

One-Minute Lessons

These One-Minute Lessons, written by Scott Lesnet, HNI Environmental and Safety Manager, provide insight on a variety of environmental issues.

One-Minute Lesson topics include the following:

- Greenhouse Gases
- Indoor Air Quality
- Sustainability
- Greenwash
- Life Cycle Assessment
- Earth Day

Greenhouse Gases

When sunlight reaches the earth, some of it is absorbed and warms the surface. Radiant energy from the ground then warms the atmosphere. The rate of atmospheric heat absorption is controlled by the mixture of water vapor and various gases in the atmosphere. The gases that regulate the earth's temperature are called greenhouse gases (GHG).

In the late 1800s, scientists discovered that gases absorb heat at different rates. Soon after, scientists recognized that significantly altering the gas mixture in the atmosphere had the potential of altering the earth's temperature, resulting in global climate change. Today, the world pumps 70 million tons of greenhouse gas into the atmosphere each day, and most scientists believe global climate change is reality.

There are natural and human-activity sources of greenhouse gases. Sources of greenhouse gases due to human activity include burning of fossil fuels and deforestation, leading to higher carbon dioxide concentrations. Lesser known sources include livestock and rice farming, wetland loss, and landfill venting, leading to higher atmospheric methane concentrations.

Measurements from Antarctic ice cores show that atmospheric CO₂ levels were between 260 and 280 parts per million (ppm) for 10,000 years preceding the Industrial Revolution. Since the beginning of the Industrial Revolution, CO₂ has increased by about 100 ppm. The first 50 ppm increase took place in about 200 years. The next 50 ppm increase took only 33 years, from 1973 to 2006, and the rate of greenhouse gas emissions continues to increase.

Greenhouse gases decay slowly and at different rates. Gases that accumulate quickly and decay slowly have a greater Global Warming Potential (GWP). Carbon dioxide equivalent, (CO₂e), is the unit of measure which describes the global warming potential of various greenhouse gases compared to carbon dioxide (CO₂):

- Carbon dioxide has a Global Warming Potential of 1.
- Methane has an atmospheric lifetime of 10 to 15 years. One pound of methane in the atmosphere is equal to 23 pounds of CO₂.



- Nitrous oxide has an atmospheric lifetime of 120 years. One pound of nitrous oxide in the atmosphere is equal to 269 pounds of CO₂.
- CFCs/HCFE, used as refrigerants, have atmospheric lifetimes between 10 and 100 years. One pound of CFCs/HCFEs in the atmosphere can equal as much as 12,000 pounds of CO₂.

At Allsteel, reducing our greenhouse gas contribution is a big step toward sustainability and is easy to do. For example, making one pound of corrugate generates 2.3 pounds of greenhouse gas; the same pound of cardboard generates another three pounds of greenhouse gas while it decomposes in a landfill. Simply not using that one pound of corrugate eliminates 5.3 pounds of greenhouse gas.

Blanket wrapping 400 Allsteel Sum® chairs:

- Eliminates the need for 400 cartons, avoiding the cost of the cartons
- Eliminates the need to pack out the chairs, avoiding the labor cost
- Eliminates the human ergonomic wear of packing out 400 chairs
- Eliminates the transportation cost and eco impact of delivering 400 cartons to the factory
- Reduces the transportation cost and eco impact of delivering 400 cartons to the customer
- Reduces the time and labor required to install the chairs by as much as 75%, saving the customer money
- Eliminates the need to recycle or dispose of 400 slightly used cartons, saving the customer more money
- ***And, by the way, this reduces greenhouse gas by nearly ten tons!***

Sustainability is about continuously improving our quality of life while continuously reducing the environmental impact of the way we live and work. Waste in any form represents unnecessary environmental impact. Eliminating waste adds value to a product or service; it also reduces its environmental impact. Creating maximum value with minimal environmental impact is the goal of the sustainable enterprise.

Indoor Air Quality

Indoor air quality emerged as a concern during the energy crisis in the mid 1970s. Buildings were engineered and operated to minimize the amount of energy required for heating and cooling. Minimizing air exchange caused the concentration of chemicals to accumulate to levels affecting the comfort of building occupants. The condition was named “sick building syndrome.”

By 1980 the cause of sick building syndrome was understood, but we lacked the science and technology required to measure the contribution of individual materials and products. 1990 saw the first office furniture emission limit in a Request For Proposal issued by the State of Washington. In 1999 the State of California set the most stringent emission limits to date for products going into schools and government buildings.



