# Designing Products and Services with Sustainable Attributes

West Michigan Sustainable Business Forum

# Designing Products and Services with Sustainable Attributes

## An Internal Assessment Tool for Product Developers


**Prepared By**

**The Design Work Group**

**West Michigan Sustainable Business Forum**

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# What is Sustainable Development?

There is no consensus on the origin of the term sustainable development, but some researchers believe that it may have originated in the World Watch Institute 1981 book ***Building a Sustainable Society*** by Lester Brown. The term Eco-development was also a common term used in the early and mid-1980s. However, in 1987 the United Nations World Commission on Environment and Development report entitled ***Our Common Future*** formalized the use of sustainable development by providing the first definition.

In that report, sustainable development was defined as "meeting the needs of the present without compromising the ability of future generations to meet their own needs."

More recently, Volume 2 of the ***Dictionary of Development*** defines sustainable development as "development that can be kept up over time because it does not erode its natural resource base and the natural environment in which it must take place." Each definition implies that sustainability includes a perpetual use of resources with no negative impact to natural ecosystems and when possible, achieving a net enhancement.

# The Purpose of the EIM

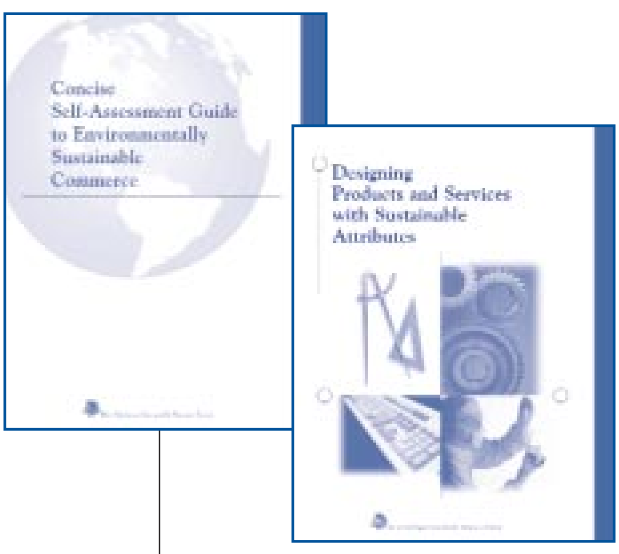
When designers are commissioned by an employer or a customer to create a new product or service, they are required to consider a number of variables including aesthetics, availability, durability, maintenance, materials, processing technology, cost, customer needs, and performance specifications. In the past, it has been difficult to include environmental considerations because of a lack of a generic systems approach to compare material specification options. As a result, design professionals have had little opportunity to document environmental sustainability improvements in their products. The Design Work Group of the West Michigan Sustainable Business Forum has developed an Environmental Impact Matrix (EIM) Rating System as a tool to evaluate progress toward achieving sustainability in new products and services.

**The National Research Council estimates that approximately 70% of the costs associated with a product's development, manufacture, and use (its life cycle) are determined in the initial design stage.**

Product developers are usually the first to conceptualize how, and of what materials, new products will be manufactured, and therefore have the earliest influence on the environmental impact of the product during its life cycle.

Building on the West Michigan Sustainable Business Forum's 1997 ***Concise Self Assessment Guide to Environmentally Sustainable Commerce***, the Design Work Group set out to develop a tool that would assist product developers in evaluating their progress toward sustainability.

The specification of raw materials, energy inputs, purchasing specifications, hazardous materials generated, recycling of the product after consumer use, and worker health and safety are just a few of the potential impacts that are involved in the initial design.




***Life Cycle Thinking vs. LCA***

*Life Cycle Assessment (LCA) should not be confused with life cycle thinking. Life cycle thinking is a unique way of addressing environmental problems from a systems or holistic perspective. In this way of thinking, a product or service system is evaluated or designed with a goal of reducing potential environmental impacts over its entire life cycle. The essential difference is that life cycle thinking does not normalize the results to a functional unit, as is done as part of a formal LCA study. Additionally, with life cycle thinking the results may be expressed either qualitatively or quantitatively. In LCA, the results are generally quantitative in nature.*

***James A. Fava, Life Cycle Assessment: What Is It and How Does It Fit Into a Broader Environmental Framework?, Society of Environmental Toxicology and Chemistry.***
***Newsletter, January 1999***

# Life Cycle Thinking

Life cycle assessment (LCA) of consumer products can be a very complicated endeavor. A full LCA provides detailed analyses of processes and materials involved in raw material acquisition, material manufacture, product manufacture, filling/packaging, and consumer use/product disposal. Environmental aspects of these activities may include resource consumption, energy consumption, water usage, airborne emissions, waterborne effluents, and solid/hazardous waste generation. Finally, risk assessment should be used to determine the potential for adverse environmental impacts to humans and wildlife.

