Frequently Asked Questions About CSO's Context-Based Carbon Metric

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1. **Why do you call your metric a "context-based" metric? What does that mean?**

   Unlike conventional *absolute* or *relative* (aka, *intensity*) metrics, the CSO metric measures emissions against normative thresholds for what they would have to be in order to be science-based, or consistent with climate change mitigation scenarios taken from science. Climate science, in particular, tells us what global emissions *reductions* must be in order to reverse climate change and restore greenhouse gas concentrations in the atmosphere to safe levels (e.g., 350 ppm CO2). Our metric simply translates the science into organization-specific goals and targets that can be used when measuring, managing and reporting greenhouse gas (GHG) emissions.

2. **How can a science-based model that is cast at the global level be applied to an individual organization?**

   Climate change mitigation models apply to all sources of emissions on Earth, including individual organizations. In effect, they lay out standards of performance for emissions reductions, which if adhered to by all emitters, will, in theory, result in the reversal of climate change to whatever extent the models envision. Rather than randomly manage its emissions to arbitrary targets, then, all an organization needs to do is pick a credible climate change mitigation scenario, and then align its emissions targets to whatever the scenario or model calls for. Our metric also adjusts for changes in organizational size over time in accordance with what an organization's contributions to GDP are each year.

3. **What does the application of a science-based model to corporate emissions mean in practice? How does it work?**

   Most science-based climate change mitigation scenarios are expressed in terms of a long-term pattern of emissions reductions, starting with a baseline year. In effect, emissions in the baseline year are grandfathered. They are what they are, after which, higher and/or lower levels of emissions (i.e., as prescribed by the scenario) are defined as targets. Normative emissions in the baseline year, then, are whatever they happened to be; normative emissions every year thereafter are, by contrast, prescribed at policy or target levels by the scenario.

   In order to use a science-based scenario for managing corporate emissions, an organization must have historical records of what its own actual emissions were,

starting with at least the baseline year. Initially, most of the scenarios we worked with referenced 2005 for that purpose, but newer scenarios are now starting with 2010 instead.

In practice, our metric works by comparing a company's emissions every year with what the science-based scenario we're using specifies as a not-to-exceed level (i.e., for every year after the baseline year). Emissions that do not exceed the levels set by reference to the science-based scenario are interpreted as being science-compliant; emissions that exceed those levels are not.

4. **Fine, but how does the metric deal with changing circumstances, since it uses science-based mitigation scenarios that play out over extended periods of time? If you start with what an organization's emissions were in a baseline year, for example, and the company then doubles in size five years later, does it get penalized if its emissions also happen to increase with its size? And what if a company shrinks in size? Is it rewarded if its emissions go down for no other reason than it shrank in size?**

   First, to express performance in the face of change, we use an intensity metric as the basis for how we calculate maximum allowable absolute emissions each year and the context-based scores that follow: ***emissions per dollar of contribution to GDP ($CGDP)*** or ***emissions per capita*** in higher education and/or municipal or national settings. Where we differ from conventional intensity measures, however, is that we also compare *emissions per $CGDP* to whatever they would have to be in any given year in order to be compliant with the science. In other words, we compare an intensity measure of actual emissions to a normative *science-based standard* that is also expressed in intensity terms.

   By taking this approach, a company's emissions in any given year, no matter how much it may have grown or shrunk in size, can be expressed in a way that is independent of such changes, and which makes inter-annual comparisons possible. We say more about this below.

5. **OK, but why do you measure emissions as *emissions per dollar of contribution to GDP*? What does GDP have to do with anything?**

   In our metric, part of the target-setting methodology we use makes reference to what an organization's economic contributions are. This is because we want to make the connection between an organization's economic contributions and its corresponding entitlements to use natural capital (i.e., to emit greenhouse gases). In principle, organizations that are making valuable contributions to society should be entitled to use corresponding shares of limited natural resources as long as they are fair, just and proportionate. Assessing contributions to GDP just so happens to be a very convenient way of gauging a company's social (and economic) contributions and so we use them as a proxy for making allocations.

That said, we fully recognize the weaknesses of GDP as a proxy for value (or indicator of human well-being) and realize that not all dollars of contribution to GDP are necessarily associated with activities, products, or services of real value to human well-being, much less equally so. In addition, not all activity of value is even *acknowledged* in GDP, nor should some activities of little or no value that *are* acknowledged be represented in the first place – we know this.

Still, until such time as a better proxy emerges, GDP will have to do. We ourselves are involved in the search for better alternatives, and will happily make the switch to one or more of them as soon as they are viable. In order to meet the requirement, an alternative to GDP must not only do a better job of expressing the size and makeup of value, but also an individual organization's contribution to it – in quantitative terms in both cases. The Genuine Progress Indicator (GPI) as a promising alternative to GDP, for example, has made progress on the former, but not the latter. We ourselves are involved in R&D attempts to help remedy that.

