

Evaluation of actions to support product environmental footprinting in the Pacific Northwest:

Findings and recommendations from research, surveys and interviews of business leaders



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Evaluation of actions to support product environmental footprinting in the Pacific Northwest:

Findings and recommendations from research, surveys and interviews of business leaders

Final Report

Prepared for:
**Oregon Department of Environmental Quality
Washington Department of Ecology
Oregon Sustainability Board**

Prepared by: **Quantis**

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About Quantis

Quantis is a leading life cycle assessment (LCA) consulting firm specialized in supporting companies to measure, understand and manage the environmental impacts of their products, services and operations. Quantis is a global company of 60 people with offices in the United States, Canada, Switzerland, France and Germany. Quantis offers cutting-edge services in environmental footprinting (multiple indicators including carbon and water), eco-design, sustainable supply chains and environmental communication. Quantis' team applies its knowledge and expertise to accompany clients in transforming their sustainability metrics into decisions and action plans. More information can be found at www.quantis-intl.com.

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Executive Summary

Context and objectives

Product environmental footprinting (footprinting) is the act of quantifying environmental impacts, such as greenhouse gas emissions, water use, and energy use over the life of a product or material.

Footprinting offers the potential of environmental improvements as well as financial benefits to product manufacturers and brand owners. Footprint studies can help businesses:

- Understand and prioritize “hot spots.”
- Compare alternative products or actions.
- Identify options to reduce environmental impacts.
- Communicate effectively with others to find solutions.

The results of product footprinting can inform operational changes, supplier engagement, and communication with customers. Many companies have shown that footprinting may lead to financial benefits, such as finding cost-cutting opportunities, spurring innovation, and improving market share. However, footprinting also poses some challenges and not every business that tries product footprinting finds it beneficial. Frequently mentioned barriers include cost, staff time, and the difficulties of collecting data and working with suppliers.

Product manufacturers and brand owners play a central role in most footprinting activities, but other entities (in this report, called “third parties,” and which might include industry organizations, governmental agencies, and non-governmental organizations), may have an interest in promoting or supporting this practice. The objective of this project is to evaluate whether it is worthwhile for such third parties to advance footprinting activities and, if so, what actions would be most effective. In order to meet this objective, we must first understand the perspectives of businesses that have experience with product footprinting, as well as businesses that, to date, have decided against engaging in footprinting activities.

Methodology

The states of Washington and Oregon convened an Advisory Group of stakeholders to discuss options to advance product footprinting. In addition, a larger number of businesses were surveyed to determine their experience and perceptions regarding benefits, barriers, and possible solutions to overcome those barriers. After the survey, some responders were interviewed in depth. Quantis assessed and

interpreted the feedback, outlined recommendations that build on the research findings, and discussed these findings with the Advisory Group. This report summarizes the 115 completed surveys, 16 completed interviews, and Advisory Group discussions, and provides a list of high-priority third party actions to support footprinting.

Results

Based on the survey and interview responses, most businesses have observed or would expect benefits, both environmental and financial, in one or more stages of the footprinting process. These include measurement, management, communication, and making decisions on purchases and use.

Motives for pursuing footprint activities tend to focus on two types of benefits:

1. Acquiring internal knowledge to make appropriate management decisions.
2. Influencing purchasing and use behavior through communication with customers or stakeholders.

Benefits are sometimes measurable in terms of return on investment. However, more often the perceived benefits are hard to measure, partly because of their indirect contribution to sustainability-based marketing and outreach.

Those who have considered footprinting but not yet taken action expect the potential for financial benefits, but perceive that the environmental payoff would be higher. This perception is largely confirmed by businesses with footprinting experience. On average, businesses with product footprint experience do more assessments, take more action, and take more informed action than those without. The range of benefits varies widely across businesses; both environmental and financial benefits tend to be moderate on average, with financial benefits somewhat lower.

Given such observations of real and perceived benefits, respondents were asked to describe the barriers and challenges associated with footprinting. They reported a diverse set of barriers, including limited resources (such as money, staff time and expertise) and a lack of clear guidance on how to achieve value from this work. They also noted higher-level challenges perceived to be beyond the sole control of their business, such as a need for better standardization allowing fair and accurate use of footprinting to help make purchasing decisions.

Recommendations for potential third-party actions

Third parties, such as industry associations, non-profit organizations and government, may be able to help producers and consumers advance responsible footprinting. Based on survey and interview results, third-party actions are viewed as moderately helpful, on average. Those with the most potential are listed in Table 1 below. Twelve recommendations are grouped into six themes.

Potential roles were identified for both industry associations and governments:

- Industry associations were suggested to organize and provide forums to share information and encourage collaboration.
- Government was identified to support transparency, knowledge, direction, and promote neutral arbitration.

Concerns about the credibility or validity of conclusions reached with footprinting information were frequently expressed. Non-governmental organizations are third parties who may be able to play a role in addressing these concerns.

Table 1: Themes and recommendations for third party (industry association, government, non-governmental organization) actions to support businesses in the Pacific Northwest on product environmental footprinting

1) Conduct, summarize, and communicate categorical footprinting assessments	<p>1a) Conduct, commission and/or summarize categorical footprinting assessments (assessments at the level of a product category or generic product, as opposed to a specific brand) to help businesses and purchasers understand environmental hot spots and trade-offs.</p> <p>1b) Communicate the results from the above assessments to businesses or other organizations that can act on the information.</p>
2) Support businesses by providing tools, training and incentives to conduct product footprinting	<p>2a) Develop and promote the use of simple footprinting tools for use by regional businesses in understanding and prioritizing the “hot spots” within their product life cycles or total corporate footprint.</p> <p>2b) Develop and/or promote the use of product footprinting tools capable of developing environmental product declarations (EPDs) for regionally important product categories, along with regional data where needed to support such tools.</p> <p>2c) Where resources allow, provide financial incentives or technical support for companies to engage in footprinting work.</p>
3) Support businesses by providing training and guidance on how to use product footprinting	<p>3a) Provide businesses with information to help them understand the basic concepts of life cycle thinking, the resources involved in footprinting, and how to get the most value from the footprinting work they do.</p> <p>3b) Provide businesses with training to achieve a higher level of expertise in footprinting methodology, process and application. Focus on addressing key barriers such as data collection and interpretation of indicators for decision making.</p>
4) Support businesses by developing clearer product category-level standards that define common/best practices for footprinting	<p>4a) Identify whether product category rules (PCRs) exist or are being developed for regionally important product categories. Improve upon existing PCRs if needed and promote the development of PCRs where they don’t exist. In all PCR efforts, engage with or mirror existing initiatives happening in other regions.</p>
5) Improve the perceived business case for companies to conduct footprinting	<p>5a) Communicate the business case for footprinting by developing and sharing success stories.</p>
6) Implement purchasing standards or management policies that encourage product footprinting by suppliers and reduce the environmental impact of product use or disposal	<p>6a) Request or require (e.g., in government purchasing) product footprint information from suppliers in product categories where this is determined to be an effective strategy in differentiating product performance.</p> <p>6b) Set purchasing policies based on assessments of what product attributes reliably indicate good environmental performers in a product category or third-party verification programs that incorporate life cycle thinking.</p> <p>6c) Set policies or decisions around the maintenance, use, disposal or replacement of products based on categorical product footprinting studies.</p>

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Abbreviations and Acronyms

EPD	Environmental Product Declaration
ISO	International Standards Organization
LCA	Life Cycle Analysis
NGO	Non-governmental organization(s)
PCR	Product Category Rule
PEF	Product Environmental Footprint
ROI	Return on Investment

1 Introduction and Purpose

This document provides a summary of the observations and findings from a survey and interview campaign to better understand the experience with and perceptions of product environmental footprinting (PEF) among manufacturers and brand owners making and/or marketing products in the states of Washington and Oregon.

Producing and consuming products often results in large environmental burdens. The major impacts of products often happen during the production of raw materials by the suppliers to the final manufacturers, or sometimes during the use of products by customers. For many products, the environmental impacts upstream in the supply chain are greater than the impacts of the brand owner's own operations. Evidence suggests that understanding impacts across the full life cycle of a product can lead to environmental benefits by enabling each actor along the product's life cycle to make better informed decisions. Some businesses also report the potential for financial benefits in the form of cost savings and/or revenue growth.

Understanding the best actions to take for the environment as a product manufacturer is rarely a simple consideration. Viewing one's product from a life cycle perspective requires not only a shift in focus, but also effort and resources to develop the supporting facts. Customers are increasingly demanding strong evidence to back claims of environmental performance. This combination of environmental and customer pressures has resulted in a focus in recent years on the potential for systematic evaluation or rating systems on the overall environmental performance of products. There is growing interest in the development of systems that can help guide decisions across a range of actions from product design to disposal and all steps in-between. Most such initiatives have focused on the practice of life cycle assessment (LCA, frequently referred to here as product environmental footprinting or PEF) as the central tool in such a system.

In response to these developments, the states of Oregon and Washington want to better understand the context and perspectives of businesses in their states with regard to this issue.

For example, among companies that have participated in footprinting activities:

- To what extent have they found environmental and/or economic benefits from this work?
- What are the challenges and how could footprinting be improved or made easier?

And among businesses that have decided not to engage in footprinting activities to date:

- What are their expectations and perspectives?
- Why have they decided (for the time being) against engaging in footprinting activities?

There is also interest in understanding if and how product environmental footprinting can promote an atmosphere of responsible production and consumption within the Pacific Northwest region in ways that benefit area businesses. Are there actions that other parties (industry groups, non-profits, government) could take to advance responsible product environmental footprinting?

Any actions the states, or others, in the region may take in this area will be most effective if they are done with a clear understanding of the context and constraints of the product producers. To better understand the benefits and barriers of footprinting for regional businesses, the

Boosting financial and environmental gains through innovation inspired by product footprinting: The case of cold water detergents

Consumer products manufacturer Procter and Gamble (P&G) conducted an assessment in the mid 2000's to evaluate the environmental impact, based on a simple indicator of energy use, across the full life cycle of each of its major product lines. The outcome of this assessment may have surprised many people: far and away the largest source of energy use within the footprint of the products P&G was making was due to the process of laundering clothes and in particular the energy used in heating water. Although this activity is clearly outside P&G's direct control, the footprint assessment helped them see a potential for a large positive influence. This discovery led P&G to focus both scientific and market innovation on solutions in this aspect, eventually leading to the launch of the very successful Tide Cold Water line of detergents.

In a similar timeframe, apparel marketer Levi's was conducting a landmark product footprint assessment on their classic 501 blue jeans. The conclusion of this work was that the most environmentally impacting aspect of the product life cycle was the consumer's use of the garment, in particular the washing and especially the heating of water in washing. Seeing an opportunity for action with the growth in cold-water detergents, Levi's wanted to push for less heating of water in washing of their garments. Realizing that communication to the consumer was a key, Levi's changed the washing instruction on its labels and also launched consumer outreach campaigns with other companies like P&G and Wal-Mart to get the message across to consumers that most garments can be washed in cold water, especially with detergents especially formulated for this.

Using product footprinting to see the big picture of their product's environmental profile has led these companies to pinpoint the same key hot spots. In both cases this opportunity was outside their own operations, but they were able to wield their influence to not only achieve big environmental gains, but also to boost their sales and consumer engagement.

states have commissioned a set of surveys and interviews of product manufacturers and brand owners, as described in this report.

2 Methodology

Summary

This research effort was a joint project of the Oregon Sustainability Board, Washington Department of Ecology, and Oregon Department of Environmental Quality. Quantis, a consulting firm with extensive product footprint experience, was hired to design, administer, and summarize the survey and interview results. The Oregon Sustainability Board convened an Advisory Group of topic experts and other stakeholders. Advisory Group members assisted in design of the survey and recruitment of participants. Funding for this project was provided by Metro, the regional government of the Portland metropolitan area, as well as Washington Department of Ecology and Oregon Department of Environmental Quality.

The survey, distributed in electronic form, was submitted to a wide range of manufacturers, brand owners and stakeholders to gain an understanding of the participants' level of experience with PEF, the expected and actual benefits of engaging in PEF efforts, the challenges and barriers faced, and what forms of third party assistance might be or have been helpful. Survey distribution focused on businesses located in the states of Oregon and Washington but also included some national and multinational firms based in the US, and a small number of firms based in the European Union, given the experience of these businesses with PEF.

Interviews using a discussion format were then conducted with a subset of stakeholders to better understand some of the survey responses and to obtain additional qualitative results.

