Responsibility & Renewal

UMASS DARTMOUTH
SUSTAINABILITY ASSESSMENT AND
CLIMATE ACTION PLAN

SUSTAINABILITY INITIATIVE

Academics

Academics

An emerging discipline

Sustainability coursework blends 21st century skill sets like carbon accounting, green chemistry, and triple-bottom-line reporting with lessons that renew traditional avocations such as farming. Peak Oil expert Richard Heinberg suggests that the U.S. will need 50 million farmers in the coming years to bring food production back to locales that lost their farms to globalization trends.

Sustainability is not a new concept in the US--the term was incorporated into modern literature in the 1960's. In 1987, the UN Bruntland Report issued a global call for sustainable development and education. In the 21st century, popular awareness of sustainability is again heating up, as concerns about the future of global warming, pollution, clean air, water, food, and fuel become impossible to ignore.

The United Nations declared the years 2005-2014 "The Decade for Education for Sustainable Development."[1] Universities for the most part are starting from scratch to develop sustainability as a field of study. While the United States lags behind some other countries in sustainability academics—notably the commonwealth countries of Canada and Australia—the creation of scholarly courses are underway nationwide. The American Association of Sustainability in Higher Education (AASHE) lists 27 minors across the U. S.—including UMass Dartmouth's offerings.[2]

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Studies in sustainability also expand existing courses to incorporate new knowledge. For example, when the business-minded are trained to grow healthy enterprises, sustainability pushes their academic lessons beyond number crunching to look at how management decisions must take into account our increasingly energy-constrained world.

Sustainability draws into its purview academic training from many disciplines that in the past may have seemed unrelated. Developing and revising curriculum that joins departments from across the campus in the pursuit of teaching sustainability requires commitments and creative thinking from faculty and administration, as well as the willingness to recognize the critical importance of success.

Where We Are

Academic Programs

Sustainability is a discipline in its own right, yet it requires networking between new and existing programs and departments. Engineers need to learn about building sustainably; chemists must concern themselves with non-toxic principles; nurses need to consider environmental health,

business students have to pursue understandings of life-cycle analysis; and all students require knowledge about climate change, species extinction, and fossil-fuel depletion.

At UMass Dartmouth, each of our seven colleges has faculty, staff, and students involved in research and coursework in areas such as sustainable fisheries, environmental nursing, triple-bottom-line reporting, and green design. Creating formal academic programs of study for degrees in sustainability is interweaving these researchers and professors in new forward-thinking endeavors.

Sustainability Research

Environmental or sustainability research is not new to the UMass Dartmouth campus. Prominent programs include wetlands and ocean research; biomimicry investigations; sustainable transportation networks; sustainable fisheries partnerships; and research into biofuels, energy efficiency, renewable energies; and sustainable business and policy matters.

Although much of UMass Dartmouth's research is not coordinated internally with a 'sustainability' tag as of yet, the University is a seedbed of sustainability projects, with a significant opportunity to coordinate and establish itself as a leading sustainability research center. Through Sustainability Studies, approved in 2010, sustainability research projects can be connected across colleges and pursued in an advantageous multi-disciplinary fashion.

Student Research and Internships

UMass Dartmouth has found that sustainability research is appealing to students because it is cutting edge, hands-on, relevant, and provides an opportunity to impact the campus and the world. Student researchers span the academic spectrum, and their projects have real world applications. Sustainability initiatives put students to work in communities doing recycling projects. They also involve students in national competitions such as the Department of Energy's Solar Decathlon where they work in teams to design, build, and operate attractive, effective, and energy-efficient solar-powered houses. Our business students are rising to the challenge of envisioning green futures that also make economic sense. One recent business plan proposed a web site that would match up potential carpoolers by pairing people going the same directions at the same time, and also allow riders to choose to travel with smokers or nonsmokers, those who prefer to listen to music versus news, and so on.

Academic Collaborations

Because sustainability is a new discipline, collaborations across campuses within the UMass system and beyond can spur the development of programs.

A UMass Dartmouth staple sustainability course called "Topics in Sustainability" examines a single area of sustainability through the lens of five disciplines. Taught by five professors, the popular course is routinely filled with students. Topics courses have included focuses on Food; Consumption; Water; Coastal Zones; Perception, Representation and the World; and Urban Environments.

Our collaborations already include the CONNECT network, which allows work to span the Southeastern Massachusetts public school campuses of Bridgewater State College, Cape Cod Community College, Bristol Community College, Massachusetts Maritime Academy, and Massasoit Community College. Past pursuits though CONNECT have drawn these partners together for projects related to the American College and University President's Climate Commitment (ACUPCC).

