



Standards Outcome Report

RENEWABLE RESOURCES & ALTERNATIVE ENERGY

SASB Standards Development Team
June 11, 2015

SASB

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Executive Summary

This report provides a reference and framework for the SASB Standards Council Renewable Resources & Alternative Energy sector standards outcome review on June 18, 2015.

In the first quarter of 2015, SASB's Standards Development Team identified sustainability disclosure topics and related accounting metrics (herein after referred to as "issue(s)" and "metric(s)") in the five industries in the Renewable Resources & Alternative Energy sector:

- Biofuels
- Solar Energy
- Wind Energy
- Fuel Cells & Industrial Batteries
- Forestry & Paper

These issues and the associated metrics have subsequently been vetted by external stakeholders through the Industry Working Group (IWG). This process allowed for each issue and metric to be evaluated on the basis of materiality, investor interest, and cost-benefit analysis. Based on this feedback and additional research, SASB will open a 90-day public comment period (PCP) on accounting standards for six industries, starting on July 7, 2015.

Note on Industry Structure: SASB has decided to split the Forestry & Paper industry into two industries, Forestry & Logging and Pulp & Paper Products, based upon IWG feedback, additional discussion with industry experts, and internal research. Pulp and paper manufacturing companies are not vertically integrated with forestry and logging operations, due to their divestment of timber holdings over the past 20 years. SASB's research and IWG feedback revealed that sustainability performance and financial value drivers are markedly different for forestry and paper companies. As a result of SASB's original industry structure, disclosure topics pertaining primarily to forestry companies would not be relevant for companies involved primarily in pulp and paper manufacturing, and vice-versa. IWG feedback on the proposed topics, particularly the higher-than-usual percentage of "Yes, but with reservations" responses, reflected this distinction. The new industry structure is a more accurate representation of the industries and results in more robust alignment of the suggested disclosure topics to the sustainability performance and financial value drivers in each industry. The upcoming public comment period will provide additional opportunity to get feedback on the new industries and their disclosure topics and standards.

This report provides the Standards Council with an update on SASB's evaluation of IWG feedback and an overview of additional evidence research, which form the basis for the revised set of issues and metrics for public comment.

- **Section I: Issues with Weak Evidence of Materiality** provides SASB's review of, and response to, specific IWG feedback on weak issues. These are issues for which a majority of participants had significant reservations or did not think the issues were likely material. SASB typically removes such issues, taking into account the evidence of interest and financial impact.
- **Section II: Issues for Reconsideration** focuses on issues where a majority of IWG participants agreed that the issue was likely material, but several had significant reservations about materiality. For such issues, SASB reconsidered evidence of materiality and/or specific aspects of the issue, based on IWG feedback and additional SASB research. SASB would like to draw the attention of the Standards Council to these issues in particular, considering the IWG feedback and SASB's response.
- **Section III: Strong Issues with Reservations** focuses on issues where a majority of participants also agreed about the likely materiality, but some had reservations. For such issues, SASB evaluated the specific IWG comments and the strength of the initial evidence of financial impact to determine whether any changes were required. Issues in this section received a relatively lower amount of negative feedback and fewer potential changes are recommended for these compared to issues in Section II.

- **Section IV: Suggested Additional Issues** presents a summary of SASB’s evidence research on and decision whether to include additional issues proposed by IWG participants.
- **Table I** (*below*) shows the percent of IWG participants that agreed on the likely materiality of issues; For 68 percent of topics across all industries, more than 75 percent of participants agreed on likely materiality
- **Table II** (*Section IV*) shows a list of new issues proposed by IWG members.
- **Appendix I** shows the list of issues by industry that were presented to the IWG and SASB’s initial assessment and process for revising each of those issues.
- **Appendix II** contains a draft list of issues that SASB will present for public comment on July 7, 2015.
- **Appendix III** provides sample draft accounting metrics for the Biofuels Industry, for reference.

In addition to this report, there is one supplemental report, which provides both a detailed materiality assessment of each disclosure topic by the IWG, as well as a list of all IWG comments on issues.

Table I: Summary of IWG Feedback on Issues

Industry	Completed surveys	Average approval	Lowest agreement
Biofuels	25	79%	56%
Solar Energy	26	82%	61.5%
Wind Energy	15	91%	86.7%
Fuel Cells & Industrial Batteries	17	88%	76.5%
Forestry & Paper	38	68%	44.7%

I. Weak Issues – For Removal

This section focuses on issues where a majority of participants had significant reservations or did not think the issues were likely material (less than 50 percent of respondents agreed that the issue is likely to constitute material information) and where SASB reconsidered evidence of materiality based on IWG feedback and SASB research. For this sector, there is only one issue within this category.¹ SASB first presents **evidence of interest** from SASB’s heat map and detailed IWG feedback and second, **evidence of financial impact** from existing research in industry briefs complemented by additional research. An **analysis** of both types of evidence is then provided, together with a final **recommendation** for inclusion or removal of the issue.

1. FORESTRY & PAPER

a. Fair Labor Practices – Remove Issue (both industries)

Evidence of Interest

Heat Map Tests

The heat map score is 61 out of 100, which is between the first and second quartile among all sustainability issues for this industry and indicates a low level of interest. The issue received the lowest heat map score among issues selected for the IWG brief.

IWG Feedback

Issue priority

The issue had the lowest priority as it ranked 11th out of a total of 11 issues put forward to the IWG.

Issue materiality

RESPONSES TO MATERIALITY OF FAIR LABOR STANDARDS IN THE FORESTRY & PAPER INDUSTRY

Materiality ²	Corporate Professionals	Market Participants	Public Interest & Intermediaries	Grand Total	% of Total
Yes	1	7	9	17	44.7%
No	4	0	1	5	13.2%
Maybe	8	3	5	16	42.1%
Grand Total	13	10	15	38	

Comments from IWG respondents

The table below highlights a sample of the key comments received from IWG participants. As noted below, participants had reservations or disagreement about the likely materiality of this issue based on their opinion that most U.S.-listed companies would have minimal to no exposure to fair labor issues within their operations and that this may be more relevant for emerging markets. Some participants noted that the topic was not relevant for pulp and paper companies that do not have forestry operations.

Stakeholder Type	Material?	Stakeholder Comment
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¹ The disclosure topic of Community Relations & Rights of Indigenous Peoples in the Forestry & Paper industry also received a low score from IWG respondents at 50% “Yes” responses. This issue is discussed in Section II.

² The three response options were: “Yes. It is material,” “No. It is not material,” and “Yes, but with reservations.”

Market Participant	Maybe	<i>Generally speaking, US pulp and paper manufacturers do not employ temporary, immigrant or other transient labor. Most labor is highly qualified with credentials (i.e. college or advanced degrees, or specific paper-making or related certifications).</i>
Corporate professional	Maybe	<i>North American labor laws are broad in scope and very detailed. Companies that legally operate in North America comply with and have in place fair labor practices. Compliance to the laws related to fair labor practices is a more appropriate metric. There are many international positions related to labor practices such as the ILO Core Conventions and the ETI Base Code as well as many opinions. What is material however to a North American company is compliance to the law.</i>
Public Interest & Intermediary	Maybe	<i>There are sharp distinctions in the issues presented domestically and those out of the US. Again - a very broad topic that will result in variability in responses limiting comparisons</i>

Evidence of Financial Impact

Initial SASB Research (Excerpt from Industry Brief for IWGs)³

Some key evidence excerpts from the brief:

- *Labor costs comprise an estimated 19 percent of revenue in the U.S. logging industry, underscoring the financial investment that companies make in their employees.*
- *...forestry work is often performed in isolated areas, making the enforcement of labor rights laws more difficult.*
- *A 2012 study conducted by researchers at the University of California Berkeley Labor Occupational Health Program and the Alliance of Forest Workers and Harvesters examined the safety, health, and working conditions of forest restoration workers in southern Oregon. The respondents, who represented 24 companies, reported a range of labor issues. Forty-eight percent of respondents claimed that they received no overtime pay wages, and 45 percent said that they were not paid for all hours worked. Ninety percent of the sample said that they were pressured to maintain a pace of work that they felt was dangerous, and were not given rest breaks. A majority reported being forced to go to work despite feeling too ill or injured to work. Other abuses include verbal harassment, lack of adequate safety training, and the frequent employment of inexperienced workers.*
- *In 2014, five Mexican employees filed a federal lawsuit against an Idaho-based Christmas tree plantation alleging multiple human rights violations.*
- *In 2014 a Swedish national pension fund decided to divest its holdings in a multinational paper and pulp company after reports surfaced that one of the company’s subsidiaries in Pakistan had used child labor. The company has since terminated all business with the subsidiary.*

Analysis

- Low agreement on issue and low heat map score. Initial evidence of financial impact was limited to one lawsuit (although additional evidence gathering found an additional lawsuit), survey of workers indicating abuses, and divestment by a pension fund.
- The initial evidence of financial impact from the IWG brief focused on forestry operations where there is some contractual and seasonal labor employed and potential violations of fair labor laws.
- Based on IWG feedback, SASB conducted additional research on the following key questions to determine whether to retain the issue:

³ Note – Paragraphs presented here and in similar sub-sections for issues that follow in this document, are extracts from SASB industry briefs and are provided for reference. Please refer to briefs for complete evidence and citations.

- Is there evidence that fair labor issues appear frequently among the majority of U.S. listed companies? Are these risks isolated to foreign operators or private companies?
- What percentage of the workforce is typically contract or seasonal/migrant labor? What percentage is unionized?
- Can a FLSA or other labor database provide information on incident frequency & fines?
- Is the issue more relevant for forestry companies or for paper companies or both?
- According to an analysis of 10-Ks and CSR reports, the issue is mentioned in standard boilerplate language in reference to the U.S. Fair Labor Standards Act. No references to litigation or company-specific risk are mentioned.
- The evidence in the brief finds fair labor issues arising at small private firms or government contractors. Further research did not reveal that fair labor issues have affected U.S.-listed forestry or logging companies.
- According to SASB's background research, most of the listed companies in the new Forestry & Logging industry have the vast majority of their land holdings (leased or owned) in North America. One company operates in Brazil, and two others have some holdings in New Zealand and South Korea.
- While operations outside of North America could present higher risk (as indicated in the IWG comments), the relatively small share of forestry and logging companies that have holdings outside the region suggests that this is unlikely to be an industry-wide risk affecting most companies.
- Although unionization rates are high at some pulp and paper companies, there are no indications that the industry faces frequent labor disruption due to wage, fair labor, or other sustainability-related issues. Significant strikes have not occurred for nearly two decades.

Recommendation

- **Remove issue** for both the Forestry & Logging and Pulp & Paper Products industries, due to low Heat Map score, weak IWG support for the issue, as well as evidence showing that the industries appear to be at low risk for violations of fair labor standards or union strikes due to labor issues.

II. Issues for Reconsideration

This section focuses on issues where a majority of IWG participants agreed that the issue was likely material, but several had significant reservations about materiality (between 50 and 75 percent of participants typically agreed that the issues were likely material). For such issues, SASB reconsidered evidence of materiality and/or specific aspects of the issue, based on IWG feedback and SASB research. Issues are analyzed by industry, looking at (i) **evidence of interest** from SASB’s heat map and detailed IWG feedback and (ii) **evidence of financial impact** from existing research in industry briefs complemented by additional research. An **analysis** of all evidence is then provided, together with a final **recommendation** for inclusion or removal of the issue, or any changes to be made.

1. BIOFUELS

a. Political Spending & Government Support – Retain issue and rename

Evidence of Interest

Heat Map Tests

The issue received a heat map score of 17 out of 100, placing it in the lowest quartile of issues. This shows low evidence of interest.

IWG Feedback

Issue priority

The average ranking of the issue shows that it is a low priority issue – 6th out of 7 issues.

Issue materiality

RESPONSES TO MATERIALITY OF POLITICAL SPENDING & GOVERNMENT SUPPORT IN THE BIOFUELS INDUSTRY

	Corporate professional	Market Participant	Intermediary	Total	Percent of Total
Yes	2	4	8	14	56%
No	1	2	-	3	12%
Maybe	4	1	3	8	32%
Total	7	7	11	25	

Comments from IWG respondents

A significant share of responses was “Yes, but with reservations” (i.e. Maybe). IWG respondents had reservations about the likely materiality of the topic due to the international scope of the issue (relevance to international companies or operations) and the effectiveness of metrics. Several of the Maybe and No comments suggest IWG members either took a limited view of political spending that did not consider the whole context presented in the brief, or supported the issue in their comments but nevertheless responded with a Maybe.

Stakeholder Type	Material?	Stakeholder Comment
Market Participant	Maybe	<i>This is relevant, but its regionally specific to the US, although you could argue that the vast majority of companies involved are based in the US. But something to bear in mind, this is not necessarily material to all companies operating globally.</i>

Public Interest & Intermediaries	Maybe	<i>There is a tremendous drive by NGOs and consumer action groups to affect corporate policy and practices. Many companies are adjusting policies and strategies as a result of consumer influences. Monsanto is a great example of a company that has spent millions to influence government policy and administrative benefits, however their profits have suffered as a result of global government policies/regulations, consumer backlash, and stock holder outcry. In global markets, the influence here is not as material as previously experienced.</i>
Corporate professionals	Maybe	<i>Makes sense only if it required across all industries. selective reporting provides no perspective. Questions also arise as to how an investor or company could measure and disclose effectiveness.</i>

Evidence of Financial Impact

Initial SASB Research (Excerpts of Industry Brief for IWGs)

Some key excerpts (issue description and evidence) from the IWG brief:

- *The Biofuels industry funds lobbying and campaign contributions related to the support of biofuel mandates, production tax credits, and the production of certain types of feedstock, including corn and soybeans. While these actions can benefit the industry by supporting the biofuels market on the demand and supply side, long-term adverse environmental and social impacts from feedstock cultivation may cause policy reversals, such as reducing allowable feedstocks under government biofuel mandates, which could negatively impact the industry.*
- *Biofuels companies could benefit from a clear strategy for engaging policymakers and regulators that is aligned with long-term sustainable business outcomes, and accounts for societal and environmental externalities. Such companies will likely be better prepared for medium- to long-term regulatory adjustments, including a shift in support for traditional biofuels to advanced fuels that utilize non-food crop feedstocks.*
- *Negative externalities related to feedstock production include increased use of fertilizer and pesticides in intensive agriculture, higher water consumption for crop irrigation, and possible influences on food prices. In this context, the industry faces reputational and regulatory risks as the effects of biofuels feedstock production could unfavorably influence biofuels mandates in the long-term.*
- *Most spending is done through industry groups, such as Growth Energy, an ethanol lobby, the National Biodiesel Board, and the Renewable Fuels Association. Poet LLC, the second-largest U.S. ethanol producer, contributed nearly \$1 million in 2014. Groups like Growth Energy tended to direct their lobbying efforts toward influencing legislation pertaining to the RFS, including legislation to prevent a reduction in ethanol blends in gasoline and a 2013 bill to expand the biofuels market. The industry also lobbies against measures that would reduce or eliminate fuel mandates in the U.S.*
- *The industry’s support of legislation that continues or expands government support for current biofuel mandates may ultimately deter biofuel companies from investing in developing alternative fuels or feedstocks that are more sustainable in the long-term. Although biofuel mandates in the U.S. and the E.U. currently require increasing production of advanced biofuels, regulators have also lowered the advanced fuel mandates in response to a lack of supply. Thus, the industry continues to be heavily reliant on selling traditional fuels... Furthermore, corn ethanol lobbying interests have been in support of adding corn ethanol to the list of advanced biofuels, which would largely eliminate the need to shift production to utilize non-food feedstocks.*

Analysis

- Low IWG “Yes” percentage combined with low heat map score would suggest issue is not likely material.

