Online Ethics Center
FOR ENGINEERING AND SCIENCE

Environmental Ethics & Sustainability Bibliography

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Description

An annotated list of resources relating to environmental ethics & sustainable development. Includes web resources, books and articles.

Body

Web Resources

American Society of Civil Engineers – Sustainability
This web site discusses projects, programs, and guidelines adopted by the ASCE to promote sustainability in engineering.

U.S. Department of Energy – Energy Efficiency & Renewable Energy
The U.S. Department of Energy's Energy Efficiency and Renewable Energy site promotes governmental green initiatives.

U.S. Green Building Council
A non-profit organization committed to promoting the goals of sustainable development through the production of LEED standards, which seek to help engineers and architects develop cost-efficient and energy-saving green buildings.

Whole Building Design Guide
The WBDG is a web-based portal providing one-stop access to up-to-date information on a wide range of building-related guidance, criteria and technology from a 'whole buildings' perspective. It is made available by the National Institute of Building Sciences.

Books

Allen, David T. and David Shonnard. 2002. Green engineering: Environmentally conscious design of chemical processes. Upper Saddle River, N.J.: Prentice Hall PTR.
Developed through the United States Environmental Protection Agency's green engineering curriculum development, this book provides a comprehensive overview and introduction to green approaches to the design and development of chemical processes and products.

Anastas, Paul T. and John C. Warner. 1998. Green chemistry: Theory and practice. Oxford University Press.
A discussion of environmental issues that arise in chemical and environmental engineering, as well as examples of active learning activities that can be used in chemistry and environmental engineering classrooms.

Anastas, Paul. T. et al. 2007. Exploring opportunities in green chemistry and engineering education: a workshop summary to the Chemical Sciences Roundtable. Washington, D.C.: National Academies Press.
This document summarizes the presentations and discussions that took place during a workshop held in November of 2005 that was designed to look at the current state of green chemistry and green engineering education; to raise awareness about the tools that are available, and to highlight promising new areas that have yet to be fully explored.

Azapagic, Adisa, Slobodon Perdan, and Roland Clift. 2004. Sustainable development in practice: Case studies for engineers and scientists. Chichester, UK: John Wiley & Sons Ltd.
After a brief discussion of the role of professional engineers and scientists in sustainable development, this book presents a series of case studies looking at issues of water use and management, air pollution, decision-making in regard to the

environment, and social and ethical dimensions of sustainable development.

Desjardins, J.R. 2000. Environmental ethics: An introduction to environmental philosophy. Belmont, C.A.: Wadsworth Thomson Learning. (3rd ed.)
The text serves as an introduction to ethical theory as it applies to environmental issues and as a casebook on contemporary problems of science, industry, and individual decision-making. It provides a readable, yet philosophically careful survey of the field of environmental ethics. It is comprehensive, covering topics from the relevance of Aristotle's ethics for environmental issues to Deep Ecology and Ecofeminism.

Gorman, Michael E. Matthew M. Mehalick, and Patricia Werhane. 2000. Ethical and environmental challenges to engineering. Upper Saddle River, N.J.: Prentice Hall.
This book features full-length, multi-faceted, real-life cases of design and managerial dilemmas involving environmental ethical dilemmas in a variety of settings--together with background readings that illustrate how one can integrate ethical and environmental challenges into engineering decisions, especially early in the design process.

Haselbach, Liv. 2008. The engineering guide to LEED-new construction: Sustainable construction of engineers. New York: McGraw-Hill.
A guide discussing how to apply LEED Standards to new construction projects. LEED is an internationally recognized green building certification system developed by the U.S. Green Building Council.

Kutz, Myer. 2007. Environmentally conscious mechanical design. Hoboker, N.J.: John Wiley & Sons.
An anthology of case studies, essays and recommendations for the environmentally-friendly mechanical design of products and processes.

Olson, Robert L. and David Rejeski. 2005. Environmentalism and the technologies of tomorrow: Shaping the next industrial revolution. Washington: Island Press.
Collection of essays discussing the role emerging technologies may play in protecting the environment, as well as the changing roles of governments, industry, and NGO’s in managing and shaping the use of these technologies in the future.

Reiss, Michael J. and Roger Straughan. 1999. Improving nature?: The science and ethics of genetic engineering. Cambridge University Press.
Discusses issues such as ecological risk, sustainable agriculture, biotechnology, environmental impact, environmental ethics.

