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This working document is a synthesis of insights and feedback gathered through research and a series of activities conducted since late 2012 in a collaborative project to develop a “gold-standard benchmark” for sustainable business. This draft document has been compiled for review, comment, feedback, and suggestions by leaders in the sustainable business field. Following a public comment period and piloting with key stakeholder groups, “Version 1.0” will be released in late 2014 as a free, open source common good under a Creative Commons licence agreement. The Natural Step will maintain stewardship of the benchmark and will release periodic future versions.

Project Team

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2 [Pong Leung bio](http://www.thenaturalstepcanada.ca/about/our-team/pong-leung), The Natural Step Canada website.
3 [Bob Willard bio](http://sustainabilityadvantage.com/about-bob-willard/), Sustainability Advantage website.
4 [Antony Upward bio](http://www.stronglysustainablebusiness.ca/), Edward Jones Consulting website.
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Introduction

The Big Picture

In this paradigm-shifting photo of our little blue spaceship suspended in the universe, only water, air / clouds, and land are visible. People / human society and the economy are invisibly nested within it. The photo reminds us of a stark reality: there is no umbilical cord going somewhere else, so we must live within the carrying capacity of our finite planet. Our continued existence depends on how well we steward our natural resources to ensure our social and economic sustainability. If we mess up our ecosystem, we are in serious trouble.

For 99.9% of human history, we have just been one species amongst many, living within the limits imposed by the boundaries of our island orb floating in the universe. But in the past 250 years we have greatly expanded our numbers from under one billion to 7.2 billion, trending toward over 10 billion by 2050. Unfortunately, our collateral damage to the ecosystem that enables life to flourish has matched this pace. Humans are now, whether we like it or not, the most invasive species on the planet and the force behind the greatest changes that this planet has ever seen. Recognizing this reality, scientists suggest that we are in a new geological epoch, the Anthropocene, a proposed term for the time since the Industrial Revolution during which humanity has had a dominant impact on the planet.

The nested dependencies model in Figure 1 reflects our interdependent reality. Human society is a wholly owned subsidiary of the environment—without food, clean water, fresh air, fertile soil, and other natural resources, we are out of business. If we bankrupt nature’s ability to support human well-being, and we bankrupt society’s ability to satisfy human needs, then the economy will go bankrupt.

The nested dependency model reinforces that nature is, in fact, in charge. Occasional earthquakes, tsunamis, and volcanic eruptions remind us of this. It’s up to us as the human species to resiliently adapt to our new environment, especially if we are increasing the severity of “natural disasters” like hurricanes, floods, droughts, and landslides by accelerating climate destabilization. If we can’t adapt and figure out how to live, work, and play together on our planet without destroying its ability to support us, we risk the slow extinction for our species.

What does this have to do with business? Our current business models are predicated on the false assumption that the planet’s resources are infinite and that limitless growth is a good thing. We’ve been drawing down our natural capital instead of living off its interest. Any financial planner knows that is unsustainable. We need to transition to sustainable business models and position companies to thrive in a new, more realistic economy.
Companies are the most important and influential actors on the planet. If they were designed to be sustainable, they would trigger a sea change in society toward more sustainable behavior. That is why we are starting with the business community. We need its help and influence to transition for unsustainable organizational models to truly sustainable organizational models.

How Would We Recognize a Truly Sustainable Business?

What distinguishes true leaders in the sustainable business movement is their ability to drive innovation by articulating a compelling vision for their business and monitoring performance relative to that vision. They ask, “How much closer are we to being truly sustainable?” instead of “How much less unsustainable are we this year than we were last year?”

This begs the question, “How would we recognize a truly sustainable business if we saw one?”

That simple question deserves a simple answer. Sustainability experts are good at describing how a business would perform if it were more sustainable. It is time that we put a stake in the ground and described how a company would perform if it were totally sustainable, operating in harmony with the nested dependency reality. That is, we need a “gold-standard” benchmark for a truly sustainable business.

A truly sustainable business creates positive financial, social, and natural capital. A gold-standard benchmark for a truly sustainable business includes key performance indicators (KPIs)
with accompanying goals that clearly define what that visionary goal line looks like—so that we will recognize companies that have reached it when we see them.

A Fourth Benchmark for a Truly Sustainable Business

For years, we have been rating and ranking organizations on their environmental, social, and governance (ESG) attributes. For years, organizations have been reporting on their progress on the sustainability front and these efforts have been helping organizations improve their sustainability performance. So what’s the problem?

Global sustainability megaforces are relentlessly gathering momentum. We are rapidly approaching tipping points on many ecosystem issues, after which recovery will be problematic. We are lulling ourselves into thinking we are making sufficient progress—that all will be well if we just keep nudging ourselves forward at more or less our current course and speed. Why?

Companies and raters use three insufficient and misleading sustainability benchmarks.

1. **Performance in a baseline year**
   The business compares its performance today on an environmental or social issue to its performance on that issue in a previous year. Progress is expressed as a percentage improvement, or is plotted against several previous years to show a trend line.

2. **Performance goal in a future year**
   The firm compares its performance today on an environmental or social issue to its performance goal that for that issue in a future year. There may be several future goals, such as five-year goals or ten-year goals, or a 2020 goal and a 2050 goal as is common for greenhouse gas emissions.

3. **Other company performance**
   The company compares its performance today on an environmental or social issue to the performance of other companies on that issue. The external baseline could be the performance of a specific company, an average performance of other companies in the firm’s sector, or an average of all companies under consideration. This approach is most commonly used when rating and ranking companies on their sustainability performance.

Using the above three benchmarks to assess progress on sustainability can be deceptive. The unintended consequences of their use may be celebration of laggards who easily make big incremental improvements because they were so far behind; celebration of companies with anemic goals; or celebration of the best of a bad lot.

Note that the third benchmark compares the company’s performance with another company’s performance. It does not compare the companies’ goals, which would be futile. When
expressing their goals, companies use different base years, different absolute and relative measures, different time horizons, different intensity ratios, different boundaries … different everything, as shown in Figure 1 from Deloitte’s “Toward Zero Impact Growth” report.13

Figure 2: The Fog of Company Sustainability Goals

Using the above three benchmarks is like steering a car by looking in the rear-view mirror, or by just making sure that we are making better time than others on the road. While the rear-view mirror provides some useful information, it is insufficient to guide a driver to his or her final destination. We should instead judge our progress by how much closer we are to our ultimate destination—in this case, being a truly sustainable business. We need a fourth benchmark.

4. **Gold-standard performance benchmark**
   The company’s sustainability performance is compared with how it would perform if it were a truly sustainable business—one that creates positive environmental, social, and economic value so that we have the possibility of sustaining a flourishing ecosystem and human society on our finite planet.14

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14 Mark McElroy, “Groundbreaking Study Reveals Shortcomings of Conventional Sustainability Metrics,” Sustainable Brands, September 26, 2012. The article explains why context-based metrics are preferable to absolute or relative metrics when assessing sustainability performance.
This benchmark puts a stake in the ground and declares the characteristics of a truly sustainable business. It is the “gold-standard” yardstick against which company sustainability performance should be compared. Following Stephen Covey’s advice, it helps us begin with the end in mind.  

![THE FOURTH BENCHMARK](image)

**Figure 3: The Fourth Benchmark**

Why hasn’t this kind of benchmark been part of the mix before? The first three benchmarks are all that are required when assessing company financial success: How is it doing compared to last year? How is it doing on its declared financial goals? How do its financial ratios look relative to other comparable companies? The notion of a boundary or limit or finish line for company financial success is heresy. Since they are the norm when assessing financial performance, we assume the same three benchmark frameworks are adequate and appropriate when assessing sustainability performance.

However, environmental, social, and governance (ESG) performance is a different story. Companies need to know how much is enough—how their business model is enabling them to operate within environmental and social boundary conditions that must be respected for human society to have the possibility of thriving on a finite planet (see Appendix D). So companies need a fourth benchmark that is derived from those larger environmental and social design principles.

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Rest assured that using the KPIs and goals in the fourth benchmark facilitates the same benefits as using the other three. First, the continuous improvement assessment provided by the first benchmark is a by-product of using the fourth gold-standard benchmark, since it shows how much closer the company is to the ultimate goal line compared to previous years. Second, measurement of progress toward sustainability goals is enhanced, since the gold-standard benchmark goals becomes the company’s new, more ambitious ultimate goals. Third, by comparing two companies’ progress toward the KPI goal lines in the fourth benchmark, we still have the benefit of the third benchmark which helps us rank leaders.

Why It Is Called a “Gold-Standard Benchmark”

There are three reasons that we call this a “gold-standard benchmark”.

- The highest level of performance at an Olympic event is rewarded with a gold medal. The “gold” part of “gold-standard” signifies that companies deserve a gold medal when they attain the level of sustainability performance described by the benchmark’s rigorous, science-based KPIs and goals.
- A monetary system that is based on a “gold standard” has a clear foundation on which to measure the value of its currency. Some sustainability KPIs may require new units of measurement. The gold-standard benchmark defines the new currency by which to assess the value of a company’s environmental and social impacts.
- “Gold-standard” is a hyphenated adjective, modifying the noun “benchmark.” This is a new benchmark, not a new standard. It is a benchmark which can be integrated into existing standards, rather than competing with them. It complements them. Rating and ranking efforts can accelerate the sustainable business movement by integrating this fourth benchmark into their proprietary methodologies.

Five Benefits of a Gold-standard Benchmark

The fourth benchmark retains the benefits of the other three benchmarks, plus it adds five more benefits.

1. It provides clear metrics for intangibles

Sustainability acknowledges the importance of intangibles like ecosystem services, human capital, and social capital. One lament in the business community about sustainability is that it is difficult to measure its associated intangible / non-financial assets in business-relevant metrics. Gold-standard performance benchmark KPIs use metrics that are material to a company’s success. They promote sustainability literacy in the business community, since performance criteria are expressed in clear, relevant, measurable, relevant goals. The benchmark blows the fog away from the finish line and gives a clear line of sight in a company’s race to the top.
2. **It creates a sense of urgency**

As companies wake up to the scale of the sustainability challenges they face, they experience a sense of urgency. Executives and employees see the gap between where they are now and how far they need to go, and make capital allocations on high-leverage programs to accelerate progress. The gold-standard sustainability performance benchmark contains quantified goals that generate action and spur us on to get to the goal line … in time.

3. **It raises the bar and sparks innovation**

A gold-standard sustainability performance benchmark describes the desired end steady state for the business. A rigorous benchmark sparks transformational approaches to being a great company, not incremental approaches toward being less bad. Leadership literature is replete with stories about how aspirational goals / Big Hairy Audacious Goals (BHAGs) / compelling visions unleash innovative thinking. The gold-standard benchmark is a BHAG. “How much closer to sustainable success are we?” is a far more compelling question than “How much less unsustainable are we?” There is nothing like a “mission impossible” moon-shot to energize and unleash stakeholders’ out-of-the-box thinking to create an exciting transformational path to the desired destination. Stretch goals energize creative thinking, convey importance, and compel action. “Zero waste” stimulates more creative strategies than “reduce waste by 10 percent.”

4. **It identifies true leaders and best practices**

If we want to find which companies are the most sustainable on the planet, why don’t we just check the ranked list? Because there isn’t one. Several lists purport to be the list. A lack of consistency among companies that are highly ranked on various lists of sustainable companies suggests diverse assessment criteria. Many of the raters’ methodologies are proprietary so we can’t check their criteria, weightings, or approach, which may undermine trust and confuse decision-making. The lack of transparent standards makes it difficult to tell the difference between a ‘good company’ and just good marketing. We need a gold-standard performance benchmark so that we can assess all companies against an agreed upon and transparent set of criteria for a truly sustainable business; agree on the leading companies; and learn from their best practices.

5. **It helps identify material sustainability issues**

Over 100 sustainability raters administer sustainability questionnaires to thousands of companies worldwide. Each rating / ranking organization has its own pet issues, phraseology, and metrics, leading to survey fatigue. We need to cut through the clutter. One way to do so is to focus on issues that are material. “Materiality” used to refer to performance information that would be necessary for a reasonable investor to make informed investment decisions. These days, investors need to know more than the company’s financial track record and its financial risk and opportunities going forward. Sustainability factors that are material to other important stakeholders are, by definition, material to company success. Company success is material to investors. So, if sustainability performance is material to other important stakeholders like...
governments / regulators, lenders, communities, customers, and the environment, it is also material to investors.

Seven Reasons That This Benchmark Is Timely

Not only are there good reasons to develop a gold-standard benchmark, there are good reasons to develop it now. Ten years ago, it might have been too soon to develop this benchmark. Ten years from now, it may be too late. There are at least seven reasons that now is the right time to create a gold-standard benchmark for sustainability performance.

1. **Leading companies are ready**
The business community has already started to set gold-standard sustainability performance benchmark-like goals for their environmental initiatives. Wal-Mart, GM, Ford, Toyota, Subaru, Unilever, PepsiCo, P&G, Kraft, Supervalu, DuPont, Kimberley Clark, Caterpillar, and others have embarked on zero-waste initiatives. California has introduced legislation that requires all new commercial buildings to be zero-net-energy (ZNE) by 2030, and new residential buildings to be ZNE by 2020. Interface is using its “Mission Zero\(^\text{16}\) to climb “Mount Sustainability” by 2020. These leading companies know that attaining these stretch goals will make them stronger, more resilient, and more successful. Aggressive “zero” or “100%” goals for KPIs in the gold-standard benchmark will not shock them. They already agree with them.

2. **Important stakeholders are ready**
Investors, consumers, employees, and other important stakeholders are holding corporations to higher and higher standards on their sustainability performance. They expect companies to not only withstand global sustainability megaforces described in reason #6 below, they expect them to proactively address such issues and flourish as they capture associated opportunities. Easier access to information and the ability of social media to share information quickly means that good news can be spread easily, but inappropriate behavior can't be hidden for long.

- **Investors**: Attention to sustainability is now a proxy for good governance. Over 80% of companies’ market valuation is intangible / nonfinancial and much of that is related to the companies’ track record on sustainability. Long-term investors (vs. “churn and burn” gamblers) seeking a high-value deal flow want to know what the company is doing to protect its market capitalization and add to it. A gold-standard performance benchmark provides investment analysts with consistent, material, and auditable benchmark indicators by which to holistically assess companies’ tangible and intangible assets / value, as well as to assess how the management team is avoiding emerging financial and nonfinancial risks.

- **Procurement officers**: Increasingly, large procurers are held accountable for environmental and social impacts throughout their value chains. Assessing the

\(^{16}\) Mission Zero, Interface website.
sustainability characteristics of suppliers against a gold-standard benchmark gives procurement officers a consistent, measurable metric by which to compare suppliers.

- **Consumers**: The public is paying more attention to the ecological and social impacts of the companies that make or sell the products that they buy. A sustainability rating against a gold-standard performance benchmark makes it easier to identify responsible companies that have proactive sustainability initiatives.

- **Employees**: There is increasing evidence that employees care about environmental and social issues. They want to know how their company is doing today on its sustainability challenges and projects. Top talent can be choosy. Employees whose values resonate with company values and focus are more likely to stay with that company.

- **Prospective employees**: Top talent is paying more attention to the ecological and social impacts of the companies that interview them. Many of them are looking for companies whose values resonate with their own. A sustainability rating against a gold-standard sustainability performance benchmark makes it easy for applicants to compare companies, just as companies compare applicants.

- **Researchers**: When comparing the performance of sustainable companies against the rest, we need to provide better guidance to researchers about which companies to include in their study sample. Otherwise, their findings will be suspect. As is often heard in computing circles, GIGO: Garbage In, Garbage Out.