Conversations between UMass campuses in Boston, Lowell, Worchester, Amherst and Dartmouth on developing the UMass System as a leader in the Green Economy have been funded through the UMass President's Creative Economy Award and other funders.

The Sustainability Initiative at UMass Dartmouth has sponsored research on a wetlands restoration study at the Atlas Tack Superfund site in Fairhaven and is currently working with UMass Amherst on the development of Biochar research (in which biomass waste is reduced to a charcoal solid to prevent carbon from entering the atmosphere).

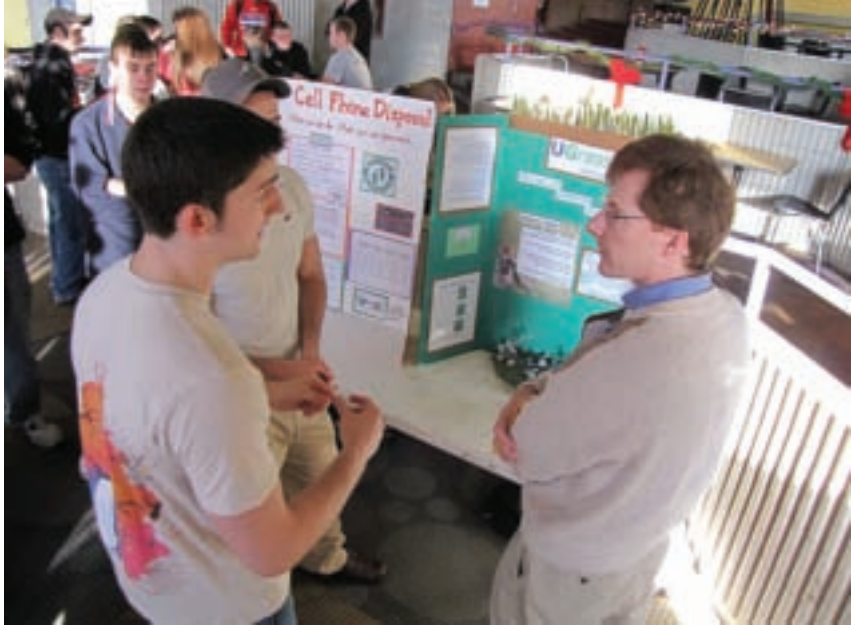
Recent Accomplishments

Multi-disciplinary Sustainability Minor

Our Multi-disciplinary Sustainability Minor was approved in the Spring of 2007 and graduated its first students in the spring of 2009. The 18-credit program *"looks to discover and examine humanity's philosophies and practices, past and present, as they relate to the natural and social world, and consider what new or alternative philosophies and practices might be capable of providing a sustainable, balanced, and ethical future for the planet and its inhabitants."* The minor was conceived of and planned by a group of faculty over the course of several years. Currently over 30 faculty members from as many disciplines are involved in teaching sustainability courses, and nearly 30 students have declared Sustainabilirty as a course of study.

Topics in Sustainability

A UMass Dartmouth staple sustainability course called *"Topics in Sustainability"* examines a single area of sustainability through the lens of five disciplines. Taught by five professors, the popular course is routinely filled with students. Topics courses have included focuses on Food; Consumption; Water; Coastal Zones; Perception, Representation and the World; and Urban Environments. Other sustainability courses at UMass Dartmouth mix old and new courses; *The Politics of Everyday Things* looks at resource chains.



Sustainability Team Projects

Many sustainability courses involve campus issues which give students concrete examples of sustainability challenges and solutions in the real world. A capstone course for the sustainability minor engages students in team projects. One such project pursued biodiesel fuel production on campus for University.

Online Programs

A 12-credit online Sustainability Certificate program started in the summer of 2009. It drew students from several states and countries. Our first graduate was a Sustainability Specialist for Universal Companies, an international distributor for skin, beauty, and body products. A 12-credit online Graduate Certificate in Environmental Policy opened in January of 2009.

Student Research

Student sustainability research projects have led to a plan to heat the swimming pool with solar thermal panels; a paper reduction campaign; and logos and marketing materials for the Sustainability Office and the Regional Council on Sustainability.