Full assessment of all of these aspects is usually beyond the capability of an individual product developer. However, life cycle thinking is crucial to steer product designs in a direction that will lead to more environmentally friendly products. This means that the product developer must look broadly at numerous environmental aspects rather than focusing on one or two whose improvement may cause weaknesses in other important areas. To conserve resources, such approaches are limited in scope to those environmental aspects of the product that are judged most important.

Environmental design tools are conceptual frameworks that allow weighting, grouping, and comparison of completely different aspects of the product's life cycle. A selection and weighting of environmental aspects will involve value judgements and could therefore be controversial. For this reason, a design tool should allow maximum flexibility and freedom for each corporation to pursue environmental goals relevant to their project.

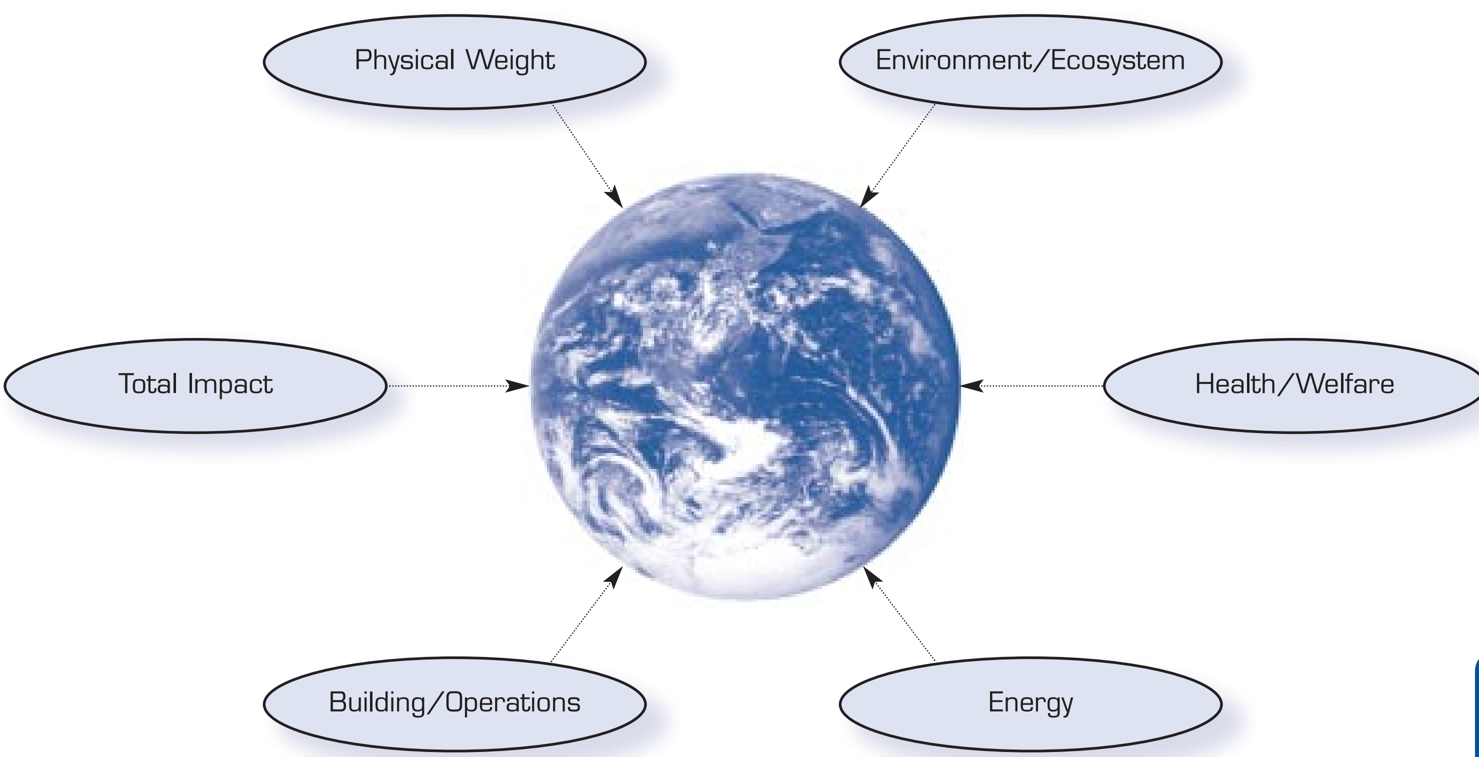
A product developer must work toward achieving or satisfying multiple business goals. Environmental performance is only one of these goals and may or may not be weighted equally with other priorities such as regulatory compliance, product performance, consumer acceptability, and price. For the purposes of this exercise, it is assumed that all of these other product aspects are acceptable, and the focus is on reducing environmental impact.