- However, while the heat map score for the generic sustainability issue of “Lobbying and political contributions” is low, the score is high (83 out of 100) for “Regulatory and legal challenges,” suggesting that the industry faces a difficult regulatory environment. There is a high percentage of Maybe responses rather than No responses from IWG respondents, suggesting the issue may likely be material with further clarification of scope.
- Given the existing evidence and feedback, SASB sought to answer the following key questions to determine whether to retain the issue and in what form:
 - What is the sustainability angle to lobbying for advanced biofuels (downsides and upsides from society's perspective)?
 - Do biofuels companies individually consider lobbying as a factor in their financial success and as a risk mitigating tool?
 - Is the topic as applicable outside the US as it is in the US?
- IWG commenters expressed concern that U.S. biofuels policy would not be relevant to international companies or companies operating outside the U.S. However, international operations for U.S.-listed Biofuels companies are limited; the issue therefore focuses on lobbying in the U.S. markets.
- A few companies mention lobbying in their financial disclosure, and the importance of biofuels mandates to companies in the industry.
- Existing and additional evidence research shows that the industry is heavily dependent upon government policy, which creates market demand through the Renewable Fuel Standard (RFS), and incentivizes supply through tax breaks and other support for feedstock production. Individual companies are involved in these lobbying efforts, and, depending on the type of feedstock they rely upon, could be impacted differently based on how government support for specific types of biofuels evolves. Often, companies may not be “feedstock-flexible.”
- Traditional biofuels (corn-based ethanol in particular) are linked to potential environmental and social externalities. Ethanol biofuel producers support government mandates for such fuels and their expansion (increase in volumes). Subsidies and government support for ethanol do not differentiate much between ethanol produced sustainably versus not (except for GHG emissions lifecycle and preventing deforestation). There are attempts to reduce/remove the support for ethanol and increase support for advanced biofuels due to environmental and social concerns regarding the former. It may be in the long-term interest of companies producing ethanol to support regulations that account for all its externalities - if companies work on reducing externalities of their own feedstock and production (e.g. by encouraging suppliers to engage in sustainable farming practices), such lobbying would align with their sustainability efforts and enable them to get a competitive edge.
- Advanced biofuels attempt to solve some of the environmental and social problems associated with corn ethanol (and regular gasoline/diesel). Advanced biofuels producers until recently lobbied with traditional biofuel companies; however, they are now moving away from traditional biofuels companies and instead focusing their lobbying efforts on expanded support for advanced biofuels more specifically. However, most such fuels are not commercialized yet and so policy support for such fuels may hit roadblocks in terms of the supply. So to be sustainable over the long-term, policy support for such fuels would need to take into account the viability of their supply and also any social or environmental externalities such fuels themselves may create. Advanced biofuels companies need to ensure that they meet the environmental requirements and demand for which they lobby.

Recommendation

- Include issue for PCP based on evidence of financial impact and some evidence of interest. Rename issue to Management of the Legal & Regulatory Environment to better reflect the focus of the issue. Revise metrics to emphasize alignment of efforts to influence government policy with long-term societal interests and the company’s own sustainability efforts, rather than focusing on amounts spent on lobbying.

b. Health, Safety, & Emergency Management – Retain issue, focus on process safety, rename

Evidence of Interest

Heat Map Tests

The issue received a heat map score of 67 out of 100, which indicates a high level of interest compared to other issues in the industry (the issue is in the upper quartile relative to all other generic sustainability issues; it received the fourth highest heat map score in relation to other issues presented to the IWG).

IWG Feedback

Issue priority

IWG respondents indicated that this issue is a relatively low priority, ranking 7th out of 7 issues.

Issue materiality

RESPONSES TO MATERIALITY OF HEALTH, SAFETY, AND EMERGENCY MANAGEMENT IN THE BIOFUELS INDUSTRY

	Corporate professional	Market Participant	Intermediary	Total	Percent of Total
Yes	6	4	7	17	68%
No	0	0	2	2	8%
Maybe	1	3	2	6	24%
Total	7	7	11	25	

Comments from IWG respondents

Only two IWG respondents disagreed, while six had reservations about the materiality of the issue ('Maybe'). Nearly 86 percent of corporate professionals said the issue was likely material. As noted below, participants had reservations or disagreement about the materiality of this issue based on current strong management of the issue by companies.

Stakeholder Type	Material?	Stakeholder Comment
Market Participant	Maybe	<i>A high level of attention to health, safety and emergency management is assumed and expected as sound business practice in the U.S. Violations are rare and very public and it is in a company's interest to comply. Do not believe there is a need to disclose.</i>
Public Interest & Intermediaries	No	<i>The biomass power and biofuels industries are fairly dangerous and accident-prone. There have been a number of fires and explosions at biomass energy facilities. However, in my opinion there is not necessarily any additional need for disclosure here, because unlike for the topics of environmental impacts, emissions, lifecycle carbon impacts, etc, the industry does not seem to be misrepresenting itself with regard to health and safety.</i>
Market Participant	Yes	<i>The cost of an accident can be very expensive and expose a producer to greater oversight from government agencies and liability from injuries and environmental damage. A catastrophic accident will also stand to stop production for a long period of time.</i>

Evidence of Financial Impact

Initial SASB Research (Excerpts of Industry Brief for IWGs)

Some key evidence excerpts from the IWG brief:

- *In May 2014, an explosive fire at a New Mexico biodiesel facility caused the evacuation of approximately 1,000 people within a half-mile radius of the facility due to a hazardous-materials emergency.*
- *Accidents may also damage equipment: An explosion at an ethanol plant in Liberal, Kansas caused an estimated \$1 to \$2 million in damage. The plant was offline for approximately a week following the explosion.*
- *In 2012, OSHA proposed a \$46,000 fine against Midwest Biofuel, LLC for 12 serious health and safety violations, including deficiencies in the company's hazard analysis and operating procedures, chemical release investigations, worker training in chemical cleanup, material safety data sheets, and respiratory protection program.*
- *In another example, OSHA alleged that United Ethanol had committed one willful violation, the most serious type, and 12 serious violations following the suffocation death of an employee in a grain bin. OSHA proposed fines of \$140,000. The agency also placed the company in its Severe Violator Enforcement Program, which mandates future inspections to ensure compliance with OSHA's standards and recommendations.*

Analysis

- Based on IWG feedback, SASB conducted additional research based on the following key questions to determine whether to retain this disclosure topic and in what form:
 - What are the relevant regulations for biofuels producers compared to oil & gas refiners? Is there data on process safety accident rates or loss of containment?
 - Are there large litigation expenses, settlements, regulatory fines from process safety events as well as employee health and safety impacts?
 - Is there risk of chronic health impacts and potential for related regulations or lawsuits?
 - What are risks to neighboring communities from accidents? Should this consideration be included in the issue and metrics? (community engagement issue suggested by IWG)
 - Is advanced biofuels manufacturing exposed to similar process hazards as for ethanol and biodiesel, the predominant fuels today?
- SASB's additional research revealed evidence that the industry is affected by process safety regulations and there have been accidents with significant associated costs or damages. An analysis of SEC filings reveals multiple direct mentions of process safety in disclosure, including financial impacts.
- The industry is subject to process safety regulations similar to the oil & gas refining industry. The regulations address the handling of potentially explosive or flammable materials.
- However, information specific to employee health and safety, initially covered by the issue, is not likely material, given low injury and fatality rates and low evidence of financial impact. U.S. Bureau of Labor Statistics (BLS) data shows that the ethanol manufacturing industry's fatal and non-fatal incidence rates are well below the U.S. private sector average.
- Regarding chronic health issues for plant workers, no evidence of lawsuits or regulations specifically involving biofuels companies was found.
- In relation to community impacts, and whether SASB should include a specific metric regarding this aspect, additional research including the NREL biomass map filter for ethanol and biodiesel plants shows that biofuel plants tend not to be situated near densely populated areas.

Recommendation

- Retain issue, but focus only on process safety. The greatest risks to employees, local communities, and the environment appear to be from process safety incidents such as explosions, versus daily operational health and safety.
- Rename issue to "Operational Safety, Emergency Preparedness, and Response" to reflect the focus of the issue. (The name is consistent with an Oil & Gas Midstream issue that focused on process safety).

- Do not include separate metric on community impacts due to insufficient evidence that this angle is likely material.

2. SOLAR ENERGY

a. Energy Access – Remove standalone issue

Evidence of Interest

Heat Map Tests

The issue received a heat map score of 38 out of 100, which is a low level of interest compared to other issues in the industry (between 1st and 2nd quartile of all generic sustainability issues; third highest heat map score out of the five topics presented to the IWG).

IWG Feedback

Issue priority

IWG respondents indicated that this issue is a low priority. It ranked 5th out of 5 issues.

Issue materiality

RESPONSES TO MATERIALITY OF ENERGY ACCESS IN THE SOLAR ENERGY INDUSTRY

	Corporate professional	Market Participant	Intermediary	Total	Percent of Total
Yes	3	5	7	15	61.5%
No	1	2	-	3	11.5%
Maybe	-	6	2	8	26.9%
Total	4	13	9	26	

Comments from IWG respondents

IWG participants felt that energy access is either out of the control of solar companies or is not the industry's 'duty', and companies will expand into new markets regardless of whether there is a social factor driving the growth or not. This is reflected in the high percentage of "maybes".

Stakeholder Type	Material?	Stakeholder Comment
Market Participant	Maybe	<i>While access to energy is an important societal topic I'm just not sure how material it is to these companies or how much is under their control. This is part of a company's business plan as it is expanding the addressable market. But I don't expect these companies to be operating in countries where it is still far from profitable for the sake of expanding energy access</i>
Market Participant	Maybe	<i>While this is an important social topic, companies serving this industry have barriers that may make it difficult to substantially increase access. Additionally, these barriers are not often controlled by the companies that will be reporting this information. Therefore, creating a disclosure item for such a topic, while still relevant and important, is likely not appropriate.</i>
Public Interest & Intermediary	Maybe	<i>Energy Access is vague and needs to be better defined to determine if it is or is not material. Is the access a justice or economic issue? Is access in general to achieve a low carbon electricity system or better rates?</i>

Evidence of Financial Impact

Initial SASB Research (Excerpts of Industry Brief for IWGs)

Issue description: ...Solar is still a relatively young industry, compared to other electricity generating technologies, and it commands only a fraction of worldwide electricity production. Expanding market access is integral to raising industry revenue. Furthermore, this growth opportunity will give the industry the potential to unlock a greater economies-of-scale advantage over other electricity-producing technologies...

Evidence: World electricity demand is expected to steadily grow at a rate of 2.2 percent annually. Eighty percent of this growth is projected to come from non-OECD countries. In many developing countries, however, overall electricity penetration is currently low, partly because of difficulties and expenses involved in extending the grid to remote areas. For example, in India, about 75 percent of the population has access to electricity. In Bangladesh, only 55 percent of the population has electricity access. In many African countries, penetration is even lower: in Kenya, only 23 percent of the population has access to electricity. Solar energy can play an important role in extending energy access in such countries.

In many developing markets, solar is cheaper than the expensive alternatives of kerosene and diesel, which are often a significant portion of the energy used in these markets. For example, the World Bank estimates that a diesel generator produces energy at a cost between \$0.190/kWh and \$0.597/kWh. A 2014 International Renewable Energy Agency (IRENA) study found the average cost of solar PV to be only slightly over \$0.10/kWh for India and China, and slightly under \$0.20/kWh for the rest of the non-OECD countries. This cheapness, especially in China and India, is bolstered by strong governmental support, making these markets ripe for expansion...

...First Solar has been working on financing models for local entrepreneurs to help them enter the burgeoning micro-grid space in India at scale. The barrier in this space is not demand. It is a financing and logistic issue: how to efficiently connect people with knowledge of the local communities and their barriers to adoption to the capital they need to finance projects. A firm that is able to gain the needed relationships with local communities and companies, and provide them an efficient product, stand to gain access to vastly untapped markets...

...There is also an underpenetrated market in the U.S. for low-income customers. As of April 2014, 54.4 percent of residential solar in Maryland was installed in a ZIP code with a median household income of over \$90,000. Meanwhile, 44.5 percent was installed in an area with an income range of \$40,000 to \$89,000, and just 1.1 percent was in an area where the income range was \$0 to \$39,999.

Targeting these customers would not just be important from a social perspective, but could also provide significant business benefits. The crux of the argument against much of the pro residential and commercial solar legislation (such as net metering, as mentioned in the Legislative and Regulatory Trends section), is that the rising utilities costs will result in a "death spiral." The "death spiral" will function like a regressive tax, benefiting the wealthy and hurting the poor. If the solar industry succeeds in extending solar energy access to these customers at an affordable rate, it could potentially provide these low-income customers with energy cost savings compared to their electricity bills and help solar to continue to receive government support.