- **Raters**: Raters of companies are realizing that they need to agree on their criteria to protect their credibility and legitimacy. The gold-standard benchmark defines excellence in sustainability. Raters can then decide which subset or weighting of issues in the benchmark best suits their users’ interests.

- **Suppliers**: Companies are being asked more pointed questions about their business-to-business customers these days. Just as firms are now accountable for their suppliers’ impacts and footprints, so too are they beginning to be accountable for their customers’ use of their products and services. The popularity of the Principles of Responsible Investment is an early signal that this thinking is taking hold in the financial community with suppliers of capital.

- **Communities**: As communities strive to become more resilient and sustainable, they may have special incentives to attract and retain like-minded corporate citizens.

**3. Capitalism is ready**

There is a growing understanding that the game of business as we have played it for the last 150 years cannot continue. The current rules of the game often reward companies that privatize
benefits and gains, socialize harm and losses, and either under-price risk or fail to identify material sustainability risks. As Peter Bakker, president of the World Business Council on Sustainable Development,\textsuperscript{17} says, “Business as usual is not an option for a future-proofed economy in which nine billion people live well within the limits of the planet by mid-century.”

Yesterday’s capitalism has created much good in the world, and much harm. It is based on free market economic theory that assumes that there are no negative environmental externalities from economic activity; that the planet can infinitely absorb our effluents; and that the planet provides us with an infinite supply of raw materials for economic growth. It is obvious that this is wishful thinking and is simply not true.

Too often, today’s business models encourage companies to relentlessly deplete our natural capital and to use nature as a dump. Nature is resilient and self-regenerative, but there is an ecological tipping point beyond which it cannot recover from this abuse. The same is true for society. The widening gap between the haves and have-nots is unhealthy, dangerous, and unsustainable.

Cumulatively, these harms have a growing impact on human and other life. Increasingly people can see that this accumulation of impacts is not sustainable. Yesterday’s capitalism has been served notice. It’s been fun, but it is not sustainable. It is obsolete and is a candidate for creative destruction. In their milestone Harvard Business Review article, “Creating Shared Value,”\textsuperscript{18} Michael Porter and Daniel Kramer declared that “capitalism is under siege” and that we need to “reinvent capitalism to unleash a wave of innovation and growth.” Allen White, in his “Capitalism needs rethinking but what are the options?”\textsuperscript{19} article in the Guardian Professional observed: “If financial wealth, the paramount metric of contemporary company performance, is built on the unsustainable or unjust extraction of other forms of capital, the long-term prospect for business is grim.”

When we reinvent capitalism, what should we call it? There is no lack of labels for a more environmentally and socially sustainable version of capitalism: John Elkington and Volans label it “Breakthrough Capitalism;”\textsuperscript{20} Corporate Knights calls it “Clean Capitalism;”\textsuperscript{21} Bill Gates and Warren Buffet used \textit{Creative Capitalism}\textsuperscript{22} as the title of their book; Al Gore and David Blood call

\begin{footnotesize}
\textsuperscript{17} Quote from \textit{Peter Bakker’s speech to The Prince’s Accounting for Sustainability Forum}, December 2012.
\textsuperscript{19} Allen L. White, “Capitalism needs rethinking but what are the options?” The Guardian Professional, April 2013.
\textsuperscript{20} “Breakthrough Capitalism,” Breakthrough Capitalism website.
\textsuperscript{21} “Clean Capitalism Defined,” Corporate Knights website.
\end{footnotesize}
it “Sustainable Capitalism;” Nicholas Shaxson uses “Responsible Capitalism;” and Michael Townsend and Brad Zarnett call it “Capitalism 2.0.” That’s the label we will use.

Gleaned from these sources and more, the attributes of today’s Capitalism 1.0 are contrasted with tomorrow’s Capitalism 2.0 in this table.

**Table 1: Capitalism 1.0 vs. Capitalism 2.0**

<table>
<thead>
<tr>
<th>Purpose of the Firm</th>
<th>Capitalism 1.0</th>
<th>Capitalism 2.0</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Maximize shareholder value; Short-term</td>
<td>Maximize stakeholder value; Short- and Long-term</td>
</tr>
<tr>
<td>Legitimate capitals</td>
<td>Financial</td>
<td>Financial, Natural, Social, Human</td>
</tr>
<tr>
<td>Bottom lines</td>
<td>Profit</td>
<td>Profit, Planet, People</td>
</tr>
<tr>
<td>Strategic focus</td>
<td>Growth; Consumption</td>
<td>Stakeholder well-being</td>
</tr>
<tr>
<td>Source of financial capital</td>
<td>Stock market; Big financial institutions; Absentee owners</td>
<td>Smaller financial institutions; Crowd sourcing; Customers; Employees; Local communities; Shared ownership</td>
</tr>
<tr>
<td>Market focus</td>
<td>Global</td>
<td>More local</td>
</tr>
<tr>
<td>Negative impacts</td>
<td>Externalized</td>
<td>Internalized</td>
</tr>
<tr>
<td>Boundaries</td>
<td>The firm</td>
<td>The firm’s value chain</td>
</tr>
<tr>
<td>Transparency</td>
<td>As little as possible</td>
<td>Naked</td>
</tr>
<tr>
<td>Business model</td>
<td>Sell products; Take-Make-Waste; Linear</td>
<td>Sell services; Borrow-Use-Return; Circular, Cradle to Cradle; Closed loop</td>
</tr>
</tbody>
</table>

Capitalism 2.0 acknowledges that genuine wealth is built on more than just financial capital. Allen White, in his Guardian Professional article referenced above, says: “Capitalism requires a new operating system, and needs to be rebooted so that we expect and manage the return on financial, natural and social capital.”

Capitalism 2.0’s value proposition is that stewardship of multiple capitals is the essence of long-term prosperity. In fact, Capitalism 2.0 redefines fiduciary duty to include a solemn responsibility for the well-being of people, planet and profit. New forms of company ownership and profit-sharing ensure company success is more equitably distributed. Resilient, locally owned businesses are more accountable and devoted to serving community needs. Ethics, fairness, and transparency are baked into day-to-day governance systems, partnerships, community relations, and employment practices. Employees are treated like valuable contributors to the company’s success, and reward and recognition systems are aligned to encourage environmentally and socially responsible decisions and behaviors. Liquidation economics is replaced by ecological economics.

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23 “Sustainable Capitalism,” The Generation Foundation website.
25 “A Journey in Search of Capitalism 2.0,” Toronto Sustainability Speaker Series website.
Capitalism 2.0 is a win-win-win for the environment, society, and the company. The company helps restore the economic, ecological, and social health of the planet. And it makes more profit. The business case for sustaining the planet is stronger than the business case for trashing it. Failure / Capitalism 1.0 is not viable for us, our children, our grand-children, and other life on Earth. The characteristics of a Capitalism 2.0 company mirror the characteristics of truly sustainable business in the 21st century. A company that aspires to gold-standard performance on its sustainability criteria will be well-positioned to flourish in a Capitalism 2.0 world.

4. The business case is stronger than ever
The business case for sustainability strategies shows that companies using today’s best practices in environmental, social, and governance areas are more successful. *The New Sustainability Advantage* describes the compelling business case for sustainability strategies. It shows that if a typical company were simply to use best-practice sustainability strategies and programs already being used by real, leading sustainability companies, it could improve its profit by at least 51 percent to 81 percent within three to five years, while avoiding a potential 16 percent to 36 percent erosion of profits if it did nothing. The company will earn more revenue, save expenses, avoid risks, and enhance its brand. Smart sustainability-related strategies offer a sustainability advantage, not a sustainability sacrifice, both in the short term and the long term.

If just doing more on sustainability increases profit that much, imagine how a gold-standard level of performance would strengthen the income statement and balance sheet. Some companies may find some KPIs more challenging than others. If a company is unable to attain the gold-standard level of performance for all KPIs using its current business model, it can now make a more informed decision about whether a new or modified business model would allow it to reap those benefits.

5. Opportunity to harmonize with other sustainability standards
The gold-standard benchmark provides a science-based platform for all other sector, industry, and even national rating, measurement and reporting sustainability standards. It sets the goal lines for company performance on critical, material sustainability factors. It may be especially helpful as a harmonizing framework for six concurrent sustainability standards for capital markets that are scheduled to launch 2013 and 2015.

- G4 of the Global Reporting Initiative (GRI): 2013
- The International Integrated Reporting Council (IIRC): 2014
- The Sustainability Accounting Standards Board (SASB): 2015
- The Investor Network on Climate Risk (INCR standard for listings on global stock exchanges: 2014
- The Global Initiative for Sustainability Ratings (GISR): 2015
- Version 4 of the B Lab Impact Assessment: 2013

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They are shown in the figure below, beside their corresponding element of the capital market information ecosystem.

These standards would all benefit if they were congruent. A gold-standard sustainability performance benchmark promotes alignment through a common set of material KPIs with measureable goals that could be used by all. The benchmark is generic—it applies to any-sized company, in any sector, in any jurisdiction—so it is an appropriate touchstone for the others.

The benchmark describes a future steady state for businesses so the KPIs are not weighted. Raters of companies may decide to weight some KPIs more heavily than others, or choose different proxies for the KPIs, or use a subset of the KPIs depending on the focus of their rating or the priority that they give to particular issues.

6. We’re running out of runway
One of the benefits of a gold-standard sustainability performance benchmark is that it creates a sense of urgency to address significant environmental and social issues before it is too late. We do not have time to make incremental improvements. A hundred years ago, sustainability issues were not nearly as pressing as they are today. As Allen White says, “A range of drivers are forcing companies and their stakeholders to confront the inadequacy of business as usual.
Science and empirical metrics signal impending and irreversible ecological breaking points. The drive toward boundless economic expansion clashes with the realities of planetary boundaries.\textsuperscript{27}

Emerging sustainability issues are captured in KPMG’s recent “Expect the Unexpected”\textsuperscript{28} report, which shows how 10 “global sustainability megaforces” impact firms.

![Image: Global Sustainability Megaforces](image)

**Figure 5: How Global Sustainability Megaforces Impact Business**

Previously, these megaforces were seen largely as irrelevant externalities—someone else’s concern. They were seen as neither a risk nor an opportunity for innovation. Now their disruptive impacts on business are becoming undeniable and increasingly significant. These cross-cutting impacts are big enough to intensify risk and volatility, the two nemeses of successful long-term investing. They are primary risk factors that could cause stranded assets and derail corporate success. The velocity with which we are approaching system collapse requires new thinking about risk-adjusted returns.

\textsuperscript{27} Allen L. White, "Capitalism needs rethinking but what are the options?" Guardian Professional, April 19, 2013.

\textsuperscript{28} "Expect the Unexpected: Building business value in a changing world," KPMG, 2012.
Capital markets now want to know if a company can handle the related risks and opportunities—is it “future-proof?” Lenders ask: “Will a company be able to pay back its loans? How should we adjust our lending rates to allow for the risk that they might not?” Investors ask: “Will a company continue to deliver a healthy return on our financial capital? Has it integrated sustainability-related risks into its enterprise risk management system (ERM)?” The risk-driven sense of urgency is becoming palpable and is becoming a bigger motivator that the opportunities described in reason #4 above.

Sustainability factors are important ingredients in investors’ risk assessment recipes. “Doing ratings as usual is not an option. Enlightened companies and investors understand this. Those who don’t are destined to lose their competitive edge in the coming years by missing opportunities and miscalculating risk and volatility.”

7. It is doable
Thanks to years of research by The Natural Step (TNS) and others, we have a good foundation of science-based sustainability principles and standards on which to base the gold-standard benchmark criteria. B Lab has a questionnaire that assesses how a prospective certified B Corp is contributing value to the environment and society. The Global Reporting Initiative (GRI) G4 has a thorough set of sustainability aspects and indicators. The Global Initiative for Sustainability Ratings (GISR) and the Sustainability Accounting Standards Board (SASB) are building on the base of existing principles and standards. We can consolidate the best-of-the-best issues and indicators, partner with environmental and social scientists to ensure appropriate science-based benchmark goals are defined for each indicator, and harmonize the gold-benchmark with criteria used in other leading sustainability standards. This is a voyage of both consolidation and discovery.

30 Allen L. White, “Capitalism needs rethinking but what are the options?” Guardian Professional, April 19, 2013.
Methodology: From Science to KPIs

This section provides an overview of the methodology used to articulate a working set of gold-standard benchmark KPIs and goals based on scientific foundations. The logic flow is summarized in the figure below.

![Methodology / Flow of Logic](image)

**System Conditions for a Sustainable Society**

The nested dependencies model described earlier reminds us that a business can’t be sustainable in an unsustainable society. In this sense, the company’s relationship to natural and social systems will ultimately determine its long-term viability.

A Bruntland-like definition of sustainable society is a society that meets the needs of the present without compromising the ability of future generations to meet their needs.\(^\text{31}\) What are the fundamental operating principles that ensure people’s ecological, social, and economic well-

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\(^{31}\) World Commission on Environment and Development, chaired by Gro Harlem Brundtland, *Our Common Future*, 1987, p. 41. It defined sustainable development as “development that meets the needs of the present without compromising the ability of future generations to meet their own needs.” This became known as the “Bruntland definition” of sustainability.
being needs are met, forever? Fortunately, natural scientists, social scientists, and thought leaders have already done much of the heavy lifting for us. A network of scientists and practitioners have been engaged over the past 20 years in the development, application and refinement of a framework that bridges scientific understanding of ecological systems with polices and operations of businesses and other organizations. The framework has been peer-reviewed and published in numerous academic journals. It is known as the Framework for Strategic Sustainable Development (FSSD), and is often referred to as The Natural Step (TNS) Framework. See Appendix A for additional details.

The FSSD stipulates three environmental systems conditions required to sustain human society. They describe how the world works in order to support a flourishing human society, forever.

![Three Environmental Conditions](http://www.naturalstep.org/the-system-conditions)

**Figure 7: Three Environmental Systems Conditions**

Complimenting these environmental system conditions are five social system conditions that sustain human society. They are the underpinnings of trusting relationships among people that enable them to collectively satisfy their needs and resiliently withstand external shocks to their social infrastructure, such as environmental variability or social,

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32 Merlin Missimer, "The Social Dimension of Strategic Sustainable Development," Department of Strategic Sustainable Development, Blekinge Institute of Technology, Karlskrona, Sweden, pp. 31-33. Note that Missimer used "Integrity" instead of "Wellness," and "Impartiality" instead of "Equity."
economic and political upheaval. They are founded on best available social science and human rights principles. They are what social scientists say society needs people to have in order for society is to be resilient, which is different from people’s fundamental needs.

Figure 8: Five Social Systems Conditions

“Well-being” is an umbrella term for people’s state when the five factors are satisfied in a flourishing, resilient society. Profound “happiness” is another collective noun that is a synonym for well-being, as are “quality of life” and “genuine wealth.” Society needs people to have well-being so they trust each other enough to collaboratively adapt to their changing world.

The notion of not subjecting people to systemic barriers to their fundamental needs is aligned with John Ehrenfeld’s definition of sustainability: “the possibility that humans and other life will flourish on Earth forever.”

---

As the song says, we’re all in this together. We need to support each other, individually and collectively, and avoid the conditions that destroy the trust that binds society together and inhibits resilience when society is faced with adversity and disasters.

Trust is built between trustworthy people. If people or institutions are corrupt, immoral, and incompetent, they are not trusted. People are not trustworthy if they display the personal traits that cause the opposites of the five social conditions, shown in this figure.

![SOCIAL CONDITIONS: OPPOSITES](image)

**Figure 9: Social System Conditions: Opposites**

In summary, eight systems conditions—three ecosystem conditions and five social system conditions—must be met if our complex adaptive social system is to function in perpetuity. Figure 10 brings them together.

