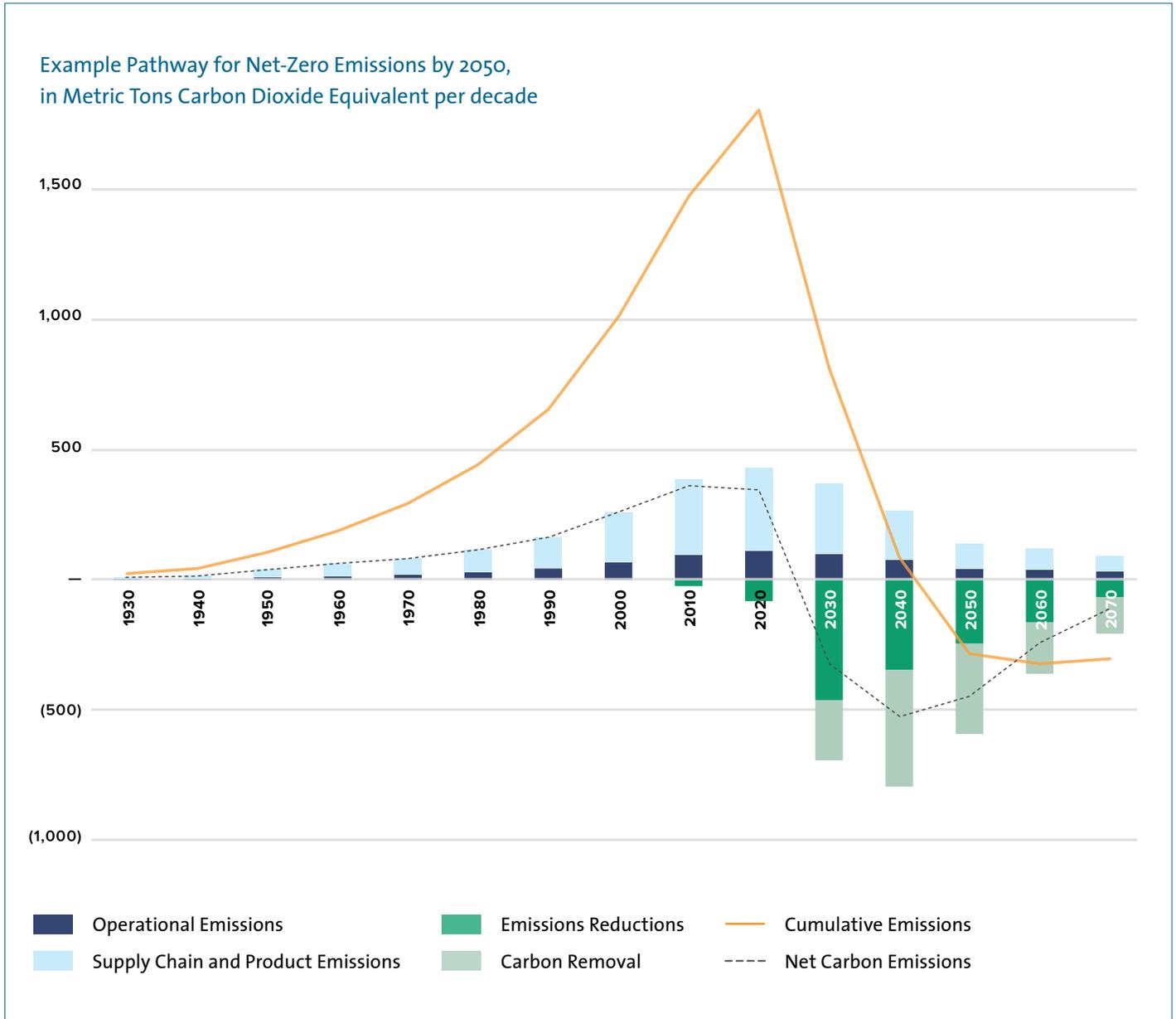
Now it gets tougher; sustainability leaders need to account for all the carbon they’ve helped send into the atmosphere before they can head toward ‘Net-Zero.’ Logic supports this. If a customer kept going to their favorite store and leaving with goods without paying, then started paying for goods after a certain number of visits, the shopkeeper would reasonably expect the customer to settle their old tab at some point. Only then would the shopkeeper be paid in full. On Earth, scientists track the response of the world’s natural systems to historic emissions. For decades, developed countries and older companies and institutions have been emitting greenhouse gases. Even fully-scoped, science-based, Paris-Agreement-compliant emissions reductions that start today would not eliminate that historical debt.

A fourth descriptor—‘Cumulative’—would strengthen the definition of ‘Net-Zero.’ It would also encourage developed nations and companies to fund the just transition to a sustainable future; not with unlimited liability but instead surrounded by some rational boundaries. These entities could calculate their historic emissions debt and fund carbon credits at a significant scale to help the less-wealthy preserve the natural resources on which we all depend. Entities could also invest in carbon removal (just at a significantly higher cost per ton than preserving developing-countries’ forests). The key is to calculate how many tons of emissions long-term emitters have produced *before* they achieve net-zero emissions for the first time, and to purchase carbon credits to settle the full tab for the entity’s life up to that point.