At a low-income housing project in Denver, the installation of a rooftop solar unit dropped residents' average electricity rate from \$0.095/kWh to \$0.08/kWh, a 15.7 percent decline in energy costs. SunEdison, in purchasing power agreements with 16 separate public housing groups in Massachusetts, will install 39.6 MW of panels, saving these housing authorities \$60 million over the next 20 years. These types of projects, if they are properly financed, can take

advantage of a combination of solar tax credits, as well as Low Income Housing Tax Credits (LIHTC) and other affordable housing subsidies, facilitating access to these markets.

Analysis

- Based on IWG feedback, some of the key questions SASB considered in further research on this issue included:
 - What are the main barriers to energy access? Do solar companies have any control over removing/influencing these barriers?
 - Is providing energy access to un-electrified populations profitable for solar companies and does it have the potential for significant impact on business?
- SASB also investigated whether to focus this issue on emerging market energy access (separate from concerns of low-income customers in developed markets as the issue initially does), and discuss in a separate issue solar energy and its interaction with existing well-established grid infrastructure in developed markets; some argue that expansion of solar and other forms of renewable energy, particularly distributed generation, can create a utility “death-spiral,” where low-income customers will be left on the grid, faced with higher electricity costs for maintaining the grid infrastructure, leading to worse social outcomes.
- Additional research found that while there is a huge market opportunity to serve un-electrified populations in developing countries, and some of the major solar companies are working on addressing the opportunity (and discuss this in their SEC filings), the commercial viability of such ventures is not well-established and is in experimental stages, with some successes. These successes usually have been non-solar industry players, often smaller companies.⁴

Recommendation

- Remove standalone issue for PCP due to low evidence of interest and limited evidence of financial impact, although the socio-economic development implications of energy access in emerging markets are substantial. See elements of this issue in revised issue of Innovation to Scale Cost-Effective GHG Mitigation below.

3. FORESTRY & PAPER

a. Waste Management – Remove issue for both industries

Evidence of Interest

Heat Map Tests

Waste Management received a heat map score of 83 out of 100, which is in the upper quartile. This indicates high evidence of interest.

IWG Feedback

Issue priority

IWG respondents indicated that this issue is relatively low priority, 9th out of 11 issues.

Issue materiality

RESPONSES TO MATERIALITY OF WASTE MANAGEMENT IN THE FORESTRY & PAPER INDUSTRY

	Corporate professional	Market Participant	Intermediary	Total	Percent of Total
Yes	5	9	12	26	68.4%
No	2	-	-	2	5.3%

⁴ For example, this is discussed in a 2012 report by the International Finance Corporation, “From Gap to Opportunity: Business Models for Scaling Up Energy Access.”

Maybe	6	1	3	10	26.3%
Total	13	10	15	38	

Comments from IWG respondents

Several IWG members had reservation about the likely materiality of the topic, with a high number of Maybe responses. As the sample IWG comments below show, some IWG comments indicate that SASB should perhaps focus only on hazardous waste generation, as non-hazardous wastes are typically repurposed for energy generation or other beneficial uses. Others indicated that hazardous wastes constitute a low percentage of total wastes and are not costly to dispose of. Yet others consider non-hazardous wastes as already being re-used or well-managed by the industry because companies have an inherent business incentive to reduce such wastes.

Stakeholder Type	Material?	Stakeholder Comment
Market Participant	Maybe	<i>Waste management is less relevant in this kind of industry, because this Sector has an inherent incentive to reduce wood wastes and to put them into production</i>
Public Interest & Intermediary	Maybe	<i>First, hazardous waste generation is low. Second, a main type of waste generated by paper and pulp companies is organic wood waste. A well-managed company would strive to use natural resources (e.g. timber) as efficiently as possible to begin with because it is an expensive input ('fiber loss' is a common KPI already). After, the wood waste isn't sent to landfill – it's used as biomass and converted to energy. It is material, I am just saying that there is already business incentive for it to be managed well.</i>
Public Interest & Intermediary	Yes	<i>Waste management in pulp industry is usually solved by burning the lignin and other waste, thus producing energy, and saw mill waste, such as shavings can be used as pulp and paper raw material. Thus the amount of waste itself is not significant, but any waste which cannot be used for energy or as raw materials.</i>

Evidence of Financial Impact

Initial SASB Research (Excerpts of Industry Brief for IWGs)

Some key excerpts from the brief (issue description and evidence):

- *The Paper Manufacturing (NAICS 322) and Wood Product Manufacturing industries (NAICS 321) combined accounted for nearly 200 million pounds of TRI-listed disposal in 2012. This represents approximately five percent of all TRI reported wastes.*
- *According to data from the 2005 PACE survey, the Wood Product Manufacturing and Paper Manufacturing industries incurred pollution abatement operating costs for solid waste of \$597.8 million, accounting for roughly 11.2 percent of the total cost for all manufacturing sectors. Related capital expenditures accounted for \$60.2 million, or 8.9 percent of capital expenditures for all manufacturing sectors.*
- *In 2006, waste to energy conversion at Neenah Paper Inc. was expected to reduce natural gas consumption by up to 80 percent. Furthermore, waste ash can be sold for use in concrete production, roadbed construction, forest fertilizer, or agricultural soil improvement.*

Analysis

- EPA industry data indicates relatively high generation of hazardous wastes (including releases to air and water) in wood products and paper and pulp manufacturing. Waste pollution abatement expenditures are relatively significant as well. The heat map also indicates high relevance of the issue.

- However, given IWG feedback indicating low hazardous waste generation and high residual waste recovery, key questions for further analysis included:
 - Might regulations concerning the disposal of hazardous wastes from these industries become more stringent in the near term in the U.S. and/or other countries?
 - How frequent are regulatory fines or other actions concerning hazardous waste disposal?
 - Is the management of non-hazardous wastes a pure business issue and therefore does not require standards?
- Hazardous Waste
 - Additional research finds that solid hazardous waste generation is low at the industry and company level (hazardous emissions to air are the most significant, followed by water, both of which are covered by other issues for the Pulp & Paper Products industry), and there is no evidence of financial impact from fines/cleanup costs at the company level (aside from legacy sites).
 - PACE abatement expenditure data indicates a high share of opex and capex for solid waste abatement relative to other industries. It is not clear whether this relates to hazardous or non-hazardous wastes or both.
- Non-hazardous Waste
 - Beneficial waste recovery is common throughout the industry, while there is limited upside for additional recovery according to EPA information and IWG comments. American Forest and Paper Association (AF&PA) data indicates that approximately half of all waste is sent to landfill and 8% is recovered for energy. Other beneficial uses comprise the remainder of waste that is not sent to landfill. AF&PA stresses that only non-recoverable wastes are landfilled (or at least non-economical). Additional evidence of financial impact from increased materials recovery or reduced amounts to landfill was not found.
 - The use of (waste) biomass for energy is covered by the Energy Management issue.

Recommendation

- Remove issue from both Pulp & Paper Products and Forestry & Logging industries, due to weak evidence of financial impact.

b. Workforce Health & Safety – Retain for Forestry & Logging, Remove for Pulp & Paper

Evidence of Interest

Heat Map Tests

The issue received a heat map score of 75 out of 100, which is in the upper quartile of all generic sustainability issues for the industry. This indicates high evidence of interest.

IWG Feedback

Issue priority

IWG respondents indicated that this issue is relatively medium priority, 6th out of 11 issues.

Issue materiality

RESPONSES TO MATERIALITY OF WORKFORCE HEALTH & SAFETY INDUSTRY

	Corporate professional	Market Participant	Intermediary	Total	Percent of Total
Yes	8	9	11	28	73.7%
No	2	--	1	3	7.9%
Maybe	3	1	3	7	18.4%

Total	13	10	15	38	
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Comments from IWG respondents

Some IWG members disagreed or had reservations about the likely materiality of the topic. Comments suggested that there is existing strong reporting of safety statistics by companies and that the issue is carefully managed. Some corporate professional respondents who agreed about likely materiality said that the issue is compliance-driven.

Stakeholder Type	Material?	Stakeholder Comment
Market Participant	Maybe	<i>As automation and regulation increases, workplace safety has improved. Contrary to the views of pro-labor groups, productivity and safety rates have improved over the past three decades. This is simply not the material issue it once was.</i>
Corporate Professional	Yes	<i>Injury rate can have an impact on costs (fines, etc.) but also on hiring and reputation.</i>
Public Interest & Intermediary	Yes	<i>The entire process poses many opportunities for injury and/or death including mechanical (high-pressure nips) and chemical (corrosive and toxic chemicals and gases) safety.</i>

Evidence of Financial Impact

Initial SASB Research (Excerpts of Industry Brief for IWGs)

Bureau of Labor Statistics (BLS) data indicates that the Forestry and Logging industry (NAICS 113) and the Wood Products industry (NAICS 321) have relatively high total fatalities and fatal and non-fatal injury rates compared with the broader manufacturing sector and other industries associated with dangerous working conditions. According to 2013 BLS statistics, logging workers have the highest fatal work injury rates of any industry in the U.S., at 91.3 fatalities per 100,000 full time equivalent workers. This is nearly 29 times the average across all industries.

Safety enforcement agencies may assess penalties for regulation violations. Pulp and paper mill and forestry workers are exposed to acute physical risks. For example, in June 2009 OSHA fined a major pulp and paper producer \$107,000 for 29 alleged serious safety violations at a pulp mill, including exposure to machinery and electrical hazards. In August 2013, OSHA cited a West Virginia logging company for serious safety violations following the death of a logging worker killed by a falling tree. Some of the violations were considered serious, which means that there is substantial probability that death or serious physical harm could result from the hazard. The company faced a fine of \$39,000. In June 2014, OSHA fined a timber mill operator in Illinois more than \$145,000 for allegedly exposing workers to excessive noise and amputation hazards. Some of the serious violations cited by OSHA investigators include failing to provide adequate machine guarding on conveyors, belts, and saws....

Analysis

- Initial research suggested some financial impact from worker health and safety issues in both forestry and paper production operations. The high heat map score and relatively high IWG agreement (albeit with reservations) suggest the likely materiality of the issue.
- However, based on IWG comments, SASB investigated the following questions further:
 - Is Workforce Health & Safety more relevant for one segment of the industry (e.g., forestry versus paper production)? Is there evidence of material financial impacts?
 - How prevalent are concerns over chronic health impacts in the Forestry & Paper industry, and do these lead to material value impacts?
- SASB examination of U.S. Bureau of Labor Statistics data found that the Forestry & Logging industry has among the highest fatality rates of all industries, far above the U.S. average. Non-fatal injury rates however are below the U.S. average.

- The Pulp & Paper Products industry has relatively low injuries and fatalities rates compared to the US average. OSHA fines mentioned in the brief are low magnitude.
- The risk and incidence of chronic illnesses at pulp and paper manufacturing facilities does not appear to present likely material impacts. No examples of significant financial impact from cases of chronic illness were found.
- Further research found a high number of fatalities and injury investigations by OSHA, and additional evidence of financial impact related to forestry and logging operations, including fines, although of smaller amounts. There is also some evidence of financial impact from workers' compensation claims and healthcare costs in this industry. However, some financial impacts from health and safety are difficult to quantify since they can be indirect, such as through employee morale or difficulties in attracting workers, as mentioned by an IWG respondent.

Recommendation

- Retain issue for PCP for Forestry & Logging due to relatively high fatality rates compared to the U.S. average (injuries are relatively low) and some evidence of financial impact, as well as high heat map score.
- Remove issue from Pulp & Paper Products industry.
- Remove angle of chronic health impacts due to lack of evidence.

c. Community Relations & Rights of Indigenous Peoples – Retain for Forestry & Logging only

Evidence of Interest

Heat Map Tests

The heat map score is 67 out of 100, which is in the interquartile range among all sustainability issues for this industry and indicates a low to medium level of interest. The issue had the second lowest heat map score among issues presented to the IWG, after the Fair Labor Practices issue.

IWG Feedback

Issue priority

The issue had a low priority as it ranked 10th out of a total of 11 issues.

Issue materiality

RESPONSES TO MATERIALITY OF COMMUNITY RELATIONS & RIGHTS OF INDIGENOUS PEOPLES IN THE FORESTRY & PAPER INDUSTRY

Materiality	Corporate professionals	Market Participant	Public Interest & Intermediaries	Total	% of Total
Yes	2	8	9	19	50%
No	5	1	1	7	18.4%
Maybe	6	1	5	12	31.6%
Total	13	10	15	38	

Comments from IWG respondents

IWG support was strong despite high number of “Maybes.” The table below highlights some of the key comments received from IWG participants. Corporations in the IWG mainly responded with a No or Maybe, while a majority (8 out of 10) of Market Participants said Yes. In general, IWG respondents that had reservations felt the issue is not material for companies operating in the U.S. (note that some companies in the industry operate globally). Such participants were of the opinion that most U.S. companies would likely not experience financial impacts from community relations within their operations.

Participants that did not agree this was a likely material issue noted that the topic was not relevant for pulp and paper companies that do not have forestry operations, or relative to other proposed issues.