The three environmental systems conditions are necessary prerequisites for human **wellness**. Without a healthy resilient environment, we become sick and/or die, and the other human social conditions become superfluous. The relationship among the eight system conditions for a sustainable society is shown in Figure 11.

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36 *We’re all in this together*, High School Musical cast.
**EIGHT SYSTEM CONDITIONS**

In a sustainable society, nature is not subject to systematically increasing...

1. Concentrations of substances extracted from the Earth’s crust,
2. Concentrations of substances produced by society,
3. Degradation of nature by physical means,

... and people are not subject to systemic barriers to their...

4. Wellness: integrity, physical, emotional, and mental wellness; safety
5. Influence: participation in decision making; voice; democracy
6. Competence: learning; growth; ability to adapt
7. Equity: impartiality, fairness; justice; respect; diversity
8. Meaning: purpose; making a difference

Figure 10: Systems Conditions for a Sustainable Society

**SUSTAINABLE SOCIETY**

*A sustainable society* must meet the needs of the present without compromising the ability of future generations to meet their needs.

The *ecological system* must not be systematically degraded by...

- Chemical means
- Physical means

- 1. No increase in concentrations of substances extracted from the earth’s crust
- 2. No increase in concentrations of substances produced by society
- 3. No degradation of nature by physical means

The *social system* must not be systematically degraded by barriers to...

- 4. Wellness
- 5. Influence
- 6. Competence
- 7. Equity
- 8. Meaning


Figure 11: Relationship among the Eight Systems Conditions

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Definition of a Truly Sustainable Business

Our overarching goal is to ensure a flourishing, sustainable human society for us, our children, our grandchildren, and generations to come. For-profit companies are major actors / “corporate citizens” in society. They dominate our political systems, our economies, and societies around the world. We can’t sustain a flourishing human society on our finite planet unless companies respect the above system conditions and become sustainable enterprises in the true sense of the term.

A truly sustainable business creates positive environmental, social, and economic value.

The definition respects the nested dependencies model of the economic, social and environmental dimensions of sustainability. Its boundaries are inclusive or many of today’s externalities in the business world. It creates value throughout its value chain / network—its upstream supply chain and its downstream customer network.

If it were to operate forever, the firm would not only do no harm; it would do well by doing some good. If a sustainable enterprise operated for the next 10, 100, or 1,000 years, it would be a good thing. It would not only have a “net zero” negative impact on the environment and society; its impact would be net positive.

This visionary definition confirms that a truly sustainable enterprise contributes to the possibility that human and other life will flourish on the planet, forever. The notion of “flourishing” comes from John Ehrenfeld’s powerful definition of sustainability, referenced earlier: “the possibility that humans and other life will flourish on Earth forever.”37 “Flourish” is more purposeful than “survive” or “exist”. He goes on to say that when humans care, are fair, are authentic, and are generous, then we trust each other and flourish, thrive, are fulfilled, and are genuinely wealthy. That’s when we experience well-being and real happiness.

From a company perspective, Ehrenfeld reminds us that sustainability is beyond energy, water, material and waste eco-efficiencies that help organizations to be less unsustainable. It requires a paradigm shift about the purpose of a company. The purpose of a company is to care for and improve the well-being of its important stakeholders, including the environment, society, its employees, its customers, and its owners. It creates or enables positive value for them.

Design Constraints for a Sustainable Business

When architects design buildings, they respect some fundamental design constraints. Some of them are more tacit than explicit. A building should not be dangerous to its inhabitants or its neighbourhood; it should be able to withstand severe weather; it should be an asset that appreciates over time; and so on. That is, it should not do any harm, it should be resilient; and it should add value to its stakeholders. The same is true for a business. The eight systems conditions are the scientific foundation for the design constraints for a sustainable business model. As shown in Table 1, there is a one-to-one correspondence of the eight systems conditions of a sustainable society and the eight design constraints / principles for a sustainable business.

Sustainable businesses are not required to satisfy the five social factors. Instead, a company’s business model should not raise barriers to the possibility that its important stakeholders can self-organize to satisfy the systems conditions for a sustainable society.

Table 1: Design Constraints for a Sustainable Business

<table>
<thead>
<tr>
<th>System Conditions for a sustainable society</th>
<th>Design Constraints for a Sustainable Business</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. In a sustainable society, nature is not subject to systematically increasing concentrations of substances from the earth’s crust.</td>
<td>1. A sustainable business eliminates its contribution to systematically increasing concentrations of substances from the earth’s crust.</td>
</tr>
<tr>
<td>2. In a sustainable society, nature is not subject to systematically increasing concentrations of substances produced by society.</td>
<td>2. A sustainable business eliminates its contribution to systematically increasing concentrations of substances produced by society.</td>
</tr>
<tr>
<td>3. In a sustainable society, nature is not subject to ongoing degradation by physical means.</td>
<td>3. A sustainable business eliminates its contribution to the ongoing degradation of nature by physical means.</td>
</tr>
<tr>
<td>4. In a sustainable society, people are not subject to barriers to personal wellness.</td>
<td>4. A sustainable business eliminates its contribution to conditions that act as systematic barriers to people’s wellness.</td>
</tr>
<tr>
<td>5. In a sustainable society, people are not subject to barriers to influence.</td>
<td>5. A sustainable business eliminates its contribution to conditions that act as systematic barriers to people’s influence.</td>
</tr>
<tr>
<td>6. In a sustainable society, people are not subject to barriers to competence.</td>
<td>6. A sustainable business eliminates its contribution to conditions that act as systematic barriers to people’s competence.</td>
</tr>
<tr>
<td>7. In a sustainable society, people are not subject to barriers to equity.</td>
<td>7. A sustainable business eliminates its contribution to conditions that act as systematic barriers to equity for people.</td>
</tr>
<tr>
<td>8. In a sustainable society, people are not subject to barriers to meaning.</td>
<td>8. A sustainable business eliminates its contribution to conditions that act as systematic barriers to meaning for people.</td>
</tr>
</tbody>
</table>

It will be a challenge for most companies to transition to a business model that works within these design constraints. “How to” guidance is provided in Appendix C.
Figure 11, above, showed the relationship among the eight system conditions for a sustainable society. Building on that format, Figure 12 shows the relationship among the eight design constraints for a sustainable business.

Figure 12: Relationship among the Design Constraints for a Truly Sustainable Business
KPIs for the Design Constraints

How will we know when a company is operating within the design constraints? We will know when we determine that the business has achieved the level of performance stipulated by the goals / targets for associated key performance indicators (KPIs). That is, the set of gold-standard benchmark KPIs is a gauge by which to measure a company’s progress toward sustainability.

The tables below map the ecological and social design constraints to their associated KPIs. The next section will explain the KPIs in more detail.

Table 3: Ecological Design Constraints and Their Associated KPIs

<table>
<thead>
<tr>
<th>Ecological Design Constraints for a Sustainable Business</th>
<th>Carbon Footprint</th>
<th>Energy</th>
<th>Water</th>
<th>Materials</th>
<th>Ecosystems Services Impacts</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. No contribution to systematically increasing concentrations of substances from the earth’s crust</td>
<td>X</td>
<td>X</td>
<td></td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>2. No contribution to systematically increasing concentrations of substances produced by society</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>3. No contribution to the ongoing degradation of nature by physical means</td>
<td></td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

Table 4: Social Design Constraints and Their Associated KPIs

<table>
<thead>
<tr>
<th>Social Design Constraints for a Sustainable Business</th>
<th>Employee Remuneration</th>
<th>Human Capital</th>
<th>Community Socio-Economic Impacts</th>
<th>Customer Social Capital</th>
<th>Owner Social Capital</th>
</tr>
</thead>
<tbody>
<tr>
<td>4. No contribution to conditions that act as systematic barriers to people’s wellness</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>5. No contribution to conditions that act as systematic barriers to people’s influence</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. No contribution to conditions that act as systematic barriers to people’s competence</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. No contribution to conditions that act as systematic barriers to equity for people</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. No contribution to conditions that act as systematic barriers to meaning for people</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
KPIs and Goals

Gold-standard benchmark KPIs for a truly sustainable business are derived from the eight science-based system conditions for sustainability and their associated eight design constraints for a truly sustainable business, as described in the previous section. They are presented in this section using an ESG (Environmental, Social, and Governance) framework. This aligns them with the categories of sustainability factors that are often used in business journals and in C-suite surveys.

Borrowing heavily from the Content Principles developed by the Global Initiative for Sustainability Ratings (GISR), the KPIs are based on the principles in the figure below.

There are measurable goals associated with each KPI. In his latest book, John Elkington introduces the term “zeronauts” – “a new breed of innovator, determined to drive problems such as carbon, waste, toxics, and poverty to zero.” Many of the KPI goals reflect this “zero” requirement.

All KPIs are quantified. The natural capital, human capital, and social capital are monetized, anticipating the trend toward **integrated reporting**. The International Integrated Reporting Council (IIRC) encourages companies to report on how they are adding value to six capitals each year: financial, manufactured, intellectual, human, social, and natural.\(^{40}\) Monetizing natural, human, and social capitals facilitates inclusion of these “blended capitals”\(^{41}\) in a more complete and realistic balance sheet that would account for the condition of the company’s “vital resources,” rather than just its “owned” assets.

The net positive dimension of the KPIs does not suggest that the company could be bad in some areas and make it up by being really good in others. Sustainability doesn’t work that way. In fact, the gold-standard level of performance requires the company to be at least “neutral” on all indicators. That’s the prerequisite ante and answers the question, “How much is enough?”

Offsets are mentioned in some KPIs. That raises the question, “Can a company make up for its environmental or social harm done in one place by doing commensurate good somewhere else?” For example, if it is not possible for a company to reduce its carbon footprint to zero, is it is okay if it purchasing enough carbon offsets to be carbon neutral or positive? Assuming that the offsets are real, effective, and context-based\(^{42}\), this is a viable strategy.

Each environmental and social KPI is described using this framework:

- **Relevant science-based design constraint:** This connects the KPI to its associated design constraint.
- **Gold-standard Benchmark Goal:** The gold-standard goal / target for each KPI defines the required level of performance on that benchmark KPI in order to perform as a truly sustainable business on that indicator.
- **Sample Proxy Goal:** Some gold-standard benchmark goals may be difficult to assess. Businesses may not have the data or we may not yet have appropriate metrics for the goal. In those cases, a sample proxy performance goal is suggested. Proxy goals conform to the Precautionary Principle and may be more stringent than the gold-standard benchmark goal.
- **Definitions:** Clarification of terminology used in the Gold-standard Benchmark Goal or Sample Proxy Goal
- **Sample Valuation Calculation:** Guidance on how to quantify / monetize the Gold-standard Benchmark Goal.

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\(^{40}\) *The Internatioal <IR> Framework*, International Integrated Reporting Council (IIRC), December, 2013, pp. 11-13.


Environmental KPIs and Goals

**Context-based approach**

Some ecosystems are global, like air. Jet streams and other air currents circulate, mix, and disperse air and its pollutants around the globe. That’s why climate destabilization is a global issue and the global world population shares the burden of mitigating the risk of climate change. When we discuss how much carbon dioxide a company can emit into the atmosphere each year, we will use a global context.

Some ecosystems are local, like water and land. Therefore, when we discuss how much water a company can use each year, the appropriate context is the available sustainable supply of water in the local watershed.

**Per capita fair share methodology**

To sustain human society, we must collectively live within the planet’s carrying capacity and respect the three ecological systems conditions described earlier. About 7.2 billion human beings currently share planet Earth. How should we allocate the planet’s available resources among the global population?

There are various methodologies. Some differentiate between people living in industrialized nations and developing nations. Some differentiate between individual needs. Some suggest that when people act as groups—when they are in governments or companies, for example—they have special privileges and should be able to use more resources or have a larger impact allowance.

We propose a **per capita** methodology. We are individually accountable for our fair share of the effort to ensure that we respect the environmental systems conditions for a sustainable society and live within planetary thresholds. Each person is equitably assigned an equal annual virtual share / allocation / budget of the available resources that would ensure a context-based sustainable supply of those resources is available in future years, forever. It doesn’t matter whether the person lives in the United States, Africa, or Europe. His/her annual allocation is calculated the same way.

People use their annual budgets as they play various roles. They use part of their annual allocation as an individual, part of it as a family member, and part of it while in their employee role. The parts of their allocations that they use in their role as employees constitute their

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43 Context-based sustainability (CBS) is an implementation of the sustainability context principle, and was first developed by Mark W. McElroy, Ph.D. at The Center for Sustainable Organizations (CSO). See *Social Footprints – Measuring the Social Sustainability Performance of Organizations* (McElroy, 2008), and *Corporate Sustainability Management* (McElroy and Van Engelen, 2012) for more information on CBS.

44 The per capita allocation method was originally developed by Mark W. McElroy, Ph.D. as described in *Social Footprints – Measuring the Social Sustainability Performance of Organizations* (McElroy, 2008, Chapter 5).
companies’ allocations. This will be explained further in the carbon footprint KPI and water KPI discussions.

**Carbon Footprint**

*Relevant science-based design constraint*

The relevant science-based design constraint for this KPI is: *A sustainable business eliminates its contribution to systematically increasing concentrations of substances from the earth’s crust.*

The substance is carbon, mostly in fossil fuels that have been extracted from the earth’s crust. The risk is the systematically increasing concentrations of carbon dioxide in the atmosphere by burning fossil fuels leads to global warming and climate change / climate destabilization.

*Context-based fair share methodology*

As discussed above, each person on the planet is allocated a fair, equal budget of carbon dioxide emissions as his / her personal share of how much carbon can be safely added to the atmosphere each year and still reverse climate destabilization. They then allocate their carbon budgets to each role that they play, according to how much time they spend in each role over the year. About a quarter of a person’s carbon budget is used while in their role as an employee working for a company. That means the company is not only paying employees for their time and talent, they are also buying a quarter of employees’ annual personal carbon budgets. So a company’s carbon budget is a quarter of its full-time equivalent employees’ annual carbon budgets.

Since they are accountable for scope 1, scope 2, and scope 3 emissions (explained below) in their upstream and downstream value chains, companies can claim similar fractions of the carbon budgets of full-time equivalent employees in their value chains. Thus the company’s fair share is determined by the size of its direct and indirect workforce. The larger a company’s workforce, including the indirect workforce in its value chain, the larger its carbon allowance. This allocation methodology ensures that companies are treated as collections of responsible citizens who have chosen to share their carbon allowances with their employers in a way that ensures the planetary threshold for climate change is respected.

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45 People spend about (40 hours per week x 52 weeks per year = 2,080 hours) in their roles as a company employees. There are 24 hours per day x 356 days per year = 8,760 hours per year. Therefore, people spend (2,080 employee hours per year ÷ 8,760 available hours per year = 24%) of their time as employees. This approach to applying the per capita allocation method to assessing a company’s GHG emissions was pioneered by Mark W. McElroy, Ph.D. in 2006 at Walmart and Ben & Jerry’s, as described in *Social Footprints – Measuring the Social Sustainability Performance of Organizations* (McElroy, 2008), Chapter 5.
Overlapping accountabilities

When a company is accountable for carbon emissions in its value chain, it is clear that there will be overlapping accountabilities. For example, when scope 3 emissions are included, Company A is accountable for its own carbon footprint and the carbon footprints of its upstream tier one supplier (Company B) and tier two supplier (Company C), etc. At the same time, Company B is accountable for its own carbon footprint, for Company C’s footprint because it is its tier one supplier, and for Company A’s carbon footprint because it is its downstream customer. And so on. This leads to shared accountability for any company’s overall carbon footprint.

This is good news because it promotes collaborative approaches in value chains to accelerate progress on reducing carbon footprints to safe levels. The overlap is a good thing.

