Energy Use Ethics in Engineered Projects Bibliography

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Description

This bibliography covers the ethics of energy use in agriculture, community planning, construction, electricity delivery, manufacturing, transportation, and the home. It also includes a list of relevant centers and web sites.

Abstract

Body

Centers & Web Sites

Climate Change – What You Can Do
This web site put together by the Environmental Protection Agency reviews simple things that individuals can do in their home, at the office, on the road, and at school to reduce the energy they use and to help mitigate climate change. Includes a link to the EPA's personal greenhouse gas emissions calculator.

Green Design Institute, Carnegie Mellon University

The Green Design Institute at Carnegie Mellon University is a major interdisciplinary education and research effort that seeks to work with government agencies, companies and foundations to develop processes that can improve environmental quality and product quality while enhancing economic development. It includes information about current initiatives and courses being taught by Institute members, a library of current publications, and a calendar of upcoming events. The site also includes a link to the Economic Input-Output Life Cycle Assessment tool developed by the Institute, which allows you to estimate the materials and energy resources required for, and the environmental emissions resulting from, activities in our economy.

Rocky Mountain Institute
An independent, entrepreneurial nonprofit organization that focuses on breaking through basic challenges related to the efficient and restorative use of resources. Their website is a great source of information on the sustainable use of energy and to explore the latest projects being worked on by RMI researchers.

Energy Star
This joint program of the U.S. Environmental Protection Agency and the Department of Energy certify products that meet strict energy efficiency guidelines set by these organizations and provides information about making homes and businesses more energy efficient.

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.

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Agriculture

Bal, Lalit M., Satya Santosh, and S.N. Naik. 2010. Solar Dryer with Thermal Energy Storage Systems for Drying Agricultural Food Products: A Review. *Renewable and Sustainable Energy Reviews.* 14(8): 2298-2314.
Discusses the large potential of solar dryers with thermal energy storage systems for the continuous drying of agricultural food products have in the developing world,

and how it is a viable substitute for using fossil fuel for this purpose. The paper summarizes past and current research in this field and its potential challenges and benefits.

Fischer, James R., Stanley Johnson and Janine A. Finnell. 2009. Energy, Agriculture, and the Food System. ***Resource: Engineering and Technology for a Sustainable World.*** **16(2): 16-19.**
Discusses current efforts by U.S. agricultural producers to use energy-efficient procedures to reduce dependence on fossil fuels and the resulting environmental effect, as well as their use of irrigation water management and sustainable farming techniques to reduce fuel consumption and cost. The authors also summarize research being done by the U.S. Department of Agriculture's Sustainable Agriculture Research and Education program on energy efficient practices.

Kharseh, Mohamed, and Bo Nordell. 2011. Sustainable Heating and Cooling Systems for Agriculture. ***International Journal of Energy Research.*** **35(5): 415-422.**
Discusses a ground-coupled heating cooling system that could be used for a poultry farm. Using the Syrian poultry sector as an example, the authors discuss the requirements of a heating/cooling system of this type for a typical Syrian chicken farm and how this system would increase poultry production while also saving money, energy, and reducing impact on the environment. At the moment, chicken farms heat their buildings using coal and have no cooling system in place due to costs. These elevated temperatures lead to reduced chicken growth and death from overheating.

Woods, Jeremy. 2010. Energy and the Food System. ***Philosophical Transactions of the Royal Society B: Biological Sciences.*** **365(1554): 2991-3006.**
Discusses in detail the energy use of modern agriculture and its heavy dependency on fossil fuels. Nitrogen fertilizer production uses large amounts of natural gas and some coal and can account for more than 50% of the total energy used in commercial agriculture. The author outlines how technology developments, changes in crop management, and renewable energy will all play a role in increasing the energy efficiency of agriculture in the future.

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Community Planning

Beatley, Timothy. 2000. ***Green Urbanization: Learning from European Cities*** **. Washington, D.C. Island Press.**
Looks at a number of case studies of European cities to see how they have developed a holistic approach to sustainable development, energy conservation, and green urbanization.