Stakeholder Type	Material?	Stakeholder Comment
Market Participant	Maybe	<i>Rights of indigenous people are simply not a material issue for pulp and paper manufacturers operating in the United States. Operators in certain other countries (New Zealand, Indonesia, etc.) are subject to causing far more harm to those populations and thus the importance of proper disclosure increases greatly.</i>
Corporate professionals	No	<i>... the examples in this category pertained primarily to other countries, not the U.S. I understand there are international companies in this sector, but I view the standard as primarily a U.S. standard.</i>
Corporate professionals	Maybe	<i>Community relations are certainly important, but I am not sure about Indigenous Peoples as a topic in the U.S. is entirely material</i>

Evidence of Financial Impact

Initial SASB Research (Excerpt from Industry Brief for IWGs)

Some key evidence excerpts from the brief:

- *The PEFC estimates that forests contribute to the livelihoods of about 1.6 billion people worldwide, and that 60 million indigenous peoples are fully dependent upon forests, and a further 350 million people depend on forests for income and food.*
- *Members of Grassy Narrows, a First Nations group in Canada of about 1,500 people, has staged a continuous logging blockade on its approximately 5,000 square miles of treaty land in Ontario, Canada since December 2, 2002. The blockade has led several companies, among them large, publicly-traded Forestry & Paper firms, to either cease clear-cut logging operations in the territory or refuse to accept wood harvested therein.*
- *In 2011, Greenpeace International filed a complaint against a Swiss-German multinational timber company, claiming that the company had engaged in human rights violations against locals in the Democratic Republic of the Congo. The company had reportedly paid security forces to violently suppress a local protest over the company's logging operations. In light of the complaint, FSC "disassociated" with the company, meaning that it lost all of its FSC certifications worldwide.*

Analysis

- The uncertainty of IWG responses may be a reflection of the fact that the issue is relevant for the Forestry & Logging industry, but not as much for the Pulp & Paper Products industry. SASB conducted additional research to address concerns regarding the scope of U.S. versus international operations.
- Key questions for further analysis included:
 - How do forestry companies engage with communities when securing land use and timber harvest rights? Are there typically issues that must be resolved before harvesting rights are secured?
 - Are most U.S.-listed (not necessarily only U.S.-based) companies not exposed to community-related risks? What proportion of operations are conducted in areas where such risks may be more acute?
 - Is there evidence that community-related issues have disrupted the operations of multiple top U.S.- listed companies? Is this risk isolated to foreign operators?
- SASB's research shows that the issue is more relevant for international operations than the U.S., but Canada and Brazil, where risks are higher due to more forest-dependent communities, are important timber-producing regions, where some of the U.S.-listed forestry companies operate.

- Globally a large number of people are dependent on forests. Indigenous peoples have special protections in law in some cases and in international principles.
- FSC certification includes considerations of community relations and indigenous peoples rights (both) – creating a demand and reputational risk driver for ensuring strong performance on the issue. The issue is also important due to impact on intangible assets and long term growth, besides the operational risks from disruptions.
- According to an analysis of 10-Ks and CSR reports, the issue is mentioned in reference to Canadian operations and rights of First Nations. More general community relations appears in boilerplate disclosure language regarding access to timberlands.
- IWG comments support strength of issue for Canadian operations, and also mention operations outside of North America where risks may be higher (e.g. New Zealand).
- SASB’s additional research did not reveal evidence that community relations or rights of indigenous peoples were likely to be material to the operations of pulp and paper products companies.

Recommendation

- Retain issue for the Forestry & Logging industry (but not for Pulp & Paper Products) based on evidence of financial impact and evidence of interest from company disclosure.

d. Climate Change Adaptation of Forestlands – Retain issue for Forestry & Logging only

Evidence of Interest

Heat Map Tests

Climate Change Adaptation of Forestlands received a heat map score of 75 out of 100, which is in the upper quartile of all generic sustainability issues, indicating a high level of interest. This is the fourth highest heat map score among the 11 issues presented to the IWG.

IWG Feedback

Issue priority

IWG respondents indicated that this issue is relatively low priority, 8th out of 11 issues.

Issue materiality

RESPONSES TO MATERIALITY OF CLIMATE CHANGE ADAPTATION OF FOREST LANDS IN THE FORESTRY & PAPER INDUSTRY

	Corporate Professional	Market Participant	Public Interest & Intermediaries	Total	Percent of Total
Yes	2	8	12	22	57.9%
No	3	0	1	4	10.5%
Maybe	8	2	2	12	31.6%
Total	13	10	15	38	

Comments from IWG respondents

There was a high percentage of IWG respondents who considered that the issue may be material, but had reservations. This was mainly due to the fact that not all companies (in the combined Forestry & Paper industry) have significant forestry operations, the timeline and nature of climate change impacts is largely unknown, and that a metric concerning mitigation strategies would be subjective or difficult to compare across companies. The majority of market participants (8 out of 10) agree the issue is likely material, while the rest said “Maybe.” Few corporations agreed on materiality.

Stakeholder Type	Material?	Stakeholder Comment
Corporate Professional	Maybe	<i>This is an area that is very difficult to tackle, and it will be very difficult for stakeholders to evaluate whether the strategy is adequate or not. This is still an area where the science in development and the outcomes are still highly uncertain. Answers would be quite subjective.</i>
Corporate Professional	No	<i>There is very little known about climate adaptation of forest species at this time to be able to credibly opine on such a topic in a public report. Furthermore, most pulp and paper companies no longer own forestlands in the U.S. so this is more of a question for primary forest owners.</i>
Market Participant	Yes	<i>Since climate change is a relevant external risk, its effects can create a need for the industry to adapt to climate change changes in terms of water supply and extreme weather phenomena</i>

Evidence of Financial Impact

Initial SASB Research (Excerpts of Industry Brief for IWGs)

Some key evidence excerpts from the brief:

- *According to the findings of the Intergovernmental Panel on Climate Change’s Fourth Assessment of Climate Change (2007), the effects of climate change on forest productivity will be felt most acutely at the regional and local levels. In general, high-latitude forests are expected to shift towards the poles, changing plant and animal species, and in some cases, forests may be replaced by dry grasslands.*
- *According to the U.S. Climate Change Science Program, between 1983 and 2008 the average area of wildfires in the U.S. increased from less than 50 acres per fire to more than 100 acres per fire.*
- *The spread of harmful insects and diseases due to warmer temperatures could potentially have rapid and widespread impacts on forests. A 2001 study estimated that forest insects and pathogens cost the industry \$1.5 billion in lost productivity annually. In the northern half of the U.S., cold winter temperatures usually keep insects such as the hemlock woolly adelgid range-bound. However, increasingly mild winters have allowed the insect to migrate northward, killing Eastern hemlock trees.*
- *In its FY 2013 Form 10-K, Resolute Forest Products warns shareholders of the risks to forest productivity and the material costs from climate change. The company states that “Our operations and the operations of our suppliers are subject to climate variations, which impact the productivity of forests, the distribution and abundance of species and the spread of disease or insect epidemics, which may adversely or positively affect timber production. Over the past several years, changing weather patterns and climatic conditions due to natural and man-made causes have added to the unpredictability and frequency of natural disasters such as hurricanes, earthquakes, hailstorms, wildfires, snow and ice storms, which could also affect our woodlands or cause variations in the cost for raw materials, such as fiber.”*

Analysis

- IWG participants had reservations about the materiality of this issue due to the industry’s initial structure as well as the difficulty in assessing the timing, location, and nature of impacts. These factors make it more difficult to compare companies’ adaptation plans.
- This issue is likely to have financial impacts only to forest owners or companies that can actively influence the management of forest lands. Most pulp and paper producers do not have significant timberland holdings and therefore the issue is less relevant for that industry.

- To mitigate long-term impacts, companies will have to take some action now, and some companies are researching how climate change will affect their timberlands. Companies may also have to make decisions about the species to plant or where to obtain harvesting rights.
- There is a possibility of acute financial impacts from severe weather or other conditions in the short term, supported by evidence in the initial brief.
- Companies don't maintain insurance on standing timber due to natural disasters, which could be a growing risk were such disasters to intensify in the future.
- The impacts are a "known trend or uncertainty." The revised standards will clarify the crucial point that climate change's impacts may be positive, negative, or neutral, yet constitute a *business uncertainty*. Brief was focused too much on downside.
- The possibility of both short- and long-term significant impacts support disclosure of climate change risks and adaptation plans, which would be useful information to investors.

Recommendation

- Retain issue for the Forestry & Logging industry (not for Pulp & Paper Products) based on initial evidence of financial impact and evidence of interest from SEC disclosure, agreement among market participants in the IWG, and high heat map score. Reservations of some IWG participants will be addressed through revision of the issue focus, the fact that paper companies would not be covered, and improvements to the metrics.

III. Strong Issues with Reservations

This section focuses on issues where a majority of participants agreed about the likely materiality of issues, but some had reservations (around 75 percent of participants typically agreed that the issues were likely material or they agreed that issues were likely material but with some reservations). Feedback on issues in this section was generally more positive than those issues presented in Sections I and II. For such issues, SASB evaluated the **specific IWG comments** and the strength of the initial evidence of financial impact to determine whether any changes were required. An **analysis** of all evidence is provided, together with a final **recommendation** for retaining or removing the issue or any changes to be made.

1. SOLAR ENERGY

a. Cost Reduction to Scale GHG Mitigation – Retain issue, rename, and add other elements

Evidence of Interest

Heat Map Tests

The issue received a high score of 100 out 100, which indicates a high level of interest.

IWG Feedback

Issue priority

The average ranking of the issue by IWG respondents was 3rd out of 5.

Issue materiality

RESPONSES TO MATERIALITY OF COST REDUCTION TO SCALE GHG MITIGATION IN THE SOLAR ENERGY INDUSTRY

	Corporate Professional	Market Participant	Intermediary	Total	Percent of Total
Yes	4	9	7	20	76.9%

No	0	1	0	1	3.8%
Maybe	0	3	2	5	19.2%
Total	4	13	9	26	

Comments from IWG respondents

IWG comments that expressed reservations with the issue were primarily concerning whether or not the topic was simply a competitive issue, or if disclosure on cost reduction was necessary. Otherwise, there was only one IWG member who disagreed with the materiality of the issue.

Stakeholder Type	Material?	Stakeholder Comment
Corporate Professional	Yes	<i>If solar depends on policy support like RPS targets and, better still, a carbon tax, solar will have to make the case that it's effective at GHG reduction -- and more than just dumb comparisons to trees and cars...</i>
Market Participant	Yes	<i>public policy and funding may switch to other energy sources if solar PV GHG mitigation is more costly</i>
Market Participant	Maybe	<i>Cost reduction to scale GHG mitigation is a very important aspect of increasing the volume and use of solar panels, and I see it as a potential material issue for solar companies, it is their own economic interest. However, I think this is well understood and therefore, while it is important, I don't see it as something that needs to be additionally highlighted as a material (risk) issue, in this context. Solar companies should be fully concentrated on ensuring safe and environmental production processes and lowering cost of solar panel through efficient manufacturing, leading to cost reduction to scale GHG mitigation.</i>
Public Interest & Intermediaries	Maybe	<i>Solar is certainly part of the solution, cost is a factor determined by the market and competitive business strategy. Requiring all solar entities to provide low cost products to scale GHG Reductions may result in cutting corners in other effective areas.</i>

Analysis

- SASB re-assessed the issue to better highlight its importance to sustainability, apart from its significance for the success of solar companies as businesses. In doing so, it considered the following key questions:
 - Would continuing policy and public support for the industry depend on solar being a cost-effective means of reducing GHGs? How important is it from a sustainability or societal perspective for further cost-reductions in solar to occur?
 - Is cost-competitiveness of solar purely a business consideration? Can the industry survive and grow without political support?
 - Did metrics receive good feedback? Consider the issue as described and whether current metrics are relevant to understand the overall context.
- In re-assessing this issue, SASB also considered other issues raised by the IWG (e.g., suggested issue of public policy and government support – covered in the next section) and the industry's overall regulatory environment. The aspects of solar energy for low-income customers in countries with existing grid infrastructure and concerns about the utility “death-spiral,” which were previously covered under the Energy Access issue (see discussion in previous section), were also considered in the context of this issue. The issue was reformulated taking into account these dimensions.
- The solar energy industry's fundamental value proposition is it is a more sustainable form of energy at a Levelized Cost of Electricity (LCOE) that, over the long term, may reach parity or fall below parity with fossil fuel energy. Therefore, it is important for the solar energy industry to scale up (and therefore scale GHG mitigation and other positive externalities) *without*:
 - continuing to rely heavily on government support over the long term i.e. ensure cost-effectiveness;

- disrupting grid reliability (or otherwise introducing difficulties in integrating with the grid – related to intermittency and dispatchability);
- imposing social costs of distributed generation i.e. increasing costs for the rest of the grid that is not on solar/distributed generation, which would arguably include low income customers (which may simply be a matter of dissolving such perceptions).
- Company-specific actions to achieve the above objectives include cost/LCOE reduction (both hard and soft costs), business model innovation, managing government relations for appropriate payment mechanisms for solar, innovating on new technologies and partnerships for storage or other means of lowering grid disruptions.
- A relevant consideration in such scaling up may be improving the commercial viability of providing energy access in underserved markets (such as un-electrified populations in emerging markets), which provides a large market opportunity compared to current revenues and also economies to lower costs.
- Financial impacts from this issue are in the form of loss or reduction of government support over the long term or impacts on long term business viability (cost-effectiveness of GHG mitigation solutions is a key concern of government policy in many regions), changes to regulations that introduce hurdles to expansion of business (e.g. utility charges, interconnection fees, roll back of net metering etc.), curtailment risks for owned projects, and loss of customers.

Recommendation

- Retain issue, rename to Innovation to Scale Cost-Effective GHG Mitigation and include additional specific elements listed above. Reconsider metrics in this context.

b. Sensitive Materials Sourcing – Retain

Evidence of Interest

Heat Map Tests

The issue received a score of 25 out 100, which is between the first and second quartile for all generic sustainability issues and indicates a low level of interest; the issue received the lowest heat map score among the 5 issues presented to the IWG.

IWG Feedback

Issue priority

The issue was ranked as a low priority by IWG respondents, 4th out of 5 issues.

Issue materiality

RESPONSES TO MATERIALITY OF SENSITIVE MATERIALS SOURCING IN THE SOLAR ENERGY INDUSTRY

	Corporate Professional	Market Participant	Intermediary	Total	Percent of Total
Yes	3	10	7	20	76.9%
No	1	0	2	3	11.5%
Maybe	0	3	0	3	11.5%
Total	4	13	9	26	

Comments from IWG respondents

IWG comments generally supported this disclosure topic, both on sourcing risks and brand equity impacts, as seen in the sample comments below. Some IWG respondents indicated uncertainty regarding the prevalence of supply chain risks in this industry and the magnitude of potential impacts. Some said that the increased reporting burden of the issue was great for some small solar companies. Those that agreed about likely materiality also mentioned the importance of rare earth and critical materials, not covered by the initial issue.