Why 1°C / 350 ppm is the safe global target

In September 2013, the Intergovernmental Panel on Climate Change (IPCC), the international body for assessing the science related to climate change, released its fifth assessment report. Authored by 250 climate scientists from 39 countries, it states: “It is extremely likely that human influence has been the dominant cause of observed warming since the mid-20th century.”

“Emissions of CO₂ from fossil fuel use and from the effects of land use change on plant and soil carbon are the primary sources of increased atmospheric CO₂. Since 1750, it is estimated that about 2/3rds of anthropogenic CO₂ emissions have come from fossil fuel burning and about 1/3rd from land use change. About 45% of this CO₂ has remained in the atmosphere, while about 30% has been taken up by the oceans and the remainder has been taken up by the terrestrial biosphere. About half of a CO₂ pulse to the atmosphere is removed over a time scale of 30 years; a further 30% is removed within a few centuries; and the remaining 20% will typically stay in the atmosphere for many thousands of years.”

How urgent is the climate change issue? The urgency depends on how soon we will exceed what scientists deem to be a safe level of carbon dioxide in the atmosphere. Four levels of carbon dioxide concentrations in the atmosphere frame our choice.

1. 280 ppm (Pre-industrial): The pre-industrial concentration of CO₂ in the atmosphere in the 1750-1850 timeframe was about 280 ppm (parts per million).47

2. 400 ppm (Today): Between the start of the industrial revolution and May 2013, human activity increased the concentration of CO₂ in the atmosphere to 400 ppm.48 These

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46 “Climate Change 2013: The physical Science Basis: Summary for PolicyMakers,” Intergovernmental Panel on Climate Change (IPCC), October 2103, p. 15.
47 “Changes in Atmospheric Carbon Dioxide, Methane and Nitrous Oxide,” IPCC.
48 “Trends in Atmospheric Carbon Dioxide,” U.S. Department of Commerce, National Oceanic & Atmospheric Administration (NOAA), Earth Science Research Laboratory, Global Monitoring Division,
elevated carbon dioxide concentrations have already increased the average global temperature above pre-industrial levels by 0.85 °C. These elevated carbon dioxide concentrations have already increased the average global temperature above pre-industrial levels by 0.85°C. As a result, we are experiencing severe weather events with wild extremes in temperature and precipitation. Climate scientists describe these anomalies as early signs of climate destabilization. Even if we stopped increasing CO₂ levels now, the temperature would still rise other 0.8°C above the 0.85°C that we’ve already warmed, because of the cumulative effects described above.

3. **450 ppm (High risk):** To have a 50% chance of stabilizing the average global temperature at 2°C increase since the pre-industrial period, concentrations of CO₂ need to be kept under 450 ppm. A report by PwC says that at our current rate of fossil fuel usage in the global economy, we will exceed that carbon budget by 2034.

4. **350 ppm (Safe):** Many climate scientists do not have that appetite for risk. A December 2013 report by James Hansen, Johan Rockström, and 15 other scientists declares that 2°C of global warming would have disastrous consequences and could cause major dislocations for civilization.

“Cumulative emissions of ~1000 gigatonnes of carbon (GtC), sometimes associated with 2°C global warming, would spur “slow” feedbacks and eventual warming of 3–4°C with disastrous consequences. ... Rapid emissions reduction is required to restore Earth’s energy balance and avoid ocean heat uptake that would practically guarantee irreversible effects. Continuation of high fossil fuel emissions, given current knowledge of the consequences, would be an act of extraordinary witting intergenerational injustice.

They advocate for a target of **350 ppm** as the maximum safe concentration of CO₂ concentration, which would allow the global temperature to only rise 1°C above pre-industrial levels and avoid runaway climate destabilization. Following the precautionary principle, the goal for the carbon footprint KPI is stabilize concentrations of carbon dioxide at 350 ppm to avoid runaway climate destabilization.

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49 “Climate Change 2013: The physical Science Basis: Summary for PolicyMaking,” Intergovernmental Panel on Climate Change (IPCC), October 2103, p. 3.
50 “FAQ: Can you explain the math please?” Do the Math.
### Carbon Footprint

<table>
<thead>
<tr>
<th><strong>Gold-standard Benchmark Goal</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><em>(Total net carbon footprint – Carbon offsets) ≥ Company’s fair share of emissions that contribute to a reversal of climate change)</em></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Sample Proxy Goal</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><em>(Total net carbon footprint – Carbon offsets) ≥ Zero)</em></td>
</tr>
</tbody>
</table>

#### Definitions

- **Total net carbon footprint**: This is the carbon footprint over the life cycle of the business’s facilities / buildings, products, and services. It includes scope 1, scope 2, and scope 3 emissions in the company’s upstream and downstream value chain, minus any permanently sequestered carbon.
- **Scope 1 emissions**: Direct emissions from company-owned or company-controlled sources.
- **Scope 2 emissions**: Indirect emissions from the generation of purchased electricity, steam, heating and cooling that is consumed by the company.
- **Scope 3 emissions**: Includes 15 categories of indirect emissions that occur in a company’s value chain. Upstream emissions include emissions associated with 1) purchased good and services; 2) capital goods; 3) fuel- and energy-related activities not included in scope 1 or scope 2; 4) upstream transportation and distribution; 5) waste generated in operations; 6) business travel; 7) employee commuting; and 8) upstream leased assets. Downstream emissions include emissions associated with 9) downstream transportation and distribution; 10) processing of sold products; 11) use of sold products; 12) end-of-life treatment of sold products; 13) downstream leased assets; 14) franchises; and 15) investments.
- **Carbon offsets**: A reduction in greenhouse gas emissions created by one party that can be purchased and used to compensate for (offset) the greenhouse gas emissions of another party. Carbon offsets are quantified in metric tonnes of carbon dioxide equivalent (CO2e) reductions. Real and effective carbon offsets meet important quality criteria.
- **Carbon sequestration**: Sometimes called carbon capture and storage (CCS), carbon sequestration technology involves capturing CO₂ produced by large industrial plants, compressing it for transportation and then injecting it deep into a rock formation at a carefully selected and safe site, where it is permanently stored. It helps reduce a company’s total net carbon footprint.
- **Company’s fair share of global carbon emissions that contribute to a reversal of climate change**: The company has a carbon allowance / budget / allocation / ration, as calculated below.

#### Sample Valuation Calculation

- **Fair share of global carbon emissions** = (Amount of annual global carbon dioxide emissions that will reduce global warming ÷ world population) x (Number of FTEs in the company’s upstream and downstream value chain ÷ 4)

- “Amount of annual global carbon dioxide emissions that will reduce global warming” is determined by climate scientists, allowing for the ability of the biosphere to stabilize carbon concentrations at 350 ppm.
- “Number of FTEs in the company’s upstream and downstream value chain” is the number of full-time equivalent employees (FTEs) directly or indirectly engaged in producing the company’s goods.
- “4” assumes FTEs spend a quarter of their time in their roles as company employees.

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Energy

Relevant science-based design constraint

The relevant science-based design constraint for this KPI is: A sustainable business eliminates its contribution to systematically increasing concentrations of substances from the earth’s crust.

As with the carbon footprint KPI, the substance that is being extracted from the earth’s crust is carbon in the form of fossil fuels, and the risk is that systematically increasing concentrations of carbon dioxide in the atmosphere from burning oil, gas, and coal will lead to global warming and climate change / climate destabilization.

This KPI is a corollary to the carbon footprint KPI, above. The carbon footprint KPI defines the limit of any company’s carbon emissions and provides an opportunity for a company to mitigate its carbon footprint by purchasing carbon offsets. The energy KPI attacks the carbon risk at its source, substituting renewable energy sources for non-renewable fossil fuels. In a sense, it is the “how” of the carbon footprint KPI and acknowledges that fossil fuels may still have non-fuel uses in the manufacture of medicines, cosmetics, plastics, synthetic fabrics, and lubricants during the transition to sustainable materials.

We need to wean ourselves off our addiction to non-renewable fossil fuels as our energy supply if we are to have a stable climate. This KPI addresses that science-based necessity.

Table 6: Energy KPI

<table>
<thead>
<tr>
<th>Energy</th>
<th>Gold-standard Benchmark Goal</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Renewable energy purchased or generated on site ≥ Total energy required by the company</strong></td>
</tr>
<tr>
<td></td>
<td>• Renewable energy does not include nuclear energy.</td>
</tr>
<tr>
<td></td>
<td>• The company is energy positive if it sells excess renewable energy back to the grid or to co-located businesses, or purchases more renewable energy certificates (RECs) than it needs to cover its own energy use.</td>
</tr>
</tbody>
</table>

Sample Proxy Goal

(Renewable energy purchased or generated on site ÷ Energy used) ≥ 100%

Definitions

• **Renewable energy purchased or generated on site**: This includes renewable energy generated at the company’s own locations and at locations of companies in its value chain. It includes passive solar, solar photovoltaic, wind, geothermal, and combined heat and power (CHP) energy.

• **Total energy required by the company**: This is the energy used by the company and by it value chain in support of its goods and services.

Sample Valuation Calculation

(See above)
**Water**

*Relevant science-based design constraint*

The relevant science-based design constraint for this KPI is: *A sustainable business eliminates its contribution to the ongoing degradation of nature by physical means.*

Degrading nature in this instance is using more water than can be sustainably replenished by the natural water cycle. Note that the design constraint says that companies need to “reduce and ultimately eliminate” their unsustainable usage of water. That is, the company needs to be at least **water neutral**, and preferably be **water positive** so that it replenishes the local source of water with more water than it extracts for its operations.

*Context-based fair share methodology*[^58]

The fair-share methodology is analogous to the methodology used for the carbon footprint KPI, above. However, because water availability is different in each watershed, its context is the potable water in the local watershed of drainage basin, not the world supply of fresh water. The people living in each watershed share responsibility for ensuring that the available water is used equitably. Some of individuals’ water usage is determined by their personal lifestyles, and some of their water usage occurs indirectly through their work.

We assume that every citizen in a watershed is allocated an equal annual virtual water allowance as his / her personal share of how much water can be safely used and still achieve a scientifically determined sustainable supply of water in that region. Assuming an eight hour work day, employees are donating a third of their daily (24 hour) water allotment to their company. Therefore, companies can use a third of their combined employees’ water allotments as their allowable fair share of water use.

Thus the company’s fair share is determined by the size of its direct and indirect workforce. The larger a company’s workforce, including the indirect workforce in its value chain, the larger its water allowance. This allocation methodology ensures that companies are treated as collections of responsible citizens who have chosen to share their water allowances with their employers in a way that ensures the watershed’s threshold for sustainable water use is respected.

*Overlapping accountabilities*

As with the carbon footprint KPI, when a company is accountable for water usage in its value chain, there will be overlapping accountabilities. A company is accountable for its own water usage and shares that accountability with companies that upstream or downstream in its value chain. There is shared accountability for any company’s carbon footprint.

[^58]: Context-based water metrics, in which fair shares of locally available water supplies are allocated to individual users, were first developed by Mark W. McElroy, Ph.D. and Heather Carlos in 2008 at Cabot Creamery Cooperative in Vermont. See *The Corporate Water Gauge™* and *How Leadership at Cabot Makes All the Difference* (McElroy, 2012) for more information.
This is good news because it promotes collaborative approaches in value chains to accelerate progress on sustainable water consumption. When collective water usage is sustainable in each of their watersheds, everyone benefits. If “extra” water offsets are purchased, we will be working toward sustainable levels even faster. The overlap is a good thing.

Table 7: Water KPI

<table>
<thead>
<tr>
<th>Water KPI</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gold-standard Benchmark Goal</strong></td>
<td>((\text{Total net water used} - \text{Water offsets}) \geq \text{Company’s fair share of water in the local watershed})</td>
</tr>
<tr>
<td>It returns as much water as it takes directly or indirectly over the life cycle of its products and services, at the same or higher quality.</td>
<td></td>
</tr>
<tr>
<td>The company is water positive if the water used is lower than its fair share of sustainable water supply in that watershed.</td>
<td></td>
</tr>
<tr>
<td><strong>Sample Proxy Goal</strong></td>
<td>((\text{Total net water used} - \text{Water offsets}) \leq \text{Zero})</td>
</tr>
<tr>
<td>It returns as much water as it takes directly or indirectly over the life cycle of its products and services, at the same or higher quality.</td>
<td></td>
</tr>
<tr>
<td>The company is water positive if the water used is lower than its fair share of sustainable water supply in that watershed.</td>
<td></td>
</tr>
</tbody>
</table>

**Definitions**

- **Total net water used**: This is water used over the life cycle of the business’s facilities / buildings, products, and services. It includes water used in the company’s upstream and downstream value chain.
- **Water offsets**: Water offsets are additional projects aimed at water recycling, water efficiency, and alternative water supply solutions for people and organizations within a given watershed. Water offsets are sometimes called Water Reclamation Certificates. The offsets that are used to reach the goal must be within the local watershed. That is, for example, a bottling company cannot drain an aquifer in one watershed and make up for it by generating water offsets in a different, distant watershed. Once the goal has been reached, additional offsets can be made in any stressed watershed and count as water offsets.
- **Company’s fair share of water in the local watershed**: The company has a water allowance / budget / allocation / ration, as calculated below.

**Sample Valuation Calculation**

Fair share of water in the local watershed = \((\text{Amount of water that can be extracted from the local watershed or drainage basin and still protect a sustainable supply of water forever} \div \text{population in the watershed}) \times (\text{Number of FTEs in the company's labor force} \div 4)\)

- “Amount of water that can be extracted from the local watershed and still protect a sustainable supply of water forever” is determined by scientists and is roughly equivalent to annual precipitation.
- “Number of FTEs in the company’s labor force” is the number of full-time equivalent employees (FTEs) directly or indirectly engaged in producing the company’s goods.
- “4” assumes FTEs spend a quarter of their time in their roles as company employees.
- A company is accountable for water use in their upstream and downstream value chains. They can claim 1/4 of the water budgets of full-time equivalent employees in their value chains.

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Materials

Relevant science-based design constraints

There are two relevant science-based design constraints for this KPI:

- A sustainable business eliminates its contribution to systematically increasing concentrations of substances from the earth’s crust.
- A sustainable business eliminates its contribution to the ongoing degradation of nature by physical means.

Since some materials extracted from the earth’s crust will eventually escape from the circular economy and end up in the biosphere, we need to be careful that their concentrations do not build up. This is especially true for heavy metals and rare minerals. Nature is degraded if we use more materials / natural resources / natural capital than can be sustainably replenished. If we do this, the materials become scarce or unavailable for future generations. A company needs to be at least materials neutral, and preferably be materials positive so that it replenishes the nature with more materials than it uses for its operations.

Context-based fair share methodology

Because materials are sourced globally, their context is global. We need to keep non-biodegradable materials in tight, technical, closed loops, and ensure that the planet can breakdown and absorb biodegradable materials at the same rate that they are produced.

Table 8: Materials KPI

<table>
<thead>
<tr>
<th>Materials</th>
<th>Gold-standard Benchmark Goal</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(Quantity of materials reused, upcycled, organic, renewable, biodegradable, or abundant ÷ Total quantity of materials used) ≥ 100%</td>
</tr>
<tr>
<td></td>
<td>It uses non-biodegradable material in tight technical closed-loop cycles, so that waste does not enter the biosphere.</td>
</tr>
<tr>
<td></td>
<td>It is materials positive if it captures excess materials in its closed-loop system and makes them available to other businesses.</td>
</tr>
<tr>
<td></td>
<td>It uses materials that are already abundant in nature (see Appendix B).</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sample Proxy Goal</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Quantity of materials reused, upcycled, organic, renewable, biodegradable, or abundant ÷ Total quantity of materials used) ≥ 100%</td>
</tr>
<tr>
<td>That is, it is the same as the Gold-standard Benchmark goal.</td>
</tr>
</tbody>
</table>

Definitions

- Abundant materials: (See Appendix B)

Sample Valuation Calculation

(See above)
Ecosystems Services Impacts

Relevant science-based design constraints
The relevant science-based design constraints for this KPI are:

- A sustainable business eliminates its contribution to systematically increasing concentrations of substances from the earth’s crust.
- A sustainable business eliminates its contribution to systematically increasing concentrations of substances produced by society.
- A sustainable business eliminates its contribution to the ongoing degradation of nature by physical means.