Gaining reliable data on environmental impacts can be challenging, particularly for those aspects that are outside of the control of the final manufacturer. This is especially true for the initial stages of raw material generation such as farming or mining.

The manner in which these operations are managed has a profound effect upon their environmental impact. It is often difficult or impossible to trace the origins of raw materials to their original sources to determine the extent of environmental impact.

For this reason, the assessment will focus on those aspects that are under the control of the company performing the analysis. Company control areas may include product design, facilities, purchasing, operations, packaging, distribution, marketing and sales, and impact to consumers. This tool will help companies create an environmental impact assessment for their products.

## Assessment of Environmental Impact



# Environmental Impact Matrix

Environmental Impact Matrix

Much of the initial material used in developing the Environmental Impact Matrix (EIM) was obtained from the work completed by the American Institute of Architects, especially the Impact Assessment Matrix found in their ***Environmental Resource Guide***. The EIM is designed to be user friendly. The goal in creating it was to establish a system that can be used as a template for rating environmental impact in the quest for sustainability and to be usable by product developers for a wide variety of products and companies. The EIM is a tool for **internal** and **confidential** use on the part of a company whose focus is self-assessment and environmental improvement.

Users of the matrix are required to allocate numeric values, by material type, for sustainable and environmental attributes for each product being evaluated. The ideal score is zero. This approach reflects the philosophy that less is better and least is best. Thus the EIM is intended to reward product developers for creating resource efficient products.

The numeric values are subjective and company specific. The values used should be consistent with each company's internal business, social, and environmental ethics and goals. The EIM is not intended to be used to compare a company's internal product to a competitor's products. Its primary goal is to compare internal products over the course of time to evaluate which changes will make a more sustainable product, or to compare alternative product options against each other. Expert decisions and weighting criteria should be based on internal policy issues, which should drive the subjective internal scoring system of the EIM.

The EIM allows a company to determine the most important environmental impacts of a product design in order to identify opportunities to improve the environmental performance and to lower the total score. It should be re-emphasized that the EIM is not intended to compare one company's products against another company's. The EIM is a tool used to document the environmental improvements of each company's own products.

# Strengths and Weaknesses of the Matrix

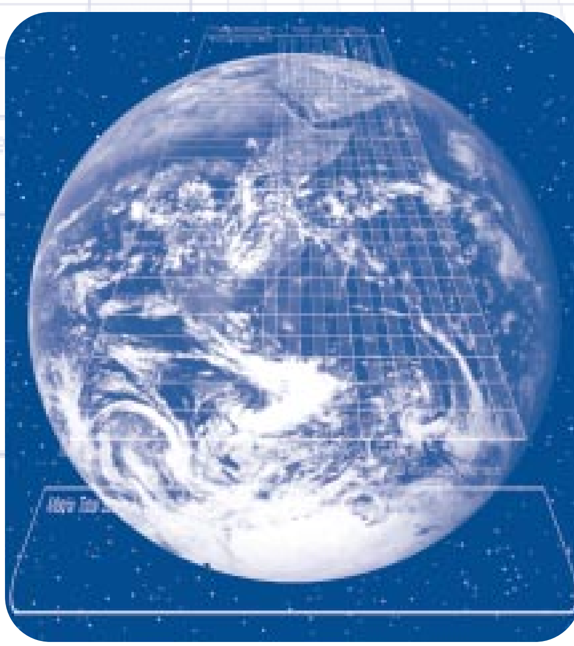
The subjectivity of the EIM allows a company to establish its own scoring system based on its internal values.