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There are very strong economic and social reasons to be concerned with indoor air quality and low level chemical exposure:

- The average American currently spends 90% of their time indoors. USEPA reports that concentrations of harmful chemicals indoors can be many times outdoor levels.
- The prevalence of asthma in the U.S. has increased 75% over the last 20 years. There are currently more than 17 million asthma sufferers in the U.S. and 38% of the American population is affected by allergies.
- U.S. children miss more than 10,000 school days annually due to asthma-related illness.
- More than 5,300 people die in the U.S. each year due to asthma-related illness.
- Annual direct health care costs for asthma exceeds \$9.8 billion (plus indirect costs from lost productivity of \$2.8 billion). These costs are expected to rise dramatically as the U.S. population ages.

Today, product emission rates are measured in parts per billion with excellent repeatability. In practice, a product or component is placed in a stainless steel chamber. Air of controlled temperature and humidity is pumped through the chamber at a fixed rate. The chemical content of the air is measured before and after it flows through the chamber. The difference is assumed to be emitted from the product in the chamber.

Primary sources of emissions for office furniture are composite materials such as particleboard, fiberglass, and paper backers that use adhesive binders. Materials which cure over time such as adhesives and wood finishes can also have high emission rates. Less obvious sources affecting product emission rates are fabric backers and some types of plastics.

The emission rate and content of a completed product depends on the emission rate and content of the components used to assemble the product. Porous materials, like fiberglass, typically have high initial emission rates which decline quickly. Nonporous materials, like particleboard, emit lower levels over a very long time. Therefore, the indoor air quality performance of any product is based on the performance of the materials and components going into the product.

Indoor air quality performance has become a major point of competition between office furniture manufacturers.

Sustainability

The modern concept of sustainability came into general usage in 1987 following publication of a United Nations report on global economic development and environmental impact. The report defined sustainable development as "development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs."

In recent years, the popularity of the term "sustainability" has led to competing definitions and confusion. However, "sustain" means "to keep in existence" so, that which is "sustainable" is expected to last a very long time, and provide value to future



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generations. That which is not sustainable will not last as long, will be of less value to future generations, and may actually consume resources that future generations will need.

The objective of sustainability is to make human economic systems last longer, have less impact on ecological systems, and benefit more stakeholders. In other words, sustainability is a process for simultaneously improving our business, our personal lives, and our communities. Organizations striving for sustainability share the following principals:

- Dealing transparently and systematically with risk and uncertainty
- Ensuring appropriate valuation, preservation, and restoration of natural resources
- Integration of environmental, social, human, and economic goals
- Building human capital, providing equal opportunity and community participation
- A commitment to best practices and continuous improvement
- The need for good governance

The pursuit of sustainability is often called a journey because it requires continuous adaptation to changing economic, environmental, and social conditions. Progress toward enterprise sustainability is measured in three areas, "People," "Planet," and "Profit," which is sometimes called the Triple Bottom Line. The key performance indicators of each are:

People

- A sustainable enterprise insists on fair and beneficial business practices toward employees and the community and region in which the corporation conducts its business.
- A sustainable enterprise recognizes that the well-being of corporate, labor, and other stakeholder interests are interdependent.
- A sustainable enterprise seeks to benefit many constituencies, not exploit or endanger any group of them.
- A sustainable enterprise will not knowingly use child labor, will pay fair salaries to employees, maintain a safe work environment, and will not otherwise exploit the community or its labor force.
- A sustainable enterprise "gives back" by contributing to the strength and growth of its community with such things as health care, education, and development.

Planet

- A sustainable enterprise seeks to minimize its environmental impact.
- A sustainable enterprise will continuously reduce its ecological footprint by carefully managing consumption of energy and non-renewable materials and reducing waste.
- A sustainable enterprise will typically use life cycle assessment in developing products to determine environmental cost from the growth and harvesting of raw materials to manufacture to distribution to eventual disposal by the end user.



Profit

- A sustainable enterprise measures "profit" as the economic benefit enjoyed by all of its stakeholders. It is the lasting effect the organization has on "people" and the "planet."

Sustainability is the process of continuously improving our quality of life while continuously reducing the environmental cost of the way we live and work.

Greenwash

Greenwash is a term used to describe the act of over-selling the environmental practices of a company or the environmental benefits of a product or service to customers.

In the late 1980s and early 1990s institutional purchasers and sophisticated consumers became interested in buying "green" products. In response, some manufacturers began using terms like "natural," "organic," "earth-friendly," "eco-safe," and "healthy" when advertising their products without attempting to clarify the basis of their claims.