An evaluation framework was developed to facilitate the survey and interview research effort. This framework identified various stages of the production-consumption chain, as well as the types of actions that external parties might take to advance footprinting and related efforts. The use of this framework is intended to help identify where barriers or opportunities exist and what can best be done to address them. This framework is discussed in more detail below, and the survey text is provided in Appendix A.

Ultimately, the recommendations presented in this report are the formulations of Quantis, based on the comments, opinions and relative emphasis expressed by stakeholders through the survey and

interviews, and the project team's understanding of how relative barriers and enablers that were mentioned by the participants inter-relate.

Evaluation framework

Feedback from the surveys and the interviews was categorized into the following framework. First, consider four stages of production and consumption. The first three stages are primarily under the control of the producer, and the fourth is primarily under the control of the purchaser and/or user.

- 1) **Measure product footprint:** This stage involves evaluating product footprints based on LCA.
- 2) **Manage product footprint:** This stage involves actions taken by the producer to reduce the overall impact of products over the life cycle. Although the actions are taken with the involvement of the producer, they may affect aspects of the product life cycle outside the producer's sole influence, such as in the supply chain or during the use of the product.
- 3) **Communicate product footprint:** This stage involves sharing information with purchasers about the absolute or comparative environmental footprint of products, typically in order to influence purchasing decisions and/or the behavior of those using the product. This information may be designed to help users reduce environmental impacts associated with production, use, and/or disposal. While communicating product footprint information requires that the footprint first be measured, measurement does not necessitate disclosure. In fact, many footprint studies are never communicated externally.
- 4) **Manage purchase and use behavior:** This stage involves a change in environmental impacts as a result of actions by the purchaser or user. Types of actions may include choosing one competing product over another, not making a purchase, or purchasing less. It also includes actions regarding the use and maintenance of products during their lives and the end-of-life management of products.

Listed below is a classification for actions that an external party might take to influence the producers, purchasers and users of products during each of the four life cycle stages listed above. These supporting actions might be taken by industry associations, non-governmental organizations, businesses, governments, or others.

- A. **Do:** The organization could take on the action itself rather than attempting to effect a change in the actions made by another entity.
- B. **Support:** The organization could provide manufacturers, purchasers, or users with tools, systems, data, guidance and/or standards to enable the desired actions.
- C. **Incentivize:** The organization could provide direct or indirect financial incentives for a producer or consumer to take or not to take a certain action. These might include grants, subsidies, taxes, tax credits, market development, their own purchasing power, etc.
- D. **Mandate:** The organization could require or prevent the action of another actor by laws, regulations, or other types of mandates that require the desired response.

With this structure, the space of potential actions can be defined by the intersections of these two aspects: (1) the stage in a chain of product production and consumption at which an initiative attempts to act, and (2) the type of supporting action that others might take to support such initiatives. This matrix is shown in Table 2.

Table 2. Framework for the evaluation of potential third-party actions

		Stages of Production and Consumption			
		Measure product footprint	Manage product footprint	Communicate product footprint	Manage purchase and use behavior
Actions by External Parties (Industry Associations, NGOs, Governments, etc.)	Do				
	Support				
	Incentivize				
	Mandate				

An explanation of types of footprinting activities

It became apparent in the course of the interviews and interactions with the project Advisory Group that discussion around “footprinting” can grow confusing if one is not clear about how the topic is defined. Although this confusion may arise due to variety in the way footprinting is done at *measurement* level, the many ways such work can be *implemented* seems to be the main aspect needing definition. Without such definitions, this can lead to a lack of clarity in discussions around whether footprinting work is advisable in a certain context or how best to enable it to be done effectively. To the extent possible throughout our discussion of findings in this report, we’ll use this terminology to

differentiate between four general types of activities in an attempt to add clarity. The distinctions in types of footprinting are made here with intent to add clarity to our discussion of findings and recommendations. Note that the survey did not attempt to differentiate among these and so the survey results will not directly differentiate between these types of footprinting work.

- **Life cycle thinking** refers to the use of the general concepts of life cycle assessment and/or examples of product footprinting outcomes to create awareness and inform decision-making, but without undertaking or applying footprint measurement activities for the subject under consideration. It is generally a qualitative rather than quantitative exercise and may be more subjective than activities that are based on measurements.
- **Streamlined internal assessment** refers to a type of assessment in which the effort spent on the precision of measurement is generally rather low. The quality objectives are to be good enough for informing internal discussion or non-critical decisions within an organization, but generally not for broad external communication or for highly critical decisions. The main purposes are generally to support prioritization, understanding and action planning with low investment of time and cost to achieve meaningful outcomes.
- **Detailed categorical assessment** refers to a more rigorous analysis, usually following standards such as those under the International Organization for Standardization (ISO), that are intended to reach conclusions that support specific insights or decisions, potentially including comparisons between products or product categories, as well as comparisons between processes, design options, alternate management decisions, and other topics. These studies are usually insight-driven, with key questions or hypotheses being tested. Their purpose is usually to support broad decisions and/or communication on management actions, purchasing and other policies.
- **Detailed single-product assessment** refers to a more rigorous analysis, usually following standards such as those under ISO, to support disclosure to customers and/or the public of the footprint results for a single product. Although it might be an intention that these disclosures could be compared with similar disclosures for other products, such assessments themselves do not generally include comparisons between products.

Survey demographics

An electronic survey was widely distributed to a range of stakeholders with representation from a variety of business sizes (with small- and medium-sized companies fairly represented), Pacific Northwest companies as well as companies based outside the Pacific Northwest, a range of economic sectors, and businesses with a variety of experience with PEF.

Screening questions near the start of the survey channeled respondents into three distinct categories of questioning: those with personal or company PEF experience, those who are aware of PEF and have considered but not implemented it, and those with little or no awareness or knowledge of PEF. Survey participants were then asked different questions, depending on the group with which they self-identified.

Overall, 115 individuals responded to the survey. Most survey respondents were at least familiar with PEF, and about half of respondents had personal or company experience with it. Most respondents were based in the United States. Figure 1 presents a classification of respondents by level of PEF experience and location (United States versus European Union).

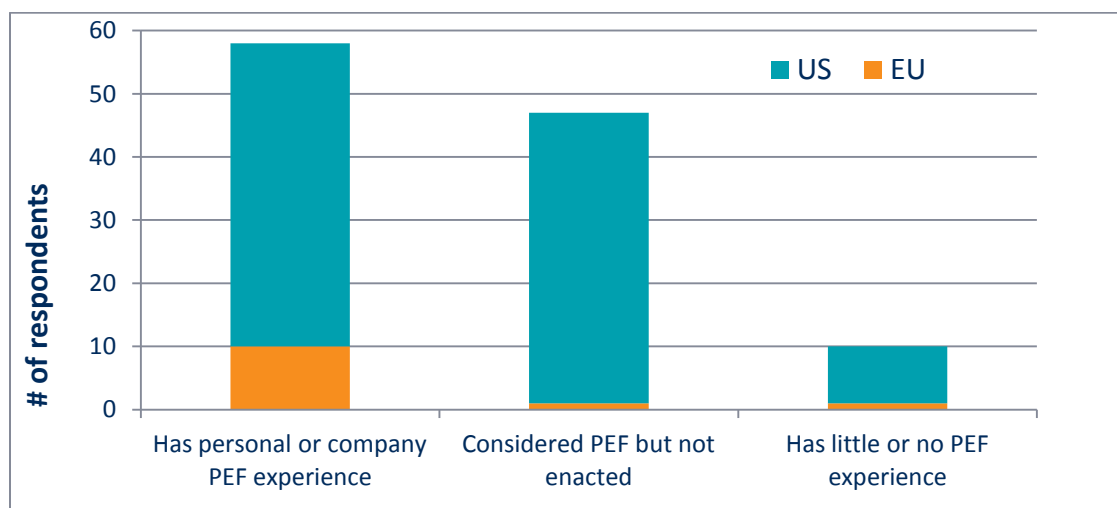


Figure 1. Classification of survey respondents by location and level of PEF experience

As shown in Figure 2, survey respondents represented a wide range of company sizes. One interesting result involves the size of businesses with direct PEF experience. While a number of very large businesses identified with this group, as would be expected, we were also successful at obtaining survey responses from a significant number of much smaller businesses that similarly report having experience with PEF.

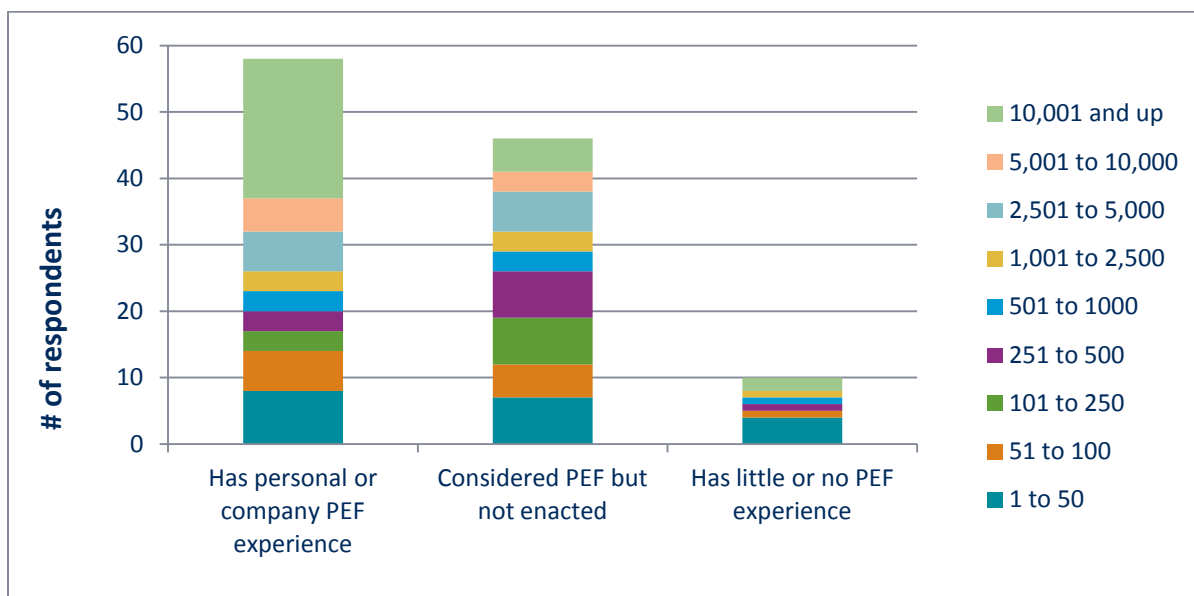


Figure 2. Classification of survey respondents in terms of company size (number of employees) and level of PEF experience

As shown in Figure 3, the majority of survey respondents with PEF experience were willing to be interviewed, and about half of those who have only considered PEF were willing to be interviewed. Those who had neither experience with PEF nor had considered PEF were not considered for interviews.

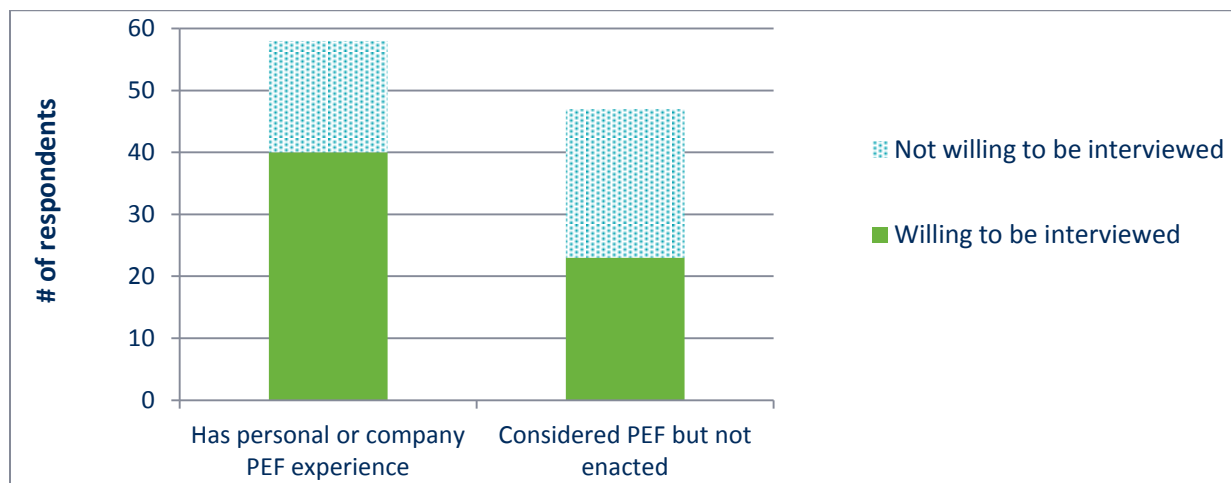


Figure 3. Classification of potential interview candidates in terms of those with PEF experience or who have considered PEF

Among survey respondents, the *Food and Beverage* sector had the most responses. Many other sectors were also well represented, as shown in Figure 4.