***Strengths of the Environmental Impact Matrix:***

- It is easy to use, straightforward and logical.
- If used consistently, it will provide a measure of product to product improvements.
- It is a self-analysis and enabling tool to help a company reduce its environmental impact over time.
- The total score is useful as a comparative environmental impact measurement between similar internal products.

***Weaknesses of the Environmental Impact Matrix:***

- It cannot be used as a complete Life Cycle Assessment. (see ISO 14040 Principles and Framework)
- Hard data may not be available to support each company's index values, in which case experience and judgement should prevail.



# Directions for Using the EIM

The basic system uses a rating from 0 to 5, with 0 signifying least impact and 5 signifying most impact. Each aspect of a material or process is assigned a maximum of 5 points. Since the design tool is only to be used within a single company to compare similar products, the absolute score is irrelevant (but should be consistent within comparisons).

***Initial Considerations:***
To make results of the tool meaningful to the product developer, you will have to invest some time and effort to customize it for your company. The EIM is meant to be flexible, so it can be used to evaluate whole products, sub-assemblies, or sub-processes. The horizontal rows list specific materials or sub-processes related to the product or service being evaluated. The vertical columns identify environmental aspects that are potentially associated with a product or service.

***Step One:***
First, in the horizontal rows list all the various materials, sub-processes, etc. that go into a product or service. List one product or service per EIM, using multiple pages as necessary.

***Step Two:***
Assign a value range using internal company goals, objectives, or definitions to determine least impact and worst impact. The matrix user can use the 0 to 5 range or should feel free to adjust numeric values to better reflect company goals or priorities. If an environmental aspect is not relevant, a zero rating will not penalize the score. The basis for the numeric value ratings can come from regulatory considerations, industry consensus, company preference, or a combination of influences relevant to the company's corporate values.

***Step Three:***
The physical weight of each component should be recorded in the Physical Weight column. It may be beneficial to include all material needed, including waste, not just the material in the final product.

***Step Four:***
Go across the matrix for each line item component, add each impact value, and record the sum in the Subtotal Column.

***Step Five:***
Multiply the subtotal by the weight and record for each line item component.

***Step Six:***
Record the final score in the Final Score space.

# The EIM

| West Michigan Sustainable Business Forum Product Design Workgroup | | Environment/ Ecosystem | | | | | | Health/ Welfare | | | Energy | | Building/ Operations | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **E**nvironmental **I**mpact **M**atrix<br>Product:<br><br>Material Type | Physical Weight | Air Quality | Water Quality | Resource Depletion | Land and Soils | Biodiversity/Habitat Loss | Acute/Chronic Toxicity | Worker/Installer Health | Building Occupant Health | Community Health and Welfare | Manufacturing Energy Consumed | Transportation | Life Expectancy/Durability | Maintenance Requirements | Reusability/Recyclability | Subtotal | Total x Weight |
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| Final Scores | | | | | | | | | | | | | | | | | |

Note: 0=good environmental performance; 1=good to reasonably good; 2=reasonably good; 3=reasonably good to poor; 4=poor; 5=very poor environmental performance

Matrix Total Score Analysis:

***Step One***
List material

***Step Two***
Assign values

***Step Three***
Record weight

***Step Four***
Sum each row

***Step Five***
Multiply subtotal by weight

***Step Six***
Final score

West Michigan Sustainable Business Forum
Product Design Workgroup

# **E**nvironmental **I**mpact **M**atrix

Product:

| | | Environment/ Ecosystem | | | | | | Health/ Welfare | | | Energy | | Building/ Operations | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Material Type | Physical Weight | Air Quality | Water Quality | Resource Depletion | Land and Soils | Biodiversity/Habitat Loss | Acute/Chronic Toxicity | Worker/Installer Health | Building Occupant Health | Community Health and Welfare | Manufacturing Energy Consumed | Transportation | Life Expectancy/Durability | Maintenance Requirements | Reusability/Recyclability | Subtotal | Total x Weight |
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| Final Scores | | | | | | | | | | | | | | | | | |

