Leadership Standards & Disclosure Tools

Raising the Bar for ALL Materials Used in Green Building

Jason Grant & Peter Moonen

6/1/11

If the green building movement is to achieve its sustainability mission, the market for building materials of all kinds must be transformed. LEED and other green building rating systems should do more to drive the development of *leadership standards* (high-bar standards that include social as well as environmental criteria) and *disclosure tools* (methods for assessing, reporting, and comparing the impacts of building materials, not unlike the nutritional labeling found on food products).

BACKGROUND

Since its inception, a central goal of U.S. Green Building Council's LEED green building rating system has been to drive building design and construction toward ever-higher levels of environmental performance. Known as "market transformation to sustainability" or simply "market transformation," this process of identifying and rewarding best practices across all facets of the planning, design and construction process -- from site selection to energy use to materials selection and indoor air and environmental quality -- is at the very heart of integrative building.

Of course, market transformation can apply not only to buildings themselves but also to building materials of all kinds and to the industries that produce them.

When LEED was first developed, wood was the only major building material for which high standards and credible, independent third-party certification existed; there were no ready methods for evaluating the impacts of the extraction and production of other commonly-used building materials like steel, gypsum, aluminum, concrete and vinyl. At the time, it made sense that certified wood was the only building material that warranted its own dedicated credit, while most other credits in the Materials and Resources section of LEED focused on single attributes like materials reuse and regional sourcing that can apply to all sorts of building materials.[1]

Though LEED has changed and improved in many significant respects in recent years (for example, by adding weighting and regionally appropriate considerations into LEED 2009), the Materials and Resources credits have lagged behind,[2] remaining relatively static.[3]

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[1] The same can be said of credits in the Environmental Quality section that deal with VOC-emitting materials

[2] Similarly, since LEED was first developed, the Environmental Quality credits dealing with VOC-emitting materials have been measured in terms of VOC content levels and the absence of urea-formaldehyde, metrics that have not shifted much over the years.

Wood is still the only building material in the main body of LEED that is weighed against a rigorous multi-attribute standard that includes social as well as environmental criteria. Competing building materials routinely eclipse wood in achieving credits backed by single-attribute metrics such as recycled content and 'rapid renewability.' LEED and other green building rating tools can and should do more to drive the development of *leadership standards* – high-bar standards that include both social and environmental criteria – for materials in addition to wood.

Another important area in which LEED and other green building rating tools can drive market transformation in the building materials industries is by encouraging the development and implementation of *disclosure tools*, including but not limited to Environmental Product Declarations (EPDs) based on Life Cycle Assessment (LCA). EPDs, LCAs and other emerging methods for assessing and reporting the environmental performance and human health impacts of building materials can be thought of as analogous to the nutritional labeling found on food products. When fully realized, they have the potential to provide comprehensive and transparent information allowing for in-depth evaluation and apples-to-apples comparison of the environmental impacts of different types of materials by users and specifiers.

Leadership standards and *disclosure tools* have the potential to create a particularly powerful dynamic for market transformation in the building materials industries. The two appear to complement one another as change drivers because, where disclosure tools reveal opportunities for improvement with regard to specific materials, their manufacturers will tend to be motivated to address them; and if a leadership standard and certification system exist for that product/industry, they can promote best practices as well as address site-specific ecological and social impacts for which many disclosure tools currently fail to account.

LEADERSHIP STANDARDS

When we use the term *leadership standard*, we refer to rigorous, multi-attribute standards and their associated eco-labels. They are rigorous because they codify best practices in the industries they rate and continue to improve with time.They

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[3] Notable exceptions include Innovation in Design credits approved in later versions of LEED for SMaRT, a consensus-based multi-attribute standard, as well as Cradle to Cradle Certification. However, such innovation credits do nothing to drive the development of other leadership standards, and their market transformation effect is limited because innovation credits do not enjoy the same status and market recognition as do the credits and reference standards enshrined in the body of the LEED family of rating systems.

are *multi-attribute* because they address an array of environmental and social considerations -- as opposed to single-attribute standards that focus only on, say, recycled-content or levels of formaldehyde off-gassing.

The goal of any true leadership standard is to drive market transformation to sustainability. A leadership standard seeks to achieve this by codifying and branding levels of environmental and social performance that are sufficiently high to require meaningful improvement over the *status quo* of industry practice and yet are economically feasible so that uptake by leadership companies is possible and a market can be made. With the making of a market, a growing number of industry participants have an incentive to improve their practices to meet the higher standard until eventually a new *status quo* is achieved that is more sustainable than that which preceded it. At this point, it may be possible and desirable to raise the bar still further to drive continued market transformation.