Cuddihy, John, Christopher Kennedy, and Phillip Byer. 2005. Energy Use in Canada: Environmental impacts and opportunities in relationship to infrastructure systems. ***Canadian Journal of Civil Engineering.*** **32(1): 1-15.**
Provides an overview of energy use in Canada by region and sector and focuses on four sectors most relevant to civil engineering activities where energy consumption could be reduced through intelligent infrastructure design. This includes the areas of residential, commercial-institutional, construction, and transportation. The authors discuss opportunities for energy use reduction in building design, water and waste-water systems, urban form, and transportation, such as the implementation of existing technologies in building upgrades, considering the geometric properties of urban canyons and their microclimatic effects, and the incorporation of mixed-modal transit.

Fitzgerald, Joan. 2010. ***Emerald Cities: Urban Sustainability and Economic Development.*** **New York: Oxford University Press.**
The author argues that investing in attracting high-paying green jobs in renewable energy technology, construction, manufacturing, recycling and other fields has two major benefits for cities who may be suffering severe budget shortfalls. Not only do these jobs help spark economic growth, but they also drastically improve the quality of life of city residents. The author also investigates how investing in green research and technology may help revitalize older industrial cities.

Hillman, Tim and Anu Ramaswami. 2010. Greenhouse Gas Emission Footprints and Energy Use Benchmarks for Eight U.S. Cities. ***Environ. Sci. Technol.*** **44(6): 1902–1910.**
The authors develop greenhouse gas (GHG) emissions footprints at the city-scale for 8 US cities using the method described in the paper below. The method incorporates end-uses of energy within city boundaries, plus cross-boundary

demand for airline/freight transport and embodied energy of four key urban materials [food, water, energy (fuels), and shelter (cement)], essential for life in all cities...

Ramaswami, Anu, et al. 2008. A Demand-Centered, Hybrid Life-Cycle Methodology for City-Scale Greenhouse Gas Inventories. *Environ. Sci. Technol*., 42(17): 6455–6461.
The authors describe a method for conducting city-scale green house gass inventories including spatial allocation of surface and airline travel and life-cycle assessment to quantify the embodied energy of key urban materials (food, water, fuel, and concrete).

Ramaswami, Anu et al. 2011. Planning for low-carbon communities in US cities: a participatory process model between academic institutions, local governments and communities in Colorado. *Carbon Management*. 2(4): 397-411.
Participatory process models combine the use of technical data with community participation to develop a sustainability plan relevant to each city. In this article, two case study applications in Denver, CO, USA and Broomfield, CO, USA use a participatory process, which combines teams from academia, local governments and community members to create city climate action plans. The participatory process is developed from concepts in community-based participatory research, analytic deliberation, and post-normal science. The refined process model developed in these two case studies goes through seven steps which include creating the deliberative body, co-developing data sets for sustainability analysis, defining sustainability goals, using scenario modeling for potential sustainability actions, prioritizing actions through deliberation, demonstrating consensus or diversity in final action plan, and conducting an outcomes assessment.

Vanderberg, Willem H. 1995. Preventative Engineering: Strategy for Dealing with Negative Social and Environmental Implications of Technology. *Journal of Professional issues in Engineering Education and Practice.* 121(3): 155-160.
This short article discusses how preventative engineering makes use of how technology affects human life, society, and the biosphere so as to adjust engineering theory and practice to create greater compatibility between technology and its contexts. The author looks at undergraduate engineering education and approaches that can be used, such as designing for the entire life cycle of a building

or community, the design of sustainable cities, and how engineered projects can seek to better the quality of human life and the environment over the long term.

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Construction

Baird, Stephen. 2008. Sustainable Design: The Next Industrial Revolution? *Technology Teacher.* 67(4): 11-15.
This article discusses how important sustainable design is going to be in the home construction industry's near future and how we must educate students in sustainable design. This article considers the use of natural light, on-site energy production, and the need to reduce wastewater in the design and construction of homes.

Castleton, H.F., V. Stovin, S.B.M. Beck, and J.B. Davidson. 2010. Green Roofs: Building energy savings and the potential for retrofit. *Energy and Buildings.* 42(10): 1582-1591.
Green roofs are a passive cooling technique that stops incoming solar radiation from reaching the building structure below. The article review studies showing how these roofs can offer benefits in winter heating reduction as well as summer cooling, and highlights situations where green roofs can help make the greatest energy savings. The authors found that older buildings with poor existing insulation can benefit the most from retrofitting with a green roof.