Note: 0=good environmental performance; 1=good to reasonably good; 2=reasonably good; 3=reasonably good to poor; 4=poor; 5=very poor environmental performance

Matrix Total Score Analysis:

# Example 1: Durable Product
# First EIM Assessment

West Michigan Sustainable Business Forum
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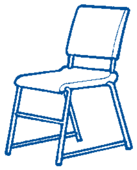
**E**nvironmental **I**mpact **M**atrix
Product:
*Stacking Chair*



| Material Type | Physical Weight | Environment/ Ecosystem | | | | | | Health/ Welfare | | | Energy | | Building/ Operations | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Air Quality | Water Quality | Resource Depletion | Land and Soils | Biodiversity/Habitat Loss | Acute/Chronic Toxicity | Worker/Installer Health | Building Occupant Health | Community Health and Welfare | Manufacturing Energy Consumed | Transportation | Life Expectancy/Durability | Maintenance Requirements | Reusability/Recyclability | Subtotal | Total x Weight |
| *Steel-1 round bar stock frame* | *8.75 LB.* | 2 | 2 | 2 | 4 | 5 | 0 | 0 | 0 | 2 | 5 | 2 | 0 | 0 | 0 | 24 | 210 |
| *Steel-2 stamped steel seat plates* | *.25 LB.* | 2 | 2 | 2 | 4 | 5 | 0 | 0 | 0 | 2 | 5 | 2 | 0 | 0 | 0 | 24 | 6 |
| *Steel-2 back stampings* | *.125 LB.* | 2 | 2 | 2 | 4 | 5 | 0 | 0 | 0 | 2 | 5 | 2 | 0 | 0 | 0 | 24 | 3 |
| *Steel-welding rod* | *.25 LB.* | 3 | 2 | 2 | 4 | 5 | 0 | 0 | 0 | 2 | 5 | 2 | 0 | 0 | 0 | 25 | 6.25 |
| | | | | | | | | | | | | | | | | | |
| *Plastic-1 PP back shell* | *1.41 LB.* | 4 | 4 | 3 | 4 | 2 | 0 | 1 | 1 | 2 | 3 | 1 | 0 | 1 | 0 | 26 | 36.66 |
| *Plastic-1 PP seat shell* | *1.73 LB.* | 4 | 4 | 3 | 4 | 2 | 0 | 1 | 1 | 2 | 3 | 1 | 0 | 1 | 0 | 26 | 44.98 |
| *Plastic-2 PP back sockets* | *.125 LB.* | 4 | 4 | 3 | 4 | 2 | 0 | 1 | 1 | 2 | 3 | 1 | 0 | 1 | 0 | 26 | 3.25 |
| *Plastic-2 PP seat spacers* | *.25 LB.* | 4 | 4 | 3 | 4 | 2 | 0 | 1 | 1 | 2 | 3 | 1 | 0 | 1 | 0 | 26 | 6.5 |
| *Plastic-4 PC floor guides* | *.03 LB.* | 4 | 4 | 3 | 4 | 2 | 0 | 1 | 1 | 2 | 3 | 1 | 0 | 1 | 1 | 27 | .81 |
| | | | | | | | | | | | | | | | | | |
| *Fasteners-6 steel push nuts* | *.018 LB.* | 2 | 2 | 2 | 4 | 5 | 0 | 0 | 0 | 2 | 5 | 2 | 0 | 0 | 1 | 25 | .45 |
| | | | | | | | | | | | | | | | | | |
| *Finish-epoxy powder coat frame* | *.19 LB.* | 0 | 0 | 2 | 1 | 1 | 0 | 1 | 0 | 1 | 2 | 2 | 0 | 2 | 1 | 13 | 2.7 |
| *Finish-black oxide on 6 nuts* | *.005 LB.* | 3 | 2 | 2 | 3 | 3 | 0 | 2 | 0 | 3 | 2 | 2 | 1 | 2 | 3 | 28 | .14 |
| Final Scores | *13.1 LB.* | 34 | 32 | 29 | 44 | 38 | 0 | 8 | 5 | 24 | 44 | 19 | 1 | 9 | 6 | 284 | 320.5 |