Market acceptance and industry uptake of leadership standards have accelerated dramatically of late. Well-established leadership standards exist in forestry and forest products, organic agriculture and produce, green building, and a few other sectors of the economy. But for the majority of commonly-used building materials, leadership standards either do not yet exist (e.g. industry-specific standards for concrete or plastics) or they are struggling to gain a foothold in the marketplace and "critical mass" within the industries they aspire to rate.[4]

The characteristics of leadership standards for building materials might include the following:

- ✓ They represent levels of environmental and social performance that are decidedly a cut above the *status quo* in the industries they rate
- ✓ Conformance is verified *in situ* by independent third parties
- ✓ They are transparent and are shaped by a balance of stakeholder groups/interests
- ✓ They operate by due process and consensus, and include an appeals process
- ✓ They are not dominated or controlled by the industries whose performance

[4] For example, the foundation for a leadership standard in the mining industry has been laid, though the 'edifice' apparently remains to be built. See The Initiative for Responsible Mining Assurance (IRMA) as well as the International Council on Metals and Mining (ICMM) Sustainability Principles, the Mining, Certification and Evaluation Project (MCEP), and the Framework for Responsible Mining

they rate

- ✓ They are subject to continuous improvement

- ✓ They incorporate social and human rights issues such as the well-being of affected communities, stakeholder input, basic labor rights, indigenous people's rights and women's rights

- ✓ They verify legal compliance in settings where lack of enforcement and political corruption are significant problems

- ✓ They establish minimum environmental requirements and formalize best practices of extractive processes at the point of extraction. Of course, these must be tailored to each extractive industry -- logging, mining, oil drilling, etc. For example:

    - Avoiding areas of high conservation value ("no go" zones)
    - Harvesting renewable resources on a sustained yield basis
    - Extracting non-renewable resources in an efficient and environmentally-responsible manner
    - Minimizing water contamination and use
    - Minimizing energy use and greenhouse gas emissions
    - Waste management
    - Ensuring timely restoration of extraction sites

- ✓ In most cases, they will have a chain-of-custody component that traces materials and addresses relevant issues through the value chain from primary and secondary manufacturing through distribution to end user

In addition to the above, there are many other important issues that leadership standards for building materials can and ultimately should address, including but not limited to:

- ✓ Controlling or eliminating chemicals that negatively impact the environment or human health

- ✓ Reducing greenhouse gas emissions throughout building material value chains, by, for example, rewarding increased renewable energy generation and use as well as energy efficiency in manufacturing and distribution

- ✓ End-of-life issues: reuse, biodegradability, recycling, landfill toxicity, etc., including Extended Producer Responsibility (EPR): the company that manufactures a product is responsible for it all the way to the end of the line

- ✓ Social responsibility throughout the value chain

- ✓ Disclosure and reduction of major environmental impacts (see section on *disclosure tools* that follows)

The reality is that there is currently no leadership standard in building materials or any other sector that both incorporates all of the above and enjoys a sufficient level of industry acceptance and market penetration as to impact general practice in the industry in question. If leadership standards are to drive real market transformation, then we must not allow the perfect to be the enemy of the best workable tool currently available.

But at the same time, given the magnitude and urgency of the environmental crisis and the tendency for yesterday's change driver to become today's complacent establishment, it is imperative that sustainability advocates insist that leadership standards continuously evolve to become ever more comprehensive of the full range of environmental and social concerns that ultimately define sustainability.

DISCLOSURE TOOLS

When we use the term *disclosure tool*, we refer to methods for assessing and reporting one or more of the major environmental and human impacts of building and other materials through some portion or all of their life cycle. Disclosure tools can be thought of as roughly analogous to the nutritional labeling found on food products.[5] Unlike leadership standards, disclosure tools do not set a prescriptive performance standard for a product, process, or industry. Rather, as the name suggests, their purpose is disclosure of important information for purposes of comparison.[6]

In addition to fostering leadership standards for all types of building materials, LEED and other green building rating systems should drive the development and improvement of disclosure tools. Over time, one hopes that disclosure tools will become ever more comprehensive and transparent so that they can fulfill their promise as accurate and holistic gauges of a product's performance. Eventually, they might even disclose social impacts that are currently only addressed in the more ambitious leadership standards.

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[5] This analogy is not exact -- nutritional labeling only addresses the "use phase" of a food product, which is to say, the impact on the consumer.

