



**BUSINESS AND INSTITUTIONAL FURNITURE
SUSTAINABILITY ASSESSMENT STANDARD**

BIFMA International
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1.0 Foreword and Goals

Established in 1973, the Business and Institutional Furniture Manufacturers Association (BIFMA) International is a not-for-profit trade association of furniture manufacturers and suppliers addressing issues of common concern. The association serves as the industry voice for workplace solutions by providing standards development, statistical data generation, government relations, industry promotion, and education.

BIFMA is committed to promoting sustainable work environments and business practices based on sound economics, environmental protection, and social responsibility. We will accomplish these goals by fostering partnerships between manufacturers, suppliers, end users, and the science community; providing association members with education in the concepts of sustainable design; and developing meaningful tools for quantifying and communicating industry progress to interested parties.

In developing a business and institutional furniture sustainability standard, BIFMA established the following goals:

1. The standard must be meaningful to the marketplace
2. It should help differentiate Environmentally Preferable Business and Institutional Furniture
3. It should help harmonize sustainability standards for the office furniture industry
4. The standard should allow for multiple levels of achievement
5. It should provide an open alternative to proprietary certification programs
6. The standard should provide incentives for smaller companies to participate

2.0 Purpose

The purpose of this voluntary BIFMA Sustainability Assessment Standard (BIFMA SAS) is to provide measurable market-based definitions of progressively more sustainable furniture by establishing performance criteria that address environmental, economic and social aspects throughout the supply chain.

3.0 Scope

An applicant should give serious consideration in defining the scope of its conformance. The BIFMA SAS provides a significant amount of flexibility in identifying the boundaries which should be used to the applicant's strategic advantage.

- 3.1 The standard is applicable to all business and institutional furniture; this includes but is not limited to moveable walls, systems furniture, desking systems, case goods, tables, seating and accessories. The standard is also applicable for materials and components manufactured by suppliers to furniture manufacturers
- 3.2 The standard is applicable to business and institutional furniture manufactured in one facility or multiple facilities, one country or multiple countries.
- 3.3 The standard addresses product based aspects in the general areas of human and ecosystem health, use of energy efficiency and renewable energy, use of water and natural resources, social responsibility impacts and economics.
- 3.4 The standard provides a pathway towards sustainability by establishing measurable criteria or multiple levels of achievement and/or performance.
- 3.5 The standard is intended to be subject to continuous improvement and updating as market and technological opportunities evolve.
- 3.6 Insofar as other standards or eco-label programs are referenced in the requirements of this standard, only meeting the requirements of those standards or programs is required, not certification to the standards or programs.

4.0 Assessing Conformance

- 4.1 The standard is useful for assessing conformance of business and institutional furniture products and/or materials or components used in the manufacture of furniture products.
- 4.2 It is intended that organizations that choose to assess business and institutional furniture and/or products to this standard can achieve first party, second party or third party conformance.
- 4.3 It is intended that organizations that choose to assess business and institutional furniture and/or products to this standard can show continuous improvement by moving products to higher levels of achievement rather than by incorporating requirements in the standard that change over time: i.e., year over year improvements in energy efficiency.
- 4.4 The manufacturer of the applicant product can determine the scope of the conformance to the extent that the scope can be clearly communicated to potential purchasers of the product.

- 4.5 The scope of conformance can be defined based on geographical location. Product that is manufactured in one location can be included, while the same product manufactured in another location can be excluded. In this case the credits that are based on “facility” or “corporate” characteristics (such as energy use, water use or health and safety management) will be evaluated based on the activities only at the location included in the scope of conformance.
- 4.6 The scope of conformance can also be limited or defined based on product options or characteristics. Wood/veneer options could be included while laminate/non-wood options are excluded, or visa versa. Certain color options or fabric options could be included while others are excluded from the scope of the conformance.

5.0 Definitions

5.1 Air Pollutant: Any substance in air that could, in high enough concentration, harm **human**, animals, vegetation or material.

5.2 Air Pollution: The presence of contaminants or pollutant substances in the air that interfere with human health or welfare, or produce other harmful environmental effects.

5.3 Alternative Fuels: Substitutes for traditional liquid, oil-derived motor vehicle fuels like gasoline and diesel. Includes mixtures of alcohol-based fuels with gasoline, methanol, ethanol, compressed natural gas, and others.

5.4 Bioaccumulants: Substances that increase in concentration in living organisms as they take in contaminated air, water or food because substances are very slowly metabolized or excreted.

5.5 Biodegradable: Capable of decomposing under natural conditions.

5.6 Biodiversity: The word is a contraction of “biological diversity,” and refers to the number, variety, and variability of living organisms.

5.7 Biomass: All of the living material in a given area; often refers to vegetation.

5.8 Byproduct: Material, other than the principal product, generated as a consequence of an industrial process or as a breakdown product in a living system.

5.9 Carcinogen: Any substance that can cause or aggravate cancer.

5.10 Compost: The relatively stable humus material that is produced from composting process in which bacteria in soil mixed with garbage and degradable trash break down the mixture into organic fertilizer.

5.11 Design for the Environment (DfE): Is the systematic integration of environmental attributes into the design of products and processes. There are three unique characteristics of DfE:

- The entire life-cycle is considered
- Point of application is clearly in the product realization
- Decisions are made using a set of values consistent with industrial ecology, integrative systems thinking or another framework

5.12 Ecology: The relationship of living things to one another and their environment, or the study of such relationships.

5.13 Ecological/Environmental Sustainability: Maintenance of ecosystem components and functions for future generations.

5.14 Ecological Integrity: A living system exhibits integrity if, when subjected to disturbance, it sustains and organizes self-correcting ability to recover toward a biomass and end-state that is normal for that system.

5.15 Ecosystem: The interacting system of a biological community and its non-living environmental surroundings.

5.16 Environment: The sum of all external conditions affecting the life, development and survival of an organism.

5.17 Environmental Aspects: An element of an organization's activities, products or services that can interact with the environment. NOTE: There may be varying degrees of sophistication from company to company in their ability to identify and address environmental aspects.

5.18 Environmental Policy: Is a statement by the organization of its intentions and principles in relation to its overall environmental performance, which provides a framework for action and for the setting of its environmental objectives and targets.

5.19 Environmental Management System: The part of the overall management system that includes organizational structure, planning activities, responsibilities, practices, procedures, processes and resources for developing, implementing, achieving, reviewing and maintaining the environmental policy.

5.20 Fossil Fuel: Fuel derived from ancient organic remains; e.g. peat, coal, crude oil, and natural gas.

5.21 Green Chemistry: Is (a set of principles to aid) the design of chemical products and processes that reduce or eliminate the use and generation of hazardous substances.

5.22 Green Engineering: Is (a set of principles to aid) the development and commercialization of industrial processes that are economically feasible and reduce the risk to human health and the environment.

5.23 Greenhouse Gas (GHG) Emissions: Emissions of gases related to human activities that accelerate the “greenhouse effect.” The term “greenhouse effect” describes the natural heat-trapping qualities of trace gases in the Earth's atmosphere. Human activities have significantly increased the concentrations of *natural* greenhouse gases such as carbon dioxide. While carbon dioxide is not the only greenhouse gas, it is the main contributor to warming. Other important greenhouse gases include nitrous oxide and methane, both of which have increased in the last century.

5.24 Indoor Air Pollution: Chemical, physical, or biological contaminants in indoor air.

5.25 Industrial Waste: Unwanted materials from an industrial operation; may be liquid, sludge, solid, or hazardous waste.

5.26 Life-cycle – Means the total impact of a system, function, product or service from the extraction of raw materials through its end-of-life management.

5.27 Life Cycle Assessment: (LCA) is a tool for the systematic evaluation of the environmental aspects of a product or service system through all stages of its life cycle **consistent with ISO 14040**. An LCA is generally quantitative and requires that the results are normalized to a functional unit. An LCA is inclusive of both product and process. An LCA is an analytical tool to implement *life cycle thinking*.

5.28 Life Cycle Thinking: is a conceptual approach that addresses environmental problems from a whole-systems or holistic perspective. The essential difference to a LCA is that the results are not normalized to a functional unit, and the results may be expressed qualitatively or quantitatively.

5.29 Post-Consumer Waste: Recovered materials that are diverted from municipal solid waste for the purpose of collection, recycling and disposition.

5.30 Pollution: Generally, the presence of a substance in the environment that because of its chemical composition or quantity prevents the functioning of natural processes and produces undesirable environmental and health effects.

5.31 Precautionary Principle: When information about potential risks is incomplete, basing decisions about the best ways to manage or reduce risks on a preference for avoiding unnecessary health risks instead of unnecessary economic expenditures.

5.32 Recycle/Reuse: Minimizing waste generation by recovering and reprocessing usable products that might otherwise become waste (e.g. recycling of aluminum cans, paper and bottles, etc.).

5.33 Renewable Energy: A renewable energy source is defined as any energy source that is replenishable and replenished on some reasonable time scale. Renewable energy sources include, but are not limited to wind, solar, heat from the earth's interior, oceans, rivers, and eligible biomass.

5.34 Renewable Raw Materials: A renewable raw material is any material that is replenishable and replenished on some reasonable time scale. Renewable material sources include, but are not limited to wood, grass fibers, plant-based plastics, fuels and 100 percent recycled content metals, papers, plastics and glass.

5.35 Resource Effectiveness/Material Intensity: Refers to the concept of continuously improving the utility and durability of the product or service provided while reducing its total material and energy throughput such as the use of less energy, the generation of less waste, and the use of less mass per unit produced.