Ekins, Paul and Eoin Lees. 2008. The Impact of EU Policies on Energy Use in and the Evolution of the UK Built Environment. *Energy Policy* 36(12): 4580-4583.
Discusses how European Union directives have influenced the design of buildings in the United Kingdom to conserve energy use. Though the current directives have been implemented in differing ways in different EU countries and the implementation remains patchy, policies of this kind have the potential to become a major influence in the evolution of the U.K.'s build environment.

Han, H.J. et al. 2010. New Developments in Illumination, Heating, and Cooling Technologies for Energy-Efficient Buildings. *Energy.* 35(6): 2647-2653.

This paper gives a concise review of new designs and developments in the area of illumination, heating and air-conditioning systems, and technologies for energy-efficient buildings. The authors also discuss new designs and ideas that can be easily implemented to improve energy efficiency and reduce greenhouse gas emissions and environmental impacts of new or existing buildings.

Hawkes, Dean and Wayne Foster. 2002. *Energy Efficient Buildings: Architecture, engineering, and environment.* New York: W. W. Norton & Co.
Discusses how partnerships between architects and engineers can lead to stunning solutions to energy efficiency puzzles. After reviewing the history of civil engineering and its relation to architecture, the book presents twenty studies of projects from the engineering firm Arup that show innovative designs that limit energy consumption and heighten the energy efficiency of the buildings featured in this volume.

Kevern, J.T. 2011. Green Building and Sustainable Infrastructure: Sustainability Education for Civil Engineers. *Journal of Professional Issues in Engineering Education and Practice.* 137(2): 107-117.
Discusses a framework for incorporating sustainable design/thinking as a new civil engineering course. The article discuss experiences and insights gained from the pilot offering of the course and outlines how green building rating systems were used to introduce the concepts of sustainability in buildings and infrastructure, highlighted by presentations from green-building professionals.

Musau, Filbert and Koen Steemers. 2008. Space Planning and Energy Efficiency in Office Buildings: The Role of Spatial and Temporal Diversity. *Architectural Science Review.* 51(2): 133-145.
Discusses how the ways in which office space is organized can drastically affect the energy use of a building. The authors use the case study of typical office space layouts in the United Kingdom and suggest ways in which new utilizations of space can have significant impacts on energy use.

Nair, Indra, Sharon Jones, and Jennifer White. 2002. A Curriculum to Enhance Environmental Literacy. *Journal of Engineering Education.* 9(1): 57-68.
Discusses the need to make environmental literacy a part of undergraduate education and describe the results of decades of efforts of teaching about energy and environmental conservation in a course on this subject.

Omar, Abdeen Mustafa. Focus on Low Carbon Technologies: The positive solution. *Renewable and Sustainable Energy Reviews.* 12(9): 2331-2357.
This paper discusses possible energy savings and better performance achieved by different solar passive strategies such as skylights and clerestory roof windows and element arrangements across the roof in zones of cold to temperate climates. These solar strategies, when coupled with conventional systems for heating, cooling, ventilation, and lighting can significantly contribute to energy conservation in the building sector.

Roosa, Stephen A. 2005. Planning for Sustainable Urban Development Using Alternative Energy Solutions. *Strategic Planning for Energy and the Environment.* 24(3): 37-56.
Discusses the role of sustainable development as an overarching guide to urban planning and looks at examples of urban areas that are using sustainable development concepts to help address their community's overall energy usage.

Electricity Delivery

Amin, S.M. 2008. For the Good of the Grid. *IEEE Power and Energy Magazine.* 6(6): 48-59.
The existing electricity infrastructure is facing a number of challenges in the near future. This includes reducing transmission congestion, increasing security, producing and distributing power in a sustainable manner, and providing power to those who currently do not have access.

Hadjipaschalis, Ioannis, Andreas Poullikkas, and Venizelos Efthimiou. 2009. Overview of Current and Future Energy Storage Technologies for

Electric Power Applications. ***Renewable and Sustainable Energy Reviews.*** **13(6-7): 1513-1522.**

One of the major issues with renewable energy sources is that their power output is not as reliable and easy to adjust as traditional power sources. This disadvantage can we overcome by effectively storing the excess power produced by renewable energy. The authors review current and future energy storage solutions and discuss how to optimize the storage capacity of each technology in terms of its ideal network environment and energy storage scale.