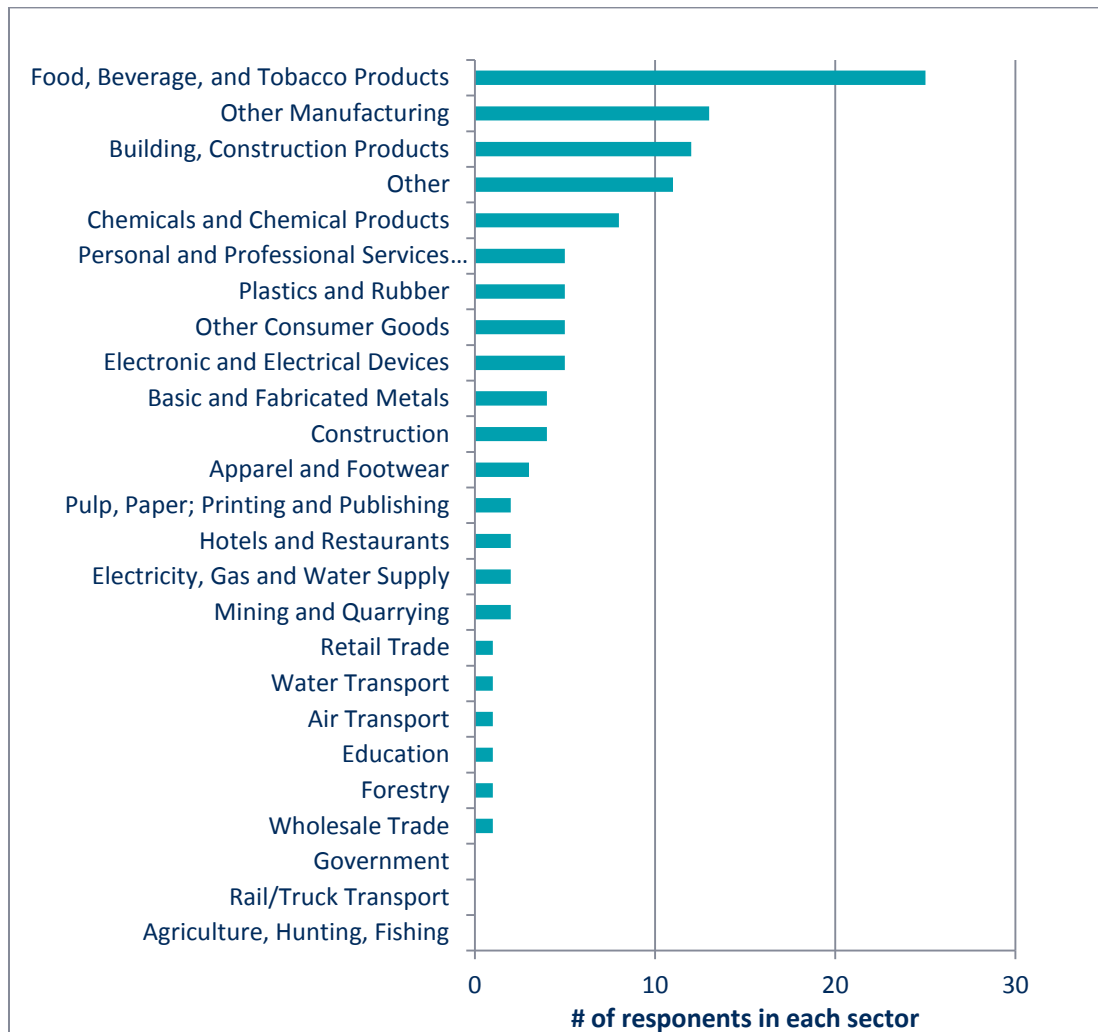


Figure 4. Classification of survey respondents in terms of industry sector

Interview demographics

The interviews were selected to represent certain key industries in the Pacific Northwest as well a mix of those with PEF experience and those who have considered PEF but not undertaken a footprint study on their own. Those who have not considered PEF were not considered for interviews.

To maintain confidentiality, aliases were assigned to each interview subject and are listed below.

Interviews were typically 30 minutes in length and attempted to draw out from the interviewees more

detail regarding the information they had provided on their survey response. The interviews provided an opportunity to better understand the rationale beyond some responses and to understand the context and background of respondents and how these influence their views on PEF. They also provided an opportunity to get more specific input from the interviewees regarding barriers and opportunities.

A total of 16 interviews were completed from the following types of businesses:

- Paper/forestry, has PEF experience (Pa1Y)
- Paper/forestry, has considered PEF (Pa2N)
- Apparel, has PEF experience (Ap1Y)
- Apparel, has considered PEF (Ap2N)
- Food, has PEF experience (Fo1Y, Fo2Y, Fo4Y, Fo5Y)
- Food, has considered PEF (Fo3N)
- Brewery, has considered PEF (Br1N)
- Brewery, has PEF experience (Br2Y)
- Packaging, has PEF experience (Pc1Y)
- Building/concrete, has PEF experience (Bu1Y)
- Building/concrete, has considered PEF (Bu2N, Bu3N)
- Government, has PEF experience (Go1Y)

3 Survey and interview results and discussion

Survey results

A summary of survey results are presented below, grouped by A) those identifying themselves (in survey screening questions) as having PEF experience and B) those identifying themselves (in survey screening questions) as having considered PEF but not having direct experience with it. The survey results were entered in an Excel file and a copy of this file with personal identifying information removed is available as an electronic appendix to this report (Appendix A).

Businesses with PEF experience do more assessments, take more action, and take more informed action than those without.

Shown in Figure 5 are the assessments and actions that those with PEF experience have engaged in or considered, in terms of the total number of respondents with PEF experience. The majority of those with PEF experience have done all of the assessment types mentioned in the survey. Many of these respondents (over 40% of them) have engaged in actions using the results of assessments.

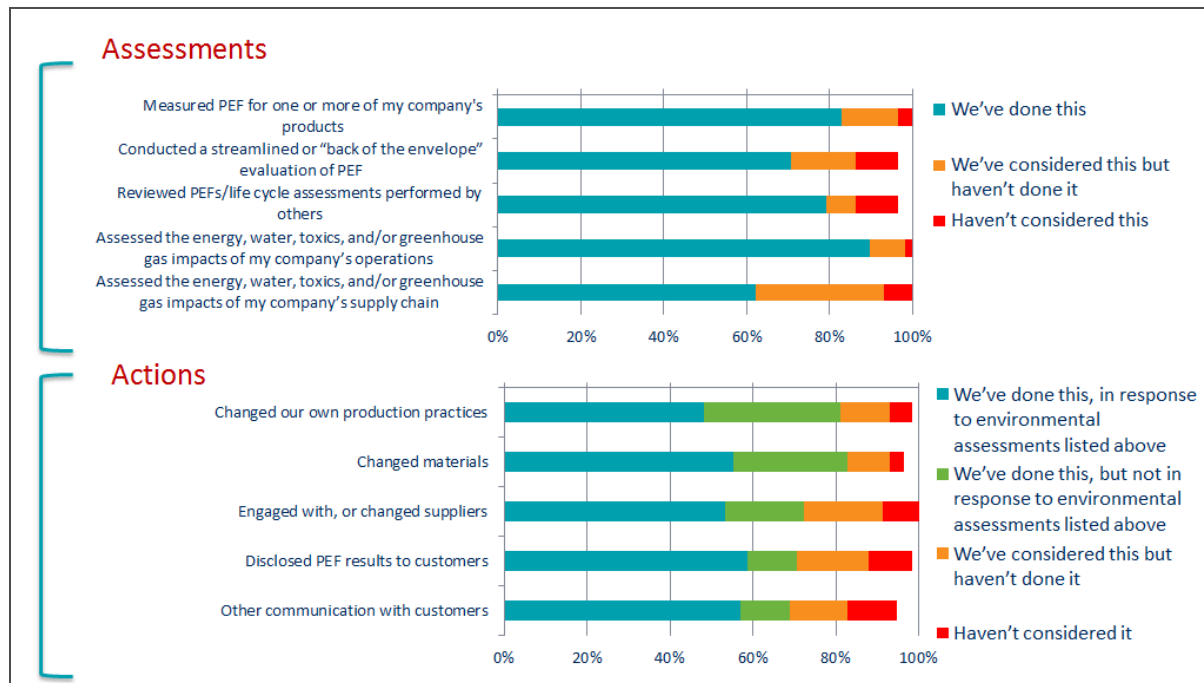


Figure 5. Those with PEF experience have carried out many assessment activities and have acted on the results. Results for businesses that initially reported having considered PEF but haven't done it are shown in Figure 6. Among these businesses, there is a mix of those who have done various types of assessment. For example, many (>60%) have assessed their own company's operations, but far fewer (~25%) have assessed their company's supply chain, even though for many products and materials supply chain emissions are often far greater than the emissions associated with final production. A narrow view of impacts (company operations only, and not supply chain) may be leading some businesses in this group to overlook important opportunities to reduce impacts. Despite this narrow level of assessment, 66% of businesses in this group report some level of engagement with suppliers (compared to 72% of businesses with direct PEF experience).

Any actions in which these respondents have engaged are typically not in response to the assessments they've done. Actions are more likely to be informed by other sources of information, such as life cycle assessments performed by others, but also information from other sources, such as vendors, third-party organizations, or even popular wisdom. Results in Figure 6 are expressed as a percentage of respondents who have considered but not implemented product footprinting.

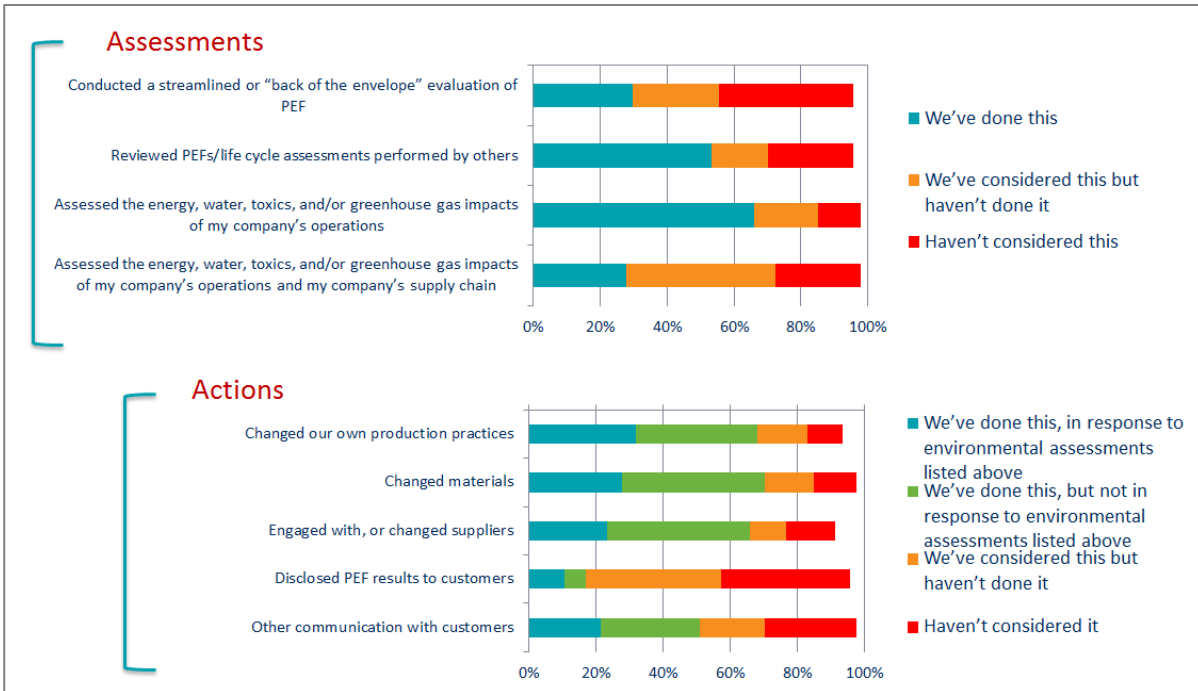


Figure 6. Those who have only considered PEF tend to engage in other environmental actions unrelated to assessment activities

Product footprinting benefits are moderate on average and unevenly distributed

With regard to the benefits observed from PEF-related assessment and actions, those with experience in PEF find it beneficial on average, though slightly less than they'd expected. Environmental benefits tend to be greater than the financial benefits, and benefits tend to be moderate rather than large or small (Figure 7). A small but equal number of respondents reported extremely low or high environmental benefit. In contrast, a substantially larger number of respondents reported extremely low financial benefit than those reporting extremely high benefit. Despite this, most report at least some financial benefit from footprinting. A notable proportion of survey respondents relayed the difficulty of quantifying benefits, and that this is a barrier to justifying footprinting efforts.