5.36 Significant Environmental Aspect: A significant aspect is an environmental aspect that has or can have significant environmental impact.

5.37 Social Equity: Involves the identification of issues, the development of standards and the implementation of programs that address corporate responsibility for the ethical treatment of employees, communities and other stakeholders.

5.38 Social Responsibility - Involves the identification of issues, the development of standards and the implementation of programs that address corporate responsibility for the ethical treatment of employees, communities and other stakeholders.

5.39 Solid Waste: Non-liquid, non-soluble materials ranging from municipal garbage to industrial wastes that contain complex and sometimes hazardous substances. Solid wastes also include sewage sludge, agricultural refuse, demolitions wastes and mining residues. Technically, solid waste also refers to liquids and gases in containers.

5.40 Source Reduction: This refers to a pollution prevention technique that eliminates the potential for pollution at the source, or where the polluting material enters the product or service cycle.

5.41 Stakeholders: People who are (or might be) affected by any action taken by an organization. Examples are: Customers, owners, employees, associates, partners, contractors, suppliers, related people or located near by.

5.42 Sustainable Development: Is defined as meeting the needs of the present without compromising the ability of future generations to meet their needs.

5.43 Sustainable Practices: This refers to efforts by industry to achieve sustainable development goals that call for simultaneous performance improvements in economic vitality; ecological integrity; and social equity.

5.44 Sustainable Business Codes: Refers to any voluntary business code of conduct or code of practice that calls for simultaneous improvements in economic, environmental, and social performance.

5.45 Toxic Substance: A chemical or mixture that may present an unreasonable risk of injury to health of the environment.

5.46 Toxic Waste: A waste that can produce injury if inhaled, swallowed, or absorbed through the skin

5.47 Triple Bottom Line: Sustainable development involves the simultaneous pursuit of economic vitality; ecological integrity; and social equity. Companies aiming for sustainability need to perform not against a single, financial bottom line, but against the triple bottom line.

5.48 Virgin Materials: Resources extracted from nature in their raw form, such as timber or metal ore.

5.49 Waste: Unwanted materials left over from a manufacturing process, or refuse from places of human or animal habitation.

6.0 Elements, Prerequisites and Credits

6.1 The BIFMA SAS is divided into four elements each composed of various credits that are potentially available to entities seeking conformance to the standard. The four elements are:

1. Materials;
2. Energy Efficiency and Renewable Energy;
3. Human Health and Ecosystem Health; and
4. Social Responsibility.

6.2 Each element has a prerequisite or several prerequisites that are required as the minimum performance against the standard and users must meet all prerequisites in each element in order to proceed. Once the prerequisite(s) are met; users may achieve additional point credits toward multiple levels of achievement in each element by meeting the specified performance requirements. Beyond the prerequisites, there are no minimum number of credits from any of the four major categories required to earn conformance. The required credits can come from any of the four elements.

6.3 There are four levels of achievement or conformance available within this standard. All credits in the standard have the same weighting or value toward conformance. Below are the four levels with the associated numbers of credits needed to achieve each level (assuming 100 total credits available):

Green	35
Silver	48
Gold	61
Platinum	74

6.4. Summarized Score Sheets – Prerequisites and potential credits are summarized for each element in tabulated scorecards.

6.5 Point Allocation (NOTE Stakeholders have tentatively recommended the following point dispersal within the elements):

1. [Materials](#) - 30 points
2. Human and Ecosystem Health- 30 points
3. Energy Efficiency and Renewable energy- 20 points
4. Social Responsibility- 15 points
5. Innovation – 5 points

7.0 ELEMENT THREE - MATERIALS

7.1 Design for Environment Program: Prerequisite (10-31-06)

Intent

Encourage institution of a Design for Environment (DFE) program. DFE is the systematic integration of environmental considerations into product and process design. Because it offers new perspectives with a product and business focus, DFE can be a powerful tool to uncover possibilities for greater competitiveness and innovation as well as greater environmental responsibility.

Requirements

Put in place a multi-disciplinary DFE program which may include design, engineering, production, quality assurance and marketing staff.

Documentation

Integration of DFE into an Environmental Management System
or

Objective evidence (e.g. procedures documented and implemented) to verify the use of Life Cycle Thinking, including such elements as:

Life Cycle Assessment
Materials Use Efficiency
Renewable Materials
Recycled Materials
Recyclable and Biodegradable Materials
End-of-Life Management
Water Management

Potential Technologies and Strategies:

Resources:

- DFE Guide prepared by National Research Council of Canada
http://dfe-sce.nrc-cnrc.gc.ca/overview/overview_e.html.
- Minnesota Office of Environmental Assistance, Better by Design (2006),
<http://www.moea.state.mn.us/berc/DFEtoolkit.cfm>.

7.2 Use of Life Cycle Assessment

Intent

Encourage use of Life Cycle Assessment (LCA) to inform product design and development and to optimize materials choices.

Requirements

Complete an LCA for the furniture product to be assessed to the SAS.

Documentation (3 levels of achievement)

1. Evidence that a company has incorporated life cycle thinking into the creation of a product by applying at least two of the four components of ISO 14040*.
2. Evidence that a company has completed an LCA utilizing all four components outlined in ISO 14040*.
3. Evidence that a company has completed an independent third party peer review of its LCA.

Potential Technologies and Strategies

Resources:

- Five Winds International <http://www.fivewinds.com/index.cfm>
- SimaPro <http://www.pre.nl/simapro/>
- International Standards Organization <http://www.iso.org/iso/en/ISOOnline.frontpage>
- The International Journal of Life Cycle Assessment
- United Nations Environment Program Life Cycle Initiative <http://lcinitiative.unep.fr/>
- BEES (NIST) <http://www.bfml.nist.gov/oa/software/bees.html>
- US Life Cycle Inventory Database <http://www.nrel.gov/lci/>
- IDCE <http://www.idce.org/>
- GABI http://www.gabi-software.com/index.html?&no_cache=1

*ISO 14040 Note: COMPONENTS OF A LIFE CYCLE ASSESSMENT

- (1) Life Cycle Management (LCM)
- (2) Life Cycle Inventory (LCI)
- (3) Life Cycle Impact Assessment (LCIA)
- (4) Life Cycle Impact Interpretation

7.3 Increase Materials Use Efficiency (10-11-)

Intent

Optimize the volume and weight of materials used in the manufacture and delivery of products and services. This strategy can improve the productivity of material resources and save on raw material consumption and transportation costs as well as reduce the environmental impacts of resource consumption.

Requirements

Conduct baseline assessment of product material use: $\text{Material Intensity} = \text{Mass of Raw Materials} / \text{Mass of Products/Output}$.

Employ strategies to reduce raw material consumption by X percent for product

Employ strategies to reduce material use in product by 2X percent for product

Documentation

Potential Technologies and Strategies

Dematerialization: is the replacement of a physical product with a non-physical product or service, thereby 1) reducing a company's production, demand and use of physical products; and 2) the end-user's dependence on physical products.

Dematerialization will result in cost-savings in materials, energy, transportation, consumables and the need to manage the eventual disposal and/or recycling of product. Dematerialization may involve: 1) Making the product smaller and lighter; 2) Implementing "shared use" of a product so that it becomes the property of the organization, rather than of an individual user resulting in a limited number of "shared" products used by many; 3) Selling a service rather than a product. Users are often more interested in the value a product provides than in its physical ownership or presence. Companies that do this assume responsibility for maintenance, repair, disposal and/or recycling of the product during its use and end-of-life phases. The buyer pays on a unit-of-service basis.

Physical Optimization: This strategy focuses on 1) optimizing the product's function; 2) extending the technical life span, i.e., the time during which a product functions well); and 3) extending the aesthetic life span, i.e., the time during which a user finds the product attractive. For example, ensuring that a product will be cleaned, maintained and repaired on time will increase its usability and life span. A modular structure makes it possible to revitalize a product from a technical or aesthetic point of view, enabling the product to keep pace with the changing needs of the end-user. Modular structure also allows new technology to be incorporated into an older product. As a result, a modular product may undergo several upgrades in components over its life span, reducing the need for new products to be purchased on a more frequent basis. Finally, avoid design

that may cause the user to replace the product as soon as the design becomes unfashionable. The psychological life span is the time in which products are perceived and used as worthy objects. Products should have the material ability, i.e., technical and aesthetic life span, as well as the immaterial opportunity to age in a dignified way.

Using Less Material: Decisions about what materials to use and how much to use have implications for health and safety during product manufacture and use, as well as product handling and waste disposal. This strategy focuses doing more with less. (Other consideration such as whether to use recycled or recyclable materials, and use non-toxic or less toxic inputs are considered in separate categories below).

Reduction of weight: Using less material is a simple, direct means to decrease environmental impact, i.e., fewer resources extracted, less waste and lower environmental-loadings during transportation. If you are interested in reducing material usage, you should closely scrutinize appropriate materials and design, e.g., reinforcing ribs instead of using thick-walled components. Weight reduction can significantly lower material use and costs.

Reduction in (transport) volume: When a product and its packaging are reduced in size and volume, more products can be shipped more efficiently in a given transport mode. Consider foldable or stackable designs and final product assembly at the retail location or by the end-user.

7.4 Renewable Materials (Question: Should wood be treated differently than other renewable materials or included herein?) (10-24)

Intent

Increase the use of renewable materials. Renewable materials are substances derived from a living tree, plant, animal or ecosystem which has the ability to regenerate itself within a reasonable timeframe (70 year timeframe). The use of renewable materials can represent a good environmental and societal choice because these materials: 1) will not be depleted if managed properly as a renewable resource; 2) may have reduced net emissions of CO₂ across their life cycle as compared to materials derived from fossil fuels; 3) result in waste that will biodegrade if managed in circumstances that permit biodegradation; and 4) may be grown and used locally--a situation that promotes employment and reduces transportation energy impacts.