Note: 0=good environmental performance; 1=good to reasonably good; 2=reasonably good; 3=reasonably good to poor; 4=poor; 5=very poor environmental performance

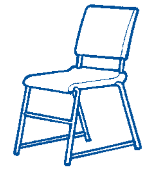
Matrix Total Score Analysis:
*The 320.5 score represents the environmental impact of the chair as it is being built with existing specifications. This number is useful for comparison to modified material or process specs.*

This is an example of how the matrix can be used to determine the environmental impact of a product. The final score reflects the overall impact as determined from the weight x the scores given to the individual components that comprise the product.

# Example 2: Durable Product
# Second EIM Assessment

West Michigan Sustainable Business Forum
Product Design Workgroup

**E**nvironmental **I**mpact **M**atrix
Product:
*Stacking Chair*



| Material Type | Physical Weight | Environment/ Ecosystem | | | | | | Health/ Welfare | | | Energy | | Building/ Operations | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Air Quality | Water Quality | Resource Depletion | Land and Soils | Biodiversity/Habitat Loss | Acute/Chronic Toxicity | Worker/Installer Health | Building Occupant Health | Community Health and Welfare | Manufacturing Energy Consumed | Transportation | Life Expectancy/Durability | Maintenance Requirements | Reusability/Recyclability | Subtotal | Total x Weight |
| *Steel-1 round bar stock frame* | *8.75 LB.* | 2 | 2 | 2 | 4 | 5 | 0 | 0 | 0 | 2 | 1 | 2 | 0 | 0 | 0 | 20 | 175 |
| *Steel-2 stamped steel seat plates* | *.25 LB.* | 2 | 2 | 2 | 4 | 5 | 0 | 0 | 0 | 2 | 5 | 2 | 0 | 0 | 0 | 24 | 6 |
| *Steel-2 back stampings* | *.125 LB.* | 2 | 2 | 2 | 4 | 5 | 0 | 0 | 0 | 2 | 5 | 2 | 0 | 0 | 0 | 24 | 3 |
| *Steel-welding rod* | *.25 LB.* | 3 | 2 | 2 | 4 | 5 | 0 | 0 | 0 | 2 | 5 | 2 | 0 | 0 | 0 | 25 | 6.25 |
| | | | | | | | | | | | | | | | | | |
| *Plastic-1 PP back shell* | *1.41 LB.* | 4 | 4 | 3 | 4 | 2 | 0 | 1 | 1 | 2 | 3 | 1 | 0 | 1 | 0 | 26 | 36.66 |
| *Plastic-1 PP seat shell* | *1.73 LB.* | 4 | 4 | 3 | 4 | 2 | 0 | 1 | 1 | 2 | 3 | 1 | 0 | 1 | 0 | 26 | 44.98 |
| *Plastic-2 PP back sockets* | *.125 LB.* | 4 | 4 | 3 | 4 | 2 | 0 | 1 | 1 | 2 | 3 | 1 | 0 | 1 | 0 | 26 | 3.25 |
| *Plastic-2 PP seat spacers* | *.25 LB.* | 4 | 4 | 3 | 4 | 2 | 0 | 1 | 1 | 2 | 3 | 1 | 0 | 1 | 0 | 26 | 6.5 |
| *Plastic-4 PC floor guides* | *.03 LB.* | 4 | 4 | 3 | 4 | 2 | 0 | 1 | 1 | 2 | 3 | 1 | 0 | 1 | 1 | 27 | .81 |
| | | | | | | | | | | | | | | | | | |
| *Fasteners-6 steel push nuts* | *.018 LB.* | 2 | 2 | 2 | 4 | 5 | 0 | 0 | 0 | 2 | 5 | 2 | 0 | 0 | 1 | 25 | .45 |
| | | | | | | | | | | | | | | | | | |
| *Finish-epoxy powder coat frame* | *.19 LB.* | 0 | 0 | 2 | 1 | 1 | 0 | 1 | 0 | 1 | 2 | 2 | 0 | 2 | 1 | 13 | 2.7 |
| *Finish-black oxide on 6 nuts* | *.005 LB.* | 3 | 2 | 2 | 3 | 3 | 0 | 2 | 0 | 3 | 2 | 2 | 1 | 2 | 3 | 28 | .14 |
| Final Scores | *13.1 LB.* | 34 | 32 | 29 | 44 | 38 | 0 | 8 | 5 | 24 | 40 | 19 | 1 | 9 | 6 | 290 | 285.5 |