Examples of benefits brought up during the interviews include cost and emissions savings due to operational efficiency improvements; development of internal knowledge to inform business strategy; revenue growth due to ability to defend "green" marketing messages with footprinting results; revenue growth due to being accepted into a "premium" product niche in the market; and due to having published an Environmental Product Declaration (EPD).

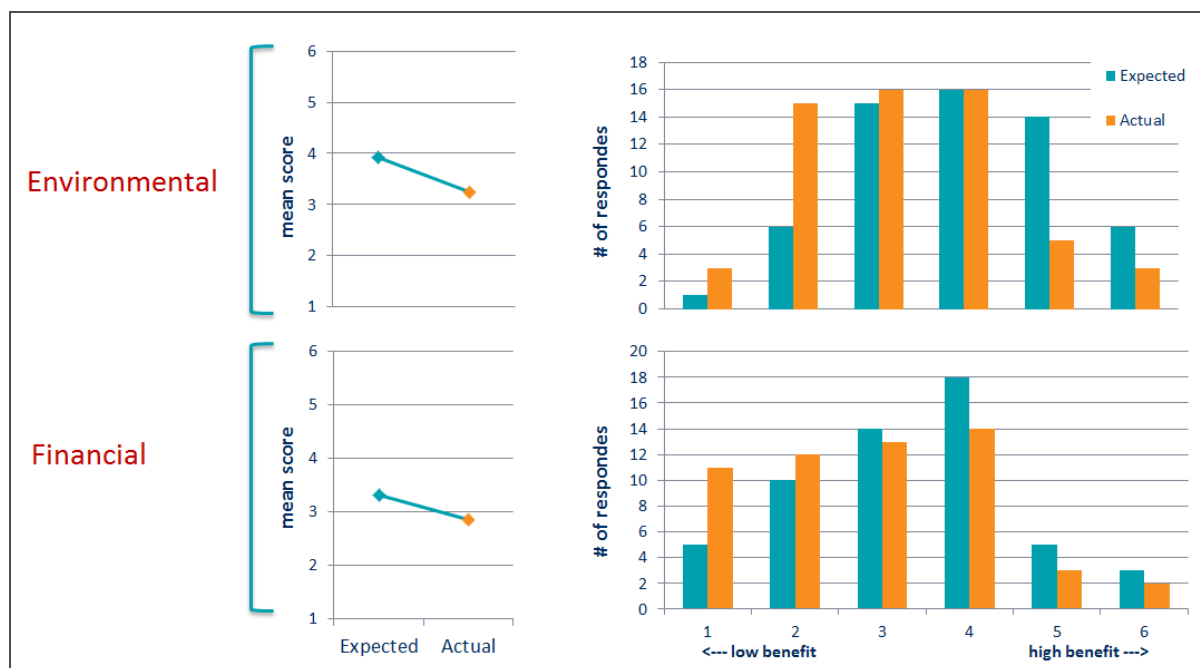


Figure 7. Expected and actual benefits reported by survey respondents with experience in PEF (1 = low benefit; 6 = high benefit)

Compared to those who have experience with PEF, those who have only considered PEF expect the same environmental benefits but lesser financial benefits (by a small margin) as shown in Figure 8.

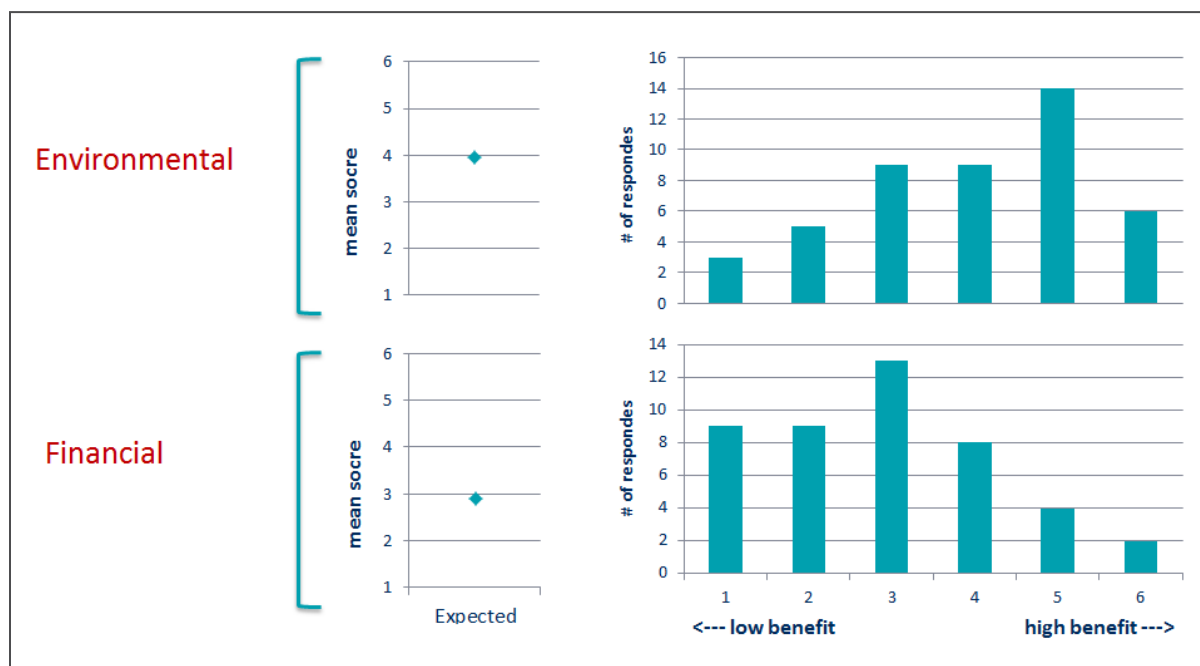


Figure 8. Expected benefits reported by survey respondents who have considered PEF

Figure 9 and Figure 10 compare expected benefits (environmental and financial, respectively) for those who have PEF experience and those who have considered PEF. Compared to those with PEF experience, those who have considered PEF expect slightly higher environmental benefits and slightly lower financial benefits. Such results could lead to the conclusion that those considering PEF perceive the potential environmental benefits to be good, but a perceived lack of financial benefits inhibits them from taking action.

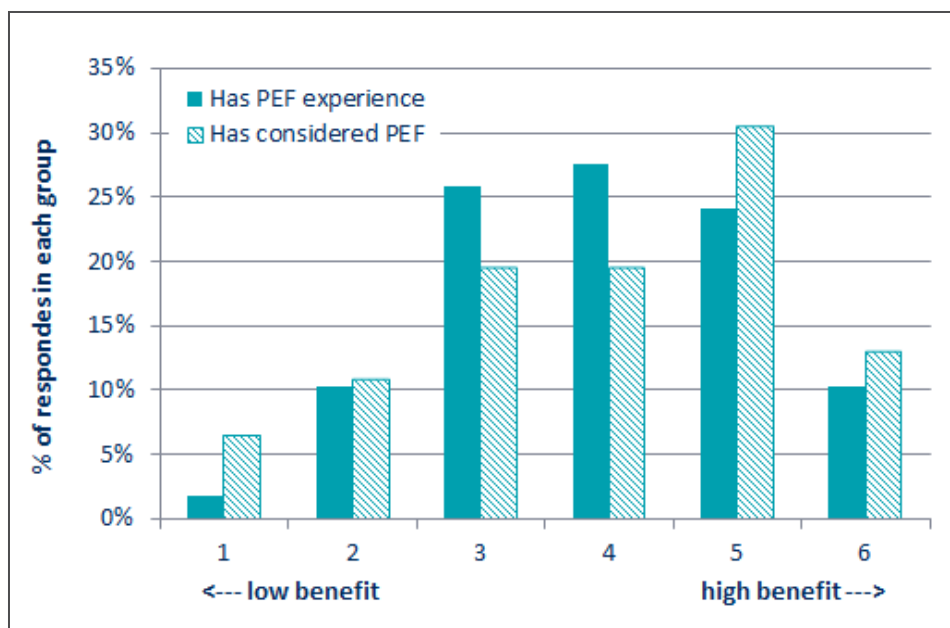


Figure 9. Expected environmental benefits are slightly higher among those who have considered PEF than those who have PEF experience

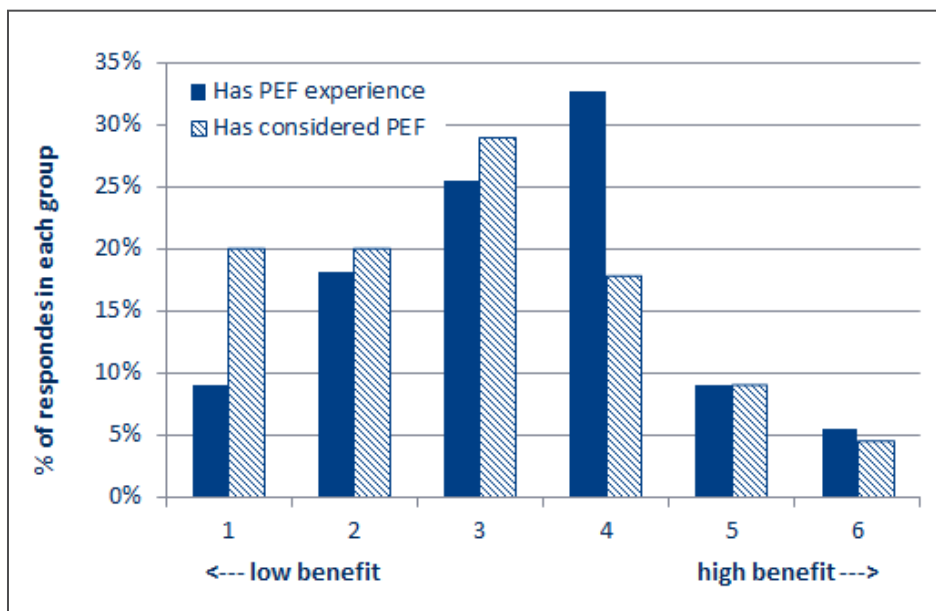


Figure 10. Expected financial benefits are slightly higher among those who have PEF experience than those who have only considered PEF

Companies who have only considered PEF were asked whether they perceive a higher level of PEF activity from their competitors. Most do not as reflected in Figure 11.

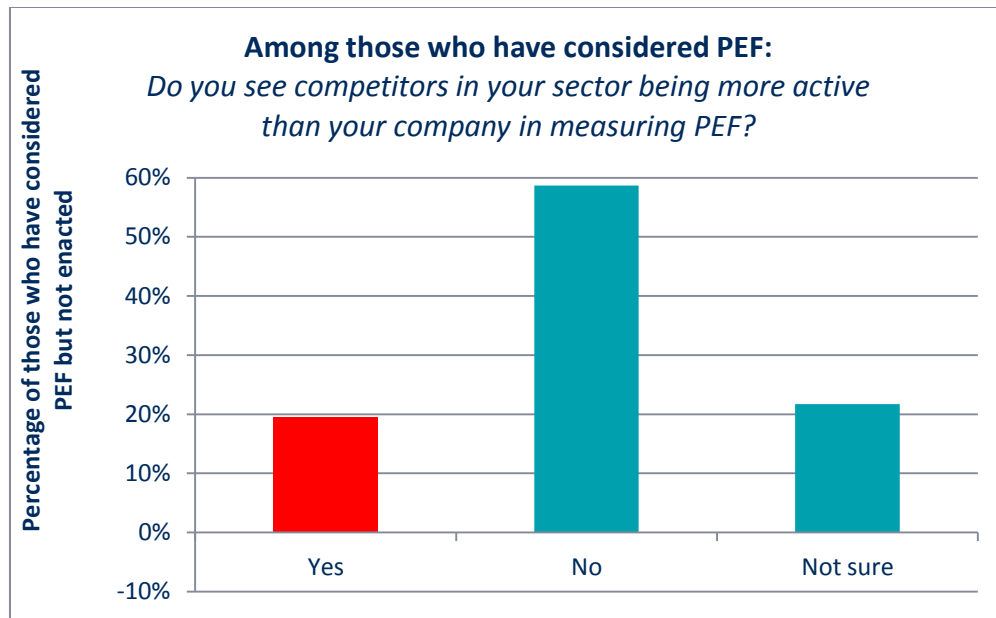


Figure 11. Among those who have considered PEF, the majority do not observe competitors being more active in measuring PEF

Among the minority who do perceive action from competitors, the perceived environmental improvements include:

- being able to help customers select environmentally beneficial products,
- helping customers to use their products in a ways that reduce environmental impacts,
- reducing the impact of their own production, and
- increasing recycling rates.