Requirements

Prerequisites: Inventory all sources of renewable resources used in the product, and verify that they are purchased from sustainable sources and assess percentage

1 Credit - Increase renewable materials use in product by 15 percent over Baseline

1 Credit – Reduce CO2 from renewable materials use in product by 20 percent

1 Credit – Waste (non-value added material) from production can be safely composted

Innovation Point – 40 percent of raw material in finished product is from locally produced sources

Documentation

Potential Technologies and Strategies:

Before using more renewable materials in product, check suppliers' product labels to verify: The quality and consistency of organic materials that are sourced from renewable stocks. That the materials have been harvested and the stocks managed in an environmentally preferable manner.

7.5 Lower "Embodied Energy" Materials (11-6)

Intent

Substitute lower embodied energy materials for higher embodied energy materials. The embodied energy of a material refers to the energy used to extract, process and refine it before use in product manufacture. A correlation exists between the number and type of processing steps and the embodied energy of materials; for example, the fewer and simpler the extraction, processing and refining steps involved in a material's production, the lower its embodied energy. The embodied energy of a material is often reflected in its price.

Requirements [Bill Stough: Thoughts here???)

Baseline: Calculate total energy used in the materials that comprise the product: from the receiving dock to the shipping dock.

Reduce embodied energy of product materials by 10 percent.

Potential Technologies and Strategies: In some cases, the most technically appropriate material will lower energy costs over the life cycle of a product. For example, composite materials involving carbon fibers or ceramic compounds may have a relatively high embodied energy, but when they are used

appropriately, they can save energy in a product's use-phase due to their advanced physical properties, e.g., strength, stiffness, heat or wear resistance. On the other hand, materials with less embodied energy may often be substituted without a loss in product performance, if you optimize the use of the material with respect to the product's reliability/durability and technical/aesthetic functions.

7.6 Recyclable and Biodegradable Materials (10-31-06)

Intent

Increase the use of 'closed loop' processes for recyclable and biodegradable materials.

Requirements

Measurement & Viability (1 point)

1. Identify and quantify the amount of recyclable and biodegradable materials in the product. All qualifying recyclable and biodegradable materials must be clearly labeled or otherwise identified in a manner that facilitates easy identification of materials during disassembly.
2. Verify availability of recycling/biodegradation facilities (excluding waste to energy) for recyclable and biodegradable materials in product in at least six of ten geographic zones (see appendix for zone map)
3. Demonstrate commercial viability of extraction of recyclable/biodegradable materials from product.

Reclamation (1 point)

1. Utilize an in-house reclamation and recycling program in which at least 80% of recycled and biodegradable materials in the product are utilized by the original manufacturer (excluding waste to energy).

Documentation

Measurement & Viability

1. Utilize BIFMA SAS template to identify amount of recyclable and biodegradable materials in product. Products must contain at least 50% recyclable and/or biodegradable material to qualify
2. Use template to identify recycling/biodegradation facilities in six of ten geographic zones (see appendix for zone map) Submit letter verifying material acceptance
3. Submit documentation that product can be quickly and completely disassembled into base materials with simple tools.

Reclamation

1. Submit documentation of in-house reclamation program.
2. Maintain 'material balance' records (Mass of reclaimed material in – Mass of material recycled)

Potential Technologies and Strategies

Product design can make a significant contribution to Recyclability. Here are some criteria to follow:

Select just one type of material for the product as a whole or for each sub-assembly. If selecting one type of material is not practical, select plastics in mutually compatible groups, i.e., SAN, ABS, PC, PMMA; PC, PET; or PVC, SAN, PMMA.

Don't cross-contaminate metals, e.g., mixing steel components with copper; aluminum with copper or iron; or copper with mercury or beryllium. To aid recycling, avoid or minimize materials which are difficult to separate such as compound materials, laminates, fillers, fire-retardants and fiberglass reinforcements.

Choose recyclable materials for which collection programs are in place or anticipated and for which a market already exists, unless the materials are coming back to the manufacturer or supply chain which can use them for the same or similar purposes again. Avoid polluting elements such as stickers that interfere with recycling, or glues and small components that are contaminants.

7.8 Water Management – Water Inventory of Factory

Intent

Establish a baseline water inventory to document water sources/withdrawals, uses and discharges for the manufacturing facility where the finished product, to be assessed to the SAS, is assembled or manufactured. Where multiple OEM or supply chain facilities are utilized in production of the product, establish the baseline water inventory for the facility which has the highest water usage rate.

Requirements

Document a facility water inventory by assessing the current sources of water, usage rates, and discharge rates.

Documentation

Record monthly or annual water volumes, including the following:

- Sources/Withdrawals (municipal supply, surface water, groundwater, collected rainwater)
- Uses (embodied in product, process/equipment, cooling & heating, facility, landscaping, sanitary/domestic)
- Discharges (on-site wastewater treatment, POTW, surface water, groundwater, evaporative loss)

Potential Technologies and Strategies

Resources:

- *Publicly-Owned Treat Works (POTW) surveys and baseline monitoring reports.*
- *<http://www.globalreporting.org/Home> (Global Reporting Initiative)*

7.9 Water Management – Water Efficiency

Intent

Maximize water efficiency to reduce the burden on the water supply and local wastewater treatment systems for the manufacturing facility where the finished product, to be assessed to the SAS, is assembled or manufactured. Where multiple OEM or supply chain facilities are utilized in production of the product, calculate the water efficiency improvement for the facility which has the highest water usage rate.

Requirements

Employ strategies to reduce (monthly or annual) water usage or discharge rates by at least 20%, relative to the established baseline values.

Documentation

Document baseline and reduced water usage and discharge rates.

Use high efficiency fixtures, dry fixtures such as composting toilets and waterless urinals, and occupant sensors to reduce the domestic/sanitary water demand. Consider process water reuse/recycling systems (note: pre-treatment may be required prior to a second use). Replace non-contact cooling water systems with high efficiency chillers or cooling towers. Institute water sub-metering programs to ensure that all water uses within a facility are identified and quantified.

7.10 Water Management – Zero Wastewater Discharge (*Innovation Credit*)

Intent

Achieve zero net water usage or wastewater discharge rates for the manufacturing facility where the finished product, to be assessed to the SAS, is assembled or manufactured. Where multiple OEM or supply chain facilities are utilized in production of the product, achieve zero discharge for the facility which has the highest water usage rate.

Requirements

Employ closed-loop processes and innovative water sourcing and wastewater treatment technologies to achieve zero net usage and zero net wastewater status.

Documentation

Document a water balance for the facility, showing zero net usage and zero net wastewater discharge rates.

Potential Technologies and Strategies

Implement process changes, water-saving systems (retrofitting and replacement), reuse/recycle systems, alternate water sources, and tertiary treatment processes.

Resources:

- EPA Capsule Report (November, 2000) *Approaching Zero Discharge in Surface Finishing* Web-link: http://www.pfonline.com/mag_images/625R99008AZD.pdf
- Canon Zero Wastewater: <http://www.canon.com/about/environment/focus.html>
- Interface Zero Wastewater: <http://www.interfacesustainability.com/>

7.11 Water Management – Innovation Credit

Consider awarding an innovation credit for zero wastewater discharges.

7.12 Water Management - Water Inventory of Factory

Intent

Establish base line water inventory to understand water consumption for a manufacturing facility.

Requirements

Conduct building water inventory for one manufacturing facility in which a company owns and operates when manufacturing BIFMA related products.

Included??

Potential Technologies and Strategies

7.13 Water Management - Water Inventory of Product

Intent

Determine water used to product or product line.

Requirements

Establish baseline for energy performance when producing specific product or product line.

Potential Technologies and Strategies

7.14 Water Management - Water Use Reduction, 20% Reduction -1 point

Intent

Maximize water efficiency within buildings to reduce the burden on municipal water supply and wastewater systems.

Requirements

Employ strategies that in aggregate use 20% less water than the water use baseline calculated for the building (not including irrigation) after meeting Energy Policy Act of 1992 fixture performance requirements. Calculations are based on estimated occupant usage and shall include only the following fixtures (as applicable to the building): water closets, urinals, lavatory faucets, showers and kitchen sinks.

Potential Technologies and Strategies

Use high-efficiency fixtures, dry fixtures such as composting toilet systems and non-water using urinals, and occupant sensors to reduce the potable water demand. Consider reuse of storm water and grey water for non-potable applications such as toilet and urinal flushing and custodial uses.

7.15 Water Management - Water Discharges are Clean

Intent

Requirements

Potential Technologies and Strategies

7.16 Water Management - Innovative Water Management Systems-1 point

Intent

Reduce generation of wastewater and potable water demand, while increasing the local aquifer recharge.

Requirements

OPTION 1

Reduce potable water use for building sewage conveyance by 50% through the use of water conserving fixtures (water closets, urinals) or non-potable water (captured rainwater, recycled greywater, and on-site or municipally treat wastewater).

OR

OPTION 2

Treat 50% of wastewater on-site to tertiary standards. Treated water must be infiltrated or used on-site.