Stakeholder Type	Material?	Stakeholder Comment
Corporate Professional	Yes	<i>Reporting and transparency are healthy for the industry. Highlighting sensitive materials -- particularly ones sourced in countries hostile to the US or EU -- will help investors judge supply chain risk, as well as help companies make CSR and humanitarian arguments that may be material to brand equity.</i>
Market Participant	Maybe	<i>In the past, this issue has rarely affected a company's market value. If the materials become difficult to obtain and affect production levels, then that is different. Also, companies are actively working on r&d to replace a number of materials which would diminish this risk.</i>
Market Participant	Yes	<i>This is an issue for any sector using sensitive or rare earth elements. Obviously, they need to keep an eye on this area--particularly, since there has been suggestion that China has been accumulating a good amount of REO which could be problematic in terms of accessing inputs down the road.</i>
Market Participant	Yes	<i>Lack of access to materials can have an adverse effect on production and revenues.</i>

Analysis

- Low heat map scores could be a result of the fact that the heat map 10-K and CSR tests were performed for 2011 and 2010 and may not reflect current disclosure.
- Based on IWG comments, SASB investigated the following questions further:
 - Does the industry primarily face risks due to polysilicon sourcing risks (also covered by the initial issue)? Is there a material 3TG conflict mineral risk?
 - Are there risks related to rare earth or critical materials? Should this angle be included and issue name changed to reflect this?
- A search of company filings using “conflict minerals” and “critical materials” keywords found multiple quotes from top companies addressing conflict minerals disclosure and sourcing risks, including financial impacts. Many companies filed a form SD.
- While rare earth and critical materials issues are likely material for some thin film technologies and a handful of companies producing panels using these, these currently make up a small portion of the market, and therefore including this angle would not be relevant for most companies in the industry.
- Initial evidence of financial impact and risk from sensitive materials sourcing (excluding critical or rare earth elements) is fairly strong. The main channels of impact include reputational damage and sourcing disruptions related to polysilicon as well as conflict minerals.

Recommendation

- Retain issue for PCP as is. Fairly strong evidence in the brief, along with general agreement among IWG about likely materiality. Several companies report conflict minerals risks in their SEC filings.

2. FUEL CELLS & INDUSTRIAL BATTERIES

a. Sensitive & Critical Materials Sourcing – Retain

Evidence of Interest

Heat Map Tests

The issue received a score of 38 out 100, below the 1st quartile for all generic sustainability issues, which indicates a low level of interest; the issue received the second lowest heat map score among the 5 issues presented to the IWG.

IWG Feedback

Issue priority

The average ranking of the issue by IWG respondents was 4th out of 5, tied with Workforce Health & Safety.

Issue materiality

RESPONSES TO MATERIALITY OF SENSITIVE & CRITICAL MATERIALS SOURCING IN THE FUEL CELLS & INDUSTRIAL BATTERIES INDUSTRY

	Corporate Professional	Market Participant	Intermediary	Total	Percent of Total
Yes	3	3	7	13	76.5%
No	0	0	1	1	5.9%
Maybe	1	0	2	3	17.6%
Total	4	3	10	17	

Comments from IWG respondents

There was general agreement about the likely materiality of the issue. There were few comments, however IWG participants indicated a degree of uncertainty surrounding the relevance of the issue to companies in the industry and difficulty in comparing performance on the issue through the proposed accounting metrics. IWG comments suggested that the use of critical materials may not be relevant for all types of fuel cells or batteries.

Stakeholder Type	Material?	Stakeholder Comment
Corporate Professional	Maybe	<i>This isn't relevant for our Company and some others in the industry as our use of Sensitive & Critical Materials is not material.</i> <i>Disclosure of specific materials used in a battery or fuel cell may provide sensitive and proprietary information to competitors.</i> <i>The use of certain types of inputs can be an investor risk factor though we wonder if this is an appropriate topic for Sustainability?</i>
Market Participant	No	<i>This is a measure that would be difficult to cost or audit and be a comparable measure.</i>

Analysis

- Although the initial evidence was fairly strong, SASB analyzed the following questions to take into account some of the IWG comments:
 - Is the use of a small amount of critical or conflict materials truly material? Is cost the main concern or availability or both?
 - What percentage of products or fuel cell types include such materials? If this is not a substantial share, risks may be isolated to a few companies or product lines.
- Additional research shows that critical materials are used in fuel cells broadly and also some (like lithium) are used in batteries. Supply shortages and/or supply and price volatility of critical materials can be a business risk.
- Difficult to find data to answer the key questions fully, due to the nascent nature of the industry; therefore, it would be beneficial to get additional comments in PCP.

Recommendation

- Retain issue for PCP based on evidence of impact and general IWG agreement.

3. FORESTRY & PAPER

- a. **Greenhouse Gas Emissions** – Retain for Pulp & Paper Products, include as emerging issue for Forestry & Logging

Evidence of Interest

Heat Map Tests

The issue received a heat map score of 83 out of 100, which is in the upper quartile of all generic sustainability issues. This indicates high evidence of interest. The issue had the third highest heat map score among the 11 issues presented to the IWG.

IWG Feedback

Issue priority

IWG respondents indicated that this issue is high priority, 1st out of 11 issues.

Issue materiality

RESPONSES TO MATERIALITY OF CLIMATE CHANGE ADAPTATION OF FOREST LANDS IN THE FORESTRY & PAPER INDUSTRY

	Corporate Professional	Market Participant	Public Interest & Intermediaries	Total	Percent of Total
Yes	8	10	11	29	76.3%
No	0	0	0	0	0%
Maybe	5	0	4	9	23.7%
Total	13	10	15	38	

Comments from IWG respondents

As indicated in the table above, several IWG participants had reservations about the likely materiality of the topic. This was due in part to the industry structure and the treatment of GHG emissions in the forestry sector. There is greater uncertainty and debate concerning forestry carbon emissions than emissions from fossil fuel combustion at pulp and paper facilities. The treatment of biomass emissions as carbon-neutral was also a factor in some IWG members' decisions.

Stakeholder Type	Material?	Stakeholder Comment
Public Interest & Intermediaries	Yes	<i>Climate change is such a significant issue globally that GHGs are somewhat inherently material for all sectors. Regardless of this, GHG emissions are still highly material for forestry and paper companies. This sector impacts climate change by being both energy intensive but also through commercial forest management and timber harvesting. On the energy side, while companies increasingly use "renewable" energy in the form of biomass, biomass is not GHG-free and is not rapidly renewable the way wind or solar is. In short, as long as a sector is energy-intensive, unless they make a major shift to clean energy (not including biomass), GHG emissions should be material and reported on. On the other side, the impact on climate change through commercial forest management and timber harvesting, in my view, companies do not understand very well the impact they have on climate change through their forest management and through timber harvesting, as I do not see comprehensive reporting on this impact in annual sustainability reports.</i>
Corporate Professional	Maybe	<i>Most greenhouse gas emissions come from the combustion of fuels, and to a smaller extent, forest management activities in areas where drain exceeds growth (this is not really an issue in the U.S. where forest stocks have been increasing over the past 50 years). GHG emissions</i>

		<i>are a lagging indicator and the result of energy use, fuel choices and forestry practices, and therefore if companies focus on energy and forest management, GHGs don't need to be included. It is important for companies to manage fewer of the right metrics, than numerous metrics of limited value. Furthermore, the majority of the pulp and paper industry energy comes from carbon neutral manufacturing biomass residuals.</i>
Public Interest & Intermediaries	Maybe	<i>I agree with the need to publish GHGs from fossil fuel consumption. However most of the GHGs from black liquor (produced only during some pulping processes and never during papermaking) and biomass would be offset by it's renewable nature. I would separate these two types of emissions - the one related to fossil fuel consumption will have a much bigger impact environmentally - though carbon cap regulations may not make the distinction.</i>

Analysis

- IWG participants had reservations about the materiality of this issue due to the differences between GHG emissions in forestry and paper manufacturing operations as well the treatment of biomass emissions.
- In additional research, SASB considered evidence of materiality separately for the Forestry & Logging industry and the Pulp & Paper Products industry. Furthermore, SASB considered the following questions:
 - Is it likely that GHG emissions from biomass sources will be regulated under cap and trade type mechanisms?
 - How likely is it that GHG emissions from forest sources will be regulated under cap and trade or other mechanisms? Is there an opportunity for forestry companies under GHG regulations due to sequestration credits?
- For Pulp & Paper Products, SASB found relatively high Scope 1 emissions from fossil fuel use. This involves regulatory risk from the U.S. GHGRP and regional cap and trade (like California AB32 or E.U. ETS), leading to capex/ opex for emissions reductions and/or expenditure on purchase of carbon credits, plus potential for fines; there is also potential for cost improvements from reducing fossil fuel use.
- The industry also has relatively high Scope 1 emissions from biomass use – half the industry's energy needs are met from biomass, emissions from which are currently not counted in regulatory schemes to reduce GHGs. Use of biomass therefore reduces both costs (assuming most biomass used is from own operations and not purchased) and current regulatory risk. However, some current risk specific to biomass use does exist - e.g., if biomass does not meet "sustainability criteria" under the E.U. ETS. The U.S. EPA is also currently developing a framework for assessing biogenic emissions from stationary sources. It is not clear if this assessment will result in future regulation, however the agency's interest in the topic suggests regulatory uncertainty. The relative size of the pulp & paper industry's biogenic emissions suggests this is a serious consideration and must be managed carefully.
- For the Forestry & Logging industry, the carbon offset markets do not appear to be a substantial source of revenues today, but several companies disclose that they anticipate participation in these markets soon. California and some other markets allow use of carbon offset credits for compliance purposes, creating a market for sequestration credits.
- Risks and opportunities for the forestry sector from emissions or sequestration are likely to become more significant as GHG regulations become more stringent. Europe's next climate framework will be factoring in GHG emissions/sinks from forestry. The UN REDD program could also create further risks and opportunities in the future.

Recommendation

- Retain issue in Pulp & Paper Products due to high industry emissions and regulatory risk. The Heat Map score was high and IWG responses were generally supportive. Issue will be included as an emerging issue in the Forestry & Logging industry.

b. Air Quality – Retain for Pulp & Paper Products only

Evidence of Interest

Heat Map Tests

Air Quality received a heat map score of 83 out of 100, which is in the upper quartile of all generic sustainability issues for the industry. This indicates high evidence of interest. The issue received the third highest heat map score of the 11 issues presented to the IWG for the Forestry & Paper industry.

IWG Feedback

Issue priority

IWG respondents indicated that this issue is relatively medium priority, 7th out of 11 issues.

Issue materiality

RESPONSES TO MATERIALITY OF AIR QUALITY IN THE FORESTRY & PAPER INDUSTRY

	Corporate professional	Market Participant	Intermediary	Total	Percent of Total
Yes	6	9	12	27	71.1%
No	1	0	0	1	2.6%
Maybe	6	1	3	10	26.3%
Total	13	10	15	38	

Comments from IWG respondents

As indicated in the table above, several IWG members had reservation about the likely materiality of the topic. Only one respondent considered the issue not to constitute material information. The high percentage of Maybe responses was mainly due to the fact that forestry companies typically do not have significant air emissions, and because of the contention that since air quality regulations are stringent in regions where the majority of pulp and paper operations are based, the issue is well-managed and therefore unlikely to have material impacts.

Stakeholder Type	Material?	Stakeholder Comment
Corporate professionals	Maybe	<i>Most air emissions come from the combustion of fuels. Air emissions are a lagging indicator and the result of energy use, fuel choices and air pollution control equipment. Air emissions are also highly regulated and emission limits can vary across the country (based on state differences and depending on if facilities are located in attainment zones or not) and therefore, do not lend themselves to being a comparable metric between companies. Air emissions by facility are already reported and publicly available in various government databases.</i>
Public Interest & Intermediary	Maybe	<i>There is an established regulatory system around emissions to air. Companies are already required to report to national pollutant release inventories. Companies will invest to reduce air emissions in accordance with regulations, thus it is already highly managed by companies. From a local community perspective (referring specifically to North America), forest communities are remote and value the economic opportunities</i>

		<i>provided by a forest company, and thus are not overly concerned with air emissions.</i>
Corporate professionals	Maybe	<i>...Considering the significant difference between the forestry industry and the paper industry it is very difficult to identify any metric that is material to both industries. Air Quality is a good example. The materiality of air quality is significantly different for a paper company than a land management company. Also air quality is heavily regulated in the United States. Compliance to regulations is more material than a stand-alone air quality metric.</i>

Evidence of Financial Impact

Initial SASB Research (Excerpts of Industry Brief for IWGs)

Some key evidence excerpts from the brief:

- *SASB's analysis of air pollution data for all industrial processes from the EPA's 2011 National Emissions Inventory of data, which contains more than 80 percent of the nation's point sources (excluding emissions from fuel combustion), shows that Pulp & Paper facilities released approximately 33 percent of all acetaldehyde and 14 percent of all VOC emissions from industrial processes. The industry's share of nitrogen oxides from all industrial processes was approximately 5.3 percent, while its share of PM 2.5 was about 8.7 percent. The industry was also consistently ranked among the top three emitters of the industries examined in the report.*
- *The new rule, labeled the Boiler MACT, aims to reduce HAP emissions and impacts all industrial manufacturers. The rule is expected to increase air pollution abatement capital expenses for pulp and paper producers. The American Forest and Paper Association estimates that the regulations may cause the industry to incur capital costs of up to \$14 billion over the next three to ten years.*
- *The PACE survey shows that the air emissions abatement operating costs of the U.S. Paper Manufacturing industry (NAICS 322) and the Wood Products Manufacturing industry (NAICS 321) were approximately \$960 million in 2005, or approximately 11.1 percent of the manufacturing sector's total air emissions operating expenditures.*

Analysis

- IWG participants had reservations about the materiality of this issue due to the existing regulatory environment and the original industry structure where forestry and pulp and paper manufacturing operations were grouped together.
- Initial research indicated that pulp and paper manufacturing generates significant air emissions relative to the broader manufacturing sector. Following the industry split, this issue was found to be applicable to pulp and paper manufacturing companies, but not to forestry and logging operations due to the low amount of air emissions and financial impact for the latter.
- Based on IWG feedback, SASB also considered the following key questions:
 - Are air quality regulations related to paper operations expected to become more stringent over time, in both U.S. and global operations, and is it anticipated that they may substantially increase the cost of air emissions abatement?
 - Is the high degree of air emissions regulation an indication of potential risk or is it a risk-mitigating factor for companies and investors? (as suggested by IWG participants)
 - Are risks of community pushback related to air emissions significant enough to have a potential material impact on operations?
- Additional research confirmed relatively high air emissions (including HAPS, CAPS, high levels of key toxic substances) result in high pollution abatement costs.
- Air emissions also lead to regulatory risk, including penalties, although instances of non-compliance are less robust than in some other industries SASB has covered previously.