Makovich, Lawrence J. 2011. The Smart Grid: Separating Perception from Reality. ***Issues in Science and Technology.*** **27(3): 61-70.**

Instead of a disruptive technology poised to transform the power sector in a decade, expect a more revolutionary change towards a “smarter” grid with more modest results. The smart grid system is actually an extension of innovations that have been going on for decades, and expect a supply-side, engineering driven application of smart grid technologies to improve operation and reliability in the short term. However, even though the change may be slow, expect real benefits from this new technology.

McDonald, Jim. 2008. Adaptive Intelligent Power Systems. Active Distribution Networks. ***Energy Policy.*** **36(12): 4346-4351.**

As our current electrical power distribution system continues to age, we need to replace outdated technologies with intelligent power networks that need to be supported by government policy commitments to cleaner and renewable sources of electricity generation. These new intelligent power systems will be able to cope with variable voltages and frequencies and will offer more flexible, sustainable methods for distributing power around the country.

De Souza Ribeiro, L.A., O.R. Saavedra, S.L. de Lima and J. Gomes de Matos. 2011. Isolated Micro-Grids with Renewable Hybrid Generation:The Case of Lençóis Island. IEEE Transactions on Sustainable Energy. 1:1-11.

Describes a renewable energy solution developed for a small, remote community in Brazil which uses a standalone micro-grid supplied by a hybrid wind-solar generating source. The article discusses some of the technical challenges faced when developing this system and how its success helps increase the confidence for renewable energy systems to isolated applications.

United States Department of Energy. 2008. ***The Smart Grid: An Introduction.*** **Washington, D.C.: Litos Strategic Communication, 2008.**

Published by the Department of Energy's Office of Electricity Delivery and Energy Reliability, this publication explores –in layman's terms –the nature, challenges and opportunities of the Smart Grid implementation. Also explores current Smart Grid projects being funded through the Department of Energy.

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Home Use

Bin, Shui, and Hadi Dowlatabadi. 2005. Consumer Lifestyle Approach to U.S. Energy Use and the related CO2 Emissions. ***Energy Policy.*** **33(2): 197-208.**

Historically we have looked at issues of energy conservation and CO2 emissions from a sectoral approach (transportation, residential, industrial sectors) which has limited our capacity to reveal the total impacts of consumer activities on energy use and its related environmental impacts. The authors of this article propose using something called the Consumer Lifestyle Approach to explore the relationship between consumer activities and environmental impacts in the United States. Based on this approach, the authors found that over 80% of energy used and CO2 emitted is a consequence of consumer demands and the economic activities to support these demands. Findings of this kind have a direct bearing for the design of more effective energy and CO2 emission policies and may help erode the false dichotomy of "them versus us" between industry polluters and consumers in regards to who is responsible for the growing use of energy in the United States.

Karjalainen, Sami. 2011. Consumer Preferences for Feedback on Household Electricity Consumption. *Energy and Buildings.* 43(2/3): 458-467.

This study investigated the best way to present information to consumers to maximize energy savings for home consumption of energy. The researchers looked at different ways of presenting feedback on energy consumption and developed user interface prototypes. The prototypes were shown to consumers in qualitative interviews to gain information on how well they understood them and what kind of feedback they preferred to receive. The authors conclude that consumers most valued presentations of cost over a period of time, appliance-specific breakdown, and historical comparison of their current versus their prior consumption.

Lovins, Amory B. 2010. Efficiency and Micropower for Reliable and Resilient Electricity Service: An Intriguing Case Study from Cuba. 31 Rocky Mountain Institute Web site. 31 January 2010.

In 2005, Cuba suffered from 224 days of blackouts lasting more than an hour. However, in 2007, they had no blackouts. This paper discusses how the Cuban government resolved the problems with their energy grid through a combination of efficient end-use and micropower in a more granular grid. Their solution included raising the power efficiencies of appliances being used, changing almost all incandescent lamps to free compact fluorescents, and changing how electric tariffs were implemented to reward low- electricity use and penalize high use.

Massiha, G. H.. Herbert A. Herbert, and Kuldeep S. Rawat. (2007) Help Students Become Better Energy Consumers. *Tech Directions.* 67(2): 29-31.