[6] As was noted previously, leadership standards can incorporate disclosure tools, creating a hybrid that can accelerate market transformation to sustainability

More robust disclosure tools are needed for many reasons. One is that, for all their advantages, leadership standards have a major failing in that they generally do not disclose specific environmental or human health impacts in a way that allows for the informed comparison of products (including buildings) certified to the standard. This is because leadership standards generally operate by establishing minimum thresholds for the use of environmental claims or eco-labels. But there can be very different pathways to achieving this threshold, and once it is achieved two products that qualify for the same claim/eco-label may in fact have very different levels of actual performance or impact.

For example, two buildings that earn sufficient points to garner LEED Platinum ratings may have dramatically different profiles if subjected to carbon footprint analysis of the major materials used in their construction or their actual operating performance. Or a second example: two certified wood products that bear the same eco-label may appear very different when Environmental Product Declarations (EPDs) are prepared for them depending on where and how they were manufactured.[7]

We submit that the task ahead is to establish the elements of an *ideal* disclosure tool to which all current tools might aspire – or more precisely, an ideal *toolkit* composed of complementary disclosure tools, since it is likely that no one tool can or should be expected to do everything. An ideal kit of disclosure tools would assess and reveal all of the major environmental, human health and social impacts associated with a particular building material.

It must be recognized that, today, neither the science nor the economic and political conditions necessary for the development of such an ideal kit of disclosure tools exist. However, this should not prevent us from promoting the use of the best tools currently available or from doing all we can to drive progress toward such an ideal toolkit – and to do this, we must both establish what it is that makes today's tools "good" along with what will make them better in the future.

Some of the key characteristics that an ideal disclosure toolkit might comprise are as follows:

- ✓ Objective and science-based
    - Obviously, this is only possible when the science is sufficiently advanced to provide the answers we need

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[7] Life cycle assessment (LCA) and associated international reporting protocols were developed expressly for the purpose of addressing these kinds of problems. For further discussion, see the section on LCAs and EPDs below.

        - Where science is insufficient, value judgments may be necessary, and these should be informed by balanced input from a broad spectrum of key stakeholders
    - Disclosure tools generally require the participation of industry but they must not be unduly influenced by the manufacturing or extractive industries producing the material(s) subject to assessment and disclosure – or by any other group or set of interests
        - It is important to recognize that, by its very nature, Life Cycle Assessment (LCA) – and the collection of Life Cycle Inventory (LCI) data on which LCA is based – requires the participation of the industries being evaluated.

✓ Conforms to international and/or national protocols (e.g. ISO, ANSI, etc.) where these exist
    - In the absence of such protocols, the tool should be non-proprietary unless it meets the transparency criteria listed below
    - The science of LCA should be applied in conformance with the ISO standards 14040 and 14044

✓ Comprehensive
    - Addresses the full array of available materials
    - Addresses the full range of impacts (environmental as well as social and economic) at each life-cycle phase
        - Includes site restoration and considers long-term impacts to the site related to materials extraction
        - Considers site impacts at every stage in processing (primary processing, secondary processing, conversion to useful products)
        - Sets consistent boundaries and data bases used for calculations by product type
    - Addresses substantial, distinct, and measurable concerns of the marketplace, such as energy and water use and pollution, legality, human health, safety, greenhouse gas emissions, etc.

✓ Transparent
    - Disclosure tools are most useful when they provide concise, high-level summaries of disclosed information. However, such summaries should be supplemented by documentation that:
        - justifies any assumptions
        - discloses data sources
        - discloses evaluation and reporting criteria
        - discloses situations where calculations of critical data for products or assemblies include the averaging of broad data

sets or the combination of disparate impact categories to arrive at a simple score or set of scores
    - Scope transparency – a good disclosure tool is transparent in regard to the environmental impacts that it covers and those that it does not, as well as in regard to the completeness and reliability of underlying data sets
    - LCA studies should be designed in an open and transparent fashion in accordance with ISO 14040 and 14044
    - The need for transparency should be balanced with the need to protect trade secrets and intellectual property
    - If a disclosure tool relies on certification to a standard (leadership or otherwise) to address any of the above impacts, this too should be disclosed

- ✓ Subject to periodic review and continuous improvement, as technology, use patterns and our understanding of the environment change all the time, and the analysis and disclosure system and the value systems imbedded in any given tool or set of tools will need to evolve to stay current.