Perceived financial improvements include:

- market share increases resulting from communicating to consumers/customers about product footprint (sales growth) and
- enhanced corporate or brand recognition from shareholders and/or consumers.

Staff time and cost are the most frequently mentioned barriers

With regard to barriers (perceived or actual), those with PEF experience most reported limited staff time, “other”¹, and cost, as shown in Figure 12.

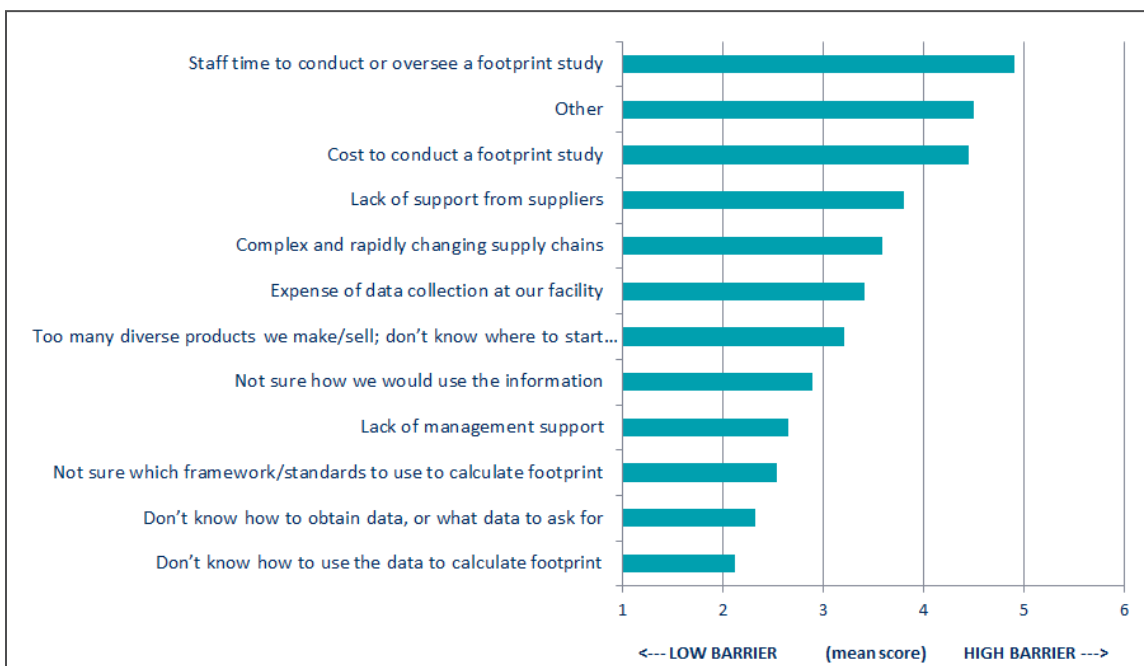


Figure 12. Barriers to PEF as reported by those with PEF experience

Among respondents who have considered PEF, the greatest barriers are likewise staff time, cost, and “other”, as well as the expense of data collection (Figure 13).

¹ “Other” barriers included lack of interest from consumers; integrating results into purchasing and product development is not easy; data complexity & enterprise data management are not aligned, difficulty to track/measure/meter inputs of raw materials in a wide variety of wood product manufacturing; too many parts to measure; does not provide competitive advantage; biased political decisions beyond our control; and lack of clarity regarding cost/resources required and benefit (ROI).

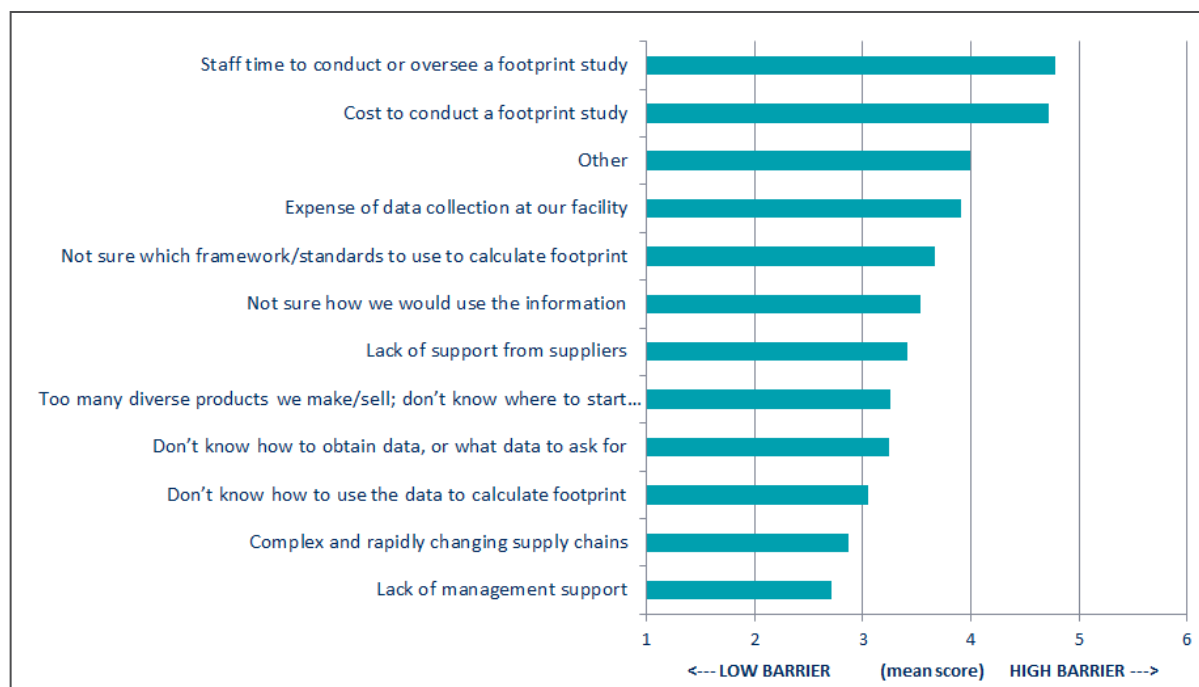


Figure 13. Barriers to PEF as reported by those who have considered PEF

The potential benefits of third-party assistance are perceived as moderate

With regard to potential assistance from third parties, measurement assistance is perceived as most helpful, while any assistance could be at least somewhat helpful (Figure 14). For those with footprinting experience, the question was phrased in terms of how helpful third party assistance had been in achieving success with footprinting. For those who have not engaged in footprinting, the question was phrased in terms of potential helpfulness. This difference in **past** helpfulness versus **potential** helpfulness may explain the slightly higher scores among those who have only considered footprinting.

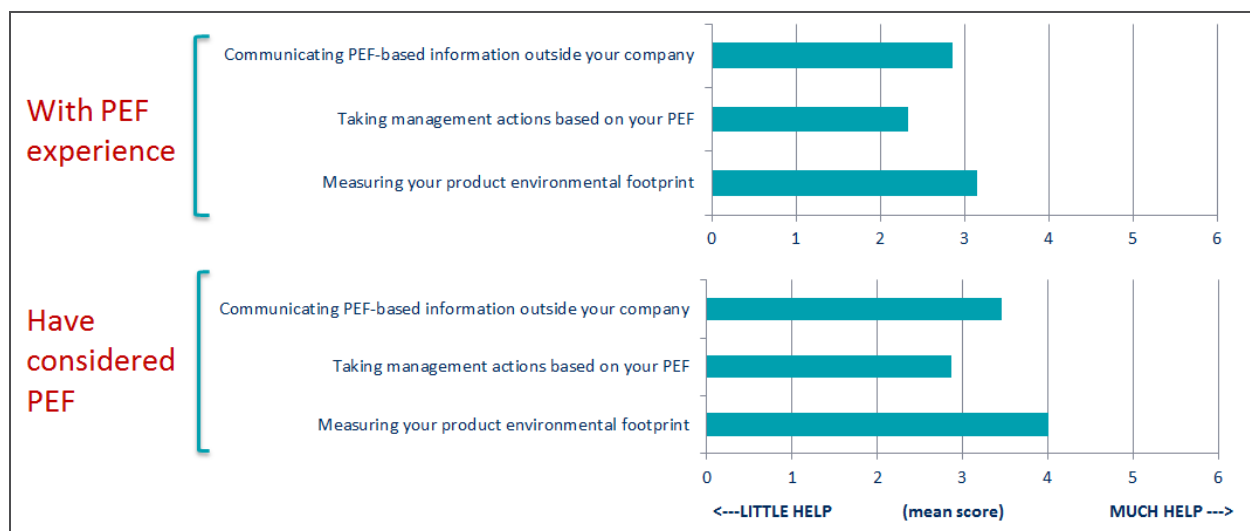


Figure 14. Third party assistance is perceived as somewhat helpful by those with and without PEF experience

Among those with PEF experience, the role of third-party assistance in efforts to successfully carry out footprinting had a wide spread in perceived helpfulness. Among those who have hesitated to engage in footprinting, the extent to which third-party assistance is expected to be helpful is also highly variable. These results are presented in Figure 15.

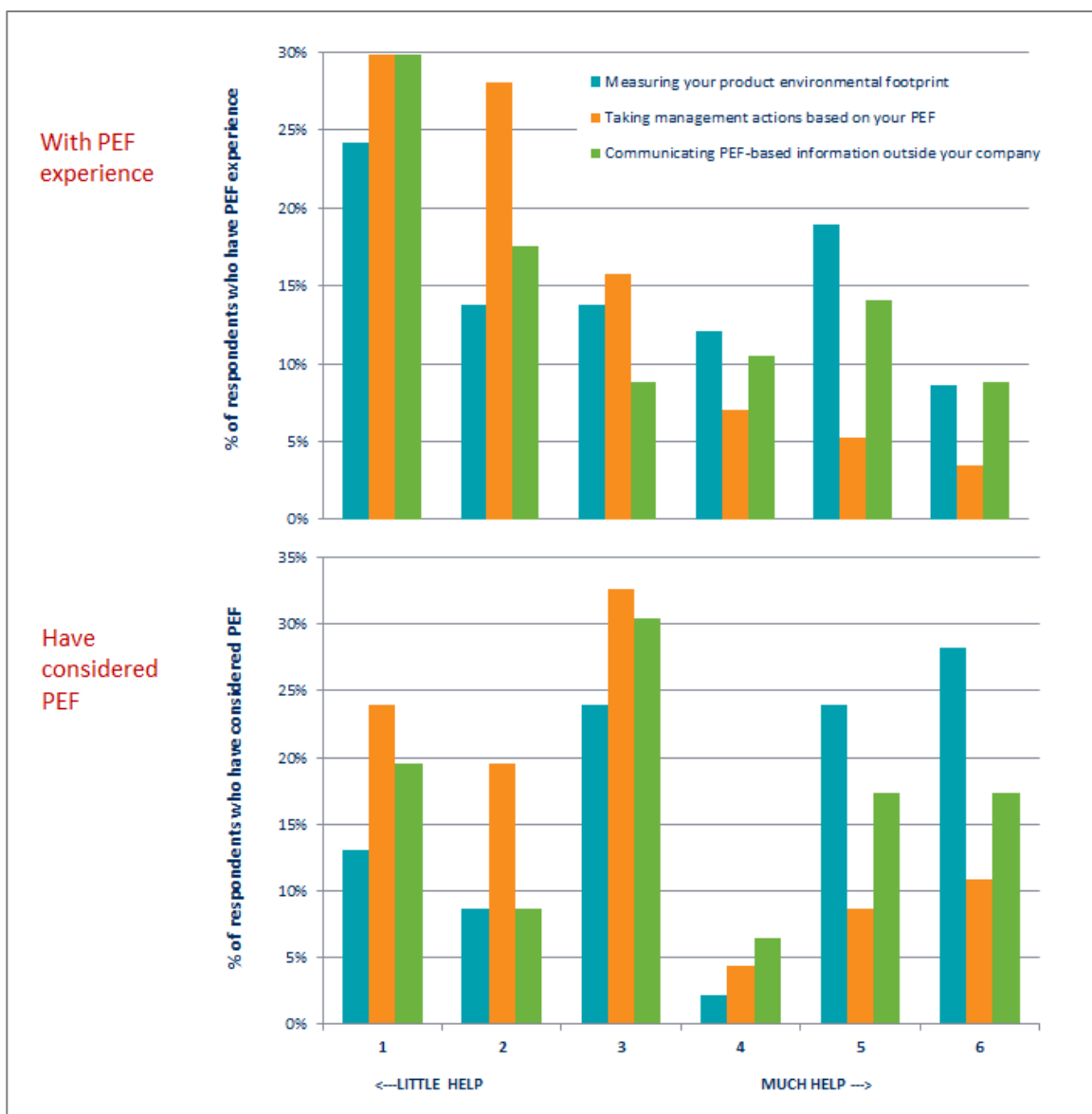


Figure 15. The perception of third-party assistance helpfulness is highly variable