Potential Technologies and Strategies

SCORESHEET ATTACHED

**8.0 ELEMENT TWO - ENERGY EFFICIENCY AND RENEWABLE ENERGY
(as of 10-19-06)**

Overview

Organizations can lower adverse environmental impacts and operational costs by increasing awareness and attention on improving energy performance. It requires strategically managing the energy used for operating buildings, production processes and finished goods consumption enterprise wide. This section provides guidance and tools to help reduce the amount of energy used and it encourages the use of more benign forms of energy.

Approach

The Energy Efficiency & Renewable Energy section focuses on energy conservation from building operations, product design, manufacturing processes and energy consumption of a product during its use. In addition, there are incentives to produce energy on-site and to purchase renewable energy.

8.1 Prerequisite 1: Develop Energy Policy

Intent

Develop and implement a corporate energy policy that will establish the overall direction of the organization in terms of its commitment to energy conservation and increase the percentage of renewable energy.

Requirements

Establish and implement a corporate energy policy for the overall direction of the organization in terms of its commitment to energy conservation and the increased use of renewable energy.

The first requirement is that top management must establish and define the energy policy. Note that this requirement does not specifically state that top management must *write* the policy, only that it be committed to the policy and ensure its implementation.

Top management must ensure the policy:

- Is appropriate to the nature and scale to its organization's activities, products, and services.
- Includes a commitment to continual improvement.
- Includes a commitment to comply with relevant local, state, and federal regulations; and with other requirements to which the organization subscribes.
- Provides the framework for setting and reviewing objectives and targets.
- Is documented, implemented and communicated.

In addition, the policy should focus on the organization's mission, vision, and core values. Specific local or regional conditions should be considered as should the organization's image and the views of other interested parties. Other interested parties may include employees, share holders, customers, consumers, local communities, environmental groups, lenders, and regulators.

Documentation

- Corporate Energy Policy Statement

Potential Technologies & Strategies

Consider best management practices and example statements from the EPA Energy Star program as prescribed in the *Guidelines for Energy Management* document located at www.energystar.gov.

8.2 Building Energy Inventory: Conduct for Manufacturing Facility -1 Point

Intent

Establish energy inventory to understand energy consumption.

Requirements

Conduct building energy inventory to create a *Statement of Energy Performance* for the manufacturing location of the product being assessed to the standard. Manufacturing location refers to the final assembly of the product. For example, if the work surfaces come from Facility A, the end panels come from Facility B, and the product is assembled in Facility C; then the final assembly is considered Facility C.

Documentation

- *Statement of Energy Performance* worksheet with PE verification

Potential Technologies & Strategies

Consider using template from the Energy Star program to help define current energy performance for building type as prescribed in the *Guidelines for Energy Management* document located at www.energystar.gov.

8.3 Building Energy Inventory: Conduct for 50% of Facilities - 1 Point

Intent

Establish energy inventory to understand energy consumption.

Requirements

Conduct building energy inventory for 50% of the total number of buildings **over** which a company has operational control or influence **for**, when producing business and institutional furniture (i.e. manufacturing facilities, offices facilities).

Documentation

- *Statement of Energy Performance* worksheet with PE verification

Potential Technologies & Strategies

Consider using template from the Energy Star program to help define current energy performance for building type as prescribed in the *Guidelines for Energy Management* document located at www.energystar.gov.

8.4 Building Energy Inventory: Conduct for 100% of Facilities -1 Point

Intent

Establish energy inventory to understand energy consumption.

Requirements

Conduct building energy inventory for 100% of the total number of buildings over which a company has operational control or influence for, when producing business and institutional furniture (i.e. manufacturing facilities, offices facilities).

Documentation

- *Statement of Energy Performance* worksheet with PE verification

Potential Technologies & Strategies

Consider using template from the Energy Star program to help define current energy performance for building type as prescribed in the *Guidelines for Energy Management* document located at www.energystar.gov.

8.5 Energy Performance: Achieve Energy Star Rating for 5% of Total Square Footage - 1 Point

Intent

Reduce energy consumption to achieve Energy Star Rating.

Requirements

Achieve Energy Star rating for 5% of the facilities total square footage of the buildings in which a company has operational control or influence over when producing business and institutional furniture (i.e. manufacturing facilities, offices facilities).

Documentation

- *Statement of Energy Performance* worksheet with PE verification showing score of a minimum of 60.

Potential Technologies & Strategies

Consider using Energy Star strategies as prescribed in the *Guidelines for Energy Management* document located at www.energystar.gov.

8.6 Embodied Energy - Determine embodied energy used to produce component parts, or subassemblies - 1 Point

Intent

Understand the amount of embodied energy required to produce components parts or subassemblies of a product line.

Requirements

Establish baseline of embodied energy used to produce component parts or subassemblies of a specific product line by determining energy usage for raw material production and transportation of components.

Documentation

- Analysis of raw materials, subassemblies, and transportation using available tools noted below.

Potential Technologies & Strategies

Use LCI software tools for gathering and tracking energy usage data. Consider using methods such as:

- BEES (Building for Environmental and Economic Sustainability) developed by the National Institute of Standards and Technology, located at www.bfrl.nist.gov/oea/software/bees.
- Franklin US LCI Database, developed by Franklin and Associates, found at www.pre.nl/download/manuals/DatabaseManualFranklinUS98.pdf
- US EPA TRACI (Tools for the Reduction and Assessment of Chemical and other environmental Impacts), found at www.epa.gov/ORD/NRMRL/std/sab/taci/index.
- US Life Cycle Inventory Database developed by the National Renewable Energy laboratory found at, www.nrel.gov/docs/fyo5osti/37661 or www.nrel.gov/lci.
- IDCE (International Design Center for the Environment) eLCie tool, found at www.idce.org.
- NCMS (National Center for Manufacturing Sciences), found at www.ncms.org.

Or obtain information from component supplier declaring the above requirements have been met. Include details demonstrating an embodied energy assessment was performed and the data is clearly defined.

8.7 Embodied Energy - Reduce embodied energy used to produce component parts, or subassemblies by 10% - 1 Point

Intent

Reduce the amount of embodied energy required to produce components parts or subassemblies of a product line.

Requirements

Reduce embodied energy consumption by 10% used to produce component parts or subassemblies of a specific product line by determining energy usage for raw material production and transportation of components.

Documentation

- Analysis of raw materials, subassemblies, and transportation using available tools noted below.

Potential Technologies & Strategies

Use LCI software tools for gathering and tracking energy usage data. Consider using methods such as:

- BEES (Building for Environmental and Economic Sustainability) developed by the National Institute of Standards and Technology, located at www.bfrl.nist.gov/oea/software/bees.
- Franklin US LCI Database, developed by Franklin and Associates, found at www.pre.nl/download/manuals/DatabaseManualFranklinUS98.pdf
- US EPA TRACI (Tools for the Reduction and Assessment of Chemical and other environmental Impacts), found at www.epa.gov/ORD/NRMRL/std/sab/taci/index.
- US Life Cycle Inventory Database developed by the National Renewable Energy laboratory found at, www.nrel.gov/docs/fyo5osti/37661 or www.nrel.gov/lci.
- IDCE (International Design Center for the Environment) eLCie tool, found at www.idce.org.
- NCMS (National Center for Manufacturing Sciences), found at www.ncms.org.

Or obtain information from component supplier declaring the above requirements have been met. Include details demonstrating an embodied energy assessment was performed and the data is clearly defined.

8.8 Components – 20% of Tier I Suppliers determine amount of energy used to produce components - 1 Point

Intent

Understand the amount of energy consumption required to produce supplied components for a product line.

Requirements

20% of Tier I suppliers, of a specific product line, establish a baseline of the amount of energy used to produce supplied components.

Documentation

- Documentation of energy use data.

Potential Technologies & Strategies

The supplier shall gather and track energy use data. The level and scope of detail will vary from organization to organization. Consider using Activity Based Costing methods such as

- Georgia Tech's *Tools that Reveal Environmental Performance* located at www.gatech.edu/.
- University of Pittsburgh's *Activity Based Costing* method located at www.pitt.edu/~roztocki/abc/abctutor/sld001.

8.9 Components – 20% of Tier I Suppliers reduce the amount of energy used to produce components by 10% - 1 Point

Intent

Reduce the amount of energy consumed to produce supplied component parts or subassemblies for a product line.

Requirements

20% of Tier I suppliers, of a specific product line, reduce 10% of the amount of energy used to produce supplied component parts or subassemblies.

Documentation

- Documentation of energy use reduction.

Potential Technologies & Strategies

The supplier shall gather and track energy use data. The level and scope of detail will vary from organization to organization. Consider using Activity Based Costing methods such as

- Georgia Tech's *Tools that Reveal Environmental Performance* located at www.gatech.edu/.
- University of Pittsburgh's *Activity Based Costing* method located at www.pitt.edu/~roztocki/abc/abctutor/sld001.

8.10 Product Manufacturing – determine process energy used to produce product - 1 Point

Intent

Understand the amount of energy consumed for the specific product line being assed to the standard.

Requirements

Establish a baseline of the amount of energy consumed to produce a specific product line.

Documentation

- Documentation of energy use data.

Potential Technologies & Strategies

Gather and track energy use data. The level and scope of detail will vary from organization to organization. Consider using Activity Based Costing methods such as:

- Georgia Tech's *Tools that Reveal Environmental Performance* located at www.gatech.edu/.
- University of Pittsburgh's *Activity Based Costing* method located at www.pitt.edu/~roztocki/abc/abctutor/sld001.

8.11 Product Manufacturing – reduce process energy used to produce product by 10% - 1 Point

Intent

Reduce the amount of energy consumed for the specific product line being assessed to the standard.

Requirements

Reduce, by 10%, the amount of energy consumed to produce a specific product line.