In the section that follows, we provide an overview of a number of *disclosure tools* that are either currently available or are actively being developed, and that we believe hold promise for accurately assessing and revealing various important facets of the performance of building materials.

OVERVIEW OF SELECTED DISCLOSURE TOOLS

Here, we provide a succinct overview of a number of *disclosure tools* and also attempt to characterize their particular strengths and limitations.

This is ***not*** a comprehensive or definitive list, ***nor*** does it intend to pick winners and losers among competing approaches to analyzing and disclosing information. It must be emphasized that the field of disclosure tools is fragmented and immature but is evolving quite rapidly. It will be many years before it is clear which tool or set of tools is most useful and reliable, but we can begin the work of articulating what we want from disclosure tools and then drive toward that set of goals as quickly as possible.

Life Cycle Assessment & Environmental Product Declarations

Overview

Life cycle assessment (LCA) is the science of measuring the environmental

impact of a given product[8] throughout its lifespan, from extraction through manufacturing, transportation, installation, use, maintenance and disposal or recycling.

The life cycle inventory (LCI) phase of LCA considers material and other inputs to a product or process as well as co-products, emissions, effluents, and solid waste, accounting for things that are more or less precisely measurable. The life cycle impact assessment (LCIA) component of LCA is designed to categorize and characterize the LCI data in order to produce a series of environmental impact measures such as global warming potential, ozone depletion potential, and acidification.

Environmental Product Declarations (EPDs) are disclosure tools that present the environmental performance of products based on LCA. Unlike the ecolabels offered by leadership standards, EPDs simply disclose environmental performance in much the same way a nutrition level discloses nutritional performance. The ultimate goal of LCA-based EPDs is to allow for comparison of the relative environmental performance of materials in order to facilitate choice of the least burdensome.

ISO (International Organization for Standardization) has formulated a standardized framework for both LCAs and EPDs (ISO 14040/14044,14025, and 21930).

Among other things, ISO standards for EPDs define and require a program of Product Category Rules (PCRs). A PCR is an established method and scope to include in creating an EPD. PCRs ensure that LCAs are done in the same way, so that an analysis of the same product will yield the same results no matter who does the analysis. An EPD presents the results of an LCA that follows a specific PCR.

Benefits

LCA is a useful and flexible tool that links products to their measurable environmental impacts. It can be an extremely powerful tool in enabling individual businesses to undertake the greening of their supply chains as well as greening their own processes.

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[8] Some LCA practitioners argue that LCA can and should be applied not just to individual products but to assemblies of disparate materials and even to whole buildings.

The great strength of LCA is that it deals with things that are more or less *precisely measureable*; thus intuition and bias are largely eliminated. As was mentioned above, LCA and fully-realized EPDs based on them can provide end users and specifiers with the means to make apples-to-apples comparisons of the environmental impacts of different products. The LCAs and EPDs available today cannot yet do this for most products for the reasons explained below, but they certainly can provide us with a great deal of important information about products that otherwise would not be available to us.

Limitations

The strengths of LCA – that it is flexible and that it focuses on what is measurable – are also the sources of its weaknesses and limitations.

Because of its flexibility, it is possible to design an LCA to favor one product over another. This is not an acceptable state of affairs in disclosure tools where one wants a clear and unbiased approach that applies to all equivalent products.

As was noted above, PCRs for different types of products are needed to ensure that LCAs are performed and information presented in EPDs in a way that is consistent no matter who is doing the analysis.

However, North American PCRs for most major building materials have not yet been developed, and the national structure for establishing and maintaining PCRs is currently under development. There is rapid progress being made, however, it may be some time before PCRs are in place across all major building materials industries. Until they are, it will not be possible to use EPDs to perform apples-to-apples comparisons of these materials. For these reasons, the timing when EPDs will be generally available is uncertain. What is certain is that the standards and procedures that are being developed today will shape the character and effectiveness of EPDs in the future.

Another limitation of LCA is that it can only assess measurable impacts, and it is only as good as the data it is based upon. All LCA is based on underlying data sets called Life Cycle Inventories (LCI). If complete and accurate data isn't available for a given impact category, the LCA won't reflect that impact. The cost of gathering data and performing comprehensive LCAs can be significant and in some cases is a barrier to their development.

For these reasons, the LCAs of today can account for natural resource depletion (e.g. energy use, fossil fuel use) and impacts from emissions (e.g. greenhouse gases, pollution). However, most LCAs either do not or cannot currently adequately address site-specific ecological impacts (known in LCA circles as "landscape disruption"), risks from indoor emissions, and risks from hazardous waste. And of course, value-based concerns such as social and human rights

issues are generally not readily measurable, and therefore are outside of LCA's current purview.