Interview responses were aligned with these survey results. Recurring examples of desired assistance included:

- resources to facilitate data collection;
- identification of relevant “hotspots” to streamline the PEF process;
- automation of data collection by coupling it with operational data collection systems;
- resources to support EPD development;

- oversight for consistent scope and boundary delineation and interpretation of results for use in purchasing decisions;
- development of consistent, simple metrics for consumers; and
- outreach to spark consumer demand/interest in PEF as a decision-making tool.

Interview results

Summaries of all sixteen interviews are provided in Appendix B. Key or recurring observations from the interviews include the following:

- All stages of the production/consumption value chain provide potential for environmental improvements. While the active stages of managing footprint and purchase/use behavior can reduce environmental impacts, so can the more informational stages (measurement and communication activities). Any stage can be perceived to have benefit.
- Environmental goals must be coupled with the prospect of profitability (either revenue growth or cost reduction) in order to be a sustained undertaking by a company.
- In alignment with the survey results, third-party assistance is most desired to facilitate “measurement” aspects of PEF, with slightly less emphasis on the “communication” aspect. Assistance with the “management” piece was least desired.
- There isn’t likely to be a single solution to suit all sectors due to variability of sector dynamics, geography-related environmental issues, and other differences.
- The building sector (concrete, forestry, etc.) in particular is frustrated by shortcomings in the use of EPDs in purchasing decisions:
 - Some purchasers are reluctant to commit to the use of EPDs as a decision-making component, and producers need higher certainty of the utility of an EPD before investing in its creation.
 - EPDs are still relatively expensive, so companies that provide them often have to charge a premium for their product to compensate, making them less cost-competitive.
 - Purchasers who do use EPDs as a decision-making criterion may not have the expertise needed to meaningfully interpret the scope and boundary decisions that influence the results. The purchaser may base the decision solely on the existence of an EPD (which is

not a clearly defensible proxy for environmental stewardship) or on a subset of environmental impact indicators which may favor some products unfairly.

- The food sector perceives much uncertainty in supply chain data availability, transparency, validation and credibility. Such perceived uncertainty in such a meaningful piece of their products' life cycle impact discourages companies in this sector.
 - Geographic variability and regional variation is perceived to be a key driver of ingredient supply chain impact, and this variability is perceived to be poorly accounted for and validated in supplier-provided information.
 - Suppliers are not perceived to always be forthcoming with information to enable food manufacturers to accurately evaluate their upstream PEF.
- There is substantial variability among companies in the pace and direction of their PEF implementation.
- There is substantial variability between sectors in level of engagement on PEF issues:
 - some sectors have actively engaged;
 - some industry associations (such as apparel) have formed support groups; and
 - businesses in other sectors approach PEF independently.

It is not immediately clear if such approaches are correlated with position on the PEF experience "trajectory".

4 Evaluation of benefits and barriers of product environmental footprinting based on interview and survey feedback

The survey and interview respondents identified a variety of benefits and barriers to effective implementation of PEF. Table 3 presents a summary of benefits identified in the survey and interview responses.

Table 4 presents a summary of the barriers identified for each stage of the production-consumption chain outlined above. Some barriers that were heavily recurring in the surveys and interviews and/or heavily emphasized have been identified here as key barriers (and show in italic text in the table).

Table 3. Table of benefits associated with footprinting

Benefit	Examples	Survey and Interview notes and quotes	Substantiated by ²
<i>Reduction of impact within one's own production processes</i>	Improvements in efficiency reduce demand for freshwater or electricity		Pa1Y, Pa2N, Fo1Y, Fo5Y, Br1N
<i>Reduction of impact of suppliers' practices</i>	Reduction in transport distances, efficiency improvements		Pa1Y, Pa2N, Fo1Y, Fo4Y, Br2Y
<i>Helps customers select products with superior environmental performance</i>	For consumers wanting a premium environmentally-performing product	"There is only a subset of customers who care about these things"	Pa1Y, Fo1Y, Fo4Y, Pc1Y
<i>Helps customers use products in ways that reduce environmental impacts</i>	Consumer behavior (e.g., washing, transport, method of disposal) can be a hugely influential contributor to a product's environmental performance		Pa1Y, Fo1Y, Pc1Y
<i>Increased sales growth from winning contracts that require footprinting information</i>	Sometimes government contracts solicit proposals for products with environmental labels Some retailers require environmental performance information from their suppliers	"LCA can be an advantage with government contracts, leading to sales growth."	Pa1Y, Fo1Y, Fo5Y, Pc1Y, Bu1Y
<i>Enhancement of corporate or brand recognition from shareholders and/or consumers</i>	Substantiates marketing position as a "sustainability-minded" company or even environmental leadership in the industry		Fo1Y, Fo2Y, Fo4Y, Br1N, Br2Y, Pc1Y, Bu1Y, Bu3N, Go1Y
<i>Reduction of expenses under own direct operational control</i>	Improvement in operational efficiency reduces utility costs		Fo1Y, Fo2Y, Fo5Y, Br1N, Pc1Y
<i>Reduction of expenses in supply chain operations</i>	Improvement in supply chain efficiencies reduce the costs of procurement		Fo1Y, Pc1Y
<i>Influences corporate decisions beyond environmental ones</i>	Thinking holistically and in terms of efficiencies	"[Life cycle thinking] becomes a natural part of product development processes once you do it a few times. It changes the way you make decisions all the way down the line." (quote from a survey respondent)	A survey respondent

² Codes are references to individual interviewees, as referenced in the report appendix materials.

Benefit	Examples	Survey and Interview notes and quotes	Substantiated by ³
<i>Allows for informed decision-making around changes that will deliver “biggest bang for the buck”; substantiation for driving key changes</i>	Identifying and prioritizing a small subset of actions that will deliver the most environmental improvements for the least cost/effort	<p>“The key thing quality PEF analysis can do for companies is help them prioritize their activities so their money will be spent on things that actually make substantial reductions in their footprint, rather than just shifting deck chairs around for the sake of appearances.”</p> <p>“Our early work in LCA in 2000 showed us that unless we could get suppliers to invest in nylon recycling technology, we would be unable to impact half of our environmental footprint. Today, one of our suppliers produces 100% recycled nylon (from 0% in 2000) which has helped us dramatically reduce the footprint of our products. They invested in nylon conversion technology and we invested in systems to capture post-consumer carpet nylon that we sell back to them. This kind of innovation was made possible by understanding what truly mattered in our environmental footprint.”</p>	A survey respondent, Fo4Y
<i>Helps put global environmental issues and efforts into perspective</i>	Educational value; eye-opening information that broadens perspectives	<p>“People have to understand why and what to achieve and how it's benefiting our industries and society. PEF should not be just another study but it should change our thought process on what and how to use our resources in our vantage point. To make it work, it should provide a level playing field to all players including overseas competitors.”</p> <p>“A national program, with labeling, would be a way to create meaningful decisions in the marketplace, much like food ingredients...”</p>	A survey respondent, Fo5Y

³ Codes are references to individual interviewees, as referenced in the report appendix materials.

Table 4. Table of barriers by stage in production-consumption chain

Barrier	Potential solution(s)	Interview notes and quotes	Substantiated by ⁴
<i>Companies are overwhelmed by complexity and do not know what to prioritize or how to plan their PEF efforts effectively.</i>	Provide access to streamlining tools (credible, transparent ones) Provide access to other PEFs to identify “hotspots” to prioritize	...but these streamlining tools need to be transparent! No black boxes. Need to be able to dive in and have intelligent conversations about what’s driving impact, i.e., the streamlining tools need to be credible and LCA-based. Access to good quality datasets that quantify uncertainty	Resource-limited companies, and those that wish to be aligned with competitors in data and metrics communicated externally, Ap1Y, Ap2N, Fo1Y, Fo2Y, Fo3N, Go1Y
<i>Companies worry that competitors will define the scope of their PEF in a way that favors themselves, rather than in an objective, balanced fashion.</i>	Promote fair and widely accepted scope and boundary delineation across product categories by supporting single efforts to define rules in each category with high rates of participation.	“State agencies can help identify guidance and resources” “need consistent holistic approach”	Mostly building industry representatives (related to forestry and concrete), companies vying for purchasing contracts based on LCA information, Bu3Y, Pa1Y, Pc1Y
<i>Companies perceive that PEF work is costly and requires a high level of expertise with LCA.</i>	Provide resources to “lower the barriers to entry” of those daunted by the idea of PEF	“Reduce barriers of entry”, “Open playing field to larger number of companies” “Retailers should share the cost with producers, since they’re demanding the information” “Give rebates/tax breaks for equipment”	Small companies that cannot afford to hire external experts Ap1Y, Ap2N, Br1N, Bu1Y, Fo3N, Fo4Y, Fo5Y
<i>Companies perceive that there is a need for data from their supply chain and encounter unwillingness from the supply chain to provide meaningful data.</i>	Identify and counteract barriers to sharing of information from supply chain; help companies to understand when data from supply chain is or is not necessary.	Tough to compare across LCAs if there is no validation process for supplier data	Pa2N, Fo4Y

⁴ Codes are references to individual interviewees, as referenced in the report appendix materials.

Barrier	Potential solution(s)	Interview notes and quotes	Substantiated by ⁵
Companies don't know where to start, what information to collect and what tools, training they need.	Know which data to collect, what to prioritize	Each industry, by region, should be informed what to focus on, depending on the salient issues	Small companies with limited resources, Bu3Y, Pa2N, Fo4Y, Fo5Y
Data collection is largely manual, deliberate, and not automated, so there is a large effort to be repeated each year.	Data collection is integrated with operational/financial data collection processes	<p>Incentives to help measure and collect data would be helpful</p> <p>Pair environmental data with cost data, "LCA needs a financial component"</p> <p>"Return on investment (ROI) of two years is acceptable."</p>	Large company/companies, related to consumer goods, Ap1Y, Br1N, Fo1Y, Fo3N
There is an uncertain amount of cost savings or revenue growth to be expected from PEF efforts, so it is challenging to justify even if some benefits are expected.	A simpler way to estimate financial ROI		Companies that need the promise of an ROI to get started, Ap1Y
Actions are taken based on what's easy, not what's most defensible with LCA	Actions are prioritized and carried out as informed by the MEASUREMENT of PEF (using a life cycle approach and a range of relevant indicators)	<p>The skirting of Measurement to inform Management is not always deliberate or understood as potentially misinformed.</p> <p>Strong attachment to certain product attributes without a clear LCA defense (e.g., "local" is inherently good)</p>	This was an observation of the interview team; noted by some interview participants. Br2Y, Br1N, Fo3N, Go1Y
There are not a universally accepted set of indicators to report or evaluate for each product category	The range of relevant impact indicators are widely accepted in the product category/industry		Ap1Y

⁵ Codes are references to individual interviewees, as referenced in the report appendix materials.