6. **OK, you've explained the theory and practice of the metric in broad strokes, but let's get more specific. How are maximum allowable emissions for an organization actually calculated in detail?**

The mechanism we use in our metric is analogous to a *cap and trade system*, except we call it a *cap and grade* system: the higher an organization's contributions to GDP (in absolute dollars), the higher its allowable emissions, since allowable emissions in our metric are calculated, in part, on a *per $CGDP* basis. The more *$CGDP* an organization has, the more it is allowed to emit. Every company's maximum allowable emissions in any given year, then, are calculated as follows:

a. The first step we take is to divide the world into two camps: (1) GHG emitters who also make contributions to GDP, and (2) GHG emitters who don't. The first camp is responsible for the vast majority of GHG emissions on Earth (we specify as 90 percent) and includes commerce and industry. Both camps, however, are accountable for lowering their emissions to help reverse climate change. Our focus is on the first camp and applies only to GHG emitters who also make contributions to GDP, which generally includes all organizations on Earth. [Note: For non-GDP emitters, we use a different context-based metric. For present purposes, our discussion here is confined to the world of GDP contributors.];
b. For each GDP-contributing emitter (e.g., a company), our metric starts by determining its *emissions per $CGDP* in the baseline year (typically 2005 or 2010). This initial measurement is key, because each emitter's maximum allowable emissions (per $CGDP) in all subsequent years are computed as a function of what its baseline-year emissions were.

c. We then set about the business of defining normative or allowable emissions over a multi-year period starting with the first year following the baseline year (typically 2006 or 2011). This process has several steps to it:
    i. We first apply a normative reduction to the organization's baseline year emissions per $CGDP each year, as prescribed by the science-based mitigation model (scenario) we're using (i.e., the reduction it prescribes for global emissions each year relative to the baseline year; we express this as an index);
    ii. We then make the same calculation explained in step 6,c,i for all other GDP-contributing emitters (in the aggregate) in the years of interest. This produces a total of all other allowable emissions per $CGDP from all other GDP-contributing sources;
    iii. We then determine what the total possible (allowable) emissions for all GDP emitters would be in the world (in each post-baseline year) by multiplying the relative emissions figures determined in steps 6,c,i and 6,c,ii above by their respective $'s of contribution to GDP and then adding the results together. This will almost always be higher than the maximum allowable global emissions specified in the science-based model, because GDP will have been growing;
    iv. We then compare total possible emissions determined in step 6,c,iii for each post-baseline year with total allowable emissions for all GDP emitters in the same years per the science-based model we're using, and express the result as a ratio (total allowable emissions divided by total possible emissions). This will typically be a number less than 1.0;
    v. We then recalculate *maximum allowable emissions per $CGDP* for the company of interest to us as determined in step 6,c,i by taking the number produced in that step and multiplying it by the ratio determined in step 6,c,iv. That will usually have the effect of lowering *maximum allowable emissions per $CGDP* each year, the result of which is the final standard of performance, or threshold, we use for determining what an organization's maximum allowable emissions must be (in *emissions per $CGDP*) in order to be science-compliant;
    vi. We then multiply the result reached in step 6,c,v by the organization's actual $'s of contributions to GDP (for the same year). That establishes its total allowable *weighted* emissions in any given year (expressed in *absolute* terms), against which we can compare actual emissions (again, for the same year);
    vii. We also compute maximum allowable *cumulative* emissions each year (from baseline year to date) using the weighted annual figures computed in step 6,c,vi above. This, then, establishes the final standard of performance, or threshold, expressed as "Maximum Allowable Cumulative CO2 Emissions" each year. It is the indicator we rely on most to determine an organization's context-based performance in our metric, according to which any score of less than or equal to 1.0 signifies science-compliant performance, and any

score of greater than 1.0 signifies the opposite. We always give preference to the most recent such cumulative score as a basis for determining how well an organization is doing over time. The cumulative score for 2017, for example, thereby reflects the quotient of total cumulative emissions since the baseline year (numerator) over total normative or allowable emissions (denominator) for the same period.

7. **Shouldn't the thresholds you set be different for different industries, or somehow differentiated by sector? Why should a bank, for example, be held to the same emissions reductions standards as a manufacturer in heavy industry? Or vice versa?**

   There are three things to say here. First and foremost is that ours is a sustainability metric, not a benchmarking metric. We are more concerned, that is, with how organizations are performing relative to science-based thresholds than with how they are performing relative to one another.

   Second, the kinds of differences alluded to in the question above between, say, banks and manufacturers are already largely accounted for by virtue of how we set targets (i.e., as explained in our answer to question #6 above). Specifically, the logic of how we do so starts with whatever an organization's actual emissions were in a baseline year, and we then proceed from there. So assuming a bank's emissions in a baseline year, for example, were much lower than a manufacturer's (i.e., per dollar of contribution to GDP), the industry or sectoral differences involved are already taken account of. As such, we grandfather what they were, including the differences between them, and we proceed from there.

   And while it's true that we then hold all organizations in all sectors accountable to the same levels of reductions each year, it is also true that an X-percent reduction of a *low* number (e.g., a bank's emissions per $CGDP) is a whole lot less than an X-percent reduction of a *high* number (e.g., a manufacturer's emissions per $CGDP) in absolute terms.

   Third and last, once we have made our calculations in the ways described above, there is certainly nothing preventing us or anyone else from aggregating scores into industry groupings for further analysis. Companies included in such aggregations can then be compared to one another in terms of their performance, but always with respect to the same science-based standard of performance, as opposed to some industry average or benchmark that may or may not have anything to do with ecological thresholds.

8. **What about justice considerations? Does your metric assign different degrees of responsibility to mitigate emissions to emitters in different parts of the world based on their development status? Or does it treat all emitters alike?**

Most of the mitigation scenarios we use do, in fact, differentiate between emissions in the developed versus still-developing parts of the world, and thereby assign higher mitigation burdens to emitters in the developed world. This is often done by distinguishing between OECD and non-OECD countries. Unless otherwise indicated, our carbon metrics are configured with OECD levels of mitigation burdens, and thereby apply higher standards of performance to organizations who use them.