This KPI accounts for waste from energy (greenhouse gases), water use (polluted water), and materials (hazardous and non-hazardous waste) that can negatively impact clean air, water, and land that are essential to human wellbeing, business success, and a functioning economy. It acknowledges that the company is responsible for damages to vital ecosystems from waste produced throughout its value chain do not exceed planetary thresholds (see Appendix D). Negative impacts have a ripple effect throughout the ecosystem, society, and the economy both in the short- and long-term.

Monetizing how much company operations directly or indirectly improve or damage ecosystems is ambitious but not impossible. A number of global business groups—including The World Bank,60 the TEEB for Business Coalition,61 the Cambridge Programme for Sustainability Leadership,62 the World Business Council for Sustainable Development63 and the WAVES (Wealth Accounting and the Valuation of Ecosystem Services) partnership64—have been developing methodologies for natural capital accounting at the company level. Trucost has been at the table for most of these, along with individual company efforts at Interface, General Mills and Puma, among others.

UNEP-FI assessed the cost of companies’ global environmental externalities / impacts as nearly $7 trillion—11% of the value of the global economy—in 2008, with the largest 3,000 companies causing around 35% of the harm.65 These impacts are too big to exclude from corporate

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60 “Call to Action on Recognizing the True Value of Nature,” The World Bank, April 18, 2013.
64 “Natural Capital Accounting,” Wealth Accounting and the Valuation of Ecosystem Services (WAVES) website.
accountability and reports. Valuing and accounting for company positive or negative impacts on natural capital will become the new normal.

**Context-based fair share methodology**

Land and water are local ecosystems so their ecosystem context is local. Air is a global so the context for air pollutants and greenhouse gases (GHGs) is global. The methodology allows for the appropriate context when damage from the company’s externalities is calculated. The carbon footprint KPI defined the goal for the volume of GHGs produced by the company; this KPI includes an assessment of the ecosystem damage caused by those GHGs.

Table 9: Ecosystems Service Impacts KPI

<table>
<thead>
<tr>
<th>Ecosystems Services Impacts</th>
<th>Gold-standard Benchmark Goal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Benefits of company initiatives/impacts on ecosystems services ≥ Damage from company initiatives/impacts on ecosystem services</td>
<td>The company is restorative if its overall impacts are positive.</td>
</tr>
</tbody>
</table>

**Sample Proxy Goal**

Net ecosystem services impacts ≤ Zero

**Definitions**

- **Ecosystems services impacts**: Impacts are caused by hazardous, non-hazardous, and radioactive pollutants that escape tight, closed-loop cycles in a circular economy over the life-cycle of the company’s products. They are the root causes of damages to ecosystems. The pollutants include:66
  - **Air pollutants** like particulates, ammonia, sulfur dioxide, nitrogen oxides and VOCs.
  - **Greenhouse gases** like carbon dioxide, methane, and nitrous oxide.
  - **Land and water pollutants** like arsenic, barium, boron, cadmium, chloroform, chromium, cobalt, copper, cyanide compounds, ethyl benzene, ethylene glycol, hydrochloric acid, lead, manganese, mercury, methanol, nickel, nitrates, nitrogen, phosphorous, silver, sulfuric acid, toluene, vanadium, zinc, other fungicides, other general pesticides, other herbicides, and other insecticides.
  - **Waste** like non-hazardous landfill waste, non-hazardous incinerated waste, hazardous landfill waste, nuclear waste, and process-polluted water.

**Sample Valuation Calculation**67

1. Determine the major categories of unpriced natural capital consumption: 1) water use, 2) greenhouse gas emissions, 3) waste, 4) air pollution, 5) land and water pollution, and 6) land use.
2. Estimate the upstream environmental impacts from downstream consumption using Environmentally Extended Input-Output (EEIO) tables.68

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66 “Natural Capital at Risk: The Top 100 Externalities of Business,” Trucost, April 2013, pp. 74-76.
67 This approach is based on Trucost’s valuation methodology, as described in “Natural Capital at Risk: The Top 100 Externalities of Business,” Trucost, April 2013, p. 8.
Social KPIs and Goals

As outlined earlier, based on the five social systems conditions for a sustainable, resilient, flourishing society on this finite planet, there are five socio-economic design constraints for a truly sustainable business. These criteria ensure that the company does not erode the foundations of flourishing and resilient social systems.

1. A sustainable business eliminates its contribution to conditions that act as systematic barriers to people’s wellness.
2. A sustainable business eliminates its contribution to conditions that act as systematic barriers to people’s influence.
3. A sustainable business eliminates its contribution to conditions that act as systematic barriers to people’s competence.
4. A sustainable business eliminates its contribution to conditions that act as systematic barriers to equity for people.
5. A sustainable business eliminates its contribution to conditions that act as systematic barriers to meaning for people.

Social KPIs are the most challenging of the three ESG groups of KPIs to agree upon, to measure, and to valuate. Environmental KPIs are based on science. Social KPIs tap into social science, human rights, and fundamental human needs. They are also based on assumptions about the role of business in society. The benchmark assumes that companies are not responsible for fulfilling the five societal need. Instead, companies are responsible for ensuring that they do not present systemic barriers to people being able to fulfill those societal needs.

As with environmental KPIs, all social KPIs acknowledge that a company is accountable for impacts throughout its value chain—impacts in its upstream supply chain, and impacts in its downstream distribution, sales, usage by customers, and end-of-life-disposition chain. This intentionally leads to overlapping accountabilities in the value stream, to encourage collaborative efforts to reduce collective negative impacts.

Social issues involve stakeholders—individuals or institutions who have a stake in the company’s success. They can be directly or indirectly impacted by the company’s operations, contribute to the company’s impact, or impact the company if they do not agree with its behavior. The important stakeholders are shown in Figure 14 below, mapped against the eight design constraints that are most relevant to each.

Not getting in the way of stakeholders’ ability to satisfy their needs is not only the right moral and ethical thing to do; it is also the necessary, smart business thing to do. Sooner or later, bad

things happen if people’s needs are not satisfied. Civil instability, unrest, and wars, can disrupt company operations and value chains. It is in a company’s interest to embrace a business model that creates goodwill with important stakeholders and promotes social cohesion.

<table>
<thead>
<tr>
<th>Design Constraints for a Truly Sustainable Company</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stakeholders</td>
</tr>
<tr>
<td>It does not devalue <strong>nature</strong> by contributing to:</td>
</tr>
<tr>
<td>• a systematic buildup of substances extracted from the Earth’s crust</td>
</tr>
<tr>
<td>• a systematic buildup of substances produced by society</td>
</tr>
<tr>
<td>• degradation by physical means</td>
</tr>
</tbody>
</table>

| It does not devalue **people/stakeholders** by subjecting them to barriers to their: | X |
| • Wellness | X | X | X | X |
| • Influence | X | X |
| • Competence | X | X |
| • Equity | X | X |
| • Meaning | X | X |

| It does not devalue **the company** with untrustworthy **governance** | X |

Reviewing the stakeholders in Figure 14, we have already addressed the **Environment** as a stakeholder with the environmental KPIs. The **Company itself** will be addressed later with the governance KPIs. That leaves the stakeholders in the middle of the figure—employees, community, customers, and owners—who are addressed with the social KPIs in this section.

The valuation of employee, community, customer, and owner social capitals assesses the company’s **goodwill** with these vital stakeholders. Each contributes to the company’s **social licence to operate**. By identifying and measuring the factors that contribute to each of these social capitals, the company can improve its decision-making on where to best invest its resources in order to enhance its social licence to operate and to manage risks to its goodwill. Valuating employee, customer, community, and owner goodwills helps to legitimize these social capitals as tangible vital resources on the balance sheet. 70

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70 Ben McClure, “Can you Count on Goodwill?” Investopedia, January 2012.
Employee Remuneration

Relevant design constraints
All five social design constraints are relevant to this KPI.

1. A sustainable business eliminates its contribution to conditions that act as systematic barriers to people’s wellness.
2. A sustainable business eliminates its contribution to conditions that act as systematic barriers to people’s influence.
3. A sustainable business eliminates its contribution to conditions that act as systematic barriers to people’s competence.
4. A sustainable business eliminates its contribution to conditions that act as systematic barriers to equity for people.
5. A sustainable business eliminates its contribution to conditions that act as systematic barriers to meaning for people.

The “people” addressed by this KPI are employees. The most important of the five design constraints is ensuring that the company does not raise systemic barriers to employees’ wellness. Poverty is the biggest barrier to employees living full, meaningful lives in a flourishing, resilient society. Specifically, inadequate employee remuneration is a systemic barrier to an employee’s physical, psychological, and emotional wellness.

- Physical wellness requires comfortable shelter, healthy food, and access to good health care for the employee and his/her family. Employees need to be able to afford these.
- Psychological and emotional wellness requires freedom from stressful choices like paying the rent or buying food; foregoing dental care in order to buy school supplies; or putting off saving for retirement in order pay utility bills. Adequate employees’ wages would alleviate stress levels.
- Physical, psychological and emotional wellness requires employees to be able to support their families’ well-being without being exhausted from working excessive overtime or working in multiple jobs to just make ends meet today, with no reserves for emergencies or planning for the future. Employees need to be paid enough that they avoid these conundrums.

Inadequate employee remuneration is also a barrier to competence. Working long hours for insufficient wages is a barrier to the time, energy, and tuition for learning.

The ratio of employee remuneration to senior executive remuneration signals whether the employee is being fairly and equitably treated.

If employees must work and worry 24/7 about supporting their families, their self-esteem and energy to influence conditions in the workplace and society is significantly diminished.

Finally, there may be some meaning in employees’ lives if they are living below the poverty line, but with their basic needs dominating their waking hours, their purpose may be relegated to helping their families to survive in the short term rather than to flourish in the long term.
Table 10: Employee Remuneration KPI

<table>
<thead>
<tr>
<th>Employee Remuneration</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gold-standard Benchmark Goal</strong></td>
</tr>
<tr>
<td>Wages of 100% of employees and contractors $\geq$ Fair living wage in local jurisdictions</td>
</tr>
<tr>
<td>• 100% of employees are eligible to participate in the company bonus plan or company ownership / stock plan, so that they benefit when the company does well.</td>
</tr>
<tr>
<td>• Pay for performance enable employees to earn more if they perform better.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sample Proxy Goal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wages of 100% of employees and contractors $\geq$ (2 x minimum wage in local jurisdictions)</td>
</tr>
</tbody>
</table>

**Definitions**

- **Employee remuneration** is total compensation paid to employees, including non-mandatory benefits such as extended health benefits, subsidised transit passes, pensions, and childcare.
- **Minimum wage**\(^1\) is the lowest hourly, daily or monthly remuneration that employers must legally pay to workers. A minimum wage is mandatory and is often based on employer affordability, not worker needs to cover the cost of the basics of life in that jurisdiction. In Ontario, a full-time minimum wage worker earns 25% below the poverty line.\(^2\)
- **Living wage**\(^3\) is the minimum hourly wage necessary for each of two workers in a family of four to meet basic needs and to participate in the civic/social life of their community. It considers what level of pay families need to be able to afford basic everyday things like food, clothing, and shelter. A living wage isn't extravagant. It doesn't allow families to save for retirement, to save for their children's education, or to service their debt.
- **Fair living wage** enables employees to support their family's well-being in the jurisdiction where the company is located, without having to work overtime and without the need for public or private additional assistance. It is a living wage plus enough to save for education and retirement, and to service debt.

**Sample Valuation Calculation**

Fair living wage = Annual family expenses + Annual saving for education, retirement, and emergencies + Annual debt servicing + Mandatory payroll deductions – Government assistance

- “Annual family expenses” includes food, clothing, rent for a three-bedroom apartment, basic household expenses, transportation, child care, premiums for a basic extended health-care plan, and a few extras.
- “Annual saving for education, retirement, and emergencies” includes saving for tuition for one parent to take part-time courses, saving for one child’s post-secondary education, retirement savings, saving for a contingency fund for emergencies, and costs of caring for a disabled, ill or elderly family member.
- “Annual debt servicing” includes meeting interest payments and mortgage payments.
- “Mandatory payroll deductions” includes government income taxes deducted at source, unemployment insurance premiums, and any social security taxes.
- “Government assistance” includes benefits paid by governments for child care, disability, etc.

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\(^1\) “Minimum wage,” Wikipedia.


\(^3\) “Living wage,” Wikipedia.
Human Capital

Relevant design constraints

The relevant design constraints for this KPI are:

1. A sustainable business eliminates its contribution to conditions that act as systematic barriers to people’s wellness.
2. A sustainable business eliminates its contribution to conditions that act as systematic barriers to people’s influence.
3. A sustainable business eliminates its contribution to conditions that act as systematic barriers to people’s competence.
4. A sustainable business eliminates its contribution to conditions that act as systematic barriers to equity for people.
5. A sustainable business eliminates its contribution to conditions that act as systematic barriers to meaning for people.

As with employee remuneration, the “people” / stakeholders addressed by this KPI are employees. This human capital KPI holistically factors in the value of employee remuneration wages and benefits (wellness and meaning); education and experience (competence); engagement, absenteeism, and volunteering (influence); and promotions and retention (equity).

This KPI uses employee wages, regardless of their amount, in its calculation of human capital. The above employee remuneration KPI provides guidance on what the level of employee remuneration / wages should be.

Human capital is the value of the employee workforce. It belongs on the balance sheet of company resources, as suggested by the CEO mantra: “Employees are our most important asset.” However, up until now, human capital has been considered as an intangible asset. As mentioned earlier, it is one of the six capitals (financial, manufactured, intellectual, natural, human, and social) that companies are encouraged to report on each year in their integrated reports.74

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### Table 11: Human Capital KPI

<table>
<thead>
<tr>
<th>Gold-standard Benchmark Goal</th>
<th>Value of year-ending human capital ≥ Value of year-beginning human capital</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sample Proxy Goal</td>
<td>(Year-ending value of employee earnings x Year-beginning productivity factor) ≥ (Year-beginning value of employee earnings x Year end productivity factor)</td>
</tr>
<tr>
<td></td>
<td>This based on the Lev Schwartz model of valuing human capital.</td>
</tr>
</tbody>
</table>

#### Definition

**Human capital** is the stock of employee competencies, knowledge, social and personality attributes, including creativity, embodied in their ability to perform labor so as to produce economic value for the company.