Barrier	Potential solution(s)	Interview notes and quotes	Substantiated by ⁶
<i>The metrics produced from PEF can be confusing and it can be difficult to compare across metrics and products to reach a clear decision</i>	The consumer-facing environmental label is easily understood by the consumer and does not further confuse the purchasing decision	PEF of the future: “provides useful, objective information on which decisions can be based” “Make concrete info available to consumers” “People don’t want a full LCA with a bunch of indicators...just the relevant ones”	Br2Y, Bu2N
<i>Companies perceive that others may only report on or focus on the indicators that favor their case.</i>	A range of relevant impact indicators will be reported		
<i>Purchasers and policy makers want to include LCA in decision-making, but they lack knowledge of how scope and boundary choices can favor products erroneously.</i>	In an effort to bolster PEF, purchasers choose products based on environmental performance as reported by the producer	“If no 3rd party verification, no trust.” “Carbon inventories are NOT LCAs...purchasers don’t seem to get this...” (Single indicator footprints are not LCAs. Inventories are not LCAs.)	Mostly building industry representatives (related to forestry and concrete), Ap2N, Br2Y, Bu1Y, Bu2N, Pa1Y, Pc1Y
<i>The purchaser is picking winners based on a metric that may not favor environmental performance, i.e., existence of a PEF disclosure itself is not a proxy for performance.</i>	Shift focus of procurement activities from asking whether an EPD can be provided to focusing on the comparative performance	Third party can help define front end and back end barriers; standardize output. Credibility is needed in boundary scoping and interpretation There is a perception that brand owners with EPDs are probably better environmental stewards. However, this is not necessarily the case, based on our interview respondents’ observations	Br2Y, Bu1Y

⁶ Codes are references to individual interviewees, as referenced in the report appendix materials.

Barrier	Potential solution(s)	Interview notes and quotes	Substantiated by ⁷
Most consumers lack interest, or do not know how to interpret, to use PEF information in purchasing decisions.	Consumers use communicated PEF to inform purchases, use behavior, and the way product is disposed	<p>“consumer demand is needed to drive supply of information”, “No additional market demand from the LCA”</p> <p>Financial benefits need to come from customer demand.</p> <p>“retail customers are not that interested in legitimate LCA results”</p> <p>Perception of impacts, or the sexy topic of the day, drives consumer behavior, rather than defensible LCA results</p>	Ap2N, Br2Y, Fo2Y, Go1Y
Purchasers are reluctant to ask for PEF disclosures from suppliers due to an expectation that it will not be provided or that it puts a large burden on the supplier. This can lead to a perception from the supplier that the purchaser does not want/require this information.	Purchasers commit to a plan (a fair one) so there is certainty between buyers and sellers with regard to if and how an EPD will be used to inform the purchase	<p>“Spending money (on EPDs, etc.) has uncertain payoffs”</p> <p>Purchasers seem to waver in their commitment to using EPDs. This discourages producers from investing in the EPD process.</p>	Bu2N, Bu1Y

⁷ Codes are references to individual interviewees, as referenced in the report appendix materials.

5 Recommended third-party actions for advancing product environmental footprinting

Overview of recommendations

Based on our assessment of the above-mentioned benefits and barriers, as well as other information provided by the surveys and interviews, we have identified several potentially beneficial areas of action within the framework described earlier. In addition, we have identified six overarching recommendation themes which house altogether 12 more specific sub-recommendations to explain what has been identified as the most effective ways of acting in each topic area. Figure 16 outlines the overarching recommendation topics, and Table 5 identifies where within the framework each of the six topics relate. Figure 1 in the Executive Summary provides an overview of all 12 recommendations within the six theme areas.

Although it has not been a goal of this work to prioritize the list of recommendations, Table 5 provides two tiers of priority to the action areas based on the strength to which each area was identified as a fertile area for action by the balance of information provided by the participants, with higher priority areas highlighted in darker green. Areas that were contraindicated (that may create more barriers than benefits) are identified in orange, where text briefly indicates the reason these are identified as areas to avoid.

Although it was beyond the scope of this project to recommend third party organizations best suited to successfully realize these recommendation, potential roles were identified for both industry associations and governments, in general:

- Industry associations were suggested to organize and provide forums to share information and encourage collaboration.
- Government was identified to support transparency, knowledge, direction, and promote neutral arbitration.

Concerns about the credibility or validity of conclusions reached with footprinting information were frequently expressed. Non-governmental organizations (NGOs) are third parties who may be able to play a role in addressing these concerns.



Figure 16. Six overarching action themes containing specific recommendations

Table 5. Table of third party actions

		Stages of Production and Consumption			
		Measure product footprint	Manage product footprint	Communicate product footprint	Manage purchase and use behavior
Actions by External Parties (Industry Assoc., NGOs, Governments, etc.)	Do	1	Brand owners feel best equipped to manage their footprint	1	6
	Support	2 and 5	3	4	
	Incentivize	2			
	Mandate	Mandates were not often offered as suggested support mechanisms. Mandates based on misinformation could lead to unintended consequences			

Discussion of individual recommendations

Presented below is the list of third-party actions that we recommend for further consideration, along with a discussion of the context of each recommendation, its relationship to addressing the barriers discussed above and some potential constraints to consider.

Theme area #1: Conduct, summarize, and communicate categorical footprinting assessments

- 1a) Conduct, commission and/or summarize categorical footprinting assessments (assessments at the level of a product category or generic product, as opposed to a specific brand) to help businesses and purchasers understand environmental hot spots and trade-offs.
- 1b) Communicate the results from the above assessments to manufacturers or other organizations that can act on the information.

Conducting a footprinting assessment directly is one potential high-value action for third parties. Within the types of footprinting activities described in Section 2 of this report, *categorical assessments to support broad decisions* would be most effectively done directly by third parties. These types of assessments are centered on answering broad questions regarding the environmental impacts and relative advantages of different ways of meeting the same functional need that different products provide. They can generally produce a number of actionable insights, such as indicating which types of products in a given category are environmentally preferable, or how to use any of the products in that category in a way that reduced their overall footprint.

In some cases, the third party organizations might directly undertake or commission the footprinting assessment. In others, the third party organizations might summarize information from existing assessments. A communications plan is essential for such activities to be effective. A third party organization might also work with businesses directly to evaluate priorities they have identified (and/or to identify priorities with them).

What might this look like?

- Identifying key policy or purchasing questions and conducting product footprint assessments to provide guidance on these questions.
- Where large bodies of footprinting work already exists on a topic, conducting a review and promoting the use of any clear and definitive LCA results in policy or purchasing.
- Convening teams of experts to evaluate available evidence on policy or purchasing questions.

Theme area #2: Support businesses by providing tools, training and incentives to conduct product footprinting

- 2a) Develop and promote the use of simple footprinting tools for use by regional businesses in understanding and prioritizing the “hot spots” within their product life cycles or total corporate footprint.

Although there may be value to be gained from the process of conducting detailed footprinting calculations, for manufacturers this work can be made more approachable and less costly by providing simple tools to help them conduct such assessments. These tools may allow them to postpone gaining a high level of expertise in the underlying methodology until they have been able to begin to demonstrate the value of such work to their organization, or to avoid such high-level expertise altogether. Such tools may be particularly important for smaller businesses, which may otherwise have difficulty engaging in footprinting work to the extent of larger businesses due to the cost of supporting staff or consultants with a high level of expertise.

Within the types of simple tools that might be provided, there is a distinction between those that might be used to provide information for internal decision making and those that might produce an assessment of the quality needed for external disclosure to customers or the public. For internal decision-making, a simple product footprinting tool might be able to be product-specific, or at least apply to a wide range of product categories, or might be oriented towards providing a footprint of an entire organization rather than of a single product. In either of these cases, companies could make use of tools that allow them to produce their own simplified assessment with a limited investment of their own time of hours to a few days and with a tolerance for results to be somewhat inaccurate, as long as the directional findings that are reached with regard to prioritization of high impact areas are reliable. Where suitable existing tools exist, they might be promoted to regional businesses. Where they don't exist, it may be valuable to develop such tools, with a focus on regionally important industries or product categories.

- 2b) Develop and/or promote the use of product footprinting tools capable of developing EPDs for regionally important product categories, along with regional data where needed to support such tools.

In addition to identifying hotspots of impact, some companies would like to communicate a product footprint more broadly to potential/current customers or to the public. Supporting a credible disclosure

requires a different type of tool than that mentioned above to ensure the credibility of the information to be disclosed. This is a crucial business consideration for companies as it affects their customer and public relations. To ensure credibility in public disclosures, the ISO standards on life cycle assessment (ISO 14040 and 14044) contain a set of requirements to be met. In addition, ISO 14025 contains a set of requirements for communicating footprinting results in a (relatively) simple format known as an environmental product declaration (EPD). EPDs require further conformance with product category rules (PCRs), which provide a much narrower set of guidelines for footprinting work within a product category. Where PCRs exist, it is possible to develop tools that would take input from a manufacturer regarding their operations and product characteristics and produce as an output an EPD. This could substantially improve the efficiency with which manufacturers could produce such disclosures and may provide a competitive advantage for businesses in the region, as the availability of such disclosures might provide more market opportunities. It should be noted that these EPDs would still need to undergo a validation by an external party to be in conformance with ISO 14025.

In some cases, new life cycle inventory data may be needed to populate tools with good information on the materials and energy that are used as inputs to the production of products. In such cases, new data development will need to be conducted to characterize these processes and to create and document these datasets. To ensure credibility of the outcomes of these tools, thorough documentation and transparency of underlying data sources are important.

- 2c) Where resources allow, provide financial incentives for companies to engage in footprinting work.

Many companies have cited costs as an important barrier to product footprinting. In fact, if staff time is coupled with costs, these explanations are the most prominent barriers cited by both those companies that have engaged in footprinting, as well as those that have not.

To the extent resources allow, providing financial incentives that reduce the cost may be an effective means of improving this benefit/cost ratio. Many of the activities mentioned in recommendations elsewhere in this report, such as providing tools and training programs, can also significantly reduce the cost of such activities for regional businesses. To the extent that third parties have resources to invest, it is worth evaluating whether it is more effective to incentivize companies to internalize this work, to conduct support activities externally, or to do some combination of the two. For example, a government could provide financial assistance in the form of tax credits or grants to bring down the cost of

footprinting, or alternatively could provide a “circuit rider” expert under contract who could assist businesses with their footprinting efforts.

The fact that many companies engaging in footprinting cited difficulties with knowing how to apply the work and also, on average, reported a lower rating of the outcomes in comparison with their expectation, gives some evidence that training and support should at least be paired with any financial incentives.

What might this look like?

- World Resources Institute is developing a free tool for companies to produce a first Scope 3 carbon footprint. Similar tools could be developed for other industries.
- Institute for Environmental Research and Education has developed a tool for breweries to use in footprinting their products and publishing product footprint disclosures. Similar tools could be developed for other important industries to the region.
- USDA has funded development of hundreds of LCA datasets representing US agriculture.
- Many industry associations, such as those for steel, plastics, and paper, coordinate the collection of industry data and publication of LCA datasets.
- Regional institutions could develop datasets to represent key raw materials produced in the region, or significant inputs to major regional industries.
- The government of Quebec has previously provided financial incentives to companies in its province who undertake footprinting work.
- Pairing companies with university teams to conduct assessments.
- State agencies or NGOs hiring staff with footprinting experience to help companies in training or implementation of footprinting work.

Theme area #3: Support businesses by providing training and guidance on how to use product footprinting

- 3a) Provide businesses with information to help them understand the basic concepts of life cycle thinking, the resources involved in footprinting, and how to get the most value from the footprinting work they do.

In addition to the benefits of being able to produce product footprints with minimal technical expertise (which would be provided by the tools mentioned in the prior set of recommendations) businesses may experience added benefits by developing internal expertise in how to conduct and apply footprinting in their organization. This is strongly indicated by the results of the present research, including frequent citation by survey and interview participants that they did not know how best to put information to use. Such training to companies could include how to understand the different types or levels of footprinting work, the best uses of each type of work, and how to overcome some of the common obstacles/barriers identified in this report. Such training should be oriented around the needs or opportunities identified by businesses.

- 3b) Provide businesses with training to achieve a higher level of expertise in footprinting methodology, process and application. Focus on addressing key barriers such as data collection and interpretation of indicators for decision making.

In addition to a basic level of training to improve understanding and navigation of the process for footprinting work, it is also clear that some businesses need opportunities to gain better expertise in the more advanced aspects of footprinting work. Components of such training could focus on:

- challenging methodological issues that arise in conducting a LCA,
- how to approach collection of data and when to approach suppliers on data sharing (which was cited as an important barrier),
- advanced application of LCA within an organization.