The issue is not theoretical. CO<sub>2</sub> and some other greenhouse gases, once emitted, remain in the atmosphere for over 100 years. The vast majority of global GHG emissions occurred within the last 80 years. For greenhouse gases like carbon dioxide, nitrous oxide, HFC-23, and sulphur hexafluoride, most of the molecules ever emitted by human activity are still up there, trapping the sun’s energy and warming the planet. Like a debt owed to a shopkeeper, nothing substitutes for repayment.

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Leaders who follow these steps to clarity may well experience a ‘U-curve’ of various emotions; potentially encountering thoughts of denial, anger and bargaining while confronting the deeds of the past; before emerging with acceptance and a focus on forward progress.<sup>20</sup> With diligence and collaboration, they will finally have a robust sustainability answer for the next generation and the developing world alike.

<sup>20</sup> Kübler-Ross Elisabeth, and David Kessler. 2014. *On grief & grieving: finding the meaning of grief through the five stages of loss*. New York: Scribner.

## MICROSOFT NET-ZERO BY 2050—A BEST-PRACTICE TARGET?

Microsoft's definition and target of 'carbon negativity by 2030'<sup>21</sup> harmonizes with the approach we outlined in the main article. Planners and evaluators can use the four descriptors to discuss, applaud and challenge their statement.

- **Fully-Scoped:** Microsoft has defined its responsibility across Scopes 1, 2 and 3 (with a jargon-light explainer video). The inclusion of Scope 3 emissions sets Microsoft apart. Typical of companies with a complex product range and large reach, its direct emissions are dwarfed by those from its supply chain and its products in consumer use and disposal.
- **Science-Based:** Microsoft's historic commitment to reducing what it calls "operational carbon emissions" runs across several years with reference to peer-reviewed science. All tech companies can do likewise.
- **Paris-Agreement-Compliant:** Microsoft has correctly spotted that historical carbon credits available for purchase have not been issued by nations themselves, nor tied to independent assessments of any nation's carbon budget as part of the Paris Agreement. Microsoft seems to view sparing trees as secondary to planting new ones, and appears to conclude that investing in expensive technologies for reduction and removal is preferable to transferring wealth to developing countries to prevent deforestation. In fact, preventing deforestation and preserving existing forest cover is crucial to achieving Paris Agreement goals<sup>22</sup>). Despite their current view on forest carbon with which we disagree, the company has left its options open for future changes in direction.
- **Cumulative:** Most resonant, Microsoft is pledging to account for all previous emissions by 2050. This is a significant challenge from a 45-year-old technology company to older industrials and younger tech companies alike. Putting it into practice can create methodologies, develop staff experience, and potentially define a new space for intellectual and investment growth.

Microsoft's approach is the first we have seen that has thoughtfully addressed all four criteria for a comprehensive 'Net-Zero' strategy. It sets a new bar for companies of any age.

<sup>21</sup> Microsoft. 2020. "Microsoft will be carbon negative by 2030." Accessed June 3, 2020. <https://blogs.microsoft.com/blog/2020/01/16/microsoft-will-be-carbon-negative-by-2030/>.

<sup>22</sup> 22Sourcing analysis for scalability of abatement solutions (McKinsey Global Institute, Global Carbon Budget 2015, Coalition for Rainforest Nations) the top three sectoral abatement opportunities are Forests & Agriculture (estimated 10–12 Gt pa), Power at 10Gt pa, and Industry at 8Gt pa

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## Next Steps

### Fully-Scoped, Science-Based, Paris-Agreement-Compliant, Cumulative ‘Net-Zero’

Together, let’s achieve ‘Net-Zero’ emissions across the globe. To do that, let’s agree and rally around one definition of success. This definition should include bold and clear concepts of scope; assume proportional responsibility of definite, ambitious reductions trajectories; include only Paris-Agreement-compliant carbon credits or investments; and it should account for our historic responsibility. When clearly defined, ‘Net-Zero’ will be an increasingly powerful conceptual tool to help focus the world’s response on the climate crisis.

We have launched a research project that includes a survey to collect views on how stakeholders define and approach ‘Net-Zero.’ Please take the survey and share it with others: [bit.ly/DefineNetZero](https://bit.ly/DefineNetZero).

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## Authors

**Peter Boyd** is Lecturer at the Yale School of the Environment; Resident Fellow at the Center for Business and the Environment; Lecturer in the Practice of Management at the School of Management (Executive MBA); and Mentor-in-Residence at Yale's Tsai Center for Innovative Thinking. Outside Yale, he is Founder & CEO of Time4Good, focused on helping Leaders and their teams build purpose-driven paths to maximum positive impact. He also serves as an Advisor to REDD.plus and Chair of the 'Sustainable Westport Advisory Team' in Connecticut. He is former Launch Director and COO of Sir Richard Branson's Carbon War Room; former Chair of The Energy Efficiency Deployment Office for the UK Department of Energy & Climate Change; and helped lead The B Team's 'Net-Zero by 2050' initiative, focused on business encouragement of an ambitious Paris Agreement at COP21.

**Casey R. Pickett** is Director of the Yale Carbon Charge, where he experiments with, and expands public understanding of, internal carbon pricing systems. He co-wrote and co-edited the [Internal Carbon Pricing in Higher Education Toolkit](#). He works with Yale's Carbon Offsets Program and supports Yale's senior leaders on special projects related to climate change. He served as Director of Innovation for Connecticut's Economic Development department and is a graduate of the Yale School of Management, and Yale School of the Environment. He has a background in startups, green building, and political organizing.

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July 2020