- Emerging regulations including new boiler MACT rules are anticipated to result in substantial compliance costs over time. The industry-specific air emissions "cluster rules" from the 1990s, which seem to have been a key driver of air emissions mitigation in the industry, may present additional risk as they have not been updated for some time.
- No evidence was found to suggest need for specific metrics or issue related to community impacts.
- While stringent environmental regulations do help to lower air emissions and promulgate compliance, SASB contends that regulations result in ongoing operational compliance costs, including capital expenditures, and the risk for compliance violations and penalties, all of which can be substantial.

Recommendation

- Retain issue for PCP for the Pulp & Paper Products industry, based on significant air emissions (relative to other industries), pollution abatement and regulatory cost implications, and relatively high evidence of interest.
- Remove issue for the Forestry & Logging industry.

c. Energy Management – Retain for Pulp & Paper Products only

Evidence of Interest

Heat Map Tests

The issue received a heat map score of 100 out of 100, which is in the upper quartile. This indicates high evidence of interest.

IWG Feedback

Issue priority

IWG respondents indicated that this issue is high priority, 4th out of 11 issues.

Issue materiality

RESPONSES TO MATERIALITY OF ENERGY MANAGEMENT IN THE FORESTRY & PAPER INDUSTRY

	Corporate Professional	Market Participant	Public Interest & Intermediaries	Total	Percent of Total
Yes	8	9	12	29	76.3%
No	1	0	1	2	5.3%
Maybe	4	1	2	7	18.4%
Total	13	10	15	38	

Comments from IWG respondents

As indicated in the table above, a few IWG participants disagreed or had reservations about the likely materiality of the topic. There were some concerns about the difference between forestry and paper operations for the applicability of this issue. Furthermore, some IWG respondents highlighted the need to recognize the role of biomass in energy generation and use in the paper industry.

Stakeholder Type	Material?	Stakeholder Comment
Public Interest & Intermediaries	Yes	<i>Energy comprises up to 30% of the cost of making paper (see Resolute FP sustainability report 2010 or later). This is a significant cost and well-managed companies are intently focused on energy reduction and energy efficiency for this reason. Companies are also trying to be energy</i>

		<i>independent and reduce reliance on the grid (e.g., through the use of biomass).</i>
Corporate Professional	Maybe	<i>Considering the significant difference between the forestry industry and the paper industry it is very difficult to identify any metric that is material to both industries. Energy management is a good example. The materiality of energy management is significantly different for a paper company than a land management company. Paper companies with virgin content paper mills generate between 50 – 70% of their energy on site with renewable materials. A more meaningful metric would be purchased fuels.</i>
Corporate Professional	Maybe	<i>Risks would mostly already be covered by the Greenhouse gas topic. Data would be impossible to compare from one company to another and would likely not bring meaningful and material information</i>

Analysis

- Existing evidence suggests that pulp and paper producers consume significant quantities of purchased electricity in addition to purchased fuels. Energy costs, including those of purchased electricity, are a significant share of operating costs. On the contrary, forestry and logging companies do not typically require significant purchased electricity for their operations.
- In the energy issue for Pulp & Paper Products, SASB will discuss how using on-site biomass electricity can reduce purchased electricity costs, but that there are tradeoffs with Scope 1 GHG emissions (discussed above), which in the future could pose regulatory risk, particularly if the biomass used is not “sustainable”. For metrics, SASB will consider the implications of using large quantities of biomass energy and whether the current metric captures this aspect.

Recommendation

- **Retain issue** for Pulp & Paper Products industry due to significant electricity consumption as a share of purchased materials, high Heat Map score and general IWG agreement.
- Do not include issue for the Forestry & Logging industry due to low energy consumption and costs.

d. Land Use & Ecological Impacts – Retain for Forestry & Logging industry only, rename

Evidence of Interest

Heat Map Tests

Land Use & Ecological Impacts received a heat map score of 58 out of 100, which is between the second and third quartile of all generic sustainability issues. This indicates a moderate level of interest. Note, however, that this heat map score is the lowest among the 11 issues presented to the IWG.

IWG Feedback

Issue priority

IWG respondents indicated that this issue is relatively medium priority, 5th out of 11 issues.

Issue materiality

RESPONSES TO MATERIALITY OF LAND USE & ECOLOGICAL IMPACTS IN THE FORESTRY & PAPER INDUSTRY

	Corporate Professional	Market Participant	Public Interest & Intermediaries	Total	Percent of Total
Yes	4	9	11	24	63.2%
No	0	0	0	0	0%
Maybe	9	1	4	14	36.8%

Total	13	10	15	38	
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Comments from IWG respondents

As indicated in the table above, several IWG participants had reservation about the likely materiality of the topic, although no one disagreed. This was mainly due to the fact that not all companies in the initial Forestry & Paper industry have significant forestry operations, and some IWG participants felt that the industry in North America has strong forestry management practices that mitigate risks. Other IWG concerns related to the metrics.

Stakeholder Type	Material?	Stakeholder Comment
Market Participant	Maybe	<i>At one time approximately 20 years ago, this was the top ecological concern in the press. Clear cutting of timber, ecological habitat and other concerns were, in many locales, headline news. We believe this topic has diminished in its materiality. Further, this is a topic that is difficult to measure its impact on financial statements, unlike other matters identified in this survey.</i>
Corporate Professional	Maybe	<i>Considering the significant difference between the forestry industry and the paper industry it is very difficult to identify any metric that is material to both industries. Land use is a good example. The relative importance of land use will depend on if the discussion id about a forest management plan or a paper mill.</i>
Corporate Professional	Maybe	<i>This is typically not a North American issue. The industry is in fact the leader in land use and sustainable forestry. Negative forest are due to urban sprawl and ag land conversion in the US.</i>

Analysis

- In considering the applicability of this issue for companies in the Forestry & Logging industry compared to the Pulp & Paper Products industry, SASB finds that the issue is relevant for the former but not the latter, in terms of likely materiality.
- SASB conducted additional research on both positive and negative externalities created by forestry operations on land use and ecosystems.
- There are tradeoffs between the various uses of forests, including timber harvesting. Timber extraction is currently the ecosystem service with a well-established market, but has the potential for degradation of ecosystems or endangerment of species, in the absence of steps to mitigate such impacts. Protecting or enhancing ecosystems within forest lands can help not only mitigate demand and operational risks related to negative ecological/biodiversity impacts, but could also enable companies to extract additional value from their forestlands, through revenues for the other ecosystem services (including fees for recreational uses or watershed protection etc.). These aspects will be reflected in the revised issue and metrics.
- Existing and additional research found that U.S. and Canadian operations are highly regulated for biodiversity impacts. Performance seems to be generally strong, but stringent regulations and harvesting rights contingent on biodiversity plans indicate this issue is important to company operations.
- Furthermore, there are some forestry operations for U.S.-listed companies in developing countries, particularly Brazil, where land use and ecological impacts can be significant.
- Financial impacts are reputational and demand-related, but also related to regulatory compliance (e.g. Endangered Species Act) which can create operational risks (e.g. court cases preventing companies from logging to protect wildlife).
- There are other value-add benefits from ecosystem services, including GHG sequestration (addressed in GHG issue), biodiversity preservation, hunting, and watershed protection. There are revenues for these types of services today across a number of forest owners. The market

appears to be a relatively small share of forestry revenues, and no companies report direct revenues attributable to value-add services. This topic should be watched for developments, including regulatory mechanisms that increase funding for ecosystem services. Nonetheless, companies do discuss ecosystem services in their regulatory filings and extracting additional value from enhancing or protecting ecosystems (besides the value to forest productivity and therefore timber output) can be seen as a business opportunity.

Recommendation

- Retain issue for the Forestry & Logging industry based on evidence of financial impact, interest, and significance in SASB heat map. Rename to Ecosystem Services & Impacts.
- Remove issue for the Pulp & Paper Products industry.

IV. Suggested Additional Issues

The following additional topics were suggested by industry working group participants, and reviewed by SASB. This is followed by SASB’s decision on the issues, based on additional evidence research and IWG follow-up.

SASB conducted further research, including analysis of Form 10-K disclosure, and discussion with industry experts to determine materiality of the issues suggested. For this sector, most of the suggested issues had already been considered by SASB in the initial research, with rationale for exclusion, which was shared in follow up emails with IWG participants who proposed the issues below. As a result, only in a small number of cases did SASB introduce a new issue or angle to an existing issue as a result of these suggestions.

TABLE II: NEW ISSUES PROPOSED BY IWG MEMBERS

Industry	Issues proposed by IWG
1. Biofuels	a. Community Relations & Land Use b. Resource & Product Efficiency c. Governance & Payments Transparency
2. Solar Energy	a. Land Use & Community & Biodiversity Impacts b. Water Management c. Political Spending & Government Support d. End of Life Management e. Employee Attraction & Retention
3. Wind Energy	a. Health & Safety b. Reliance on Government Subsidies & Financial Structuring c. Design for Increased Output Efficiency d. Product End of Life Management
4. Fuel Cells & Industrial Batteries	a. Greenhouse Gas Emissions b. Waste Management
5. Forestry & Paper	a. Innovation & Design for Environmental Sustainability b. Employee Attraction & Retention c. Genetically Modified Organisms

1. BIOFUELS

a. Community Relations & Land Use – Do not add

IWG Comments

- *“Indigenous people with traditional claims to land are particularly disadvantaged by oil palm expansion, as formal recognition of their claims is limited.”*
- *“I feel as though community relations & rights of indigenous peoples was not adequately represented in the metrics.” - Public Interest & Intermediaries*
- *“Because biofuels production involves physical plants and community impact, this topic is as pertinent as it is for general manufacturing.” – Corporate Professional*

Analysis

- SASB’s Biofuels industry does *not* include the producers of biofuel feedstocks such as corn or palm oil. Therefore, any social or environmental externalities from the cultivation of these feedstocks would be addressed in the industry’s supply chain.
- The vast majority of the industry’s feedstocks are corn, soybean, and other seed crops traditionally produced in and sourced from the U.S. and Canada. Some companies may also source sugarcane from Brazil. Furthermore, many biofuels feedstocks are commodities and are thus difficult for companies to trace back to suppliers.
- Palm oil biofuel production specifically is a small percentage (approximately 5%) of the total biofuels market. Therefore most companies do not see a significant share of production using palm oil feedstocks.
- Biofuels facilities do not appear to be located in or near densely populated areas. Although the heat map score for this issue is between the 2nd and 3rd quartile, there is little evidence of financial impact related to impacts on local communities from air, water, accident-related issues; no evidence that there are other issues related to community relations affecting the industry. The air, water, and process safety issue descriptions will mention impacts on neighboring populations, but no separate metric is needed for community impacts in these issues.

Recommendation

- Do not include separate issue.

b. Resource & Product Efficiency – Do not add

IWG Comments

- *“Second and third generation biofuels have potential to divert cellulosic feedstock or otherwise unusable waste materials, as well as create fuel from non-edible crops. This isn’t a fully formed idea, but I think the list of disclosure topics doesn’t provide for the potential positive impact of resource efficiency, waste diversion - two of the most exciting concepts within biofuels.” – Market Participant*
- *“standardized measurements such as conversion yields from feedstock to ethanol (denatured or undenatured), etc. Provides investors data to compare investment alternatives (i.e. which company is more efficient).” –Corporate Professional*
- *“Following the “waste hierarchy,” it would be helpful to disclose the proportion of biofuel derived from post-consumer recycled waste. Without this information, beneficial practices like curbside recycling of plastics and composting will not be featured. This is another means to deal with the issue of discouraging food used for fuel.” –Corporate Professional*
- *“The brief is well done, but should be supplemented with some topics mentioned earlier in this response -- the distinction between pre- and post-consumer feedstocks, the need to address recycling vs. fuels consumption where composting and traditional recycling are superior on a life-*

cycle basis to biofuels production, the importance of community engagement for all operations with potential for community impacts.” –Corporate Professional

Analysis

- The size of the second and third generation biofuels market, which uses non-food crop feedstocks, is relatively small compared to the existing biodiesel and ethanol markets. The majority of Biofuels industry companies are not involved in producing these fuels.
- Current metrics in the following issues cover the angle suggested: Product Formulation & Impact on Food Markets and Sourcing & Ecological Impacts of Feedstock Production.
- It is not clear at this time whether using post-consumer wastes versus other types of wastes or non-edible materials as feedstocks is likely to have material financial impacts, although there could be a sustainability advantage (due to waste reduction in society). Therefore, an additional metric calling out such post-consumer wastes is not necessary.

Recommendation

- Do not include issue based on likely weak financial impact and some aspects being included in existing topics and metrics.

c. Governance & Payments Transparency – Do not add

IWG Comment

- *“The industry receives Governmental support in many countries. The disclosure on capital composition, PEPs and corruption measures is key.” - Corporate Professional*

Analysis

- The comment suggests that companies may be exposed to corruption risks, including from politically exposed persons with government ties. This topic was not previously considered for this industry.
- The heat map score for “Business Ethics and Competitive Behavior” is in the upper quartile.
- However, SASB spoke with the IWG commenter in order to better understand the comment. The IWG member indicated that some companies operating in Europe and the Middle East are at risk for occurrences of bribery and other forms of corruption. Information on these occurrences is not public, and the IWG member could not provide evidence that the issue was likely to affect biofuels companies. The companies that may be involved are not the companies that make up SASB’s Biofuels industry.
- While some U.S.-listed biofuels companies mention that they must adhere to anti-bribery legislation in the U.K. and the U.S. in their SEC filings, no evidence of investigations or litigation concerning corruption issues was found. The majority of the industry’s operations are within the U.S.