Another challenge confronting the field of LCA and its observers is that there appear to be significant differences between and divisions among competing LCA approaches, tools, and "camps" of practitioners. Some LCA approaches may be more comprehensive than others in what they cover. Also, some LCA tools combine and aggregate results from disparate impact categories in order to arrive at a simplified overall "score" for comparison purposes, though most LCA studies keep results from impact categories separate.

It seems clear that both the science and practice of LCA and EPDs need to advance before they can deliver all that they promise. It is important not to prematurely pick winners and losers amongst LCA tools, but rather to foster progress in key areas, for example, by driving the development of LCI data for LCA and encouraging the development of Product Category Rules for EPDs.

The Pharos Project

Overview

Pharos is an on-line materials evaluation tool that evaluates building products and materials against multiple environmental and human health criteria. The system currently evaluates materials in five categories: VOCs, toxic exposures during use, toxic emissions during manufacturing, renewable materials use, and renewable energy use.

Benefits

Pharos's strengths are its independence, its transparency and its adaptability.

Pharos is administered by the non-profit Healthy Building Network and is funded mostly through foundation grants. It is available on a subscription basis, and accepts no income from product manufacturers. It sells no advertising and charges no fees for product listings. This independence has helped Pharos to gain credibility among green architects, designers, specifiers and procurement professionals.

Pharos allows for relatively easy side-by-side comparisons of building products against multiple criteria. Its filters and sorting capacity allow users to evaluate building products from multiple perspectives, against different priorities. The Pharos evaluation includes numerous certifications for products in the categories in evaluates, and allows its users to discriminate between specific attributes of products carrying the same certification.

Pharos is transparent relative to many disclosure tools now available. Its assumptions and scoring formulas are published, all data are sourced, and through a series of hot links Pharos users can get to original documentation concerning product attributes.

Pharos is adaptable. It is capable of incorporating new metrics, such as a carbon ratings, as they are developed. Its ten-point evaluation scale leaves room for continued product innovation – no products are currently obtained the highest rating on the system.

Limitations

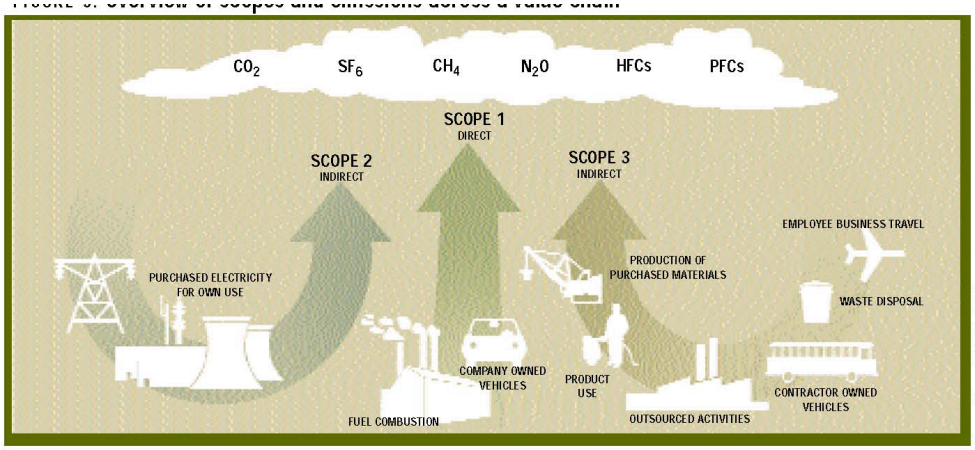
Pharos is limited by the number of products currently evaluated. There are currently approximately 500 products in the system in seven categories: Insulation, Resilient Flooring, Particle Board, Wallboard, Ceilings, Standard Paints, and High Performance Coatings.

Also, Pharos primarily measures toxicity issues, and primarily evaluates the use phase. Unlike LCA, it does not cover the life cycle impacts of climate change, acidification, land use/biodiversity, eutrophication, water use or photochemical smog. It does not cover transportation and disposal phases of buildings, and includes relatively minimal upstream impact evaluation of building material choices.