Opportunities

New Academic Programs in Sustainability

With the creation of the Sustainability Programs Academic Unit by the Chancellor at the beginning of 2010, the structure to create new undergraduate and graduate programs is in place. Programs in the works include:

- Potential undergraduate and graduate sustainability tracks in the Colleges of Engineering and Business. Student interest in renewables and strategic sustainability management suggest that such tracks would be well populated.
- Online Graduate certificate program in Sustainable Development.
- A multi-disciplinary Master of Science in Sustainable Development.

Sustainability Literacy as a General Requirement

Our Climate Action Plan includes a commitment to make sustainability literacy part of every UMass Dartmouth student's experience. This could be accomplished through a General Education requirement or through a campus-wide effort to infuse sustainability in every department.

Academics Best Practices

For best practices in sustainability academics, we look to Arizona State University's (www.asu.edu) doctoral program in Environmental Planning and Design which offers concentrations in:

Design: a concentration focused on the study of factors affecting various aspects of built environments. ASU's design lessons consider large scale concerns as found in landscape architecture, architecture and interior design, as well as reduced scale concerns in industrial design and visual communication design.

History, Theory, and Criticism: a concentration focused on the theoretical dimensions of sustainable design in areas of architectural and design history including critical discourse in the design disciplines.

Healthcare and Healing Environments: a specialized concentration with a focus on the integration of evidence-based design, sustainable science and best practices in the design and planning of healthcare facilities.

ASU's multidisciplinary program *"provides research experience for students wishing to pursue careers in industry as members of interdisciplinary design and planning teams on environmental and energy issues, as well as for those wishing to teach in the architecture, design, or planning fields."*

Spotlight on Sustainability

Lessons in Sustainability

UMass Dartmouth kicked off its Sustainability Studies offerings in the spring semester of 2007 with the now popular Topics in Sustainability course focused on food, how we grow it, distribute it, and what that means in terms of current costs to our planet and its population. This experimental course was taught by professors from five different departments since a complete understanding of the global marketplace and food production didn't fit under any one area of expertise.

The same turned out to be true for subsequent Topics in Sustainability which educated students about sustainability issues related to consumption, water, coastal zones, and urban environments. Involved in the carbon cycle study for spring 2010 are professors and researchers from the areas of political science, business management, anthropology, marketing, and marine science.

This single course each semester has helped to coalesce a disparate group of faculty from across the campus who are interested in forwarding sustainability studies, but had no previous path for coming together to take action. New foci for Topics in Sustainability are recommended and voted on by sustainability faculty. The course is required for the Sustainability Minor but is popular with students throughout the campus, with each offering filling up quickly.

The first Chairman of Sustainability Studies at UMass Dartmouth, English Professor Jerry Blitefield, said the inter-departmental approach to teaching the Topics course "demonstrates to students that sustainability studies is under no single province. It's not exclusively science-based. It's not exclusively philosophically-based."

He explained that a student majoring in economics does not have to become an expert in earth system science in order to develop their interest in working in their own field with an understanding of a sustainability framework.

Those who choose to take one or more Topics in Sustainability should be prepared, Blitefield said, "To have the doors blown open on their own thinking."

Future Research Projects

Joint Work Across Departments, Campuses, and Colleges

There are significant opportunities in developing multi-disciplinary research or grant collaborations.

Growing a Sustainability Doctoral Program

The depth of campus strengths in sustainability offerings and research in Policy Studies, Engineering, Business, SMAST and other colleges suggests that a Doctoral Program in Sustainability would be a natural fit for the University.

Development of a Sustainability Cooperative Extension Service

With students, researchers, certificate-holders, and professors all connected to the Sustainability Office at UMass Dartmouth, we'd make a logical hub of outreach help for people in the community looking to bring their own sustainability practices forward.

For Discussion

How do you envision that training in sustainability would enhance your chosen course of study?

If you pursued credentials in sustainability itself, how would you apply them to make yourself more valuable as a working professional after graduation?

Blending the expertise of more than one department at UMass Dartmouth, what kind of sustainability research project would you be interested in investigating and how to you imagine answers to your questions would benefit the global sustainability thought process?