Note: 0=good environmental performance; 1=good to reasonably good; 2=reasonably good; 3=reasonably good to poor; 4=poor; 5=very poor environmental performance

Matrix Total Score Analysis:
*By changing the recycled content of the steel frame from 30% to 90%, the total score is reduced from 320.5 to 285.5: a 12.2% change toward better environmental performance. Steel is 67% of the chair weight.*

This second example has a new score that reflects the fact that a higher recycled content was used in the steel frame of the chair (the numbers in blue on the matrix). This change in the components that comprise the chair resulted in a lower score on the matrix and thus a lower environmental impact.

# Example 3: Chemical Process

Product: Generic Laundry Detergent
80 grams/use

**Environmental Impact Matrix**

| *Formula Component* | % by Weight | Weight/use (g) | Volatile Organic Carbon | Biodegradability | Acute Toxicity | Bioaccumulation | Insoluble Solids | Consumer Env. Prefs. | Renewability | Manufacturing Energy | Reportable Emissions | Transportation | **Subtotal** | **Total Score x Weight** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Builder | 52 | 41.6 | 0 | 2 | 1 | 0 | 0 | 5 | 4 | 3 | 0 | 3 | 18 | 748.8 |
| Nonionic Surfactant | 14 | 11.2 | 1 | 0 | 5 | 0 | 0 | 2 | 2 | 3 | 2 | 3 | 18 | 201.6 |
| Anionic Surfactant | 10 | 8 | 1 | 1 | 3 | 1 | 0 | 3 | 4 | 2 | 2 | 2 | 19 | 152.0 |
| Bleaching Agent | 10 | 8 | 0 | 2 | 3 | 1 | 0 | 4 | 4 | 2 | 3 | 4 | 23 | 184.0 |
| Bleach Activator | 3 | 2.4 | 1 | 1 | 2 | 2 | 0 | 1 | 4 | 2 | 2 | 3 | 18 | 43.2 |
| Fabric Softener | 3 | 2.4 | 1 | 0 | 1 | 0 | 0 | 1 | 1 | 2 | 0 | 2 | 8 | 19.2 |
| Suds Controller | 3 | 2.4 | 1 | 4 | 2 | 2 | 0 | 1 | 4 | 3 | 0 | 2 | 19 | 45.6 |
| Chelator | 1 | 0.8 | 1 | 5 | 3 | 5 | 0 | 4 | 4 | 3 | 3 | 3 | 31 | 24.8 |
| Enzyme | 1 | 0.8 | 1 | 1 | 3 | 0 | 0 | 3 | 0 | 1 | 4 | 2 | 15 | 12.0 |
| Soil Dispersant | 1 | 0.8 | 1 | 4 | 2 | 2 | 0 | 1 | 4 | 3 | 2 | 3 | 22 | 17.6 |
| Solvent | 1 | 0.8 | 2 | 0 | 1 | 0 | 0 | 2 | 1 | 2 | 1 | 1 | 10 | 8.0 |
| Brightener | 0.8 | 0.64 | 1 | 4 | 3 | 3 | 0 | 4 | 4 | 3 | 3 | 2 | 27 | 17.3 |
| Colorant | 0.1 | 0.08 | 1 | 4 | 3 | 4 | 0 | 3 | 4 | 3 | 2 | 2 | 26 | 2.1 |
| Fragrance | 0.1 | 0.08 | 1 | 3 | 4 | 4 | 0 | 3 | 3 | 4 | 2 | 2 | 26 | 2.1 |
| Total | 100 | 80 | 13 | 31 | 36 | 24 | 0 | 37 | 43 | 36 | 26 | 34 | 280 | 1478 |

Builder has the largest impact by virtue of its large percentage in the product.