Vallero, Daniel A. and Chris Braiser. 2008. Sustainable design: The science of sustainability and green engineering. New York: John Wiley & Sons.
This volume provides a detailed explanation of the scientific principles that underlie sustainable design, as well as discussing the ethical concepts inherent in green design from a multidisciplinary perspective. Includes case studies and exercises for students.

Vallero, Daniel A. and A.P. Vesiland. 2007. Socially responsible engineering: Justice in risk management. Hoboken, N.J.: John Wiley Publishing Company.
This book focuses on environmental aspects of engineering ethics, gives a historic and philosophical background for the concept of environmental justice, and discusses the technical tools necessary to help engineers evaluate projects from an ethical perspective and to properly access the risk it presents to communities that may be impacted.

Vallero, Daniel. 2006. Paradigms lost: Learning from environmental mistakes, mishaps and misdeeds. Boston: Butterworth-Heinermann.
This book contains a large number of case studies about environmental mistakes and disasters in engineering. Each case includes a scientific explanation of what went wrong, and how similar problems could be avoided in the future. The volume discusses issues such as ethics, risks, and reliability, how pollutants move through the environment, and best practices in dealing with environmental issues in engineering.

Van Deveer, Donald and Christine Pierce. 1997. The environmental ethics and policy book : Philosophy, ecology, economics. Wadsworth Publishing.
Environmental ethics, ethics and economics, ecological risk, sustainable development.

Vesilind, P. Aarne and Alastair S. Gunn. 1998. Engineering, ethics, and the environment. Cambridge University Press.
A volume covering the topics of engineering ethics, environmental impact, design

and the environment.

Weaver, Paul, et.al. 2000. Sustainable technology development. Greenleaf Publishing.
Sustainable development, design and the environment, environmental impact, technology development.

Wilcox, John R. and Louis Theodore. 1998. Engineering and environmental ethics: A case study approach. New York: Wiley Publishing.
This is a collection of over 100 case studies looking at engineering ethics in the environment. Each case is accompanied by expert case studies that examine underlying philosophical aspects and discuss how the problems in the case could have been addressed better or differently. The cases are organized by engineering discipline, and environmental issue (waste disposal, public safety, etc.).

Articles

Amadei, B. and W.A. Wallace. 2009. Engineering for humanitarian development. IEEE Technology and Society Magazine. 28(4): 6-15.
The article discusses the imbalance of benefits that engineering has been given to developed nations, leaving underdeveloped nations without adequate facilities and infrastructure to build sustainable communities. The authors discuss the need for a new form of engineering project delivery that meets the technical and social challenges involved in working in underdeveloped communities while also delivering appropriate and sustainable solutions.

Beamon. Benita. M. 2005. Environmental and sustainability ethics in supply chain management. Science and Engineering Ethics. 11(2): 221-234.
Discusses the responsibility of professional engineers to consider the environmental impacts of products and processes they manage/design, and describes how environmentally conscious supply chain management is an important duty of the responsible engineer.

Boyle, C. and G.T.K. Coates. 2005. Sustainability principles and practice for engineers. IEEE Technology and Society Magazine. 24(3): 32-39.
Article describes the process the Institute of Professional Engineers of New Zealand went through to develop and provide engineers with a set of sustainability principles

for engineers based on the long-term viability of the planet, and a holistic view for projects and engineering practice that integrates environmental, social, and economic issues.

Catalano, George D. 2006. Promoting peace in engineering education: modifying the ABET criteria. Science and Engineering Ethics. 12(2): 399-406.
The author suggests some possible modifications that could be made to ABET Criterion 3 that support the pursuit of peace in engineering education, including ideas of sustainable development.

Duffell, R. 1998. Toward the environment and sustainability ethics in engineering education and practice. Journal of Professional Issues in Engineering Education & Practice. 124(3): 78-90.
Stresses the importance for engineers to consider the ethics of sustainability in engineering education, in continuing education development and in practice in the United Kingdom.

Eisenbarth, Steven R. and Kenneth W. Van Treuren. 2004. Sustainable and responsible design from a Christian worldview. Science and Engineering Ethics. 10(2): 423-429.
Describes efforts at Baylor University's Engineering School to see how a Christian worldview and insights can act with engineering design to inform the non-quantifiable aspects of the engineering process, such as ethics, social impact, responsibility and sustainability.