Recommendation

- Do not include due to weak evidence of financial impact and further confirmation from IWG commenter that the issue pertains to non-U.S. listed companies operating outside the U.S.

2. SOLAR ENERGY

a. Land Use & Community & Biodiversity Impacts – Add issue, rename

IWG Comment

- *“For developers of large scale projects, delays caused by unhappy neighbors can be really expensive and important. So what programs are in place to work with local communities to prevent delays.” –Market Participant*
- *“I also think solar developers should provide discussion and analysis of their environmental impact with respect to water, wildlife, noise, sight lines, etc. for projects under development. Not*

all countries have strict standards with regards to impact to the local environment from solar development (which may be more applicable for utility scale development)."

Analysis

- SASB had considered this issue prior to the IWG. However, the initial approach to the industry may have underestimated solar companies' involvement in project development, specifically related to obtaining land and other regulatory permits. Initial research had also indicated that the issue may be more relevant for concentrated solar projects than solar PV projects; the former form a small share of projects in the industry. The heat map score for this issue is relatively low.
- Many solar companies, including the largest ones, are involved in the project development phase to varying degrees. SASB researched additional examples of several project delays and community concern caused by potential community or ecological impacts (including impacts on endangered species) through solar project development (especially for medium- to large-scale projects). Although many of these apply to concentrated solar projects, permitting issues related to environmental and community impacts also can affect solar PV projects.
- Financial impacts stem from difficulties in getting necessary environmental permits or other delays caused by community concerns, which can affect project development, resulting in lost revenues, impaired assets, or even the permanent cancellation of a project. Environmental assessments are required for any large scale project and permitting can take a long period of time, with associated costs.
- Evidence of interest from SEC filings is strong, with several companies discussing the many environmental and social factors involved in project development and the potential downside financial risks. The management of environmental and community impacts from project development may become more important over time, as the industry will require greater land area for solar projects as the industry scales.

Recommendation

- Add issue of **Community & Environmental Impacts of Project Development** based on strong evidence of financial impact and interest. Solar developers are involved in the site permitting and negotiation phase when ecological and community impacts of siting are considered.

b. Water Management – Pending further research

IWG Comment

- *"I think there should be requirements to disclose water intensity (water usage) for both manufacturers and developers (i.e. to panels need to be constantly cleaned?)."* – Market Participant

Analysis

- Prior to the IWG, SASB had considered the issue of water use during the operation of solar power plants. Evidence suggested that water consumption during the use phase is minimal for solar PV, especially when compared to other energy generation technologies, and there is little evidence to suggest likely material financial impacts from the same. However, SASB had not investigated water use and contamination issues in the manufacturing of solar panels.
- Additional research reveals that PV manufacturing is almost as water-intensive as general semiconductor manufacturing (including the need for ultra-pure water) and also creates wastewater. The manufacturing and other upstream stages consume more water than the operation of solar power plants. SASB's Semiconductor industry standards included a Water & Waste Management in Manufacturing issue due to evidence of financial impact and water intensity of manufacturing, together with wastewater generation.
- Companies are working on improving water efficiency and reducing or handling wastewater. They have manufacturing plants overseas, where there may be water supply risks or related tensions with communities.
- Evidence of interest in the topic from SASB's heat map was high, while SEC filings discuss water with respect to manufacturing, including water contamination, although much of the disclosure is boiler plate.

- However, thus far, SASB has not come across strong evidence of financial impact and will continue to investigate the possible impacts further. A link could potentially be drawn to the evidence in the Semiconductors industry due to the similarities in manufacturing.

Recommendation

- SASB is investigating this issue further. SASB plans to (a) contact some of the solar companies in the network (b) reach out to the IWG commenter again; and (c) look at company CDP reports on water – which may highlight financial risks if any.

c. Political Spending & Government Support – Do not add separate issue

IWG Comment

- *“Depending on the political environment, any regulations that limit the use of solar stand to have an impact.”* – Market Participant
- *“You touch on it in the brief; however, the uphill battle that solar (and all renewables/alternative) players face in terms of incumbent energy companies who will do what it takes to thwart new players is a real issue. Regulatory/political hurdles are substantial and should attempt to be discussed/potential impact may be hard to quantify. But this will impact investors.”* – Market Participant
- *“As shown in your industry summary, the development of this sector and each participant relies significantly on Government subsidies. Moreover, project developers are not able to use those subsidies the same way, especially in the US. That could create significant competitive advantage or disadvantage that is worth disclosing.”*
- *“In the US, government subsidies are massive and are provided as “tax” benefits. That creates potentially meaningful variations in financial and tax structuring of transactions. Moreover, the eligibility to those tax subsidies, as well as the eligible amount, are not clearly defined, allowing significant room for interpretation that is worth disclosing.”* – Market Participant

Analysis

- SASB had considered the issue prior to the IWG but decided to exclude. As solar development has few clear adverse social or environmental externalities, there is low confidence that lobbying could prove detrimental to society or the environment (and in turn the industry’s long-term sustainability). Lobbying for potentially harmful activities, such as delaying solar panel hazardous waste regulation, was not found under issues and bills in the Opensecrets database. The industry does not spend large amounts on lobbying relative to others, based on publicly available data.
- Furthermore, research suggests that solar is becoming less reliant on government subsidies for its long-term business viability. Additionally, some reports suggest that solar/renewables subsidies are significantly lower than subsidies received by fossil fuel firms.
- Some of the IWG comments above were considered in revising the previous issue of Cost Reduction to Scale GHG Mitigation.

Recommendation

- Do not add standalone issue on political spending and government support, due to low levels of lobbying spending and no evidence of support for policies that are not aligned with society’s interest and the sustainability of the industry. Some aspects of the comments are being addressed in the revised issue of Innovation to Scale Cost-Effective GHG Mitigation.

d. End of Life Management – Add issue (currently in emerging issues), rename

IWG Comments

- *“First Solar several years ago was criticized for use of cadmium in their panels and Japan refused to import them. First Solar offering product end of life management was a response to this concern. Will grow in importance.”* – Market Participant

- *“industry needs to help build recycling infrastructure - should be part of costs now vs in 20 years”* – Market Participant
- *“Solar panels contain both hazardous substances, as well as having valuable recyclable materials and while the bulk of panels today still have a long period of effective usage, it is important to lay the groundwork of the WEEE-thinking and “circularity-concepts” early on in this sector. Tightening regulation in this area can be expected. There are also regularly defect panels that will need to be properly handled and the materials recycled.”* – Market Participant
- *“I do see Product End-of-life management as a material factor in the near future. Including this item in disclosures has the following benefits: -It creates awareness which can push innovation towards good design which can include: reducing the amount of toxic materials at end of life as well as the ability to disassemble, reclaim and potentially reuse materials. -While not currently classified as hazardous waste, the regulations have the potential to change. Companies that address this pre-regulatory will benefit. -The electronics industry in general is already making consistent headlines regarding the waste beds in third world countries. The solar industry does not want to lose consumer support or be part of the problem in the future. -Solar industry attention to this issue could reduce risk of future lawsuits, regulations, losing backing of public and gov’t -Bringing about collaboration within industry to address the issue pro-actively increase perceived value”* - Public Interest & Intermediaries
- *“I think the end-of-life issue should be given enough weight to add it to the criteria under consideration. This is a concept that is gathering momentum across the electronics and semiconductor industries. Companies that are not leaders on this issue could find themselves at a significant competitive disadvantage in the not-so-distant future.”* - Public Interest & Intermediaries

Analysis

- Multiple IWG members suggested including this issue. Initial research for the IWG found that solar panels are likely to remain online for several more years before a large number begin to reach the end of their useful lives. Therefore the issue was included as an emerging issue.
- However, there is fairly strong evidence from company SEC filings as well as potential impacts from existing legislation in Europe (WEEE Directive) that suggests manufacturers may increasingly have to become involved with recycling or repurposing their panels. Some companies report establishing special accounts to fund the recycling of their panels and the materials within. Companies also report that they can benefit financially from utilizing recycled raw materials during manufacturing, which lowers materials costs. Companies can also enjoy reputational benefits from product lifecycle management.
- It is likely that companies will need lead time to adjust to the potential for extended producer responsibility requirements, other end of life management legislation or customer demands. Further discussion with an industry expert found that this topic is likely relevant today for many companies and warrants inclusion.
- The heat map score for “Product lifecycle use impact” was between the 2nd and 3rd quartile, indicating a medium-high level of interest.

Recommendation

- Add issue, but rename to Product Lifecycle Management, to include both a focus on design for recyclability as well as implementation of take-back and recycling programs.
- Based on several IWG suggestions to include the issue, evidence that financial impacts related to solar panel lifecycle management will likely become more significant in the near term.

e. Employee Attraction & Retention– Do not add

IWG Comment

- *“The industry is moderately to high labour intensive. It demands, and pay for, high skilled jobs.”* - Public Interest & Intermediaries

Analysis

- This issue was analyzed in the pre-IWG phase, when it was determined that the solar industry does not likely face substantial difficulties in recruiting or retaining employees, as solar is regarded as an exciting and attractive industry to work in.
- Additional research into the topic finds that the solar industry is generally a high-wage industry across manufacturing, engineering, and installation capacities. There are no indications that the industry faces hiring or retention difficulties due to poor working conditions, benefits, wages or other human capital factors which SASB traditionally uses to analyze human capital issues.
- A further review of SEC disclosure did not find mentions of a labor shortage or difficulties in recruiting employees outside of boilerplate references to human capital requirements.

Recommendation

- Do not add issue due to lack of evidence of a significant worker recruitment and retention problem and indications that the industry provides a well-compensated, attractive work environment.

3. WIND ENERGY

a. Health & Safety – Add issue, rename

IWG Comment

- *“In 2012 XXX conducted a materiality assessment with selected stakeholders. Six key account customers gave Health & safety an overall rating of 97 out 100 making Health and safety the most material issue. As one customer commented: Expected from suppliers now. Not a competitive advantage but a “must have” – Corporate Professional*

Analysis

- Health and safety was examined pre-IWG in terms of employee health and safety and determined not to likely present a great financial risk, due to low fatality and injury rates (according to U.S. Bureau of Labor Statistics data) and a lack of evidence of financial impact. There were few anecdotal accounts of health and safety incidents at wind turbine manufacturing companies and limited evidence of likely financial impact on Wind Energy companies from the management of the employee health and safety issue.
- The majority of industry revenues are from manufacturing activities (turbine and component manufacturing) and not project management and operation, where accidents appear to occur. However, SASB considered whether this means there are product quality and safety issues (not considered pre-IWG).
- SASB sought additional input from IWG commenter and did research on some of the following questions:
 - Do customers require strong health and safety metrics in order to hire wind companies for installation or maintenance? Is this a significant risk to the business of most companies in the industry?
 - Do the customers of wind turbine manufacturers include health and safety performance in manufacturing as a factor in turbine purchasing contracts or decisions?
 - Are health and safety risks higher during wind farm operation versus turbine manufacturing?
 - Is product safety a more relevant consideration?
- Based on additional research, SASB determined that issue angles would include:
 - Product design and operations and maintenance (O&M) services to ensure safety of turbines during wind farm operations (design defects and product malfunctions have been major causes in accidents);
 - Impacts Wind Energy company employees and their contractors working on maintaining, monitoring and repairing wind turbines (global data on wind energy accidents confirms there is risk to workers and neighboring communities in maintenance and installation of

- wind farms, and furthermore the major wind energy manufacturers are increasingly providing high margin O&M and other services);
 - Injuries and fatalities for wind turbine manufacturing workers are low and not likely significant (no evidence found to support materiality).
- Evidence shows that financial impacts can come from:
 - Warranty claims;
 - Personal injury claims and litigation in the event of injuries to service employees;
 - Impacts on high margin maintenance services provided by wind energy companies;
 - Reputational risks and impacts on demand for products and services (operational downtime due to problems with the wind turbines – including fires, blade failure, mechanical malfunctions etc. – reduces power output and operational efficiency of wind farms; impacts on client’s own construction and maintenance workers; wind farm insurance costs; all of which add to total costs of operating wind farms and wind energy).
- Follow-up email response from IWG commenter confirms angle of financial impact from customer demand and relation to safety performance of O&M employees and contractors. While injury and fatality figures (for workers as well as people in neighboring communities, emergency responders etc.) are also relatively low, there are wider implications of safety of wind farm operations.

Recommendation

- Include issue, named Safety of Wind Farm Operations, based on additional evidence of financial impact.

b. Reliance on Government Subsidies & Financial Structuring – Do not add

IWG Comment

- *“As shown in your industry summary, the development of this sector and each participant relies significantly on Government subsidies. Moreover, project developers are not able to use those subsidies the same way, especially in the US. That could create significant competitive advantage or disadvantage that is worth disclosing”*
- *In the US, [G]overnment subsidies are massive and are provided as “tax” benefits. That creates potentially meaningful variations in financial and tax structuring of transactions. Moreover, the eligibility to those tax subsidies is not clearly defined, allowing significant room for interpretation that is worth disclosing.”* – Market Participant

Analysis

- SASB followed up with the IWG participant that suggested this issue, who provided further information that the Wind Energy industry benefits from monetizing tax benefits. The industry does not appear to engage in highly risky financial structuring activities.
- SASB had evaluated the evidence for the issue prior to the IWG. Input from experts and evidence analysis had indicated this issue was not likely material. Research suggests that wind energy is becoming less reliant on government subsidies for its long-term business viability. Additionally, some reports suggest that wind/renewables subsidies are significantly lower than subsidies received by fossil fuel firms.
- Follow-up with IWG respondent did not lead to strong evidence of impact or clarity around the sustainability implications.

Recommendation

- Do not add issue.

c. Design for Increased Output Efficiency – Do not add

IWG Comment

- *“Product innovation should target not just efficient use of materials, but also specific technology improvements to allow for greater power output for the same wind speed.”* – Public Interest & Intermediaries

Analysis

- SASB investigated the issue further. There is no evidence that technological improvements not captured in other Wind Energy issues contribute to substantial power or efficiency gains. Power output and capacity factor is largely determined by turbine height and swept areas, with some O&M services and technologies to increase output, all of which can be captured by the Materials Efficiency and Safety of Wind Farm Operations topics.