Documentation

- Documentation of energy reduction data.

Potential Technologies & Strategies

Gather and track energy use data. The level and scope of detail will vary from organization to organization. Consider using Activity Based Costing methods such as:

- Georgia Tech's *Tools that Reveal Environmental Performance* located at www.gatech.edu/.
- University of Pittsburgh's *Activity Based Costing* method located at www.pitt.edu/~roztocki/abc/abctutor/sld001.

8.12 Finished Product Energy Consumption – Lighting products meet California Title 24 - 1 Point

Intent

Reduce energy consumption during product usage.

Requirements

Lighting products meet California Title 24.

Documentation

- Lighting specification documentation.

Potential Technologies & Strategies

Reference California Title 24 located at www.energy.ca.gov/title24/.

8.13 Finished Product Energy Consumption – Use of Energy Star Motors - 1 Point

Intent

Reduce energy consumption during product usage.

Requirements

Finished products with motors meet Energy Star requirements.

Documentation

- Motor specification documentation with Energy Star label or equivalent.

Potential Technologies & Strategies

Consider using the Department of Energy's *Motor Master Database* and/or the Energy Star motor requirements.

8.14 Transportation – Carrier and Shipper Strategies - 1 Point

Intent

Reduce environmental impact on carrying freight.

Requirements

Develop and implement technologies and strategies to facilitate reductions in fuel consumption and emissions associated with freight shipping activities. This includes receiving and shipping of raw materials, components, and finished products.

OR

Develop, document, and implement technologies and strategies that help truck carriers save fuel, reduce air pollution, and reduce emissions that contribute to climate change.

Documentation

- Procedure and/or programs documenting strategies and reductions.

Potential Technologies & Strategies

Consider using strategies from the EPA's *SmartWay Transportation Partnership* program located at www.epa.gov/smartway/.

8.15 Transportation – Carrier and Shipper participate in the EPA's Smartway Program - 1 Point

Intent

Reduce environmental impact on carrying freight.

Requirements

Improve fuel efficiency, reduce environmental footprint, and reduce energy consumption by participating in the EPA's *SmartWay Transportation Partnership* program.

Develop and implement technology and strategies as defined by the program for shippers and/or freight carriers.

Documentation

- FLEET Performance Model (Freight Logistics Environmental and Energy Tracking Performance Model)

Potential Technologies & Strategies

Assess the environmental performance of freight operations using the EPA's *SmartWay Transportation Partnership* program's FLEET Performance Model (Freight Logistics Environmental and Energy Tracking Performance Model) located at www.epa.gov/smartway/.

8.16 Renewable Energy – Use of renewable energy for 1% total corporate energy consumption - 1 Point

Intent

Increase the usage of green energy as a percent of total energy consumption to help reduce greenhouse gasses and minimize the use of petroleum products.

Requirements

Use green energy for 1% total corporate energy requirements for facilities in which a company has operational control or influence over when producing business and institutional furniture (i.e. manufacturing facilities, offices facilities).

Documentation

- Proof of green energy procurement from accredited program.

Potential Technologies & Strategies

Consider using Green-e *Tradable Renewable Certificates*, or a supplier that meets the Green-e Renewable Power definition. www.green-e.org.

8.17 Renewable Energy – Use of renewable energy for 2% total corporate energy consumption - 1 Point

Intent

Increase the usage of green energy as a percent of total energy consumption to help reduce greenhouse gasses and minimize the use of petroleum products.

Requirements

Use green energy for 2% total corporate energy requirements for facilities in which a company has operational control or influence over when producing business and institutional furniture (i.e. manufacturing facilities, offices facilities).

Documentation

- Proof of green energy procurement from accredited program.

Potential Technologies & Strategies

Consider using Green-e *Tradable Renewable Certificates*, or a supplier that meets the Green-e Renewable Power definition. www.green-e.org.

8.18 Green Energy – 20% of Tier I suppliers use green energy for 1% of total energy requirement - 1 Point

Intent

Increase the usage of green energy as a percent of total energy consumption to help reduce greenhouse gasses and minimize the use of petroleum products.

Requirements

20% of Tier I suppliers use green energy for 1% of total corporate energy requirement

Documentation

- Proof of green energy procurement from accredited program.

Potential Technologies & Strategies

Consider using Green-e *Tradable Renewable Certificates*, or a supplier that meets the Green-e Renewable Power definition. www.green-e.org.

8.19 On-Site Energy – Reclaiming waste for 1% of total facility energy requirement - 1 Point

Intent

Encourage and recognize increasing levels of on-site renewable energy self-supply in order to reduce environmental and economic impacts associated with fossil fuel energy use.

Requirements

Reuse of materials that would normally go to the waste stream for on-site energy for 1% of total facility energy requirement where final assembly or finished product is manufactured.

Documentation

- Proof of reclamation of on-site energy generated.

Potential Technologies & Strategies

Consider referencing California Rule 21 and the ANSI IEEE *1547 Standard for Interconnecting Distributed Resources* in the California Distributed Energy Resource Guide located at www.energy.ca.gov/distegen/.

Examples of reclamation could be burning sawdust for heat and recovering steam for heat/energy.

8.20 On-Site Energy – Produce green energy for 1% of total facility energy requirement - 1 Point

Intent

Encourage and recognize increasing levels of on-site renewable energy self-supply in order to reduce environmental and economic impacts associated with fossil fuel energy use.

Requirements

Produce on-site energy for 1% of total facility energy requirement where final assembly or finished product is manufactured.

Documentation

- Proof of on-site manufactured green energy.

Potential Technologies & Strategies

Consider using the Center for Resource Solution's Green-e program at www.green-e.org.

Examples: wind, solar, geo-thermal, etc...

8.21 Greenhouse Gases - Develop Greenhouse Gas Inventory for the six major gases - 1 Point

Intent

Establish baseline for Greenhouse Gas (GHG) emissions from such activities as energy use, industry processes, and mobile sources where the final assembly of finished product is manufactured.

Requirements

Develop a corporate wide greenhouse emission inventory including all emissions sources of the six major gases (CO₂, CH₄, N₂O, HFC's, PFC's, and SF₆) for the facilities that produce product line.

Documentation

- Annual GHG Inventory Summary form.

Potential Technologies & Strategies

Consider using the EPA Climate Leaders GHG Inventory Protocol.
www.epa.gov/climateleaders/.

9.0 ELEMENT ONE - HUMAN AND ECOSYSTEM HEALTH – as of 11/02/06
(Need description of Element One here)

9.1 – Prerequisite – Compliance Demonstration

Consideration – probation period??

Laura R – revise?

Intent

Assure compliance with applicable environmental regulations and all health and safety regulations which govern toxic and hazardous substance use and risk management associated with human and ecosystem health.

Requirements

The facility(ies) where the sustainable product is being manufactured have had no violations within the past 2 years meeting the following:

- Classified as a Significant Noncompliance under the CWA or RCRA programs
- Classified as a High Priority Violation under the CAA program
- <<OSHA Major>> specific to chemical handling/management/exposure
- DOT????

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- EnvironmentalSimilar Classification outside the US (need definition – look at ECHO)
- Fines of \$25,000 or more
- Repeat violations (check definition per OSHA???)

Potential Technologies & Strategies

Include all media (water, waste, air)

Odor/nuisance compliance

Environmental Justice (appropriate/separate credit/social responsibility???)

Documentation

9.2 Prerequisite – Integrated Management

Laura to complete (w/ help from Bill Stough)

Intent

Applicant has implemented an environmental management program to reduce environmental impacts

Requirements

The environmental management program shall document the following minimum elements:

1. Environmental Policy which includes.....
2. Chemical Management Policy which includes.....
3. Identification of Significant Environmental Impacts
4. Establish a plan (organizational and operational) to reduce impacts
 - a. Identified resources, roles, responsibilities and authorities for significant environmental aspects
 - b. Management
 - c. Training, awareness and communications plan
5. Demonstrate progress in reducing impacts (Monitor and measure)
6. Periodic review of Impacts and progress from top management
7. Chemical management and storage.....id requirements

Potential Technologies

(Add information)

Works with Credit 9.3 - EMS

9.3 Environmental Management System

9.3.1 Compliance with ISO 14001 or equivalent - Two Points

Intent

Document compliance with ISO 14001 *Environmental management systems – Specification with guidance for use*, or a recognized equivalent.

ISO 14001 is an international standard that specifies the requirements for an environmental management system. It is based on a continuous improvement approach that incorporates the establishment of an environmental policy, targets and objectives, and the continual process of planning, implementing, measuring and checking, and reviewing those elements.

Requirements

2 points	Company shall meet the requirements of ISO 14001 <i>Environmental management systems – Specification with guidance for use</i> , or a recognized equivalent for all facilities associated with sustainable product manufacturing.
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Documentation

Formal EMS system

OR

- Current Certificate of Registration to ISO 14001 or equivalent criteria issued by an accredited Registrar.

Potential Technologies & Strategies

Consult with environmental management systems professional to prepare for corporate registration audit. Issue Request for Proposal to potential Registrar organizations. STATE PROGRAMS???

9.3.2: Compliance with additional management systems standards. 1-2 Points

Intent

Document corporate compliance with management system standards in addition to ISO 14001 or equivalent criteria (Credit 9.3.1).

Responsible Care® 14001 (RC 14001) and Responsible Care® Management Systems (RCMS) establish requirements for effective management of occupational and environmental risks due to the manufacture, handling and use of chemicals. This document was developed to help companies make progress toward the goal of no chemical accidents, injuries or harm to the environment.