Following numerous consumer complaints, the U.S. Federal Trade Commission (FTC), identified a variety of advertising practices, including unsubstantiated, incomplete, and misleading claims about the environmental benefits of products that could be viewed as deceptive. Following its investigation, the FTC issued its [Guide for the Use of Environmental Marketing Claims](#) outlining acceptable and unacceptable environmental marketing practices.

The FTC guidelines require manufacturers to provide specific details forming the basis for any environmental claim and prohibit overstating an environmental attribute or benefit of a product or service. Generic claims of "environmental preferability," "environmentally friendly," or "earth smart" are to be avoided because they do not provide purchasers with information that can be used to compare products.

While greenwashing decreased following the release of the FTC guidelines, it has not completely disappeared. In fact, as demand for environmentally preferable products has increased, greenwash advertising has become a primary irritation to purchasers and supply chain professionals. A recent [study](#) of current greenwash practices identified the following:

1. **Unsubstantiated or General Claims of Environmental Benefit** – Communications using words like "earth-friendly," "good-for-you," "green," or "eco-safe" without providing the basis for the claim. Environmental claims should be verifiable by the purchaser, and the manufacturer must be willing and able to provide the necessary documentation to prove a claim when it is requested.
2. **Irrelevant Claims of Environmental Improvement** – Communications using factually correct environmental claims that are no longer relevant. An example is a claim that the product does not use or contain ozone-deleting compounds (ODCs) even though the Clean Air Act initiated the phase-out of ODCs in 1990.
3. **Single Attribute Claims** – Communications which make bold claims about a single attribute of a product which may lead purchasers to mistakenly believe that it is the only environmental attribute of concern for the product. A textile



manufacturer, for example, recently claimed that their products are manufactured in a LEED®-certified building. However, the manufacturer made no reference to the hazards of the dyes used in the product itself.

4. **Vague, Overly Broad, Environmental Claims** – Non-specific claims of environmental goodness continue to challenge purchasers seeking high-quality, environmentally preferable products. A vague claim such as “natural” can be very misleading because some naturally occurring substances such as arsenic and dioxin are harmful to human health. Legitimate environmental claims use specific, provable terms and are not vague.

Companies seldom intentionally make false environmental claims to mislead their customers. Greenwashing most often occurs when people crafting environmental marketing communications fail to recognize the technical aspects of environmental performance. The challenge Allsteel faces in describing the environmental attributes of our products is ensuring our claims are meaningful, relevant, and allow consumers to compare our products to the competition. HNI’s procedure, issued in November of 2002, requires that such claims meet the following criteria:

- Accuracy of the claim is substantiated by reliable documentation
- Qualifications and limiting disclosures are clearly defined
- The specific component, packaging, or service covered by the claim is identified
- The claim does not overstate the factual environmental attribute
- Comparative claims clearly disclose the basis of comparison
- The claim does not allude to non-specific environmental benefits
- Claims of recyclability must be qualified so as to identify limitations or general availability of recycling programs for individual components or materials
- Claims of recycled content identify the pre- or post-consumer origin of the waste and the content percentage by weight or volume

Purchasing professionals are increasingly interested in purchasing goods and services with real environmental benefits. Allsteel’s obligation is to accommodate the growing interest in “green” products with clear, concise, specific communications about the environmental performance of HNI Corporation products.

Life Cycle Assessment

Life cycle assessment (LCA), also known as life cycle analysis, is the accounting of environmental impacts created by a product or service. The goal of LCA is to provide a scientific basis for making informed choices between products and services.

The term “life cycle” refers to raw material production, manufacture, distribution, and use and disposal, including intermediate transportation required to produce the product. Life cycle assessment accrues the environmental costs of each step into designated categories. Common impact categories include:

- **Global warming** – Caused by the accumulation of certain types of gaseous chemicals in the atmosphere. The so called “greenhouse gases” increase the ability of the atmosphere to hold heat and potentially alter weather patterns.



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- **Acidification** – Sulfur and nitrogen compounds, primarily from energy production, react in the atmosphere to produce acids. Rain falling through the atmosphere adsorbs the acid which ultimately increases the pH of streams and rivers.
- **Smog** – Visible haze caused by the combination of coal smoke from electrical generation and atmospheric moisture.
- **Ozone layer depletion** – Occurs when certain chemicals react with oxygen in the outer atmosphere, allowing more cancer-causing UV-B rays to reach the earth.
- **Eutrophication** – An increase in chemical nutrients in land and water, especially nitrogen and phosphorus, leading to rapid changes in the mix of plant species in the affected area.
- **Eco and human toxicological pollutants** – Chemicals having specific types of adverse effects on living organisms.
- **Desertification** – Degradation of land in arid, semi-arid, and dry sub-humid areas resulting from climatic variations and human activity.
- **Land use** – Conversion of the natural environment to “built environment,” such as the conversion of native forest to farm fields and cities.
- **Resource depletion** – Resources are commonly divided between renewable resources and non-renewable resources. Use of either beyond their rate of replacement is considered “resource depletion.”