Recommendation

- Do not add issue.

d. Product End of Life Management – Do not add

IWG Comment

- *“Wind turbines have a finite lifetime, especially as the technology advances. There have not been many large windfarms decommissioned, but this will happen increasingly, and manufacturers would create benefits by anticipating that and incorporating design aspects that facilitate recycling of materials, for instance.”* – Public Interest & Intermediaries

Analysis

- SASB had considered this issue prior to the IWG. Wind farm operators or owners (largely outside SASB’s Wind Energy industry) bear responsibility for decommissioning of wind farm sites. Many turbines get refurbished at the “end of life” and used in developing countries or on smaller community sites.
- Additional research finds that more than 80 percent of turbine material by mass can be recycled, while there is some difficulty in recycling composite materials. Wind turbine manufacturers are not currently affected by legislation or pending regulatory action on turbine end of life.
- Lack of evidence in SEC disclosure and other media and no indications of financial impact suggests that the issue likely does not provide material information.

Recommendation

- Do not add.

4. FUEL CELLS & INDUSTRIAL BATTERIES

a. Greenhouse Gas Emissions – Do not add

IWG Comment

- *“Not sure whether this is integrated in the energy management / product design aspects but GHG emissions would be very relevant in a two degree celsius scenario, with increasing CO2 abatements costs.”* – Market Participant

Analysis

- GHG was examined in the pre-IWG research phase. Industry-wide and company-specific GHG emissions were found to be very low, as most energy use is in the form of grid electricity, addressed through the Energy Management issue. Emissions from use of fuel cells are also much lower compared to conventional power plants, and in fact this is a selling point for fuel cells.
- Products seem to compete on product efficiency and cost (covered by the Product Efficiency issue) more than GHG emissions.

Recommendation

- Do not add.

b. Waste Management – Do not add

IWG Comment

- *“Hazardous Waste (RCRA) is very important since some of the components of fuel cells and energy storage, in general, are hazardous. It would be good to seek markets that could re-use these hazardous materials. One avenue would be to reduce the existing level within the waste and subdivide concentrations if it in different applications where only a portion is used. This decreases the initial impact of a larger quantity of material (as waste) and distributes it amongst different products.”* – Public Interest & Intermediaries

Analysis

- The issue was researched prior to IWG. Issues related to hazardous materials used in products and at their end of life are captured in the Product Design & End of Life Management issue. Waste generation was found to be relatively low for this industry, based on limited data availability particularly for the fuel cell segment.
- Additional research did not find evidence of financial impact from hazardous materials disposal. For example, industry evidence from the EPA suggests that companies in the industry received minimal or no fines related to hazardous waste disposal or generation between 2000 and 2015.
- Additionally, the issue currently has low evidence of interest based on the heat map score.
- SASB followed up with the IWG commenter but received no further response regarding the topic.

Recommendation

- Do not add, waste generation in manufacturing does not appear to be significant or likely to result in financial impacts.

5. FORESTRY & PAPER

a. Innovation & Design for Environmental Sustainability - Do not add, but consider Emerging

IWG Comments

- *“Paper industry product mix is facing commodity pressures and large levels of substitution. Continuous innovation and new market assessment is needed by each company for business sustainability.”* – Public Interest & Intermediaries
- *“Traditional forest product companies need to think more innovatively about the possibilities of forest products, what innovative products can be developed, how can forest products help consumers reduce their own impacts. Some companies have done a lot here (in Scandinavia mostly) but most have not. FPAC has also put some research into this topic.”* – Public Interest & Intermediaries

Analysis

- The forestry biobased product market appears to be nascent, growing out of R&D efforts by industry associations and companies. It does not appear that there is a market for such products currently. These products are not likely to have significant financial impacts within the industry at this time.
- Medium to long term, there might be an opportunity from developing value add biobased products (to replace fossil fuel-based products). Companies could use their ready access to renewable wood biomass as feedstocks for biobased alternative materials, creating additional value-add products from existing raw materials. Some estimates suggest significant growth potential and projected market size for emerging bioproducts.

Recommendation

- Do not add as a disclosure topic, but include as an Emerging Issue called Biobased Product Innovation for the Pulp & Paper Products industry at this time.

b. Employee Attraction & Retention – Do not add

IWG Comment

- *“Despite the economic challenges faced by the forest industry, it faces significant challenges from an employee attraction and retention standpoint. First, it is an ageing work force with a large portion set to retire in the short term. Second, it faces competition from mining and energy firms, and therefore must work harder to attract and retain young talent, especially in terms of skilled and highly skilled labour.”* – Public Interest & Intermediaries

Analysis

- Following additional discussion with the IWG member that proposed this topic, SASB concluded that the industry’s employee recruitment and retention challenges are caused primarily by a shift in demographics, including an aging workforce and insufficient numbers of younger people that are joining the industry. The industry is also facing wage competition from the energy and mining industries. There is no evidence that there are sustainability implications or challenges related to this issue, therefore it is outside the scope of SASB’s work.
- Additional search of SEC filings finds that companies mention worker recruitment and retention in boilerplate language as one of their ongoing business risks. This type of disclosure is seen in many industries.

Recommendation

- Do not add.

c. Genetically Modified Organisms – Do not add.

IWG Comment

- *“Please consider GMOs as an additional materiality issue”* – Public Interest & Intermediaries
- *“GMO tree fiber will come on line in North America in the near future and is an area of contention for many global and local NGOs”* – Public Interest & Intermediaries

Analysis

- This topic is an interesting development for the forestry industry. The first genetically modified (GM) tree species was recently approved in the U.S. for limited use, while GM trees are grown in some plantations in Brazil. A few small R&D companies are testing GM trees in the U.S., but have not been able to get approval from U.S. regulators for the commercial sale of GM trees. It is not known if regulators will approve GM tree species for widespread commercial forestry applications.
- GM wood products currently represent a very small share of the industry according to feedback from industry experts and market analysis. Experts indicated that it would be premature to include disclosure on this topic. If GM trees do gain regulatory approval and are planted on a large scale, this issue will become more significant.
- Most major forest product certification schemes do not certify forests or products if GM trees are involved in any way. The industry therefore has a direct channel of impact from revenue through customer demand, as well potential reputational impacts from the use of GM trees. However, since there is practically no market for GM forest products yet, these financial impacts have not materialized.

Recommendation

- Do not add as separate issue, as elements of this issue are addressed in the Ecosystem Services & Impacts issue in Forestry & Logging.

Appendix I: Summary of IWG Feedback on Issues

	Biofuels	Solar Energy	Wind Energy	Fuel Cells & Industrial Batteries	Forestry & Paper
Environment	<ul style="list-style-type: none"> Air Quality Water Management 	<ul style="list-style-type: none"> Energy Management in Manufacturing Hazardous Materials Management Land Use & Community & Biodiversity Impacts Water Management 		<ul style="list-style-type: none"> Energy Management Greenhouse Gas Emissions Waste Management 	<ul style="list-style-type: none"> GHG Emissions Air Quality Energy Management Water Management Waste Management Land Use & Ecological Impacts Genetically Modified Organisms
Social Capital	<ul style="list-style-type: none"> Community Relations & Land Use 	<ul style="list-style-type: none"> Energy Access 			<ul style="list-style-type: none"> Community Relations & Rights of Indigenous Peoples
Human Capital		<ul style="list-style-type: none"> Employee Attraction & Retention 	<ul style="list-style-type: none"> Health & Safety 	<ul style="list-style-type: none"> Workforce Health & Safety 	<ul style="list-style-type: none"> Workforce Health & Safety Fair Labor Practices Employee Attraction & Retention
B. Model & Innovation	<ul style="list-style-type: none"> Product Formulation & Impact on Food Markets Lifecycle Emissions Balance Resource & Product Efficiency 	<ul style="list-style-type: none"> Cost Reduction to Scale GHG Mitigation Product End-of-Life Management 	<ul style="list-style-type: none"> Design to Mitigate Community & Ecological Impacts Design for Materials Efficiency Design for Increased Output Efficiency Product End-of-Life Management 	<ul style="list-style-type: none"> Product Efficiency Product Design & End-of-Life Management 	<ul style="list-style-type: none"> Climate Change Adaptation of Forestlands Innovation & Design for Environmental Sustainability
Leadership & Governance	<ul style="list-style-type: none"> Political Spending & Government Support Health, Safety, & Emergency Management Sourcing & Environmental Impacts of Feedstock Production Governance & Payments Transparency 	<ul style="list-style-type: none"> Sensitive Materials Sourcing Political Spending & Government Support 	<ul style="list-style-type: none"> Sensitive & Critical Materials Sourcing Reliance on Government Subsidies & Financial Structuring 	<ul style="list-style-type: none"> Sensitive & Critical Materials Sourcing 	<ul style="list-style-type: none"> Wood & Fiber Supply Chain Management
Emerging		<ul style="list-style-type: none"> Product End-of-Life Management 			

Appendix II: Draft List of Disclosure Topics for Public Comment

The following table comprises issues that are likely to be presented for Public Comment on July 7, 2015, based on SASB's review of IWG comments and additional research. Note these issues are not final and are subject to change.

	Biofuels	Solar Energy	Wind Energy	Fuel Cells & Industrial Batteries	Pulp & Paper Products	Forestry & Logging
Environment	<ul style="list-style-type: none"> Air Quality Water Management 	<ul style="list-style-type: none"> Energy Management in Manufacturing Water Management in Manufacturing ? Hazardous Materials Management Community & Environmental Impacts of Project Development 		<ul style="list-style-type: none"> Energy Management 	<ul style="list-style-type: none"> GHG Emissions Air Quality Energy Management Water Management 	<ul style="list-style-type: none"> Ecosystem Services & Impacts
Social Capital						<ul style="list-style-type: none"> Community Relations & Rights of Indigenous Peoples
Human Capital				<ul style="list-style-type: none"> Workforce Health & Safety 		<ul style="list-style-type: none"> Workforce Health & Safety
B. Model & Innovation	<ul style="list-style-type: none"> Product Formulation & Impact on Food Markets Lifecycle Emissions Balance 	<ul style="list-style-type: none"> Innovation to Scale Cost-Effective GHG Mitigation Product Lifecycle Management 	<ul style="list-style-type: none"> Design to Mitigate Community & Ecological Impacts Design for Materials Efficiency 	<ul style="list-style-type: none"> Product Efficiency Product Design & End-of-Life Management 		<ul style="list-style-type: none"> Climate Change Adaptation of Forestlands
Leadership & Governance	<ul style="list-style-type: none"> Management of the Legal & Regulatory Environment Operational Safety, Emergency Preparedness, and Response Sourcing & Environmental Impacts of Feedstock Production 	<ul style="list-style-type: none"> Sensitive Materials Sourcing 	<ul style="list-style-type: none"> Sensitive & Critical Materials Sourcing Safety of Wind Farm Operations 	<ul style="list-style-type: none"> Sensitive & Critical Materials Sourcing 	<ul style="list-style-type: none"> Wood & Fiber Supply Chain Management 	
Emerging					<ul style="list-style-type: none"> Biobased Product Innovation 	<ul style="list-style-type: none"> GHG Emissions

Appendix III: Sample Accounting Metrics

The following table lists the metrics, as they stand currently, for the sustainability topics determined by SASB to likely constitute material information for companies in the Biofuels industry, following IWG feedback. This table provides sample metrics for reference only. The accounting metrics are currently being revised, and final metrics put forward for public comment may be different from the ones outlined below.

TOPIC	ACCOUNTING METRIC	CATEGORY	UNIT OF MEASURE	CODE
Air Quality	Air emissions for the following pollutants: NO _x (excluding N ₂ O), SO _x , volatile organic compounds (VOCs), particulate matter (PM), and hazardous air pollutants (HAPs)	Quantitative	Metric tons (t)	RR0101-01
	Number of incidents of non-compliance with air quality permits, standards, and regulations	Quantitative	Number	RR0101-02
Water Management	(1) Total water withdrawn and (2) amount consumed, percentage in regions with High or Extremely High Baseline Water Stress	Quantitative	Cubic meters (m ³), Percentage (%)	RR0101-03
	Number of incidents of non-compliance with water quality permits, standards, and regulations	Quantitative	Number	RR0101-04
Product Formulation & Impact on Food Markets	Production of (1) conventional biofuel, (2) advanced non-corn starch biofuels, (3) advanced cellulosic biofuels, and (4) biomass-based diesel	Quantitative	Millions of Gallons	RR0101-05
	Top five feedstocks used for biofuels production and amount of each	Quantitative	Metric tons (t)	RR0101-06
	Percentage of crop-based feedstock grown in food insecure regions	Quantitative	Percentage (%) by weight	RR0101-07

Lifecycle Emissions Balance	Normalized lifecycle greenhouse gas emissions by biofuel type ⁵	Quantitative	Grams of CO ₂ -e, per Megajoule (MJ)	RR0101-08
Management of the Legal & Regulatory Environment	Amount of biofuel subsidies received through government programs	Quantitative	U.S. Dollars (\$)	RR0101-09
	Discussion of efforts to influence public policy	Discussion and Analysis	n/a	RR0101-10
Operational Safety, Emergency Preparedness, and Response	Process Safety Incidents Count (PSIC), Process Safety Total Incident Rate (PSTIR), and Process Safety Incident Severity Rate (PSISR)	Quantitative	Rate	RR0101-11
Sourcing & Ecological Impacts of Feedstock Production	Description of strategy to manage environmental risks associated with feedstock sourcing	Discussion and Analysis	n/a	RR0101-12
	Percentage of biofuel production third-party certified to an environmental sustainability standard	Quantitative	Percentage (%) of gallons	RR0101-13
	Percentage of feedstock sourced from regions of High or Extremely High Baseline Water Stress	Quantitative	Percentage (%) by weight	RR0101-14

⁵ Note to RR0101-08 — Disclosure shall include a description of efforts to manage risks and opportunities associated with the lifecycle GHG emissions of its products



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