Carbon Footprinting

Overview

A carbon footprint is defined as the global warming potential scaled to equivalent CO_2 (CO2eq). This can be calculated using the methods of LCA but only looking at a single attribute. There are standards existing and under development (at ISO and the World Resources Institute/World Business Council (WRI/WBC) and elsewhere) to provide guidance in creating a carbon footprint. In addition, proprietary methods have been developed to simplify the carbon footprint calculations for simple processes (such as personal travel or a single building).



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From WRI

WRI has a fairly established method of accounting for a corporations' carbon footprint based upon 'scope 1 and scope 2' (the energy generated and purchased for the operations of a company. Standards for scope 3, the indirect items purchased by the company, are currently under review.

Benefits

A carbon footprint is a relatively simple concept and easy to communicate. Carbon is a compelling environmental impact to focus on both because of the pressing challenge of GHG-induced climate change and the growing public understanding of carbon as an environmental performance metric. If rigorous application of LCA methodology is used in developing carbon footprint methods, the business and policy focus on carbon has the potential to drive LCA methods and data that can be expanded to include additional environmental impacts.

Limitations

Because carbon footprints only focus on a single environmental impact, there is a risk that using global warming potential (GWP) as a single metric could result in system changes that have unintended, and potentially more catastrophic, consequence.

About the Authors

Jason E. Grant

For nearly 20 years, Jason Grant has been a leader in the sustainable forestry and green building movements. In 1992, he co-founded EcoTimber, a pioneering distributor of ecological forest products. EcoTimber was among the first companies in the world to bring to market products from forests certified to the stringent environmental and social standards of the Forest Stewardship Council (FSC). In 2001, Jason sold EcoTimber and helped launch the first trade association for the FSC forest products industry, the Certified Wood & Paper Association. More recently, he played a central role in crafting the National Wood Flooring Association's Responsible Procurement Program (NWFA RPP), a program that has been adopted by the leading manufacturers in the wood flooring industry and that FSC US has recognized as "a valid incremental approach toward socially and environmentally responsible forestry."

Jason is widely recognized as an expert in ecological forest products, the FSC industry, and the role of wood in the green building. His consultancy serves businesses, trade associations, and non-profit organizations that are interested in participating in the movement toward a more sustainable forest products industry.

Jason is a LEED Accredited Professional and a chain of custody auditor for Scientific Certification Systems. He serves on the Forest Certification Team of the Sierra Club, and has in the past sat on the boards of several seminal organizations in his field, including Woodworkers' Alliance for Rainforest Protection, the Good Wood Alliance, and the Certified Forest Products Council.

Jason is the principal of Jason Grant Consulting. He also operates a training business, Green Forest University. He holds a Masters degree in Teaching from the University of Puget Sound and a Bachelors degree from Reed College. Jason lives and works in Sonoma County in the northern San Francisco Bay Area, and has a wife, a son, and two daughters.

Peter N. Moonen

Peter Moonen is a third generation British Columbian who, like many in the province has his roots in the forest sector. He is a value added marketing and communications professional specializing in value-added wood products. He was also Vice President of Thinwood Forestry Ltd., a veneer manufacturing firm in Port Mellon.

He is head of the Sustainable Building Coalition formed with the Canadian Wood Council, Forest Products Association of Canada and various industry,

government and non-government organizations. He is also Coordinator of Special Projects for WoodWORKS!, a program developed by the Canadian Wood Council to stimulate and enhance a wood culture in B.C. through education, training and awareness-building programs.

In 1999, he became a founding director and President of the B.C. Associations' Cooperative of Small Wood Businesses ('The Wood Co-op'), a provincial co-operative formed to provide sales and marketing opportunities and business services for smaller producers of high quality wood products.

He is also involved in community economic development, especially transitional strategies for small, rural and resource economies. He has worked closely with several communities around the province in enhancing and diversifying their economies with special emphasis on meeting the needs of small and medium sized value-added businesses.

He was also Co-Chair of the Howe Sound Round Table for Environmental, Social and Economic sustainability.

He has a major degree in Marine Biology and Zoology as well as studying Forestry at the University of British Columbia and Communications and Marketing in Calgary. He lives in Roberts Creek with his wife, three daughters and one son.

Acknowledgements

The authors wish to acknowledge the following for their substantial contributions to his paper:

Steve Baer, William Buchholz, Lewis Buchner, Ben Cashore, Ann Edminster, Katie Fernholz, Jamey French, Ian Hanna, Pat Hooper, Jeff Howe, Mike Italiano, Marian Keeler, Bruce King, Tom Lent, Lou Newett, Doug Pierce, Kirsten Ritchie, Rita Schenck, Kate Simonen, Larry Strain, Bill Walsh