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U.S. Environmental Protection Agency's National Environmental Performance Track is a partnership that recognizes top environmental performance among participating U.S. facilities of all types, sizes, and complexity, public and private. Program partners provide leadership in many areas, including preventing pollution at its source (see <http://www.epa.gov/performance-track/>).

Requirements

1 point	Company shall demonstrate compliance to the requirements of RC 14001 or equivalent chemical management programs.
1 point	Company shall demonstrate current participation in the U.S. Environmental Protection Agency's National Environmental Performance Track partnership program or equivalent incentive state or national program.

Documentation

- Formal RC 14001 system or Current Certificate of Registration to RC 14001 issued by an accredited Registrar.
- Current listing as a Performance Track member on the Performance Track website (see <http://www.epa.gov/performance-track/>).

Potential Technologies & Strategies

Consult with management systems professionals to prepare for corporate audits. Issue Request for Proposal to potential Registrar organizations.

Obtain information on Performance Track program participation requirements from EPA website. Michigan has Clean Corporate Citizen, Minnesota, Wisc....., Maine.....

NPEP and NEPT are partnering in the national challenge commitment for priority chemicals (10% decrease in 31 priority chemicals) – synergy with reduction points below

9.4 Chemical Management Plan (CMP) - (Facility) 1-3 points

1 point - Develop and implement a system for inventory tracking and control of chemicals that includes:

- acquisition
- use
- storage
- transportation

- final disposition

Potential Technologies & Strategies

DOE - Environment, Safety and Health – Chemical Management Tools
http://www.eh.doe.gov/chem_safety/tools.html

MSDS Search <http://www.msdssearch.com/>

American Chemistry Council-Responsible Care Program
http://www.americanchemistry.com/s_acc/sec_statistics.asp?CID=176&DID=304

GHS REACH

Documentation

Purchase orders, manifests, billable materials records, MSDS, regulatory reporting requirements and routine inventory of used and unused chemicals. Self audit, regulatory inspections, EMS. Optional: third party certification.

1 point - Adopt as part of best management practices (BMPs) chemical hazard recognition using elements of the Process Safety Management Standard (OSHA Std. 29 CFR 1910.119) and EPA RMP (40 CFR Part 68)

Potential Technologies & Strategies

OSHA Process Safety Management – Hazard Recognition
<http://www.osha.gov/SLTC/processsafetymanagement/recognition.html>

EPA's Risk Management Planning Rules

<http://ehso.com/RMPs.htm>

Documentation

CMP includes documented elements of PSM and a Risk Management Plan (RMP). Optional: third party certification.

1 point – CMP contains a documented action plan for emergency planning and response which includes the basic reporting requirements of SARA Title III (U.S.

Code Title 42- The Public Health and Welfare, Chapter 116 – Emergency Planning and Community Right to Know)

Potential Technologies & Strategies

Emergency Planning and Community Right to Know
<http://www.access.gpo.gov/uscode/title42/chapter116.html>

Integrate into EMS.

Documentation

CMP includes basic reporting requirements of SARA Title III. Integrated Environmental Management System. Optional: third party certification.

9.5: Assess the human health and ecosystem impacts of process and product chemicals [1-6 Points]

[NOTE: This credit was originally written for [Intent 3](#), but both the original language and the modifications made here may serve to make [Intent 2](#) redundant]

Intent

Through the Design for Environment (DfE) protocol, evaluate the human health and ecosystem health impacts of chemicals (of concern) using life-cycle thinking and improve public and environmental health by designing safer products and processes.

Credits are available for evaluating chemicals of concern at three levels: product, facility, and corporate. An extra credit is available for developing a strategy to minimize the human and ecosystem health impacts of chemical use.

Footnotes:

1. The DfE protocol is established through prerequisite 9.2
2. Chemicals of concern are chemicals with known/anticipated impacts to human health and ecosystem health, as identified/defined in section X [BIFMA SAS Chemical List]
3. Life cycle impact categories pertaining to “human health and ecosystem health” (shall/must/may?) include: Global warming; Ozone depletion; Acidification; Eutrophication; Photochemical smog; Terrestrial toxicity; Aquatic toxicity; and Human health. The current credit does not cover resource depletion and land use (see credits 9.X)

Requirements

Credit 9.5.1: Product Level [Material specification]

[1-3 Points]

Identifying all chemicals down to 0.1% (by weight) of the materials **specified** and used to manufacture the product (**seeking conformance**) and assess chemicals of concern:

- 1 point - 75% by weight of product.
- 2 points - 95% by weight of product
- 3 points - 99.9% by weight of product

{Note: This credit is akin to the “Cleaner Materials” element stipulated by the Canadian DfE strategy 3.1 (under Strategy 3 – Optimize Material Use) as adopted by Credit 9 [Natural Resources Working Group]}

Credit 9.5.2: Facility Level [Process chemicals]

[1 Point]

Identify 50% (by \$) of all **process chemicals** down to 0.1% used **directly** in the manufacture of the product (**seeking conformance**) and assess chemicals of concern.

{Note: This credit is akin to the “Fewer/Cleaner Production Consumables” element stipulated by the Canadian DfE strategy 4.5 (under Strategy 4 – Optimize Production) as adopted by Credit 9 [Natural Resources Working Group]}

Credit 9.5.3: Corporate Level

[1 Point]

Identify 50% (by \$) of all **maintenance and operating chemicals** down to 0.1% **not directly** used in the manufacture of the product (**seeking conformance**) and assess chemicals of concern.

[Should this include the purchasing of “greener” consumer goods, e.g. electronics, to help drive out the use of chemicals of concern in other sectors?] [Maintenance would include janitorial supplies, landscape chemicals]

Credit 9.5.4: Chemical reduction strategy

[1 Point]

Develop a strategy to improve public and environmental health by reducing the use of materials and processes that have significant life cycle impacts.

Documentation

1. Submit documentation to demonstrate assessment (**evaluation**) results.
2. Submit a copy of the strategy **to reduce chemicals of concern**.

Potential Technologies and Strategies

1. Design for the Environment
2. LCI / LCA tools
3. Chemical assessment tools
4. Green chemistry and green engineering

There are many life-cycle based tools that can help assess an organization environmental impacts. The potential list of tools includes McDonough Braungart Design Chemistry's Cradle to Cradle Design Protocol, SC Johnson's Greenlist™, Nation Center for Manufacturing Sciences' Simplified LCA, and other recognized strategies. *(Issue how to recognize equivalent strategies)*

Impact Categories include:

- Acidification
- Bioaccumulation
- Criteria Air Pollutants
- Depletion
- Ecological Toxicity
- Eutrophication
- Fossil Fuel Depletion
- Global Warming
- Habitat Alteration
- Human Health
- Persistence/Biodegradation
- Photochemical Smog
- Solid and Hazardous
- Stratospheric Ozone
- Waste
- Water Intake

The Standard may/will provide a list of chemicals of concern, including a designation of whether the chemical occurs at the level of product, process or other (e.g. maintenance).

9.6 Cleaner Materials

Intent

Encourage avoidance of some materials or additives that cause hazardous emissions during production or use of a product or when the product is managed at the end of its useful life (e.g., when it is recycled or disposed). Examples of constituents that cause problems in these applications include:

- Colorants
- heat or UV stabilizers
- fire retardants
- degreasers
- softening agents

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- fillers
- foaming agents
- antioxidants

Requirements

(to be added)

Documentation

Potential Technologies and Strategies:

(to be added)

Suppliers meeting various credits to reduce impact on HEH

What % of spend, Tier 1, 2 3???, partial points for various credits.

9.6.2 Low Emitting Furniture: Systems Furniture, Seating and Freestanding Furniture - 1-3 Points

Intent

Reduce indoor air contaminants from finished products that are odorous, potentially irritating, and/or harmful to the comfort and wellbeing of occupants.

Requirements

Emission limits

A – Based on LEED CI – 1 point

B – Based on CREL – 1 point

C – Based on Risk (Carcinogenic or Reproductive Toxic limits) – 1 point

- A. Emissions from workstations and seating meet the criteria at 168 hours
<<define workstation, seating, and freestanding furniture (components)>>

Workstation systems (open plan and private office)

TVOC _{toluene}	≤ 0.5 mg/m ³
Formaldehyde	≤ 50 ppb
Total Aldehydes	≤ 100 ppb
4-Phenylcyclohexene	≤ 0.0065 ppb

Seating

TVOC _{toluene}	≤ 0.25 mg/m ³
Formaldehyde	≤ 25 ppb
Total Aldehydes	≤ 50 ppb
4-Phenylcyclohexene	≤ 0.00325 ppb

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Freestanding Furniture

<<Check into

GEI – component criteria ½ workstation limit

FES – tbd (next meeting December)

SCS approach?

Source: BIFMA X7.1 Emissions Standard, September 2005 and/or USGBC
LEED CI 2.0 EQ Credit 4.5 Low Emitting Product – Furniture

B. Emissions from workstations and seating meet the criteria at 336 hours

IVOC emissions at 336 hours from the finished product should not exceed the
VOC and chemical component limits ½ crel – 14 day – occupant exposure (Toni
send link to list OEHHA) reference 2006 bid spec???? Seating not currently
addressed (1/2 vs ¼ CREL?)<<Need to resolve freestanding furniture>>
Formaldehyde has interim value (16.5 ug/m³ HCHO)

See Appdx C in bid spec.