As an example, many survey and interview respondents indicated a need for simplification of results to support decision making and action. Although approaches for simplification exist, applying them includes a combination of science-based objective information with values-based subjective information and cannot therefore easily be built into tools. Rather, it must be addressed openly with those making a decision or building an internal decision-support system. Training companies on such more advanced issues would address further barriers that have been identified as preventing them from achieving the most value from these tools.

What might this look like?

- Providing access to instructional courses on how to conduct footprinting work, such as live courses or web-based learning.

- Providing access to instructional courses on how to apply footprinting information to management actions, such as through live courses or web-based learning.
- Developing or providing educational materials, such as guidance documents or examples.
- Providing training on the use of simplified footprint indicators in decision making.

Theme area #4: Support businesses by developing clearer product category-level standards that define common/best practices for footprinting.

- 4a) Identify whether PCRs exist or are being developed for regionally important product categories. Improve upon existing PCRs if needed and promote the development of such rules where they don't exist. In all PCR efforts, engage with or mirror existing initiatives happening in other regions.

A frequently mentioned concern about product footprinting involves the flexibility within the practice and standards for LCA. This flexibility in standards is a large advantage for categorical types of footprinting assessments because it allows a very wide range of issues to be explored and questions to be answered. However, there is a feeling that manufacturers or industry groups may take advantage of this flexibility to achieve a result for their product that is not accurate and balanced. The trend toward disclosure of footprint results by independent manufacturers creates a rapidly growing subset of footprinting work that is more an accounting exercise than an analysis. Such applications require tighter rules to ensure consistent accounting so that the user of the resulting information can have more confidence in the comparability and accuracy. Tighter standards also help to address the concern mentioned above of groups choosing an accounting approach within the allowed range that provides them the most favorable result. Such standards can also define a set of relevant impact indicators to be reported for a product category, addressing an important concern raised in the surveys and interviews that many footprinting results focus only on those environmental aspects that favor their products, ignoring those that don't.

The development of PCRs – and improvement of existing PCRs – is a potentially very important solution. Fortunately, the past several years have seen a rapid growth in PCR development globally and in some product categories, the concern is rather that too many rules exist rather than that none exist. It is recommended that regional groups identify whether such rules exist or are being developed in regionally important product categories. Where no such rules exist, promoting the development of such

a rule is recommended as a way of supporting industries that are important to the region in engaging in such work.

For the users of the resulting disclosures, which may include the third parties themselves through their purchasing functions, the existence of multiple standards/rules within a category, as well as multiple systems for such standards, can be a substantial inefficiency and barrier to comparability of results, even in cases where one succeeds in obtaining disclosures from multiple potential suppliers. Rather than potentially adding further discordance, it is important that actions on rule development take place with knowledge of what is happening elsewhere on this topic, as most industries extend across global regions. It could be useful to identify a single system for establishing PCRs to harmonize efforts in this area. Some other regional governments, such as the European Union, have relatively advanced programs in this area and it could be advisable to partner with those governments rather than launching an independent effort on such a topic.

What might this look like?

- Participating in the work many industry groups are doing to develop PCRs to improve consistency of public disclosures.
- Exploring joint efforts with other governments like the EU in improving consistency within PCR development and promoting its application.
- Providing training on or resources for identifying the relevant indicators to report on each category.
- Promoting positive examples from which people can be inspired and calling out negative examples from which others can learn.

Theme area #5: Improve the perceived business case for companies to conduct footprinting.

- 5a) Communicate the business case for footprinting by developing and sharing success stories.

The research presented here identifies not only that many companies in the region are not yet engaging actively in footprinting activities, but also identifies what barriers are preventing them from doing so. Much of the evidence suggest that even in cases where there is a sincere intent to achieve better environmental outcomes, it is the financial drivers that are governing decisions about whether to engage in footprinting work. Assuming that it is desirable to promote more footprinting work among the

region's businesses, increasing the actual and perceived financial benefit/cost ratio is an important hurdle to overcome. Several of the other recommendations described above will help to reduce the costs and improve the financial benefits of footprinting.

In addition to reducing the costs for doing such work, it is important to focus on improving both the perception of the benefits to be attained and the actual benefits obtained. It is clear from the research outcomes that although most companies that engage in such work claim that they are achieving a moderate level of benefits, this level is lower than they had hoped. Their frequent mention of barriers in applying and communicating the work suggest that there are many more benefits that might be achieved with further work in this area. Communicating success stories where a high financial return, as well as an environmental return, has been achieved can help to improve the expected benefit from this work. At the same time, training on how to achieve similar benefits should be paired with this communication to avoid communicating a false hope of positive outcomes.

What might this look like?

- Developing educational material highlighting the business benefits of footprinting work. The educational material should feature successful businesses and include examples of how they achieved benefits.

Theme area #6: Implement purchasing standards or management policies that encourage product footprinting by suppliers and reduce the environmental impact of product use or disposal.

Some third parties, especially governments, might have significant influence on:

- Environmental outcomes through the purchasing decisions they make.
- Policies they set regarding how products they own and operate are used and managed.

Taking advantage of footprinting information to guide decisions in these areas can be an effective way of achieving positive environmental (and often financial) outcomes for these organizations.

- 6a) Request or require (for example, in government purchasing) product footprint information from suppliers in product categories where this is determined to be an effective strategy in differentiating product performance.
- 6b) Set purchasing policies based on assessments of what product attributes reliably indicate good environmental performers in a product category or third-party verification programs that incorporate life cycle thinking.

We can distinguish two main ways of including footprinting information in purchasing. The first involves directly requesting suppliers to disclose footprinting results. The second is to set purchasing policies based on the outcomes of categorical footprinting assessments; i.e., the assessment indicates a set of attributes that indicate an environmentally preferable purchase, and the policy is set around those attributes. Among these choices, the more effective approach may differ among product categories. Some categories may prove amenable to simple purchasing policies that do not require measurement and disclosure of the footprint for each option, whereas others may prove more challenging to identify the best performers based on a pre-defined set of attributes. Identifying the specific footprint of each product may be a better approach in those cases.

- 6c) Set policies or decisions around the maintenance, use, disposal or replacement of products based on categorical product footprinting studies.

In addition to actions regarding purchasing, organizations might also use the results of footprinting work to manage their maintenance and use of the items they purchase, as well as to set other policies about their operations. For some product categories, such as vehicles, electronics, and buildings, a significant portion of the environmental impact occurs in the use and/or disposal of the product. Decisions about product use and disposal may provide important opportunities to improve the environmental performance of those products. Such assessments may also provide a basis for decisions regarding under what conditions it makes sense to replace existing, working equipment with new equipment that may be more efficient.

What might this look like?

- Identifying attributes in product categories that reliably indicate a high environment performance and setting purchasing guidelines or policies around those attributes.
- Requiring or (more likely) favoring products to have EPDs in certain categories for purchasing decisions.
- Favoring products with lower impacts based on their EPD results.
- Setting policies on the management of vehicle fleets or equipment pools based on conclusions from footprinting studies that indicate such things as optimal replacement times and maintenance or use practices.

- The Sustainability Consortium is attempting to develop KPIs to indicate “more sustainable” products. The Sustainable Purchasing Leadership Council has a similar vision of setting purchasing guidance. Participating in such activities might allow for identifying usable and effective purchasing criteria.

6 Limitations

It is important to understand how this study was conducted so that its results and conclusions are applied appropriately. The following limitations should be considered along with the context described in earlier sections of this report when interpreting the information presented in this work:

The analyses presented in this report are not intended to be statistically representative of the sectors and companies, either in the Pacific Northwest region or of the US. The opinions expressed here are from a self-selected subset of stakeholders and were further filtered by the project team.

The suggested third-party actions expressed here by the project team are recommendations formulated by the project team based on a combined consideration of the needs of stakeholders and the potential benefit of pursuing each action. The subset of recommendations presented here are not intended to represent a full set of possible actions by third parties. These suggested actions may not be the best solutions to the barriers identified by interviewed stakeholders.

7 Appendixes

Appendix A – Survey results

See Excel file:

Quantis_PEF_Research_AppendixA_SurveyResponses_20141212

Appendix B – Interview results

See Word file:

Quantis_PEF_Research_AppendixB_Interviews_20141212

Appendix C – Initial recommendations prepared for the second Advisory Group meeting

Presented below for reference is the draft set of recommendations provided to the project Advisory Group as fodder for discussion at their second group meeting in October 2014. It is upon this draft set of recommendations that the current set of recommendations was built, based on discussion during and following that group meeting.

Table 6. Initial recommendations for priority third-party actions

Action	Stage in production-consumption	Key strengths	Constraints
1. Supporting development and use of credible measurement streamlining tools	<i>(Measurement, Support)</i>	<ul style="list-style-type: none"> helps both internal and external efforts could substantially improve efficiency and consistency of footprints 	<ul style="list-style-type: none"> requires consensus or objective development to be trusted simplification can come at the expense of thoroughness, accuracy and flexibility
2. Supporting development and sharing of datasets	<i>(Measurement, Support)</i>	<ul style="list-style-type: none"> helps both internal and external efforts helps build collaborative relationships within an industry 	<ul style="list-style-type: none"> over-reliance on shared data may mask meaningful differences in impacts
3. Supporting training and guidance on measurement	<i>(Measurement, Support)</i>	<ul style="list-style-type: none"> helps both internal and external efforts common training programs improve consistency in implementation 	
4. Supporting training and guidance on management practices, informed by the results/experiences of others	<i>(Management, Support)</i>	<ul style="list-style-type: none"> could leverage existing LCA information, saving resources compared to conducting new measurement work 	<ul style="list-style-type: none"> standardized guidance may be difficult to provide due to differences in the context of the users of the information; environmental decisions are often complicated and context-dependent.
5. Providing access to experts who can assist companies	<i>(Measurement, Support and Incentivize)</i>	<ul style="list-style-type: none"> helps both internal and external efforts addresses the perceived barrier of high financial burden associated with footprinting 	<ul style="list-style-type: none"> may be expensive and inefficient
6. Promoting consistent and accepted scope and boundary in a product category when making external communications or claims	<i>(Measurement, Support and Do)</i>	<ul style="list-style-type: none"> would help equalize the playing field and appease disheartened potential PEF participants would catalyze PEF activity by adding “certainty” to measurement needs 	<ul style="list-style-type: none"> a very resource-heavy endeavor to evaluate all the issue that must be considered and addressed, as well as to coordinate among many groups active on these topics globally
7. Promoting comprehensive reporting of all relevant impact indicators	<i>(Communication, Support)</i>	<ul style="list-style-type: none"> would reduce greenwashing, which disheartens many potential participants 	<ul style="list-style-type: none"> “relevant impacts” vary with the audience’s interest, geography, time, and technology
8. Promoting development and use of simple, easily understood indicators that facilitate purchasing decisions	<i>(Communication, Support)</i>	<ul style="list-style-type: none"> many feel that consumer apathy or unfamiliarity with LCA metrics is the cause of low demand for environmental labels 	<ul style="list-style-type: none"> it’s not certain that clearly presented information will motivate consumers to care about and act on the information
9. Engaging LCA expert input in policy and purchasing decisions	<i>(Management of purchase & use, Do)</i>	<ul style="list-style-type: none"> would help rebuild trust in purchasing and policy activities and could catalyze more PEF participation any certainty and credibility that can be given to the interpretation of LCA results might boost brand owner confidence in PEF activity 	<ul style="list-style-type: none"> even arbiters are subject to biases of interpretation; human subjectivity cannot be eliminated
10. Promoting use of EPDs in purchasing decisions	<i>(Management of purchase & use, Do and Incentivize)</i>	<ul style="list-style-type: none"> Promotion of EPDs by providing the certainty producers need to invest in EPD, and perhaps setting a trend for others to emulate. 	<ul style="list-style-type: none"> If this is not done in conjunction with fair scope and boundary delineation and fair interpretation by an LCA expert; this could set the EPD effort back by disheartening already jaded producers.

At the October 2014 meeting, Advisory Group members were asked to prioritize among these ten initial recommendations in order to narrow discussion by the group. Initial feedback from the Advisory Group identified recommendations 1, 4, 5, 6, and 7 as higher priority and it was these recommendations that

the Advisory Group devoted additional time to discussing. It should be noted that each of the remaining initial recommendations was of interest to several Advisory Group members.