#### Sample Valuation Calculation

<table>
<thead>
<tr>
<th>Value of year-beginning human capital</th>
<th>(based on # of employees, their wages, their tenure years with the company, their years of formal education, and amount of internal training that the company has invested in them)</th>
</tr>
</thead>
<tbody>
<tr>
<td>+ Annual investment in human capital</td>
<td>(based on fully-costed new training and development; cost of employee volunteer time during working hours; cost of medical and pension benefits; and cost of health and wellness benefits)</td>
</tr>
<tr>
<td>+ Annual appreciation of human capital</td>
<td>(based on value of step promotions; and level of employee engagement)</td>
</tr>
<tr>
<td>– Annual depreciation</td>
<td>(based on wages paid to employees over the year, cost of lost productivity as a result of sickness absence and health &amp; safety incidents; cost of lower productivity during overtime worked; cost of lost productivity during turnover; and cost of knowledge decay)</td>
</tr>
</tbody>
</table>

= Value of year-end human capital

---

76 “Human Capital,” Wikipedia.
77 This “Human Capital Stocks and Flows” valuation methodology was developed by Route2 Sustainability. It was piloted by Interface as described in a presentation by Lindsay Stoda, Senior Business Analyst, Interface, at the Sustainable Brands New Metrics for Sustainable Business Conference, September 2013.
Community Socio-Economic Impacts

Relevant design constraint

The relevant design constraints for this KPI are:

1. A sustainable business eliminates its contribution to conditions that act as systematic barriers to people’s **wellness**.
2. A sustainable business eliminates its contribution to conditions that act as systematic barriers to people’s **influence**.
3. A sustainable business eliminates its contribution to conditions that act as systematic barriers to people’s **competence**.
4. A sustainable business eliminates its contribution to conditions that act as systematic barriers to **equity** for people.
5. A sustainable business eliminates its contribution to conditions that act as systematic barriers to **meaning** for people.

The “people” / stakeholders addressed by this KPI are the stakeholders in the local community in the company’s locations, including indigenous peoples. The company must ensure that direct and indirect impacts from its operations do not raise systemic barriers to the community’s short- and long-term resilience and well being. The company’s relationship with the local community and its associated social licence to operate is enhanced by its contribution to the community’s social and economic well-being.

“In addition to creating benefits for the local communities, sustainability investments also create significant business value for companies. Intuitively, companies understand that there is a business case for being a good corporate citizen. Positive relationships with communities, civil society and governments help ensure that, among other things, production schedules are met, access to labor, land and resources are maintained, and reputations are kept intact.”

As outlined in the Table 12 below, community needs and issues are typically grouped into these categories: economic, health, education, infrastructure, safety, local institutional capacity, and access to natural resources. They map to the five design constraints as follows:

- **Wellness:** Local economy, livelihoods, and labor force issues; health-related issues and access to quality healthcare; safety, security, and nuisance factors; and access to natural resources
- **Influence:** Local institutional capacity
- **Competence:** Access to quality education
- **Equity:** Quality of utilities, infrastructure, and services
- **Meaning:** Local institutional capacity and access to natural resources

---

78 "About the FV Tool," IFC Financial Valuation Tool for Sustainability Investments
It is challenging to quantify impacts and to attribute socio-economic improvement or deterioration to company operations or initiatives. Further, normalizing the impacts to a dollar value is helpful when aggregating the positive and negative impacts of diverse initiatives. However, monetizing the socio-economic benefits / harm of some company operations / initiatives may not be possible or desirable. Accounting for some outcomes that cannot be monetized may require unique metrics in separate line items.

Various methodologies help with the valuation of social capital created by company impacts.

- **The Financial Valuation tool (FV Tool)**\(^ {79}\) compares various scenarios in order to demonstrate the full value of a company’s community sustainability / social programs. It facilitates a cost / benefit analysis of various community interventions.

- **Total Impact Measurement and Management (TIMM)**\(^ {80}\) assesses how a business’s activities and operations impact a broad range of stakeholders, including communities, and how these impacts in turn affect the business. Positive and negative impacts arise directly through a business’s operations and indirectly through the effects of its customers in the marketplace and by other organisations in the supply chain.\(^ {81}\)

- **B Impact Assessment**\(^ {82}\) scores a company’s social and environmental impact. The company’s social performance score is an indicator of its social capital. The B Impact Ratings System is used to both certify B Corporations\(^ {83}\) and generate GIIRS ratings.\(^ {84}\)

- **Socio-Economic Assessment Toolbox (SEAT)**\(^ {85}\) was developed by Anglo American mining company as a way to incorporate socio-impact assessment into the ongoing management of major operations. The SEAT Toolbox\(^ {86}\) is a robust and comprehensive guide on how to assess the positive and negative impacts of company operations on a community. It identifies key social and economic impacts and issues that need to be managed; it improves risk management; it assesses the effectiveness of community development projects; and improves the company’s understanding of the views and interests of a full range of local stakeholders.

It the SEAT methodology works in a high impact sector like mining, it is the superset of tools and is readily adaptable to any size company in any industry sector. It is used as the basis for the goal, definitions, and calculation in this KPI.

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\(^{79}\) "FV Tool Tutorial – Gold Mine in Africa," IFC Financial Valuation Tool for Sustainability Investments.

\(^{80}\) "Total Impact Measurement and Management," PwC website.


\(^{82}\) "Performance Requirements," B Corp website.

\(^{83}\) "What are B Corps?" B Corp website.

\(^{84}\) "About GIIRS," Global Impact Investment Ratings System (GIIRS) website.

\(^{85}\) SEAT, Anglo American website.

\(^{86}\) SEAT Toolbox, Anglo American website. This is 284-page document provides excellent guidance on how to assess the community socio-economic impacts of any company operations and initiatives.
Table 12: Community Socio-Economic Capital KPI

### Community Socio-Economic Impacts

**Gold-standard Benchmark Goal**  
_Benefits of company initiatives/impacts on important socio-economic issues in the eyes of priority stakeholders in the community ≥ Negative socio-economic initiatives/impacts_

**Sample Proxy Goal**  
_(To be determined)_

### Definition

- **Important socio-economic issues:** These are identified with priority stakeholders and are prioritized by the company using a likelihood-consequence matrix to assess company risk if the issue is not addressed and the benefit to the company if it is addressed. The potential material issues include:
  - Local economy, livelihoods, and labor force issues
  - Health-related issues and access to quality healthcare
  - Access to quality education
  - Quality of utilities, infrastructure, and services (roads and transportation infrastructure, housing, safe drinking water; sanitation / sewage services, access to electricity; access to telecommunications; and waste collection)
  - Local institutional capacity development
  - Safety, security, and nuisance factors
  - Access to natural resources

- **Company initiatives/impacts:** These include positive and negative impacts of the company’s core activities, as well as philanthropic contributions (monetary, staff time or gifts in kind) that bring benefits to communities over and above a company’s core activities. These investments address needs associated with the above issues, as identified by priority stakeholders within the community. For example:
  - Economy: Permanent and temporary job creation, local procurement, local workforce development and training, development of alternative livelihoods for displaced citizens, micro-credit of SMEs,
  - Health: Support for quality healthcare
  - Education: Support for quality schooling
  - Infrastructure: Local institutional capacity development, support for small-scale water and sanitation delivery, support for sustainable energy delivery, supporting community health, support for low cost housing.

- **Priority stakeholders:** These are external stakeholders who are identified as important within the zone of influence of the company operations, including indigenous peoples, vulnerable groups, government leaders and administrators, the media, and other community leaders.

### Sample Valuation Calculation

The formula is in the Gold-standard Benchmark Goal, above. Stakeholders help decide the appropriate metrics by which to assess the positive and negative socio-economic impacts of the company’s operations and initiatives. To avoid mixing metrics, accounting for some impacts may require separate line items.

Note that the value of positive impacts from a company’s philanthropic investments in non-local, distant communities is counted only if the company’s socio-economic impacts are net positive in its local community first.

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87 [SEAT Toolbox](#), Anglo American, pp. 25-43.  
88 [SEAT Toolbox](#), Anglo American, p. 149 (summary) and pp. 153-254 (detail)
Customer Social Capital

Relevant design constraints
The relevant design constraints for this KPI are:

- A sustainable business eliminates its contribution to conditions that act as systematic barriers to people’s wellness.
- A sustainable business eliminates its contribution to conditions that act as systematic barriers to meaning for people.

The “people” / stakeholders addressed by this KPI are customers. The company must ensure that direct and indirect impacts over the life cycle of its products and services do not raise systemic barriers to customers’ short- and long-term wellness and meaning.

Table 12: Customer Social Capital KPI

<table>
<thead>
<tr>
<th>Customer Social Capital</th>
<th>Gold-standard Benchmark Goal</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Customer well-being after using the company’s products and services ≥ Customer well-being before using the company’s products and services</td>
</tr>
<tr>
<td></td>
<td>- Customers are not directly or indirectly harmed by using the company’s products and services, in either the short or long term.</td>
</tr>
<tr>
<td></td>
<td>- The products and services do not directly or indirectly present short- or long-term systemic barriers to customer’s wellness and meaning.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sample Proxy Goal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of customers directly or indirectly harmed by using the company’s products and services, in either the short or long term = Zero</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Direct harm in the long term: This condition addresses products and services like illegal drugs or gambling which might produce a temporary, short-term feeling of well-being, but long-term addiction is harmful to the customer’s over all-well-being.</td>
</tr>
<tr>
<td>- Indirect harm in long term: This condition addresses products like fossil fuels which provide needed energy / well-being in the short term, but their use contributes to climate destabilization which has a long-term indirect harmful effect on customers and society.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sample Valuation Calculation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Value of customer well-being before using the company’s products and services:</td>
</tr>
<tr>
<td>(To be determined)</td>
</tr>
</tbody>
</table>

| Value of customer well-being after using the company’s products and services: |
| (To be determined) |
Gold-standard Benchmark for Sustainability Performance

Owner Social Capital

**Relevant design constraints**
The relevant design constraints for this KPI are:

- A sustainable business eliminates its contribution to conditions that act as systematic barriers to people’s **wellness**.
- A sustainable business eliminates its contribution to conditions that act as systematic barriers to **meaning** for people.

The “people” / stakeholders addressed by this KPI are owners, lenders, and investors. The company provides them with a strong environmental return on their investment (eROI), social return on their investment (sROI), and financial return on their investment (fROI), which improves their physical, psychological, and emotional wellness.

<table>
<thead>
<tr>
<th>Table 13: Owner Social Capital KPI</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Owner Social Capital</strong></td>
</tr>
<tr>
<td><strong>Gold-standard Benchmark Goal</strong></td>
</tr>
<tr>
<td>Owners’ annual eROI, sROI, and fROI ≥ Owners’ eROI, sROI, and fROI in the previous year</td>
</tr>
<tr>
<td><strong>Sample Proxy Goal</strong></td>
</tr>
<tr>
<td>Owners’ annual fROI ≥ Owners’ fROI in the previous year</td>
</tr>
</tbody>
</table>

**Definitions**

- **Environmental return on investment (eROI):** The owner’s share of the company’s net positive ecosystems services impacts that year (see the Ecosystems Services Impacts KPI above).
- **Social return on investment (sROI):** The owner’s share of the company’s net positive community socio-economic impacts that year (see the Community Socio-Economic Impacts KPI).
- **Financial return on investment (fROI):** The owner’s share of the financial returns created by the company that year, as normally calculated.

**Sample Valuation Calculation**
(See above.)
Governance KPIs and Goals

These KPIs are based on norms and principles of good governance. They are informed by social science principles about what a corporate citizen must do to build trust with its important stakeholders. It treats the company itself as a stakeholder, and ensures that its external stakeholders do not perceive company traits that create the opposites of the five social conditions (see Figure 9).

These criteria ensure that the company's success was not an accident, or would not stop if one or two senior executive sustainability champions left the company. They ensure that the company's ethical and responsible behaviours are intentional and baked into its policies, management systems, and culture—that the company’s sustainability performance is sustainable.

Table 14: Governance KPIs and Goals

<table>
<thead>
<tr>
<th>KPI / Aspect</th>
<th>Gold-standard Benchmark Goal and Sample Proxy Goal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Board oversight</td>
<td><strong>Gold-standard Benchmark Goal</strong></td>
</tr>
<tr>
<td></td>
<td>The Board of Directors has a committee with specific responsibility for sustainability oversight.</td>
</tr>
<tr>
<td></td>
<td><strong>Sample Proxy Goal</strong></td>
</tr>
<tr>
<td></td>
<td>The Board of Directors reviews the company’s social and environmental performance on at least an annual basis, as part of its fiduciary duty.</td>
</tr>
<tr>
<td>Policies and systems</td>
<td><strong>Gold-standard Benchmark Goal</strong></td>
</tr>
<tr>
<td></td>
<td>The company embeds sustainability considerations into corporate policies and risk management systems.</td>
</tr>
<tr>
<td></td>
<td>• The company vision, mission, values, goals, policies, procedures, processes, and management systems ensure sustained achievement of gold-standard benchmark performance their primary objective.</td>
</tr>
<tr>
<td></td>
<td>• Labor rights include freedom of association and right to collective bargaining, non-discrimination, transparency around disciplinary practices, fair working hours, workplace health and safety, and equal pay for work of equal value. The company has strict policies on human rights, child labor, and forced labor. There are serious consequences for violations, including immediate dismissal.</td>
</tr>
<tr>
<td></td>
<td>• The diversity demographic of senior leadership and the workforce mirrors the demographics of the local community. 50% of its board, senior leadership, and workforce are women. Normally excluded populations are included.</td>
</tr>
<tr>
<td></td>
<td>• A strong employee ESG pay link ensures that all employees pay is linked to their support for sustainability policies, systems, and initiatives.</td>
</tr>
<tr>
<td></td>
<td><strong>Sample Proxy Goal</strong></td>
</tr>
<tr>
<td></td>
<td>Sustainability performance results are a core component (worth at least 20%) of compensation packages and incentive plans for 100% of employees, including executives.</td>
</tr>
<tr>
<td>KPI / Aspect</td>
<td>Gold-standard Benchmark Goal and Sample Proxy Goal</td>
</tr>
<tr>
<td>-------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
</tbody>
</table>
| Ethical practices | **Gold-standard Benchmark Goal**  
|                   | **Zero ethical violations over the last three years.**  
|                   | - 100% of employees are trained in ethical business practices and annually commit to them. Ethical practices cover bribes, kickbacks, anti-competitive prohibitions, conflicts of interest, insider trading, and validity of financial reporting. There are serious consequences for violations, including immediate dismissal.  
|                   | - Zero of its products and services injure or cause negative health effects in their users and associated stakeholders.  
|                   | - Zero of its products and services contain conflict minerals.  
|                   | **Sample Proxy Goal**  
|                   | *The company has strict, formal policies on truth in advertising; customer warranty, complaint, and injury resolution; and whistleblower protection.*                                                                                                                                 |
| Disclosure        | **Gold-standard Benchmark Goal**  
|                   | *The company discloses all material sustainability information to its stakeholders.*  
|                   | - The company discloses material sustainability issues in financial filings.  
|                   | - Its sustainability goals, plans, and performance are third party verified and publicly available.  
|                   | - The company produces a public-facing annual report detailing its mission-related/sustainability performance.  
|                   | - Transparent disclosure as an affirmative duty.  
|                   | **Sample Proxy Goal**  
|                   | *The company produces an integrated report on sustainability, at least annually, verified by an external third party.*                                                                                                                                 |
| Transparency      | **Gold-standard Benchmark Goal**  
|                   | *The company is transparent about its position on sustainability-related public policy issues.*  
|                   | - It publicly reports all financial and in-kind contributions to political parties, individual politicians, political advocacy groups, charitable organizations, and advocacy groups, by country.  
|                   | - Lobbying is done transparently and in a manner consistent with sustainability commitments and strategies.  
|                   | - Bribes in any form, including kickbacks or gifts, on any portion of contract payments or soft dollar practices are prohibited.  
|                   | **Sample Proxy Goal**  
|                   | *The company has strict, formal policies on truth in advertising; customer warranty, complaint, and injury resolution; and whistleblower protection.*
<table>
<thead>
<tr>
<th>KPI / Aspect</th>
<th>Gold-standard Benchmark Goal and Sample Proxy Goal</th>
</tr>
</thead>
</table>
| Tax leadership      | **Gold-standard Benchmark Goal**  
100% of annual statutory tax obligations are paid. Taxes are paid where the revenue is raised.  
• The company does not exploit tax loopholes such as transfer pricing schemes, shifting profits to low-tax havens, creating off-shore subsidiaries and shell companies, using digital technology to flip money to the most advantageous location, and other forms of fiscal evasion.  
• To level the global playing field, the company advocates for global rules that mandate the disclosure of all earnings in the country where they're earned, and payment of all taxes due in that same country.\(^9^9\)  
• The company advocates for a Tobin Tax—a tiny levy on certain categories of global financial transactions (Foreign Exchange Deals, for instance) to generate potentially huge government revenues to be used to help poorer countries meet development goals on health, education, hygiene, adaptation to climate change, biodiversity protection and so on.\(^9^0\)  
• The company advocates for a universal carbon tax to incent slashing greenhouse gas emissions that are destabilizing the climate.\(^9^1\)  
| Sample Proxy Goal   | 100% of annual statutory tax obligations are paid. Taxes are paid where the revenue is raised.  
This is the same as the Gold-standard Benchmark goal. |
| Financial performance | **Gold-standard Benchmark Goal**  
Current year financial performance ≥ Previous year financial performance.  
| Sample Proxy Goal   | The business has been profitable for at least the last three years. |

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Summary

The set of gold-standard benchmark KPIs provides a clear set of rigorous and material targets for companies that aspire to being truly sustainable companies. The KPIs define the steady state destination for companies on a sustainability journey. This figure summarizes all the KPIs with their associated goals.