El-Zein, Abbas, David Airey, Peter Bowden, and Henriikka Clarkeburn. 2008. Sustainability and ethics as decision-making paradigms in engineering curricula. International Journal of Sustainability in Higher Education. 9(2): 170.
Paper explores the rationale for teaching sustainability and engineering ethics within a decision-making paradigm, and critically appraises the ways of achieving related learning outcomes.

Fenner, Richard A., Charles M. Ainger, Heater J. Cruickshank, and Peter M. Guthrie. 2005. Embedding sustainable development at Cambridge University. International Journal of Sustainable Development. 6(3): 229-241.

The paper discusses efforts to introduce concepts of sustainable development into the activities of the Department of Engineering at Cambridge University, UK.

Grunwald, A. 2000. Against over-estimating the role of ethics in technology development. Science and Engineering Ethics. 6(2): 181-196.
Technology development, engineering ethics, ethics and prudence, ethics and economics.

Herkert, J.R. 1998. Sustainable development, engineering, and multinational corporations: Ethical and public policy implications. Science and Engineering Ethics. 4(3): 333-346.
Conflict of interest, ethics and economics, sustainable development, corporate ethics, engineering ethics.

Herkert, J.R. A. Farrell, and J.J. Winebrake. 1996. Technology choice for sustainable development. IEEE Technology and Society Magazine. 15(2): 12-20.
This article describes an operational knowledge based tool that can help determine which technologies are best suited to the needs of a sustainable society, in light of the defined goals of sustainable development.

Holmberg, J., M. Svanstrom, D. J. Peet, K. Mulder, D. Ferrer-Balas, and J. Segalas. 2008. Embedding sustainability in higher education through interaction with lecturers: Case studies from three European technical universities. *European Journal of Engineering Education*. 33(3): 271–282.
DOI 10.1080/03043790802088491
In this paper, three universities compare their work on the integration of sustainable development into their educational programmes. The purpose is to show examples of how this can be done and to illustrate important generalised success factors.

Manion, M. 2006. Ethics engineering and sustainable development. IEEE Technology and Society Magazine. 21(3): 39-48.
The author attempts to provide a rationale for a philosophy of engineering ethics grounded in the notion of sustainable development , and urges for professors of engineering to help increase awareness by stimulating engineering students to build sustainable ideas into their designs, as well as to help transform the attitudes, values, and philosophies of the new engineer.

McIsaac, G.F., Morey, N.C. 1998. Engineers' role in sustainable development: Considering cultural dynamics. Journal of Professional Issues in Engineering Education and Practice. 124(4): 110-119.
Sustainable development, professional responsibility, engineering ethics, design and the environment.

Meadowcroft, J. 2000. Sustainable development: a new(ish) idea for a new century? Political Studies. 48(2): 370-387.
Sustainable development, environmental engineering, environmental impact, global.

Minteer, Ben and James Collins. 2008. From environmental to ecological ethics toward a practical ethics for ecologists and conservationists. Science and Engineering Ethics. 14(4): 483-501.
The authors discuss how the emerging field of ecological ethics offers a practical or scientific ethics that offers a superior approach to the ethical dilemmas often faced by ecological researchers and managers in the lab, field, and conservation facility.

Nelson, Michael P. and John A. Vucetich. On advocacy by environmental scientists: What, whether, why, and how. Conservation Biology. 23(5): 1090-1101.
This article discusses the nature and appropriateness of advocacy by environmental scientists, and reports the results of a literature review during which the authors catalogued, categorized, and critiqued the arguments used for and against the appropriateness of advocacy by environmental scientists. Most arguments, whether for or against advocacy, are characterized by some significant deficiency. From their analysis of the literature, they argue that advocacy is nearly unavoidable, and that scientists, by virtue of being citizens first and scientists second, have a responsibility to advocate to the best of their abilities, to improve their advocacy abilities, and to advocate in a justified and transparent manner.

Peet, John and Hartmut Bossel. 2000. An ethics-based systems approach to indicators of sustainable development. International journal of sustainable development. 3(3): 221-238.
Discusses the need and a method to identify criteria that will allow society to judge if policies promoting sustainable development are a success.