Additional Resources

UMass Dartmouth Sustainability
www.umassd.edu/sustainability

Teach Sustainability www.teachsustainability.com.au

Association for the Advancement of Sustainability in Higher Education www.aashe.org

Second Nature www.secondnature.org

Recommended Reading and Viewing

Second Nature
Education for Sustainability

Books

Believing Cassandra
Alan Atkission

Cradle to Cradle: Remaking the Way We Make Things
William McDonough,
Michael Braungart

Deep Economy
Bill McKibben

Depletion and Abundance
Sharon Astyk

Dream of the Earth
Thomas Berry

Earth in Mind
David Orr

Limits to Growth
Donella Meadows

Natural Capitalism
Paul Hawken,
Amory Lovins,
L. Hunter Lovins

Omnivore's Dilemma
Michael Pollan

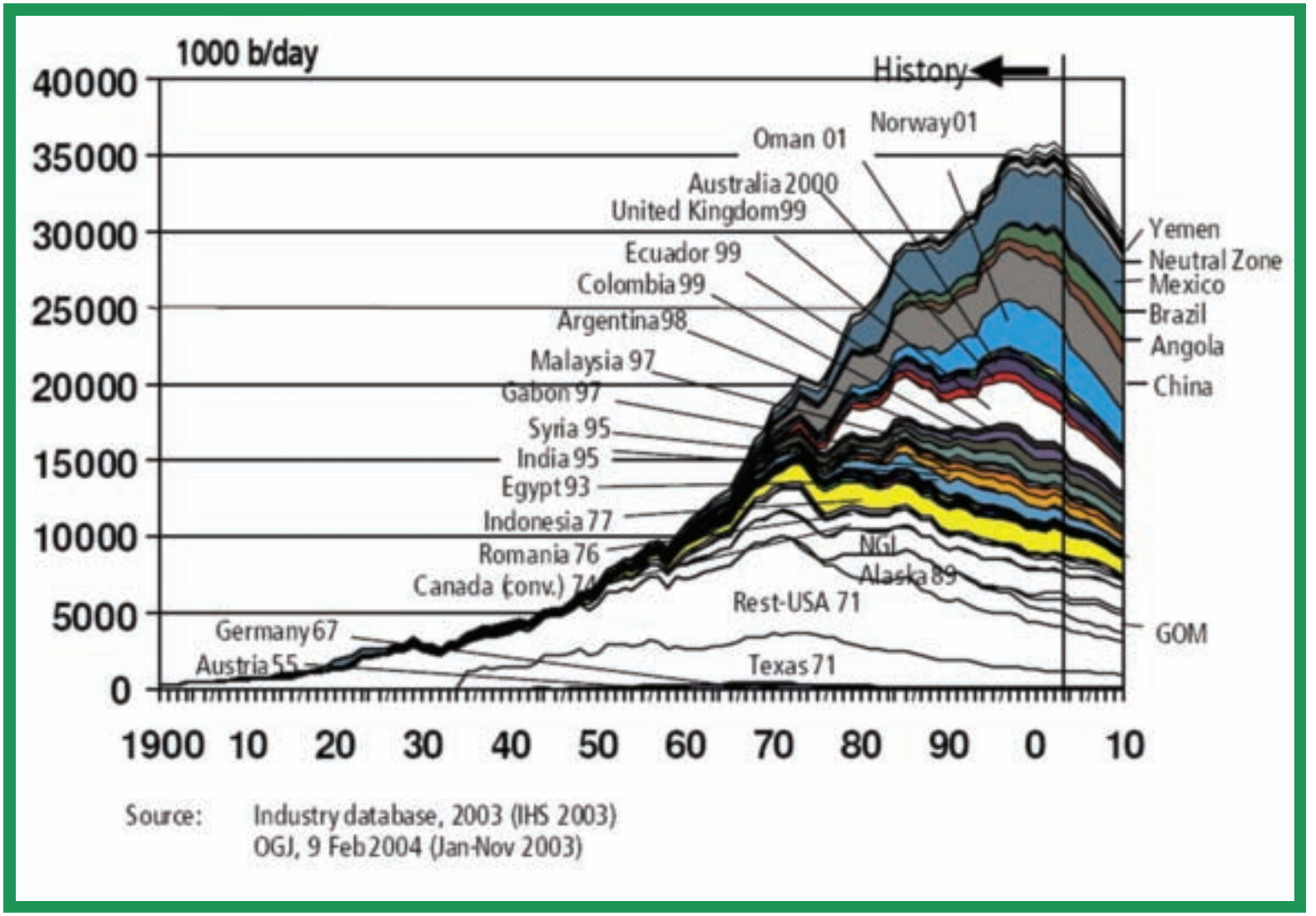
Peak Everything
Richard Heinberg

Web Sites

350.org
aashe.org
foodroots.org
greenreportcard.org
grist.org
newdream.org
peakoil.net
secondnature.org
transitiontowns.org
usgbc.org

