Our comment is predicated on the premise that accounting for environmental impact must be done accurately such that the resulting climate actions are proportional and effective. All SASB standards should cite GHG properties established by AR5 and GWP20.
TO: Sustainability Accounting Standards Board  
1045 Sansome Street, Suite 450  
San Francisco, CA 94111

FROM: Engineers for a Sustainable Future  
15721 SW Windham Terrace, Tigard, Oregon 97224

Subject: Comments Solicited by 30 January 2018

SUMMARY

The Action Committee of Engineers for a Sustainable Future is made up of post-career engineers who, except for the climate disaster, would otherwise retire after decades of successful problem solving. Each of us has un-retired in a panic, each independently deciding that our knowledge, experience with successful solutions, and corresponding skillsets are sorely needed. We offer best science guidance as self-selected lifetime STEM practitioners. Please also see http://www.esf-oregon.org.

SASB products are an astounding improvement over FASB standards. We regard the planetary trends reported by the NY Times as the consequence of neglecting science-based sustainability accounting for decades if not centuries.

**Fighting Climate Change? We’re Not Even Landing a Punch**

COMMENT SUBMITTAL

Citations for IPCC Assessment Report 5 (AR5) are current, although AR6 is pending. We regard current science as best science. Any references to AR4 or earlier IPCC standards are obsolescent and must be replaced with current fact in SASB products.

**Anthropogenic CO2 and CO2e.** The IPCC reports 40 years of anthropogenic CO2 together with anthropogenic methane CO2e for the 40-year period, 1970-2010 in their Working Group 3 report, “Summary for Policymakers.”


Factors used to produce the Figure SPM.1 graphic from 2014 are explained clearly in the title caption. It states the basis for the data as depicted. “Emissions are converted into CO2-equivalents based on GWP100 from the IPCC Second Assessment Report.”

For convenience, Figure SPM.1 is repeated here.
Figure SPM.1 From IPCC WG3 Summary for Policymakers, 2014

The caption for Figure SPM.1 is replicated here:

"Total annual anthropogenic GHG emissions (GtCO2eq / yr.) by groups of gases 1970 – 2010: CO2 from fossil fuel combustion and industrial processes; CO2 from Forestry and Other Land Use (FOLU); methane (CH4); nitrous oxide (N2O); fluorinated gases covered under the Kyoto Protocol (F-gases). At the right side of the figure GHG emissions in 2010 are shown again broken down into these components with the associated uncertainties (90 % confidence interval) indicated by the error bars. Total anthropogenic GHG emissions uncertainties are derived from the individual gas estimates as described in Chapter 5 [5.2.3.6]. Global CO2 emissions from fossil fuel combustion are known within 8 % uncertainty (90 % confidence interval). CO2 emissions from FOLU have very large uncertainties attached in the order of ± 50 %. Uncertainty for global emissions of CH4, N2O and the F-gases has been estimated as 20 %, 60 % and 20 %, respectively. 2010 was the most recent year for which emission statistics on all gases as well as assessment of uncertainties were essentially complete at the time of data cut-off for this report. Emissions are converted into CO2-equivalents based on GWP100 from the IPCC Second Assessment Report. …"

Our principal concern is that since 2014 this graphic has not been updated from IPCC Second Assessment Report cited in the caption, and that the use of GWP 100 is far less relevant than GWP 20. For any sustainability accounting, IPCC GWP 20 absolutely must be established as the only accurate GWP standard.
Global Warming Potential, GWP. Since 1996 the IPCC has released three (3) revisions to the standard factor describing the properties of methane as a Greenhouse Gas. In the 20 years after release to the environment, methane is now regarded as 84x more effective in trapping solar heat in Earth’s atmosphere than is CO2. The history of GWP revisions is given in the following table. Since climate action goals and plans are predicated in the next 30 years, the 100-year time horizon cannot be employed for near term decision-making.

<table>
<thead>
<tr>
<th>Lifetime (years)</th>
<th>GWP time horizon</th>
<th>Report Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>20 years</td>
<td>100 years</td>
</tr>
<tr>
<td>Carbon dioxide (CO₂)</td>
<td>Complex</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>1</td>
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<tr>
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<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Methane (CH₄)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12.4</td>
<td>84</td>
<td>28</td>
</tr>
<tr>
<td>12</td>
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<tr>
<td>12</td>
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<td>21</td>
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</tbody>
</table>

GWP Ref: https://ghg institute.org/2010/06/28/what-is-a-global-warming-potential/

The trend in quantifying 20-year methane global warming properties is depicted in terms of step increases. Changes are due to advances in atmospheric science.

CH4 GWP20 Trends
We see that GWP100 from 1996 was GWP100 = 21. We would agree with employing GWP100 assuming we have all century to contain CO2e, but we do not have all century. Relying on the IPCC AR5 standard for GWP20 to modify Figure SPM-1, a depiction of the near-term effects of methane involves adjusting the blue methane bar for the GWP increase since AR2. This means expanding the blue CH4 bar by GWP100/GWP20 = 84/21 = 4. Such a depiction by IPCC or any other source has not been found.