DEVELOP OVERALL COMPARISON TABLE FOR A, B & C

Testing Methodologies:

Pts A – BIFMA M7.1 /GEI

Pts B – BIFMA M7.1/GEI (based on powerlaw fit from data points 24 hours
and beyond with appropriate ventilation rates (Look at CA 2006 bid spec)

Pts C – BIFMA M7.1/GEI tbd

Documentation

- A copy of the test report with start and end dates of testing demonstrating the product meets the requirements prescribed in the BIFMA M7.1 Test Method and X7.1 Standard.
- For finished products tested through the GEI or SCS, a copy of the product certification certificate with start and end dates of the certification period.
- For finished products tested through the EPA EVT protocol, provide test results and supporting calculations demonstrating that the emission limits have not exceeded those identified in the BIFMA X7.1 Emission Standard.

Potential Technologies & Strategies

Specify low emitting materials in product component specifications. Use environmental chamber technology for profile sampling to help determine emissions of raw materials, components, and assemblies.

10.0 SOCIAL RESPONSIBILITY (Draft of 11/15/06)

10.1 Credit 1: Policy on Social Responsibility

Intent

Develop and implement a corporate policy on social responsibility with which to govern the corporation, management, and its employees.

Requirements

Publicly available policy on social responsibility which includes:

- Fair hiring practices
- Minorities
- Disabilities
- Education and training for all employees
- Corporate ethics
- Receipt of gifts
- Insider trading

Potential Technologies & Strategies

Review requirements and recommendations from the International Labor organization (ILO) conventions. Consider benchmarking other organizations that have demonstrated effective social responsibility practices and achieved significant improvement

Documentation

Provide copy of policy

10.2 Credit 2: Comply with external Health and Safety Management Standard

Intent

To enhance productivity and employee welfare by implementing policies and procedures that exceed locally mandated regulations.

Requirements

Comply with the requirements of publicly available external health and safety management system standard.

Potential Technologies and Strategies

Demonstrate compliance to the requirements of:

- An Employer's Guide to Developing a safety and health program
- OHSAS 18000
- Any state health and safety program approved by US Occupational Safety and Health Administration as shown at www.osha.gov/fso/osp/index

Documentation

Compliance can be documented through the BIFMA SFAS audit or by providing documentation of third party audit and/or certification.

10.3 Credit 3: Social Responsibility Reporting

10.3.1 Public Social Responsibility Report

Intent

Promote transparency through public reporting of social responsibility policies and activities, wherever possible using widely accepted metrics to evaluate the effects of these on the company's diverse stakeholders.

Requirements (*Need to add more definition to this area*)

Publish a public report that addresses:

Prerequisite 1 Employee Health and Safety Management

Prerequisite 2 Labor and Human Rights Management

Credit 4 Diversity

Credit 5 Community Outreach and Involvement

Standards set for product labeling recognized in public policy documents and the means used to insure these standards are met consistently and fully reported to all stakeholders and in public documents. PR1

Potential Technologies and Strategies

Review:

- websites of firms recognized for corporate social responsibility reporting
- EPA Environmental Performance Track (covers community outreach)
- Global Reporting Initiative (includes criteria and definitions used in Accounting for social costs and benefits) Reference Global Reporting Initiative Sustainability Reporting Guidelines)
- LA1/LA11 Composition of the Workforce and Management
- LA9- Average Hours of Training
- SO1 Policy to manage impact on communities-Volunteer programs, philanthropy
- HR4 Nondiscrimination

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- HR6 Child Labor
- HR7 Forced or Compulsory Labor -
- IDCE Corporate Sustainability Rating (tracks whether there are policies on workforce diversity; stakeholder involvement; stakeholder satisfaction monitoring; community involvement; contributions to community projects)

Document social responsibility policies and activities in the Annual Report

- Note nature of involvement of the company's top management
- Delineate means of communicating company policies to the entire staff.

Create separate social responsibility report and post on company website

- Identify personnel responsible for developing and implementing policies
- Describe metrics used to evaluate effects of policies and activities

10.3.2 Expanded Publicly Available Social Responsibility Report

Intent

Expanded content and visibility of social responsibility report.

Requirements

Add other report content beyond that required in Credit 3a.A comprehensive report Based on GRI Social Responsibility or SA8000 format or equivalent..

Potential Technologies & Strategies

Sources of potential future additional requirements:

- Global Reporting Initiative
- Labor Practices and Decent Work including opportunity policies or programs
- Human Rights
- Society including share of operating revenues redistributed to local communities.
- Product Responsibility for preserving customer health and safety during use of products and services and clear description of policy, procedures related to product information and labeling.
- IDCE Corporate Sustainability Rating
- Corporate Codes of Conduct
- Has the board defined standards of conduct and have they been followed?
- Does the company train employees to understand the "triple bottom line"?
- Does company subscribe to a voluntary environmental code of conduct?
- Does company subscribe to a voluntary social code of conduct?
- Does company subscribe to a voluntary sustainability code of conduct?
- Does company publicly report performance to voluntary codes?
- Does the company have a policy for any of the following social programs?
- Freedom of Association
- Workforce Diversity
- Fair Labor Policies

- Stakeholder Involvement
- MBDC C2C Standard
- Publicly available corporate ethics and fair labor statement(s), adopted across entire company
- Identified third party assessment system and begun to collect data for that system
- Acceptable-third party social responsibility assessment, accreditation or certification

Documentation TBD

10.4 Credit 4: Diversity

Intent

To bring visibility to the overall diversity of the workforce, management, senior management and corporate governance bodies while recognizing the unique local norms which exist in different countries around the world.

Requirements

The diversity program shall include the following components:

- An equal employment/diversity policy
- Identification of the local, national and international diversity rules and regulations applicable to the facility
- Documented procedures for the management of the system a performance tracking and reporting method
- Regular evaluation of compliance to applicable Equal Employment/Diversity laws, as well as internal procedures and requirements
- Establishment and maintenance of employee diversity metrics
- Diversity training for all employees (*need group to address whether this requirement remains as is*)
- A documented corrective action process for responding to workplace diversity issues.

Potential Technologies & Strategies

Review requirements and recommendations from International Labor organization (ILO) and Global Reporting Initiative Benchmarking other organizations which have demonstrated effective diversity management practices.

Documentation

Policies, procedures and records developed to demonstrate compliance to the requirements.

10.5 Credit: Engage in community outreach and involvement

Intent

Encourage companies to be good corporate citizens within their community.

Requirements

Demonstrate at least one volunteer effort and/or financial contribution supporting community projects within the last 12 months.

Potential Technologies & Strategies

These are examples of the types of community projects that could be considered:

Local Scholarships

Highway Clean up

Sponsorship of community charitable events

Participation in children tutoring programs

Community benefit programs

Documentation

Provide evidence of contributions of volunteer time or financial contributions.

10.6 Credit: Extend Social Responsibility Expectations into Supply Chain

10.6.1 Include Social Responsibility Expectations into Supplier Assessment Procedure

Intent

Through the use of internationally recognized social responsibility criteria, begin to encourage continuous improvement in the supply chain relative to sustainable business criteria, and particularly social responsibility.

Policies on green supply chain management with documentation of how they are communicated to suppliers of the corporation and monitored to insure progress

Requirements

Establishment of a documented supplier self-assessment procedure containing social responsibility criteria for tier 1 suppliers.

Potential Technologies & Strategies

Establish supplier self-assessment criteria as provided in an internationally recognized social responsibility standard such as SA8000. The following self-assessment criteria from SA8000 may be used:

- Does your company engage or support the use of child labor under the age of 15?
- Does your company engage in or support the use of forced labor?

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- Does your company provide a safe and healthy working environment, and take adequate steps to prevent accidents and injury to health in the workplace?
- Do you measure the frequency and the gravity of the industrial accidents in your company?
- Does your company respect the right of all personnel to form and join trade unions of their choice and to bargain collectively?
- Does your company engage in or support discrimination in hiring, remuneration, access to training, promotion, termination or retirement based on race, caste, national origin, religion, disability, gender, sexual orientation, union membership, political affiliation, or age?
- Does your company engage in or support the use of corporal punishment, mental or physical coercion, and verbal abuse in your disciplinary practices?
- Does your company comply with applicable laws and industry standards on working hours, including at least one day off in every seven days period?
- Does your company ensure that wages paid for a standard working always meet at least the minimum legal or industry standards, and meet basic needs of personnel, and to provide some discretionary income?

Documentation

Provide copy of supplier assessment tool which includes social responsibility questions.

10.6.2 Receive completed assessments which include social responsibility criteria from suppliers

Intent

Through the use of internationally recognized social responsibility criteria, encourage continuous improvement in the supply chain relative to sustainable business criteria, and particularly social responsibility.

Requirements (Need to run this by individual supply chain managers)

Provide completed responses to documented supplier self-assessment containing internationally recognized social responsibility criteria (see questions in 6a) for tier 1 suppliers comprising not less than **75% of the total direct material spend** of the OFM's supply base, measured using actual annual spend data for a time period within the previous 24 months.