Films

An Inconvenient Truth
Flow
Food, Inc.
I.O.U.S.A.
King Corn
No Impact Man
The Corporation
The End of Suburbia
Who Killed the Electric Car
Why We Fight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History
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United Kingdom 99
Ecuador 99
Colombia 99
Argentina 98
Malaysia 97
Gabon 97
Syria 95
India 95
Egypt 93
Indonesia 77
Romania 76
Canada (conv.) 74
Germany 67
Austria 55
Rest-USA 71
Texas 71
NGL
Alaska 89
GOM
Yemen
Neutral Zone
Mexico
Brazil
Angola
China
1900 10 20 30 40 50 60 70 80 90 0 10
Source: Industry database, 2003 (IHS 2003)
OGJ, 9 Feb 2004 (Jan-Nov 2003)

Glossary

ACUPCC
The American College & University Presidents' Climate Commitment (initiated in 2007)

April 2007 Executive Order 484
"Leading By Example: Clean Energy and Efficient Buildings." The goals of this executive order include that all Commonwealth agencies meet the following by 2012:

- 25% reduction in greenhouse gas emission from 2002 levels
- 20% reduction in energy per square foot from 2004 levels
- 10% reduction in water use from 2006 levels

Arboretum
A facility where trees and shrubs are grown for display

Bike Sharing
Systems where numerous bicycles are made available for shared use amongst individuals who do not own any of the bikes

Biochar
Charcoal created by the chemical decomposition of condensed substances by heating that occurs spontaneously at high enough temperatures (pyrolysis) of biomass.

Biomass
A renewable energy source. Biological material derived from living, or recently living organisms, such as wood, waste, and alcohol fuels. Biomass is commonly plant matter grown to generate electricity or produce heat.

Bioreserve
An area containing a wildlife preserve bordered by a buffer zone in where frequent use is permitted to the public.

Brutalist
A style of modern architectural style that developed in the 1950s to mid 1970s. Stylistic features range from block-like geometric forms to organic and sculptural looking forms

Carbon Footprint
Measures the total amount of greenhouse gas emissions released into the environment either directly or indirectly by an individual, organization, event, or product.

Carbon Sequestration
Designed for the lessening of global warming, it is a geoengineering technique for the long-term storage of carbon.

Carpooling
The shared use of a car by a driver and one or more individuals that are going to the same destination, therefore reducing the number of vehicles on the road and reducing CO_2 emissions.

Climate Neutrality
Having net zero Green House Gas emissions (also referred to as Carbon Neutrality).

Closed Loop
A system where materials are continually recycled into the same product. For example, a glass bottle can be recycled and made into another glass bottle.

Consortium for the Advancement of Teaching, Learning, and Scholarship (CATLS)
A group though UMass Dartmouth that seeks to provide a communications nexus within which larger conversations can take place; to help the faculty fulfill their multiple roles; and to connect the activities and programs that the faculty already engages in.

Cradle to Cradle
An assessment where the end-of-life disposal step for a product is a recycling process where a new identical or completely different product is created.

Daylighting
The use of natural light through windows, skylights, light shelves, and other techniques that minimize glare and heat.

DCAM
Division of Capital Asset Management—the state agency responsible for real estate and public building construction for the Commonwealth of Massachusetts.

Electronic Product Environmental Assessment Tool (EPEAT)
A system that helps purchasers evaluate, compare and select electronic products based on their environmental attributes.

Energy Performance Contract
(EPC) a financing technique that uses cost savings from reduced energy consumption to repay the cost of installing the energy conservation measures.

Energy Service Company (ESCO)
A business that provides energy management services to an energy user.

Environmentally-Preferable Purchasing (EPP)
The federal government requires the purchase of products or services that have the least negative effect on the environment and human health in consideration of the attainment of raw materials, manufacturing methods, packaging, distribution, and recyclability.

Externalized Costs
Negative effects associated with economic transactions which affect people outside of those dealings, which means that neither the buyer nor the seller is influenced by the impact.

Food Waste
Is any food substance which is discarded, or intended or required to be discarded.

Geothermal
Of or relating to the heat in the interior of the earth.

Green Roof
A literally green roof that's covered with plants to reduce the heat that the roof absorbs. The roof system uses a specialized undercarriage for the waterproof membrane and excess water removal.

Green Seal Certification
means that a product or service has been tested according to science-based environmental leadership standards, that it works as well or better than others in its class, and that it as been evaluated without bias or conflict of interests.

Grey-Water
Non-industrial wastewater generated from domestic processes such as dish washing, laundry and bathing.