Describes a class activity that helps students apply design methodologies in the creative pursuit of a solution to an open-ended problem. The students are asked to calculate the energy use in a house and to propose creative ways of reducing consumption for that household.

Meyers, Robert, Eric D. Williams and H. Scott Matthews. 2010. Scoping the Potential of Monitoring and Control Technologies to Reduce Energy Use in Homes. *Energy & Buildings.* (42:5): 563-569.

Looks at how information technology-enabled monitoring and control systems could assist in mitigating energy use in residences by more efficiently allocating the delivery of services by time and location. The authors estimate that over 39% of residential primary energy is wasted and discuss how technologies such as programmable thermostats, smart meters and outlets, zone heating, automated sensors, and wireless communications infrastructures could help reduce this waste.

Perkins, Alan et al. 2009. Transport, Housing and Urban Form: The Life Cycle Energy Consumption and Emissions of City Centre Apartments Compared with Suburban Dwellings. *Urban Policy and Research* 27(4): 377-396.

This study looked at the energy consumption and greenhouse gas emissions of high density urban apartments versus suburban households in Adelaide, Australia. The researchers found that while the total energy consumption of apartment households were lower than suburban households mainly due to care usage, the total amount of greenhouse gas emissions when compared on a per capita basis was actually higher for apartment households. The researchers conclude that this higher greenhouse gas emissions per capita is because of lower occupancy rates and higher emission arising from higher dwelling operation and embodied energy consumption. Overall, they concluded that it cannot be assumed that centralized, higher density living will deliver per capita emission reductions for residents once the per capita life cycle emissions from housing and transport have been accounted for.

Son, Young-Sung, T. Pukkinen, Keyeong-Deok Moon, and Chaekyu Kim. 2010. Home Energy Management System Based on Power Line Communications. *IEEE Transactions on Consumer Electronics*. 56(3): 1380-1386.

Describes a home energy management system based on smart metering and power line communication that helps provide detailed information of energy consumption patterns and intelligent controlling of appliances in the home.

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Manufacturing

Abdelaziz E.A. R. Saidur, and S. Mekhilef. 2011. A Review on Energy Saving Strategies in the Industrial Sector. *Renewable & Sustainable Energy Reviews.* 15(1): 150-168.

This article presents a comprehensive literature review about industrial energy saving management, technologies, and policies currently in use around the world.

Al-Ghandoor, A., P.E. Phelan, R. Villalobos, and J.O. Jaber. 2010. Energy and Exergy Utilizations of the U.S. Manufacturing Sector. *Energy.* 35(7): 3048-3065.
The energy and exergy utilizations in the U.S. manufacturing sector are analyzed by considering the energy and exergy flow for the year 2002. Detailed end-use models for fourteen intensive industries are established using scattered data from the Manufacturing Energy Consumption Survey. The authors found a low efficiency value for most of these sectors and conclude that many opportunities for better industrial energy utilization still exist, despite the improvements that have been made over the past few years.

Christoffersen, Linek Block, Anders Larsen, Mikael Togeby. Empirical Analysis of Energy Management in Danish Industry. *Journal of Cleaner Production* (14: 5): 516-526.
The authors provide an empirical analysis of energy-management practices in the Danish manufacturing industry to see to what extent energy management is put into practice as a way to conserve energy. They conducted a phone survey of over 304 Danish industrial firms and concluded that between 3% and 14% practice energy management. The authors discuss two potential avenues for improving energy management and how a one-size-fits-all approach is not appropriate when giving incentives for firms to practice improved energy management. Possible variations between industrial sectors are addressed.

Hayajawan, N., Y. Wakazono, T. Kato, Y. Suzoki, and Y. Kaya. 1999. Minimizing Energy Consumption in Industries by Cascade Use of Waste Energy. *IEEE Transactions on Energy Conversion.* 14(3): 795-801.
This paper discusses the regional energy savings potential by cascade use of waste heat in energy intensive industries, taking into account the actual local industrial structure in Japan. The authors looked at the potential to minimize the oil consumption of steam boilers through the use of heat cascading in the iron & steel, cement, paper & pulp, and ethylene industries. The authors found that more than a 90% reduction in oil consumption was expected by interconnections of waste heat supply and energy demand, especially between the ethylene and paper & pulp industries.