Minor ingredients exert minor influence on score. If necessary, numerical weighting may be used to emphasize attribute importance.

| | Use Temperature | Functional Weight | Unit Cost | **Total** |
|---|---|---|---|---|
| Product Performance | 3 | 4 | 3 | 10 |

Product performance cannot be calculated from the sum of ingredients. Performance is an important environmental attribute since it impacts wash temperature and amount of product used. Improved performance may justify a higher ingredient score. Total cost and performance are important because they affect consumer acceptability.

| | Recycled Content | Functional Weight | Disposal Fees | **Total** |
|---|---|---|---|---|
| Packaging Score | 2 | 3 | 4 | 7 |

Packaging is an integral factor in overall environmental impact. Its characteristics are influenced by product chemical properties, but packaging is a separate entity and should be scored independently using appropriate environmental considerations.

Here is an example of a different approach to using the EIM. Utilizing the EIM as a starting point, the developer then customized the matrix with his own weight and environmental impact components. This illustrates the flexibility of the matrix and demonstrates how it can be used for a wide range of products and services.

# Guidance for Allocation of Numeric Values

It must be stressed that the EIM and similar indices are not tools appropriate for consumers or other third parties to compare products or make purchasing decisions. These are simply aids to enable product developers to meet their environmental goals. The first step is to identify these goals. Examples of goals include weight reduction of a product, reduction in hazardous chemical use, reduction of waste during manufacturing, lengthening product life span, or facilitating recycling or the improvement of any other product feature that affects the environment.

Environmental aspects of the product may then be prioritized and appropriately quantified to form the EIM scoring system. As long as the EIM accurately reflects the corporation's environmental strategy, there are no incorrect index values. The EIM score itself is meaningless outside of the company, but it is expected that continued successful use of the EIM will eventually lead to attainment of environmental goals and measurable improvements in environmental performance. The measurable improvements resulting from this process will provide tangible evidence of the manufacturer's commitment to sustainable development.

Guidance on the relative importance of various environmental aspects of products can sometimes be found in published literature or information from studies performed by manufacturers trade associations.

**Rating System**

The Rating system listed below and used throughout the matrices in this book was chosen for convenience. Keep in mind, however, that you may use whatever rating system applies to your company's environmental strategy as reflected by its corporate policies and goals (for instance, you may be better served by using a finer gradient such as 0-100).

0 = good environmental performance
1 = good to reasonably good
2 = reasonably good
3 = reasonably good to poor
4 = poor
5 = very poor environmental performance

# About the West Michigan Sustainable Business Forum

The West Michigan Sustainable Business Forum encourages the implementation of business practices that promote sustainable development. Its primary goal is to investigate ways to improve corporate profitability while enhancing the long term health of the environment. Chartered by the West Michigan Environmental Action Council and twelve founding West Michigan companies, the Sustainable Business Forum continues to explore environmentally sustainable commerce.

This guide was developed by the West Michigan Sustainable Business Forum Design Work Group which consisted of the following members: Mark Bonnema and Steve Eriksson-Steelcase Inc.; Bill Dowell-Herman Miller, Inc.; Margaret Dunford, President-Guilford of Maine Marketing Company; Dan Edwards-Amway Corporation; Chairperson Tom Newhouse-Thomas J. Newhouse Design; Project Manager Bill Stough, technical support Layali Schuster-BLDI Environmental and Safety Management. Creation of this document was made possible by funding from the Joyce Foundation. The booklet was designed by Jim Kuzee and printed by the Printing Arts Company.

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1432 Wealthy SE, Grand Rapids, MI
(616) 451-3051 FAX (616) 451-3054
Web Site: www.sustainable-busforum.org

***Additional Sources of Information about Sustainable Attributes of Products:***

- Society for Environmental Toxicology and Chemistry (SETAC):
  http://www.setac.org/setac1.html
- U.S. Environmental Protection Agency (EPA):
  http://www.epa.gov/opptintr/dfe/
- International Organization for Standardization (ISO) Technical Committee 207:
  http://www.iso.ch/meme/TC207.html
- Organization for Economic Cooperation and Development (OECD):
  http://www.oecd.org/subject/sustdev/
- West Michigan Sustainable Business Forum:
  http://www.sustainable-busforum.org

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