A Life Cycle Assessment is carried out in four distinct phases:

1. **Goal and scope** – The first phase specifies the goal, scope, and functional unit of study; for example, comparing glass vs. plastic milk bottles. The goal and scope also establish the system boundaries that determine the processes to be included in the LCA.
2. **Life cycle inventory** – The inventory phase involves modeling the process flow and collecting data for each material and process involved in making the product. Inputs include raw materials, energy, chemicals, labor, etc. Outputs include the product, emissions to air, water, solid waste, and any other form of waste. The result provides information about flows “out of” and “into” the environment caused by producing the product or service.
3. **Life cycle impact assessment** – The third step calculates impact potentials based on the results of the life cycle inventory. The data are normalized to provide a way of comparing impact categories (all impacts get the same unit), and weighted depending on the relative importance of each impact category.
4. **Interpretation** – Interpretation is the analysis of assessment, leading to conclusions about the environmental cost of competing products or processes. An independent review is expected if product comparisons or claims are to be made public.

The recent interest in sustainability has led to several variations on the standard ISO Life Cycle Assessment process. Some of the more common forms of LCA coming out of these proprietary programs include:



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- Cradle-to-grave is the full life cycle assessment from extraction or harvesting (“cradle”) to disposal at the end of a product’s useful life (“grave”).
- Cradle-to-gate is a partial life cycle assessment of common materials such as steel or particleboard occurring between extraction or harvesting (“cradle”) and the factory dock (“gate”), where the material is converted into the product the consumer will use.
- Gate-to-gate is a partial life cycle assessment of the impacts occurring during the conversion of commodity materials from arrival at the factory receiving dock (“gate”) to the factory shipping dock (“gate”).
- Cradle-to-cradle is a an assessment where the end-of-life disposal step for the product is a recycling process, providing material for new, identical products such as glass bottles or fiberglass from recycled glass bottles. Simply stated, a material is recycled for an equal or higher use.
- Life cycle energy analysis (LCEA) is an approach in which all energy inputs to a product are accounted for, not only direct energy inputs during manufacture, but also all energy inputs needed to produce components, materials, and services during the manufacturing process. An LCEA quantifies the “embodied energy” of a particular product.

In summary, life cycle assessment is the internationally accepted tool for comparing the environmental performance of competing products across a standard set of impact categories.

Earth Day

Earth Day actually has two separate observances, both held annually during spring in the northern hemisphere and autumn in the southern hemisphere. Both are intended to inspire awareness and appreciation for the earth's environment.

The Equinox Earth Day

An equinox is that moment in time when the center of the sun is directly above the earth's equator. This occurs around March 20 and September 23 each year. John McConnell first introduced the idea of a global holiday called "Earth Day" at a United Nations Educational, Scientific, and Cultural Organization (UNESCO) conference on the Environment in 1969. UN Secretary General Kurt Waldheim first observed Earth Day with ceremonies on the March equinox in 1972, and the United Nations Earth Day ceremony has continued each year on the day of the March equinox.

The April 22 Earth Day

The modern environmental movement in the United States “spouted” in 1962 with Rachel Carson’s book, *Silent Spring*. Carson’s book documented detrimental effects of pesticides on the environment, particularly on birds. Carson called for balance in how humans interface with the environment using examples of pest control programs which created pesticide-resistant insects: “Spray as little as you possibly can rather than spray to the limit of your capacity... pressure on the pest population should always be as slight as possible.”

Wisconsin Senator Gaylord Nelson is credited with passing the bill designating April 22 as a national day to celebrate the earth, after he witnessed the effects of a major oil spill



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off the Santa Barbara coast in 1969. An estimated 20 million demonstrators and thousands of schools and local communities participated in “environmental teach-ins” on the first Earth Day in 1970. Congress passed major environmental legislation in the wake of the 1970 Earth Day, including the creation of the United States Environmental Protection Agency (USEPA). April 22 is now observed as Earth Day in 175 countries and celebrated by more than a half-billion people every year.

Today, the environmental movement is a diverse group of scientific, social, and political organizations working to harmonize human activity with global ecosystems. Environmentalists advocate the sustainable management of resources and stewardship of the natural environment through changes in public policy and individual behavior which foster improvements in the quality of life for all passengers on “Spaceship Earth.” Earth Day is the day we accept our responsibilities as “part of,” “not apart from,” our environment.



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