Perdan, Slobodan, Adisa Azapagic, and Roland Clift. 2000. Teaching sustainable development to engineering students. International Journal of

Sustainability in Higher Education. 1(3): 267-279.
This paper outlines the way in which a multidisciplinary approach to teaching sustainability has been embodied in learning programs and activities in engineering at the University of Surrey, UK. More specifically, it describes a project to develop a comprehensive IT-based learning resource comprising a set of multidisciplinary case studies and support material in order to aid engineering students in understanding the concepts inherent in sustainability and how solutions can be developed.

Prendergast, J. 1993. Engineering sustainable development. Civil Engineering. 63(10): 39-42.
Sustainable development, civil/structural engineering, professional responsibility, environmental impact.

Rowden, K. and B. Streibig. 2004. Incorporating environmental ethics into the undergraduate engineering curriculum. Science and Engineering Ethics. 10(2): 417-422.
The article describes a three-hour unit on the economic and environmental impacts of the product desig developed at Gonzaga University that focuses on the design of personal computers. Historically, products have not been designed to be recycled easily. By incorporating environmental ethics into our classrooms and industries, valuable materials can be recovered and harmful materials can be eliminated from our waste stream. Future engineers must consider the economic cost-benefit analysis of designing a product for easy material recovery and recycling versus the true cost of the disposal and continued use of virgin materials.

Rusinko, C.A. 2007. Green manufacturing: An evolution of environmentally sustainable manufacturing practices and their impact on competitive outcomes. IEEE Transactions on Engineering Management. 54(3): 445-454
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This paper presents an exploratory study of the relationships between specific environmentally sustainable manufacturing practices, and specific outcomes in the U.S. carpet industry to discover if these environmentally sustainable practices are associated with positive competitive outcomes.

Sau., R. 2000. Creating sustainable global advantage for America's technology industries. IEEE Transactions on Engineering Management. 47(2): 283-284.
Sustainable development, technology development, business, ethics and economics.

Seglas, J. D. Ferrer-Balas, and K.F. Mulder. 2010. What do engineering students learn in sustainability courses?: The effects of the pedagogical approach. Journal of Cleaner Production. 18(3): 275-284.
Paper presents the results of a five year research project that analyzed how sustainable development competences were introduced into technical universities, and to evaluate which pedagogical approach facilitates student learning in this area.

Shen, Li-Yin, Vivian W.Y. Tam, Leona Tam, and Ying-Bo Ji. 2010. Project feasibility study: The key to successful implementation of sustainable and socially responsible construction. Journal of Cleaner Production. 18(3): 254-59.
This paper introduces a new approach to conducting project feasibility studies by embracing the principles of sustainable development, and including economic performance attributes, social performance attributes, and environmental attributes.

Sotoudeh, M. 2005. Links between sustainability and technology development. IEEE Technology and Society Magazine. 24(1): 9-14.
The author discusses important official statements on the role of technology in sustainable development, and shows that sustainability entails more than using environmentally friendly technologies and projects. The framework of sustainability implies that the impacts of a technology should be assessed using methods such as the Constructive Technology Assessment (CTA) at the global and local levels to improve positive effects.

Striebig, Bradley A. Tyler Jantzen, and Katherine Rowden. 2006. Ethical considerations of the short-term and long-term health impacts, costs, and educational value of sustainable development projects. Science and Engineering Ethics. 12(2): 345-354.
This paper addresses the ethical dilemma of dealing with immediate medical needs in developing countries while trying to implement sustainable technologies as a student engineering project.

Van Dyke, Fred. 2005. Teaching ethical analysis in environmental management decisions: A process-oriented approach. Science and Engineering Ethics. 11(4) 659-669.
The article discusses the ethical as well as scientific analysis needed in the decisions made by environmental managers, and discusses a case study of the prescribed burning of sagebrush to illustrate one method of teaching students to ethically

evaluate a management action using an ethical decision-making framework.

Vesilind, P. Aarne. 2002. Vestal virgins and engineering ethics. Ethics and the Environment. 7(1): 92-101.
Author explores how present codes of ethics are inadequate in addressing the problem of maintaining environmental quality. The moral responsibilities of engineers, he argues, should include the commitment to provide a high quality and sustainable environment for future generations.

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Resource Type

Bibliography

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Sustainability

Topics

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Discipline(s)

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