Figure 15: Summary of Key Performance Indicators and Goals
Next Steps

We have a multilayered vision, with different time-frames.

**Vision 2014 for the gold-standard benchmark project**

A group of influential users / co-creators agree to use the benchmark and advocate for its use by other high-leverage players in the business sector.

The gold-standard benchmark for sustainable business is a work in progress. We have been working on it since early 2012. In 2013, several facilitated feedback sessions and workshops were held with representative stakeholders. The content if this document reflects feedback from those sessions, as well as numerous conversations and extensive research by its authors. In 2013, The Natural Step (TNS) Canada used the System Conditions / Design Constraints lens in an-depth analysis by the B Impact Assessment rating system that underpins the rapidly-expanding B Corporation movement. It proved to be a helpful approach.

We are at the stage where we need more help. This document is a starter set for further dialogue to refine and improve its content. To that end, in 2014 we will produce an “exposure draft” of this document and invite input from the global community of sustainability experts and potential users of the benchmark. Following a 60-90 day comment period, we will synthesize the ideas and suggestions into a “beta version” of the document and open it up for a second 60-day comment period. Based on suggestions from that second round of feedback, we will produce a “pilot version” in mid-2014 that will be road-tested with selected users and co-creators of the benchmark. Following that, “Version 1.0” will be released in late 2014 as a free, open source common good under a Creative Commons licence agreement The Natural Step will maintain stewardship of the benchmark and will release periodic future versions.

In parallel, in 2014, we will produce a robust business case for a truly sustainable business, to reinforce that it will have a competitive advantage over other companies—that truly sustainable businesses are not sacrificing success by making the necessary transitions. For companies who discover that they cannot reach the benchmark KPIs with their current business models, we will also work with the Strongly Sustainable Business Model group to provide a canvas that enables business to prototype a sustainable business model for their company.

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92 **Strongly Sustainable Business Model Group**, led by Antony Upward in the Strategic Innovation Lab at the Ontario College of Art and Design (OCAD)
**Vision 2020 for the business sector**

*A critical mass of influential businesses uses sustainable business models.*

The intent is that pilot stakeholders become advocates. They will work within their networks of influence to build a critical mass—a high-leverage twenty percent—of businesses that commit to make the necessary transitions to a sustainable business model. They may advocate the use of the Strongly Sustainable Business Model canvas and business case tools mentioned above to help accomplish buy-in with this critical mass of influential businesses.

**Ultimate vision for the business sector**

*All businesses use sustainable business models.*

If all goes well, change theory says that this will happen. How soon it will happen depends on how effectively we accomplish the 2014 and 2020 visions.

**Ultimate vision for society**

*Human society flourishes on our finite planet.*

Companies are the most important and influential actors in society. If they are designed to be sustainable, they will trigger a sea change in society. That is why we are starting with them.

The collaborative process used to create the gold-standard benchmark for sustainable businesses provides a model process by which to create gold-standard sustainability benchmarks for other sectors in society, like government, education, and even households. With adequate resources, our plan is to collaboratively generate additional gold-standard benchmarks by 2016, dramatically raising sustainability literacy across society’s most important actors. Our vision is that we have a critical mass of influential organizations in these sectors using sustainable business models by 2020.

As outlined in the Introduction, there are five benefits to developing a gold-standard benchmark for sustainable business, and seven reasons that the stars are aligning to do it now. We think it could create a “butterfly effect” in our complex eco-social system that precipitates massive change and a sustainable future.

It will work if we do it right, together.

---

Appendix A: Overview of Framework for Strategic Sustainable Development

This appendix provides a brief overview as to the rationale and content for the Framework for Strategic Sustainable Development, with a particular focus on the System Conditions for Sustainability.

1. If you want to be strategic, you must—by definition—at least know where you want to be.

2. The objective can, in general, not be defined in detail when it comes to complex systems. For complex endeavors in complex systems we need basic principles as boundary conditions.

3. If principles are to be basic and operational definitions of objectives, the principles must be:
   - **Necessary (but not more):** to avoid imposing unnecessary restrictions and to avoid confusion over elements that may be debatable;
   - **Sufficient:** to avoid gaps in the thinking i.e. to allow elaboration into second and higher orders of principles from a complete base;
   - **General:** to be applicable in any arena, at any scale, by any member in a team and all stakeholders, regardless of field of expertise, to allow for cross-disciplinary and cross-sector collaboration;
   - **Concrete:** to actually guide problem solving and re-design and a step-by-step approach in real life planning;
   - **Non-overlapping:** to enable comprehension and facilitate development of indicators for monitoring of progress;

4. When you have defined a goal by principles fulfilling such criteria, and only then, you can obtain the following:
   - **The resource potential becomes calculable.** If you do not know how to define the objective, you cannot even attempt to calculate the resource potential and determine the degrees of freedom within the constraints of the objective. But if you do, your planning and decision-making can be supported by a scientific estimation of the resource potential (using, e.g., physics and ecology), rather than based only on the constraints of, e.g., current technologies and cultures.
   - **Trade-offs can be more rationally managed.** Advantages and disadvantages often relate to different variables and parameters and come in different units. “Is it better to risk polluting with Mercury than to waste energy (as in the case of low-energy light bulbs)?”
Analyzing the either/or of snapshots has limited strategic value. However, if you know the end goal, you can evaluate various options for their capacity to serve as stepping stones to bringing the process to a stage where the trade-off does not exist. You model optional routes to complete success, rather than evaluating snapshots as good vs. bad. If you frame a choice between plague and cholera, you are likely to get one or the other!

- **System boundaries setting can be guided by the Purpose.** Science puts demands on clear and adequate system boundaries when systems are studied. Sustainability discourses in an organization often come with debates around where to draw the system boundaries. Trained scholars tend to ask: “Do you mean the factory with its walls, or do you include: Clients? Supply chains? Other stakeholders? The whole world?” The latter is often proposed with a little smile, to demonstrate how un-imaginable that would be. Yet, the truth is; when it comes to sustainability, the whole world does count, to some level of detail. Again, basic principles of objectives provide a way forward. You put yourself in the shoes of the CEO or project manager and ask yourself what, in the whole world, need to be taken into account to make the respective organization / planning endeavor / region support societal compliance with sustainability principles and you let this inform your decision on system boundaries, from geography to disciplines and beyond.

- **Interdisciplinary cross-sector cooperation can be better facilitated.** With a principled definition of the objective, each expert group becomes better in drawing the relevant knowledge from their respective silos. Again, each sector that needs to be taken into account to comply with the sustainability principles is brought to the table.

- **Unknown problems can be avoided.** You can do much better than just fixing the impacts you already know. If you re-design your respective area of responsibility by basic principles that are robust for success, you will not learn all the detailed consequences from not doing so. For instance, you can avoid contributing to increasing Zinc or Silver levels in natural systems, without knowing exactly what further increases in such concentrations may imply at certain (unknown) eco-toxic thresholds. Just like we should have done, e.g., with CFCs already at the time of introduction, and already before we learnt what they do to the ozone layer.

- **Selection, use and development of other concepts, methods and tools can be guided.** A principled definition of the objective, fulfilling the listed criteria, makes it possible to make better use of other existing concepts, methods and tools for sustainable development, by guiding the selection of such concepts, methods and tools that are necessary for reaching the objective. It can also help identify a need for development, and it can guide such development, of new concepts, methods and tools.

A Framework for Strategic Sustainable Development (FSSD), including System Conditions as success principles fulfilling the above criteria and thus with the ability of providing the above
unique deliverables, has been developed, scrutinized, tested in reality, refined and scrutinized again in a 20+ years peer-reviewed scientific consensus process. The FSSD helps to merge seemingly impossible-to-merge polarities into unity: big picture with small picture, long term with short term, ethics with money and sectors and disciplines with each other.

The FSSD is structured in five levels, and each of those are “cut” along the dimension of what we want in the system, i.e. the second level of the framework, the principled vision (including the System Conditions). The five levels are described briefly below.

1. **System**
   The global socio-ecological system (society within the biosphere) including, in that context, the respective organization or region or topic; An overview of the sustainability challenge.

2. **Success**
   The organization/region/topic reaching its goals without contributing to violation of the basic sustainability principles.

3. **Strategic Guidelines**
   Backcasting from success; Logical guidelines for step-wise transitions between current challenges and future opportunities.

4. **Actions**
   Actions put into a plan that help move the organization/region/topic towards its sustainable vision.

5. **Tools**
   Tools used to help planners explore actions (4) to be strategic (3) to arrive at the objectives (2) within the system (1).

The original phrasing of the System Conditions (level 2) is as follows:

**In the sustainable society, nature is not subject to systematically increasing ...**

1. ... concentrations of substances extracted from the Earth's crust;
2. ... concentrations of substances produced by society;
3. ... degradation by physical means;

...and, in that society

4. ... people are not subject to conditions that systematically undermine their capacity to meet their needs.
Furthermore, an organization can ‘translate’ the System Conditions to its own ultimate objectives as to eliminate its contribution to…

1. … systematic increases in concentrations of substances from the Earth’s crust;
2. … systematic increases in concentrations of substances produced by society;
3. … systematic physical degradation of nature;
4. … conditions that systematically undermine people’s capacity to meet their needs.

Guidance on how to put each of the ultimate objectives into practice includes:

1. This often means substituting certain minerals that are scarce in nature for others that are more abundant, using all mined materials efficiently, and systematically reducing dependence on fossil fuels.

2. This often means substituting certain persistent and unnatural compounds with ones that are normally abundant or break down more easily in nature, and using all substances produced by society efficiently.

3. This means drawing resources only from well managed eco-systems, systematically pursuing the most productive and efficient use both of those resources and land, and exercising caution in all kinds of modification of nature, e.g., introductions.

4. This means thinking of how our behaviour has consequences for people, now or in the future, which restrict their opportunities to lead a fulfilling life, by asking whether we would like to be subjected to the conditions we create.

Recent research has helped to elaborate the fourth social system condition. The elaboration of the fourth principle is based on the following points.

- Individual humans aim to satisfy their needs. They need others to do so, but inherently have the capacity to organize this effort by themselves.
- Humans are meaning-seeking and making creatures and therefore need meaning and purpose. Purpose functions as a mechanism through which humans connect to the larger system.
- Diversity, learning and self-organization are inherent aspects of all living systems. They therefore do not need to be engineered, but left room for to allow them to unfold.
- Trust is an essential element for the human complex adaptive system to function.

---

Based on the above, basic conditions for a sustainable social system are not that every individual’s needs are provided for (an ‘utopia’), but that the social system is designed such that it can optimize the possibility for its individuals to get their individual needs satisfied. In other words, how can social systems be designed such that its members will trust each other as much as possible and be as resilient as possible in the face of any forthcoming challenges, including un-sustainability related impacts? This leads to the following system conditions for social sustainability.

**In a sustainable society, people are not subject to systemic barriers to:**

- personal wellness\(^95\)
- influence
- competence\(^96\)
- equity
- meaning

This provides eight system conditions for sustainability in total.

**In a sustainable society, nature is not subject to systematically increasing ...**

1. concentrations of substances extracted from the Earth’s crust;
2. concentrations of substances produced by society;
3. degradation by physical means;

...and, in that society people are not subject to systemic barriers to:

5. personal wellness
6. influence
7. competence
8. equity
9. meaning

---

\(^95\) This has been changed from “personal integrity” as expressed in Missimer’s research to allow for easier comprehension. It includes physical, psychological, emotional and spiritual wellness.

\(^96\) This has been changed from “impartiality” to allow for easier comprehension.
Appendix B: Guidance on Scarcity vs. Relative Abundance of Mined Materials

The table below gives an indication of natural flows from the lithosphere to the ecosphere and the societal flows we are creating through mining and extraction of fossil fuels. Referring to this information we can see in the end column that numbers greater than 1 show were the societal flow of mined materials already exceeds the entire natural flow rates. As a rule of thumb this can help to see that some element are therefore at higher risk of accumulating in nature faster than it can be naturally assimilated or re-deposited back into the lithosphere.

This indicator gives a forewarning of potential problems to come. We should avoid using these substances. At a minimum, we should manage them more carefully in closed technical cycles and bear in mind societal vs. natural flow-rates when substituting for new substances.