Huiquan, Li, et al. 2010. Energy Conservation and Circular Economy in China’s Process Industries. *Energy.* 35(11): 4273-4281.

Since energy consumption in process industries accounts for the greatest proportion of China's total energy consumption, promoting energy conservation in this and other sectors is a practical long-term solution to some of China's energy and environmental problems. This paper analyzes what the main technical bottlenecks and resource-environment problems were with special emphasis on energy utilization efficiency, energy consumption mode, and waste emission. As for the measures to resolve these problems, at the policy level, policies and programs of Chinese government related to energy conservation were introduced in combination with China's circular economy structure. At the technical level, the key technologies and research progress to improve energy utilization efficiency and reduce energy consumption, as well as utilizing the resource of discharged waste was reviewed.

Journal of Cleaner Production. June 2010 (18:9)843-951.
This special issue of the Journal of Cleaner Production contains thirteen articles from the 12th Conference, "Process Integration Modeling and Optimization for Energy Savings and Pollution Reduction" in 2009. It include articles discussing emission reduction, improving the efficiency and reliability in the utilization of renewable energy, and process integration challenges of sustainable energy systems upon the challenges of industrial/social integration of sustainable energy systems into regional sustainable development planning.

Jusko, Jill. 2009. Energy Efficiency: Doing More With Less. *Industry Week.* (258:4): 26-30.
Discusses the energy efficiency initiatives of AAI Corp's operations in Charleston, South Carolina and Proctor & Gamble Co. While AAI Corp has taken on some simple energy reduction efforts such as reducing cooling tower operation and shutting down cooling tower pumps, Proctor and Gamble took a comprehensive approach including monitoring and reducing energy usage, waste disposal, and water usage.

Klemeés, J. et al. 2010. *Sustainability in the Process Industry: Integration and Optimization*. New York: McGraw-Hill, 2011.
This book explains process integration and optimization and discusses applications for improving the energy and water efficiency of industrial and nonindustrial energy users. The volume also includes eight industrial-based cases studies and nine testing examples with developed solutions.

Madool, N.A., R. Saidur, M.S. Husain, and N.A. Rahim. 2011. A Critical

Review on Energy Use and Savings in the Cement Industries. *Renewable and Sustainable Energy Reviews.* 15(4): 2042-2060.
The cement sub-sector consumes about 12-15% of total industry energy use. This review looks at the areas of energy wastage as a way to identify what kinds of measures could be enacted to reduce energy consumption. The authors reviewed energy use in different sectors of the cement industry, specific energy consumption, types of energy use, details of the cement making process, as well as various energy savings measures that could currently be implemented.

Silvestre-Blanes, Javier and Rubén Pérez-Lloréns. 2011. Energy Efficiency Improvements through Surveillance Applications in Industrial Buildings. *Energy and Buildings.* 43(6): 1334-1340.
Presence sensors for energy controls that detect motion are now commonly used in many areas of life such as in applications that monitor traffic and people. This article sought to analyze occupancy patterns in manufacturing industries with the aim of determining the possible energy savings that could be obtained by using these types of technologies.

Wernet, Gregor, Christopher Mutel, Stefanie Hellweg, and Konrad Hungerbuhler. 2011. The Environmental Importance of Energy Use in Chemical Product. *Journal of Industrial Ecology.* 15(1): 96-107.
Though policymakers and laymen often perceive harmful emissions from chemical plants as the most important source of environmental impacts in chemical production, energy and greenhouse gas emissions are also an important pollutant from that industry. This article reports on a life cycle analysis that was done looking at the total environmental impacts of producing 99 chemical products in Western Europe.

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Transportation

Agarwal, Ramash. 2009. Integrating Concepts of Sustaianble Aviation in Undergraduate Aerospace Engineering Courses. *ASEE Annual Conference and Exposition, Conference Proceedings, 2009.* June 14, 2009.
Discusses how concepts of sustainable aviation are being integrated into an Introductory Course in Aeronautics. The students are introduced to some of the

environmental issues related to aviation, such as noise, emissions and fuel consumptions, and discuss some technology concepts currently being investigated by the industry to mitigate these problems. The paper provides some examples of the sustainability ideas in aerodynamics and propulsions courses as well.