Life Cycle Cost
The total of all costs concerning a system, product, structure or service during its life time.

LEED
Leadership in Energy and Environmental Design. A system to categorize the level of environmentally sustainable construction in buildings.

Meteorological Tower
A device that measures wind speed and determines whether a site qualifies for a wind turbine.

Methane Capture
A method of gathering methane by using wells, pipes, and other technology from either landfills or dairy farms, stopping it from entering the atmosphere and harnessing it for energy.

Municipal Solid Waste
A waste type that includes predominantly household waste collected by a municipality within a given area.

Nature Deficit Disorders
Refers to the trend that children are spending less time outdoors, resulting in a wide range of behavioral problems.

Peak Oil
The term used to describe the point when worldwide production of conventional crude oil peaks in volume, which is expected to result in an increase in oil prices from a decline in the availability of cheap and easily accessible oil sources.

Potable Water
Water which is free from impurities that may cause disease or harmful physiological effects, such that the water is safe for human consumption.

Preferred Parking
Parking that is preferred for environmentally-friendly vehicles including hybrid cars. However no punitive action is taken when a non-preferred vehicle parks in a preferred spot.

Public Transportation
Various forms of shared ride vehicles which are intended for use by the public.

Recycled Content
Refers to the percentage or weight of recycled materials in a product.

Renewable Energy
Energy from sources that cannot be used up: sunshine, water flow, wind and vegetation.

Restriction of Hazardous Substances (RoHS) environmental standards
Restricts the use of six hazardous materials in the manufacture of various types of electronic and electrical equipment. It is closely linked with the Waste Electrical and Electronic Equipment Directive which sets collection, recycling and recovery targets for electrical goods and is part of a legislative initiative to solve the problem of huge amounts of toxic e-waste. Helps reduce solders' environmental footprint, including energy consumption, releases of toxic chemicals, and potential risks to human health and the environment.

Single Occupancy Vehicle
(SOV) is a privately operated vehicle whose only occupant is the driver.

Slow Food
Movement that was founded by Carlo Petrini in Italy to combat fast food. It claims to preserve the cultural cuisine and the associated food plants and seeds, domestic animals, and farming within an ecoregion.

Sprawl
Development patterns where rural land is converted to urban/suburban uses more quickly than needed to house new residents and support new businesses, encouraging people's dependence on automobiles.

Sustainability
Meeting the economic, social and environmental needs of the present generation without compromising the needs of future gererations.

Sustainable Living
Lifestyle that attempts to reduce an individual's or society's use of the earth's natural resource and his/her own resources.

Thin-Film Solar
Also called a thin-film photovoltaic cell, is a solar cell that is made by depositing one or more thin layers of photovoltaic material on a substrate. Thin film solar cells employ materials such as amorphous silicon cadmium telluride and copper indium diselenide. These materials have high light absorbency and a much thinner layer of material is required. Cells fabricated from these materials are currently less efficient

than Crystalline cells, but promise attractive cost and flexibility benefits.

Triple-Bottom-Line
Is for companies aiming for sustainability, who have to perform to not just a single financial bottom line, but the simultaneous pursuit of economic prosperity, environmental quality and social equity—Profit, Planet & People.

U.S. Green Building Council's' (USGBC) Leadership in Environmental and Energy Design (LEED) green building certification program
Provides independent, third-party verification that a building project meets the highest green building and performance measures. LEED-certified buildings are designed to:

- Lower operating costs and increase asset value;
- Reduce waste sent to landfills;
- Conserve energy and water;
- Be healthier and safer for occupants;
- Reduce harmful greenhouse gas emissions;
- Qualify for tax rebates, zoning allowances and other environmental incentives in hundreds of cities;
- Demonstrate an owner's commitment to environment stewardship and social responsibility.

Waste Stream
The total flow of solid waste from homes, businesses, institutions, and manufacturing plants that are recycled, burned, or disposed of in landfills, or segments thereof such as the "residential waste stream" or the "recyclable waste stream."

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One generation of intensely focused investment, research, and redevelopment— redesigning our energy systems, overhauling our chemical industries, rebuilding our cities, finding substitutes for wood and replanting lost forests, and so much more—could transform the world as we know it into something far more beautiful, satisfying, and sustainable.

This I believe: Sustainability is possible. Sustainability is desirable. Sustainability is a goal worthy of one's life's work. Sustainability is the great task of the next century. Sustainability is the next challenge on the road to our destiny.

From http://www.atkisson.com/pubs/Manifesto-AtK2001.pdf


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