To provide an example, aluminium is naturally abundant, as indicated by the background concentration in soils and the large amount coming into the ecosphere through weathering and volcanic eruptions. It would therefore be very difficult for our societal flows to overwhelm nature. However, for those elements that are scarce in nature such as copper, even introducing a small amount through mining and dissipative uses in society can lead to accumulation and future problems that we cannot foresee.
### Table B1: Relative Abundance of Mined Minerals

<table>
<thead>
<tr>
<th>Element(s)</th>
<th>Name</th>
<th>Conc. in Soils (mg/Kg)</th>
<th>Natural Flows</th>
<th>Societal Flows</th>
<th>Ratio of Societal to Natural Flows</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Weathering</td>
<td>Mining (M)</td>
<td>Fossil Fuels (F)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>and Volcanic</td>
<td>(kton)</td>
<td>(kton)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(W)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Al</td>
<td>Aluminum</td>
<td>72,000.00</td>
<td>1,100,000.00</td>
<td>18,000.00</td>
<td>34,000.00</td>
</tr>
<tr>
<td>Fe</td>
<td>Iron</td>
<td>26,000.00</td>
<td>390,000.00</td>
<td>540,000.00</td>
<td>34,000.00</td>
</tr>
<tr>
<td>K</td>
<td>Potassium</td>
<td>15000</td>
<td>230,000.00</td>
<td>24,000.00</td>
<td>340</td>
</tr>
<tr>
<td>Mg</td>
<td>Magnesium</td>
<td>9000</td>
<td>140,000.00</td>
<td>3,100.00</td>
<td>690</td>
</tr>
<tr>
<td>Ti</td>
<td>Titanium</td>
<td>2900</td>
<td>44,000.00</td>
<td>2,500.00</td>
<td>1700</td>
</tr>
<tr>
<td>Mn</td>
<td>Manganese</td>
<td>550</td>
<td>8,300.00</td>
<td>8,600.00</td>
<td>170</td>
</tr>
<tr>
<td>Zr</td>
<td>Zirconium</td>
<td>230</td>
<td>3,500.00</td>
<td>880.00</td>
<td>140</td>
</tr>
<tr>
<td>V</td>
<td>Vanadium</td>
<td>80</td>
<td>1,200.00</td>
<td>32.00</td>
<td>350</td>
</tr>
<tr>
<td>Zn</td>
<td>Zinc</td>
<td>60</td>
<td>910.00</td>
<td>7,300.00</td>
<td>260</td>
</tr>
<tr>
<td>Cr</td>
<td>Chromium</td>
<td>54</td>
<td>830.00</td>
<td>3,800.00</td>
<td>34</td>
</tr>
<tr>
<td>Cu</td>
<td>Copper</td>
<td>25</td>
<td>380.00</td>
<td>9,000.00</td>
<td>55</td>
</tr>
<tr>
<td>Li</td>
<td>Lithium</td>
<td>24</td>
<td>360.00</td>
<td>9.90</td>
<td>230</td>
</tr>
<tr>
<td>Ni</td>
<td>Nickel</td>
<td>19</td>
<td>300.00</td>
<td>880.00</td>
<td>570</td>
</tr>
<tr>
<td>Pb</td>
<td>Lead</td>
<td>19</td>
<td>290.00</td>
<td>3,300.00</td>
<td>85</td>
</tr>
<tr>
<td>Ga</td>
<td>Gallium</td>
<td>17</td>
<td>260.00</td>
<td>0.037</td>
<td>24</td>
</tr>
<tr>
<td>Nb</td>
<td>Niobium</td>
<td>11</td>
<td>170.00</td>
<td>14.00</td>
<td>14</td>
</tr>
<tr>
<td>U</td>
<td>Uranium</td>
<td>2.7</td>
<td>41.00</td>
<td>47.00</td>
<td>3.4</td>
</tr>
<tr>
<td>Sn</td>
<td>Tin</td>
<td>1.3</td>
<td>20.00</td>
<td>210.00</td>
<td>5.7</td>
</tr>
<tr>
<td>Mo</td>
<td>Molybdenum</td>
<td>0.97</td>
<td>15.00</td>
<td>110.00</td>
<td>17</td>
</tr>
<tr>
<td>Be</td>
<td>Berkelium</td>
<td>0.92</td>
<td>14.00</td>
<td>0.34</td>
<td>10</td>
</tr>
<tr>
<td>Cd</td>
<td>Cadmium</td>
<td>0.35</td>
<td>5.30</td>
<td>20.00</td>
<td>3.4</td>
</tr>
<tr>
<td>Element</td>
<td>Name</td>
<td>Conc. in Soils (mg/Kg)</td>
<td>Natural Flows</td>
<td>Societal Flows</td>
<td>Ratio of Societal to Natural Flows</td>
</tr>
<tr>
<td>---------</td>
<td>---------------</td>
<td>------------------------</td>
<td>---------------</td>
<td>----------------</td>
<td>-----------------------------------</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Weathering and Volcanic (W)</td>
<td>Mining (M) (kton)</td>
<td>Fossil Fuels (F) (kton)</td>
</tr>
<tr>
<td>Hg</td>
<td>Mercury</td>
<td>0.09</td>
<td>1.40</td>
<td>5.20</td>
<td>10</td>
</tr>
<tr>
<td>Ag</td>
<td>Silver</td>
<td>0.05</td>
<td>0.75</td>
<td>15.00</td>
<td>1.7</td>
</tr>
<tr>
<td><strong>Semi Metals</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Si</td>
<td>Silicon</td>
<td>310000</td>
<td>4,700,000.00</td>
<td>4,600.00</td>
<td>9500</td>
</tr>
<tr>
<td>B</td>
<td>Boron</td>
<td>33</td>
<td>500.00</td>
<td>0.37</td>
<td>250</td>
</tr>
<tr>
<td>As</td>
<td>Arsenic</td>
<td>7.2</td>
<td>110.00</td>
<td>19.00</td>
<td>18</td>
</tr>
<tr>
<td>Ge</td>
<td>Germanium</td>
<td>1.2</td>
<td>18.00</td>
<td>0.27</td>
<td>17</td>
</tr>
<tr>
<td>Sb</td>
<td>Antimony</td>
<td>0.66</td>
<td>9.90</td>
<td>54.00</td>
<td>10</td>
</tr>
<tr>
<td><strong>Non Metals</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>Carbon</td>
<td>25000</td>
<td>780,000.00</td>
<td>5400000</td>
<td>6.4</td>
</tr>
<tr>
<td>S</td>
<td>Sulphur</td>
<td>1600</td>
<td>33,000.00</td>
<td>58000</td>
<td>100000</td>
</tr>
<tr>
<td>F</td>
<td>Fluorine</td>
<td>950</td>
<td>14,000.00</td>
<td>2300</td>
<td>240</td>
</tr>
<tr>
<td>P</td>
<td>Phosphorus</td>
<td>430</td>
<td>6,500.00</td>
<td>2100</td>
<td>1700</td>
</tr>
<tr>
<td>Se</td>
<td>Selenium</td>
<td>0.39</td>
<td>5.90</td>
<td>2.1</td>
<td>12</td>
</tr>
</tbody>
</table>

Appendix C: Necessary Transitions

Each of the design constraints described above can be broken down into a set of “necessary transitions”—things that will need to happen in order for the design constraint to be met. Taken together, the necessary transitions represent guidelines on what it will take to achieve a sustainable business. Table 2 below describes the transitions necessitated by each design constraint.

<table>
<thead>
<tr>
<th>Design Constraints for a Sustainable Business</th>
<th>The Necessary Transitions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. A sustainable business eliminates its contribution to systematically increasing concentrations of substances from the earth’s crust.</td>
<td>From the inefficient use of minerals, metals and energy</td>
</tr>
<tr>
<td></td>
<td>From the use of fossil-fuel based energy as the primary form</td>
</tr>
<tr>
<td></td>
<td>From the use of scarce minerals and metals</td>
</tr>
<tr>
<td></td>
<td>From dissipative uses of minerals and metals</td>
</tr>
<tr>
<td>2. A sustainable business eliminates its contribution to systematically increasing concentrations of substances produced by society.</td>
<td>From the inefficient use of chemical compounds</td>
</tr>
<tr>
<td></td>
<td>From the use of chemical compounds that are persistent in nature.</td>
</tr>
<tr>
<td></td>
<td>From dissipative uses of chemical compounds</td>
</tr>
<tr>
<td>3. A sustainable business eliminates its contribution to the ongoing degradation of nature by physical means.</td>
<td>From the inefficient use of water, resources and land</td>
</tr>
<tr>
<td></td>
<td>From resources taken from a poorly managed ecosystem</td>
</tr>
<tr>
<td></td>
<td>From practices the enable ongoing direct encroachment into nature</td>
</tr>
<tr>
<td>4. A sustainable business eliminates its contribution to conditions that act as systematic barriers to people’s wellness.</td>
<td>From unsafe working environments</td>
</tr>
<tr>
<td></td>
<td>From practices that act as economic barriers to sufficient resources for livelihood (e.g. forced labour, chronically low wages)</td>
</tr>
</tbody>
</table>

Table C1: Sustainable Business Design Constraints and the Necessary Transitions
### Design Constraints for a Sustainable Business

<table>
<thead>
<tr>
<th>Design Constraints for a Sustainable Business</th>
<th>The Necessary Transitions</th>
</tr>
</thead>
<tbody>
<tr>
<td>From practices that act as barriers to access to basic services (e.g. clean water, shelter)</td>
<td>To practices that enable people to have access to basic services (e.g. clean water, shelter)</td>
</tr>
<tr>
<td>From practices that inhibit people from accessing services to allow them to take care of their own health</td>
<td>To practices that enable people to access services to allow them to take care of their own health</td>
</tr>
<tr>
<td><strong>5. A sustainable business eliminates its contribution to conditions that act as systematic barriers to people’s influence.</strong></td>
<td>From policies that support politically oppressive government regimes</td>
</tr>
<tr>
<td></td>
<td>From a closed and non-transparent work environment where people are not able to shape the system where they live and work</td>
</tr>
<tr>
<td></td>
<td>From communications and marketing that falsely influence stakeholder decisions</td>
</tr>
<tr>
<td></td>
<td>From a closed and siloed approach to working with others</td>
</tr>
<tr>
<td><strong>6. A sustainable business eliminates its contribution to conditions that act as systematic barriers to people’s competence.</strong></td>
<td>From policies and practices that restrict opportunities for personal and collective learning and growth in competence</td>
</tr>
<tr>
<td></td>
<td>From policies and practices that are discriminatory</td>
</tr>
<tr>
<td><strong>7. A sustainable business eliminates its contribution to conditions that act as systematic barriers to equity for people.</strong></td>
<td>From a work environment that inhibits people from a sense of purpose</td>
</tr>
<tr>
<td><strong>8. A sustainable business eliminates its contribution to conditions that act as systematic barriers to meaning for people.</strong></td>
<td></td>
</tr>
</tbody>
</table>
Redesign the Business Model to Make Enable the Transitions

Everyone knows it is “mission impossible” to get perfect scores in the National Highway Traffic Safety Administration (NHTSA) 5-star rating for car safety. However, in 2013, the Tesla Model S sedan did it.97 Not only did the Tesla Model S achieve a perfect overall safety score, but it also achieved perfect scores in every subcategory without exception. In fact, it was better than perfect. The NHTSA does not publish a star rating above 5, but safety levels better than 5 stars are captured in the overall Vehicle Safety Score (VSS) provided to manufacturers. The Model S achieved a new combined VSS record of 5.4 stars.

And performance was not sacrificed for safety. In 2013, Motor Trend named the Tesla Model S its car of the year98 and it outscored all other cars in Consumer Reports’ performance test ratings.99 How did Tesla accomplish these safety and performance feats? It redesigned the car to ensure that it did.

Similarly, if achieving a gold-standard level of performance on the benchmark KPIs is “mission impossible” for a company, perhaps it is time to redesign its business model to enable that level of success. The Strongly Sustainable Business Models Group (SSBMG)100 is building tools to help do that. It focuses primarily on small- and medium-sized enterprises (SMSs) and builds on the canvas described by Alexander Osterwalder and Yves Pigneur in Business Model Generation.101 It will build on that model to provide tools to holistically design a sustainable organization using a “Strongly Sustainable Business Model Canvas.”102

Designing a strongly sustainable company requires its attributes / specifications / design constraints. The SSBMG effort will use the same design constraints for a sustainable business that are used in this document as a framework for the gold-standard benchmark. We are in sync.

100 The Strongly Sustainable Business Models Group (SSBMG) is part of the Strategic Innovation Lab at the Ontario College of Art and Design (OCAD).
Appendix D: Planetary Boundaries and Ecosystem Frameworks

In his landmark article in Nature magazine, Johan Rockström and colleagues identified and quantified planetary boundaries that must not be transgressed if we are to prevent human activities from causing unacceptable environmental change. The following table shows how the environmental KPIs address the root causes of threats to planetary boundaries.

Table D1: Environmental KPIs and Planetary Boundaries

<table>
<thead>
<tr>
<th>Rockström's Planetary Boundaries</th>
<th>Gold-standard Benchmark KPIs</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Carbon Footprint</td>
</tr>
<tr>
<td>Climate change</td>
<td>X</td>
</tr>
<tr>
<td>Rate of biodiversity loss</td>
<td></td>
</tr>
<tr>
<td>Nitrogen and phosphorous cycles in the atmosphere and oceans</td>
<td>X</td>
</tr>
<tr>
<td>Stratospheric ozone depletion</td>
<td></td>
</tr>
<tr>
<td>Ocean acidification</td>
<td>X</td>
</tr>
<tr>
<td>Global freshwater use</td>
<td></td>
</tr>
<tr>
<td>Change in land use</td>
<td></td>
</tr>
<tr>
<td>Atmospheric aerosols loading</td>
<td>X</td>
</tr>
<tr>
<td>Chemical pollution</td>
<td></td>
</tr>
</tbody>
</table>

In a 2012 paper for Oxfam, Kate Raworth nested a “social doughnut” of eleven needs within Rockström’s nine planetary boundaries, to reinforce their interdependencies.

![Social Doughnut](image)

The nine factors in the social foundation map well to the five social systems conditions:

- Wellness is aligned with health, food, water, energy, jobs, and income
- Influence is aligned with voice
- Competence is aligned with education
- Equity is aligned with gender equity and social equity
- Meaning is not explicitly referenced but loosely aligns with resilience

The natural capital KPI references ecosystem services. The Millennium Ecosystem Assessment assessed the health of 30 ecosystem services, organized in four categories: Provisioning services, Regulating services, Supporting services, and Cultural services. Using the

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104 Kate Raworth, “A Safe and Just Space for Humanity Can we live within the doughnut?” Oxfam Discussion Paper, February 2012.
105 “Ecosystems and Human Well-being: A Framework for Assessment,” Millennium Ecosystem Assessment, World Resources Institute, Washington, 2005, pp. 56-60,
same four categories, The Economics of Ecosystems and Biodiversity (TEEB) has 17 similar ecosystem services.\textsuperscript{106} Trucost has 27,\textsuperscript{107} and the World Business Council for Sustainable Development (WBCSD) lists 17.\textsuperscript{108}

Table D2: Ecosystem Services

<table>
<thead>
<tr>
<th>Ecosystem Services Frameworks</th>
<th>Millennium Assessment</th>
<th>Trucost</th>
<th>TEEB</th>
<th>WBCSD</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Provisioning Services</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Food and fiber</td>
<td>• Food</td>
<td>• Food</td>
<td>• Food</td>
<td></td>
</tr>
<tr>
<td>• Fuel</td>
<td>• Wood</td>
<td>• Raw materials</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Freshwater</td>
<td>• Fiber</td>
<td>• Freshwater</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Biochemicals, natural medicines, pharmaceuticals</td>
<td>• Other raw materials</td>
<td>• Medicinal resources</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Genetic resources</td>
<td>• Biomass fuel</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Ornamental resources</td>
<td>• Freshwater</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Biochemicals, / pharmaceuticals</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Scientific research / genetic resources</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Energy production</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Other (coral reefs only)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Regulating Services</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Air quality regulation</td>
<td>• Air quality</td>
<td>• Local climate and air quality regulation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Climate regulation</td>
<td>• Climate</td>
<td>• Carbon sequestration and storage</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Water regulation</td>
<td>• Water</td>
<td>• Moderation of extreme events</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Erosion control</td>
<td>• Erosion</td>
<td>• Waste-water treatment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Water purification and waste treatment</td>
<td>• Disease</td>
<td>• Erosion prevention and maintenance of soil fertility</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Regulation of human diseases</td>
<td>• Pest</td>
<td>• Pollination</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Biological control</td>
<td>• Natural hazard</td>
<td>• Biological control</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Pollination</td>
<td>• Biological control</td>
<td>• Pollution</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Storm protection</td>
<td>• Pollination</td>
<td>• Biological control</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Cultural Services</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Cultural diversity</td>
<td>• Recreation and ecotourism</td>
<td>• Recreation and mental and physical health</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Spiritual and religious values</td>
<td>• Ethical</td>
<td>• Tourism</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Knowledge systems</td>
<td></td>
<td>• Aesthetic appreciation and inspiration for culture, art and design</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Educational values</td>
<td></td>
<td>• Spiritual experience and sense of place</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Inspiration</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Aesthetic values</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Social relations</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Sense of place</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Cultural heritage values</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Recreation and ecotourism</td>
<td></td>
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\textsuperscript{106} "Ecosystems Services," The Economics of Ecosystems and Biodiversity (TEEB) website
\textsuperscript{107} "Natural Capital at Risk: The Top 100 Externalities of Business," Trucost, April 2013, p. 34.
\textsuperscript{108} "Guide to Corporate Ecosystem Valuation (CEV)," World Business Council for Sustainable Development (WBCD), April 2011, p. 23.
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