Potential Technologies & Strategies

TBD

Documentation

11.0 Resources (these lists needs to be reviewed, edited, and assembled correctly)

- BIFMA Sustainability Guidelines
<http://www.bifma.org/documents/SusGdlines.pdf>
- ASTM E2432-05 Standard Guide for General Principles of Sustainability Relative to Buildings
Download 6-page standard for \$33 at >>
http://www.astm.org/cgi-bin/SoftCart.exe/STORE/filtrexx40.cgi?U+mystore+vqpm0798+L+E2432+/usr6/htdocs/astm.org/DATABASE.CART/REDLINE_PAGES/E2432.htm
- ASTM E2129-05 Standard Practice for Data Collection for Sustainability Assessment of Building Products
Download 10-page standard for \$33 at >>
http://www.astm.org/cgi-bin/SoftCart.exe/STORE/filtrexx40.cgi?U+mystore+vqpm0798+L+E2129+/usr6/htdocs/astm.org/DATABASE.CART/REDLINE_PAGES/E2129.htm
- ASTM E1991-05 Standard Guide for Environmental Life Cycle Assessment (LCA) of Building Materials/Products
Download 9-page standard for \$33 at >>
http://www.astm.org/cgi-bin/SoftCart.exe/STORE/filtrexx40.cgi?U+mystore+vqpm0798+L+E1991+/usr6/htdocs/astm.org/DATABASE.CART/REDLINE_PAGES/E1991.htm
- ASTM E2114-05a Standard Terminology for Sustainability Relative to the Performance of Buildings
Download 5-page standard for \$33 at >>
http://www.astm.org/cgi-bin/SoftCart.exe/STORE/filtrexx40.cgi?U+mystore+vqpm0798+L+E2114+/usr6/htdocs/astm.org/DATABASE.CART/REDLINE_PAGES/E2114.htm
- ASTM E917-05 Standard Practice for Measuring Life-Cycle Costs of Buildings and Building Systems
Download 19-page standard for \$39 at >>
http://www.astm.org/cgi-bin/SoftCart.exe/STORE/filtrexx40.cgi?U+mystore+vqpm0798+L+E917+/usr6/htdocs/astm.org/DATABASE.CART/REDLINE_PAGES/E917.h

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[tm](#)

- Collaboration for High Performance Schools Section 01350
<http://www.chps.net/manual/index.htm#specs>
- MBDC Cradle to Cradle
website: <http://www.mbdc.com/certified.html>
document: http://www.mbdc.com/docs/Certification_Outline.pdf
criteria: <http://www.mbdc.com/docs/CertificationCriteria.pdf>
- Natural Step System Conditions
<http://www.NaturalStep.org>
- GreenSeal Office Furniture Choose Green Report --
http://www.greenseal.org/recommendations/CGR_office_furniture.pdf
- Unified Sustainable Textile Standard© 2.0
<http://mts.sustainableproducts.com/standards.htm>
- SCS EPP Standards -- Carpet Face Fiber, Carpet Broad Loom, and Flooring Management Systems
 - http://www.scscertified.com/manufacturing/manufacture_facefiber.html
 - <http://www.scscertified.com/carpet/>
 - http://www.scscertified.com/manufacturing/manufacture_flooring.html
- Global Reporting Initiative (GRI) Sustainability Reporting Guidelines (2000) Social Equity Performance Indicators
http://www.sustainableproducts.com/susproddef2.html#Performance_Indicators
- Business for Social Responsibility – issue briefs
<http://www.bsr.org/CSRResources/IssueBriefsList.cfm?area=all>
- Electronic Product Environmental Assessment Tool (EPEAT)
Description of Voluntary Environmental Performance Criteria for Computers, Laptops and Monitors and EPEAT Product Rating System as Designed by the EPEAT Development Team --
<http://www.epeat.net/files/EPEAT%20Full%20Criteria%20050602.pdf>
- EPA/WBDG Federal Green Construction Guide for Specifiers: 12700-Systems Furniture: <http://fedgreenspecs.wbdg.org>

- DfE Furniture Flame Retardancy Partnership: Furniture foam flame retardants alternatives assessment
<http://www.epa.gov/dfe/pubs/flameret/ffr-alt.htm>

Environmental calculators for measuring the environmental benefits of waste reduction/recycling efforts. They are mostly relevant to materials management:

The Waste Reduction Model (WARM) - calculates greenhouse gas (GHG) emissions implications of alternate management strategies for about 3 dozen materials:

<http://yosemite.epa.gov/oar/globalwarming.nsf/content/ActionsWasteWARM.html>

The greenhouse gas equivalencies calculator will let you translate those GHG emissions into things like barrels of oil and acres of trees:

<http://www.usctcgateway.net/tool>

ReCon will help to estimate GHG emissions and energy impacts for purchasing materials with varying degrees of post-consumer recycled content:

<http://yosemite.epa.gov/oar/globalwarming.nsf/content/ActionsWasteToolsRecon.html>

This tool will let you estimate the GHG emissions of various waste management decisions for durable goods:

<http://yosemite.epa.gov/oar/globalwarming.nsf/content/ActionsWasteToolsDGC.html>

This calculator (not an EPA product, although they helped fund the development) estimates GHG emissions, energy implications, and some water issues from resource management decisions, including recycling, source reduction and electronics recycling:

<http://www.nerc.org/documents/aboutcalc.html>

MORE RESOURCES:

BEES (US Govt. developed LCA tool)

California High Performance Schools Best Practices Design Manual

A comprehensive guide to planning, designing, maintaining and operating a high performance school. Includes a materials specification, criteria scorecard and an array of fact sheets on topics ranging from acoustics to mold prevention.

California High Performance Schools (CHPS) List of CHPS-Compliant Low Emitting Materials. Products listed in the Compliant Materials Table have been chamber tested to meet the indoor air quality guidelines outlined in CHPS Specification Section 01350.

California State Recycled Content Product Database

Creating a High Performance Workspace: G/Rated Tenant Improvement Guide. This helpful resource guide identifies key steps toward ensuring healthy, productive, durable, and resource-efficient workspaces. It includes dozens of helpful strategies, fact sheets, model specifications, a glossary of terms, and a list of regional vendors and product manufacturers.

EPA's Energy Star Building Label Program

EPA's Environmentally Preferred Products Database

Green Guide for Health Care

The Green Guide for Health Care™ is the health care sector's first quantifiable sustainable design toolkit integrating environmental and health principles and practices into the planning, design, construction, operations and maintenance of their facilities. This Guide provides the health care sector with a voluntary, self-certifying metric toolkit of best practices that designers, owners, and operators can use to guide and evaluate their progress towards high performance healing environments.

(from BIFMA Sustainability Guidelines)

Example Programs/Partnerships/Initiatives The following resources are provided as a partial list of the many available programs and organizations working on sustainable business practices.

- Global Reporting Initiative
<http://www.globalreporting.org>
- World Business Council for Sustainable Development (WBCSD)
<http://www.wbcsd.ch>
- EPA National Environmental Performance Track Program
<http://www.epa.gov/performance-track>

- Federal Trade Commission (FTC) “Guides for the Use of Environmental Marketing Claims”:
<http://www.ftc.gov/bcp/online/pubs/buspubs/epaclaims.htm>
- Green Suppliers Network
www.greensuppliers.gov
- The Natural Step
http://www.naturalstep.org/gateway_business.php

Additional elements of the Sustainability GUIDELINES

Executive Summary

The executive summary is a brief overview of the information contained in the report. It ties together the five key elements and gives the reader an understanding of their relationships and the company's progress towards continuous improvement. Significant accomplishments, as well as awards and other forms of recognition earned during the previous year, should be included in the executive summary. Companies may also choose to include challenges faced implementing the principles.

Environmental Policy

Include the text of the company's environmental policy that incorporates sustainability. List documents, marketing materials, websites where the company's environmental policy has been made available to the stakeholders and/or the public. Companies may also choose to list any of their significant environmental goals.

Environmental Aspects

Report on the progress made in identifying and addressing significant environmental aspects. There will be a wide range in achievements reported, depending upon how long the company has utilized an Environmental Management System (EMS), and on the extent of the company's resources devoted to environmental sustainability. Initially, it may be a challenge for the company to identify key environmental aspects related to products, processes, and services. Next, the company may report progress in establishing a means of ranking environmental aspects in a relative order of priority. Eventually, the company may report on their progress in minimizing environmental aspects or in

implementing product and process design practices which eliminate aspects altogether.

Legal and Other Requirements

Report on the progress made in identifying and addressing applicable legal requirements. There will be a wide range in achievements reported, depending upon how long the company has utilized an EMS, and on the extent of the company's resources devoted to environmental sustainability. Initially, the company may report on progress in implementing a proactive regulatory compliance approach, such as achieving compliance with new programs ahead of schedule, or working with trade associations and regulators to draft applicable regulations, or implementing a compliance and corrective action database. Eventually, the company may report on their progress in voiding environmental permits, eliminating waste streams, or replacing regulated materials with sustainable, non-hazardous materials.

Objectives and Targets

Report on the progress made in identifying and accomplishing specified objectives and targets, based upon the company's significant environmental aspects. There will be a wide range in achievements reported, depending upon how long the company has utilized an EMS, and on the extent of the company's resources devoted to environmental sustainability. Initially, the company may report on their EMS implementation progress. Next, the company may report on their efforts to aggressively reduce environmental impacts, including reductions in waste generation rates and reductions in resource consumption rates. Eventually, the company may report on their increased use of renewable energy, or their replacement of petroleum-based product constituents with rapidly renewable materials.

Management Review

Report on the progress made in completing an assessment of EMS effectiveness. There will be a wide range in achievements reported, depending upon how long the company has utilized an EMS, and on the extent of the company's resources devoted to environmental sustainability. Initially, the company may report on the changes made to their EMS, based upon recommendations from a management team review of the program. Next, the company may report the use of newly developed EMS metrics, accounting for audit findings and corrective actions, which carefully address the root causes for any system failures. Eventually, the company's executives may come to rely upon a comprehensive annual sustainability report which follows an established format (e.g. the Global Reporting Initiative), carefully accounting for virtually every process input and output.

Conclusion

Companies may summarize any conclusions that might be drawn from the information contained in this report and identify any specific goals and/or projects for the upcoming year.