Consequently the blue methane bar reported in SPM.1 is one-fourth its true height. A pasted-up correction to figure SPM.1 is given in the following graphic and depicts the impact of the current near-term GWP20 standard regarding the root cause of climate change. Who knew that for the last 50 years anthropogenic CO2 has actually been second to the real driver of climate change, CH4?

Figure SPM.1-R IPCC WG3 emissions revised for relative influence of CH4 over CO2 (approximate, pasteup).
Full disclosure: we are unable to locate other reports correlating the conclusion that anthropogenic CH4 emissions exceed fossil fuel and industrial CO2 emissions.

**Measurements.** Natural gas industry owners and operators do not report measured methane leaks and releases, and instead are allowed by government agencies such as the US EPA to provide mere estimates. We are still looking for a CH4 sink like forests are for CO2. For this reason, CH4 deserves immediate and imperative attention. Other anthropogenic and natural sources of methane defy measurement taking at the source: rice paddies, wetlands, landfills, sewage treatment ponds, feedlot ponds, etc. The only credible measurements are available from environmental science, used to validate planetary models.

**CH4 Dissipation** Methane has a half-life. If releases of methane to the environment were eliminated overnight, methane would cease to be a concern after the passage of time. Instead, methane concentrations are on the rise. This means the releases are winning in the battle against dissipation.

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**CONCLUSION**

Until the cumulative effects of dissipation become dominant, methane is a clear and present danger, and if anyone hopes to intervene with the root causes of climate damage, methane 20-year GWP is the only way to get the accounted numbers to accurately reflect measured reality.

**Submitted:** Mike Unger, President, Engineers for a Sustainable Future

**ATTACHMENT - Relevant SASB Standard**
ATTACHMENT

EXPOSURE DRAFTS
REDLINE OF STANDARDS FOR PUBLIC COMMENT
EXTRACTIVES & MINERALS PROCESSING SECTOR

Relevant Language
P17

Accounting Metrics

NR0101TA04-01-01. Gross global Scope 1 emissions, percentage methane, and percentage covered under a regulatory program, percentage by hydrocarbon resource

.01 The registrant shall disclose gross global Scope 1 greenhouse gas (GHG) emissions to the atmosphere of the six-seven greenhouse gases covered under the Kyoto Protocol: carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride, and nitrogen trifluoride.

- Emissions of all gases shall be disclosed in metric tons of carbon dioxide equivalent, calculated in accordance with published 100-year time horizon global warming potential (GWP) factors. To date, the preferred source for global warming potential (GWP) factors is the Intergovernmental Panel on Climate Change’s (IPCC) Fourth and Fifth Assessment Report (2007) (2013). “Gross emissions are GHGs emitted to the atmosphere before accounting for any GHG reduction activities, offsets, or other adjustments for activities in the reporting period that have reduced or compensated for emissions.”

ESF Comment 1
We concur strongly with the edits that add nitrogen trifluoride.

ESF Comment 2
We concur strongly with the replacement of any prior IPCC AR with the current Fifth AR (2013).

ESF Comment 3
It seems as if the missing closed-parenthesis fits at the end of the .01 bulleted statement, second sentence as amended.

ESF Comment 4
We regard the 100-year time horizon GWP factors to be as irrelevant to accurate accounting as the 500–year GWP factors. We need “now-accounting” because 100% successful interventions and mitigations must be taken on NOW and for the next 20 years in order to stem the pending extinctions, and to peak global carbon emissions before 2025 at the absolute latest.
PLEASE ONLY CITE 20—YEAR GWP FACTORS FROM THE FIFTH ASSESSMENT REPORT THROUGHOUT ALL SASB STANDARDS, for the reasons given in the letter body above.

ATTACHMENT TO THE ADDENDUM – Other Authorities citing GWP 20 from AR5

1. California Air Resources Board
   Short-Lived Climate Pollutant Reduction Strategy
   https://www.arb.ca.gov/cc/shortlived/meetings/03142017/final_slcp_report.pdf
   “Short-lived climate pollutants contribute about 40 percent to current anthropogenic global radiative forcing, which is the primary forcing agent for observed climate change.

2. Oil Change International
   Jordan Cove LNG and Pacific Connector Pipeline GHG Emissions Briefing
   “We use the 20-year GWP timeframe and 86 GWP for methane from the Intergovernmental Panel on Climate Change’s (IPCC) most current Assessment Report 5 (AR5), because whereas CO₂ accumulates in the atmosphere over the long term, the impact of methane is felt in the short term. Its most important contribution to total warming occurs at the time of peak atmospheric CO₂ concentrations (i.e. net zero CO₂ emissions) – that is, when CO₂ has its greatest warming effect, and methane potentially adds to that maximum amount of warming.”

3. GWP Explained:   Global Warming Potential
   https://terrastendo.net/gwp-explained/
   “The issue is critical when considering the impact of climate change tipping points, with potentially catastrophic and irreversible consequences.”