Agarwal, Ramesh. 2010. Sustainable (Green) Aviation. *SAE International Journal of Aerospace.* 2(1): 1-20.
This paper provides an overview of energy and environmental sustainability issues related to air transportation and its impact on the environment. The author then discusses some technological solutions to help solve these issues such as new aircraft and engine designs and technologies, alternative fuels, as well as aircraft operations logistics including Air to Air refueling, Close Formation Flying, and tailored arrivals to minimize fuel burn.

Fedra, Kurt. 2004. Sustainable Urban Transportation: A model-based approach. *Cybernetics and Systems.* 35(5/6): 455-485.
This paper describes the methodology and application examples of the Sustainable Urban Transportation Project being done under the European Union Energy, Environment and Sustainable Development Research Programme. The object of this project was to develop a consistent and comprehensive model-based approach and planning methodology for the analysis of urban transportation problems and to support design strategies for sustainable cities.

Kurtz, Meyer. 2008. *Environmentally Conscious Transportation.* Hoboken, N.J.: John Wiley & Sons.
This anthology provides a foundation for understanding and implementing methods for reducing the environmental impact of a wide array of transportation modes including private automobiles, heavy trucks and buses, rail, and public transportation.

Odoki, J. B. and Akena R. 2008. Energy Balance Framework for Appraising Road Projects. *Transport.* 161(1): 23-35.
Instead of basing the appraisal of road transport projects primarily on the assessment of economic benefits, this framework compares the total energy used by different modes of road transport. This framework can be used to calculate the total energy consumption at project and network level analyses of road investment policies and strategies, differences in the consumption of renewable and non-renewable fuels on non-motorized and motorized transport modes, and the energy

use during road works. The framework is demonstrated using case studies featuring typical examples of road investment schemes.

Powers, Susan E., J.E. Dewaters, and M.Z. Venczel. 2011. Teaching Life-Cycle Perspectives: Sustainable Transportation Fuel Unit for High School and Undergraduate Engineering Students. *Journal of Professional Issues in Engineering Education and Practice.* 137(2) 55-63.
Discusses a series of classroom modules that were developed for high school environmental science and college industrial ecology classes that helps introduce students to life-cycle perspectives and systems analysis of transportation fuel/vehicle systems. These modules considered the environmental and energy issues related to the nation's transportation sector.

Pro, Boyd H., Roel Hammerschlang, and Patrick Mazza. 2005. Energy and Land Use Impacts of Sustainable Transportation Scenarios. *Journal of Cleaner Production.* 13(13-14): 1309-1319.
Calculates the energy efficiency and land use for four hypothetical renewable fuel cycles for light vehicles. These included renewable energy to electrolytic hydrogen to fuel cell vehicles, renewable electricity to battery electric vehicles, (3) biomass gasified to hydrogen to fuel cell vehicles and biomass liquefied to biofuel to fuel cell vehicles.

Simoes, Andre Felipe, Robert Schaeffer. 2005. The Brazilian Air Transportation Sector in the Context of Global Climate Change: CO2 emissions and mitigation alternatives. *Energy Conservation and Management.* 46(4): 501-503.
This study discusses the participation of Brazilian air transportation within the context of global climate change. It first presents an inventory of CO2 emissions caused by airborne activities in Brazil and then discusses eight possible mitigation strategies and investigates their potential positive impact. The authors conclude that a joint implementation of these strategies could reduce CO2 emissions up to 28.5% by 2023, according to their estimates.

Sperling, Danie. And Sonia Yeh. 2009. Low Carbon Fuel Standards. *Issues in Science and Technology.* 25(2): 57-66.
Discusses a policy strategy for reducing oil dependence and decarburizing transportation. As transportation consumes half of the oil used in the world and accounts for almost one-fourth of all greenhouse gas emissions, we must start adopting policies that inspire industry to purse innovation, are flexible and

performance-based, and that take into account all green house gas emissions associated with the production, distribution, and use of fuel from the source to the vehicle. The authors discuss the adoption of a low carbon fuel standard approach that is based on the total amount of carbon emitted per unit of fuel energy.

Rights

Resource Type

Bibliography

Topics

Energy

Discipline(s)

Engineering