Annotated Bibliography of Ethical Issues in Physics: Energy Issues

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Ethical Issues in Physics
Bibliography assembled by
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Energy Issues

ENE Bulletin of the Atomic Scientists
67.6(November 2011) pp. 44–52
Fukushima and the inevitability of accidents
The author argues that in complex systems such as nuclear power plants, accidents are inevitable, despite the precautions taken by operators and regulators.

ENE APS Forum on Physics and Society Newsletter
Volume 40, Number 4 October 2011
Personal Transportation in the 21st Century and Beyond
Danny J. Krebs
This article focuses primarily on energy sources for personal transportation.

ENE APS Forum on Physics and Society Newsletter
Volume 40, Number 4 October 2011
The Quest for a Fusion Energy Reactor
Weston M. Stace (reviewed by Bernard L. Cohen)
Book Review

ENE Bulletin of the Atomic Scientists
67.5(September 2011) pp. 9–18
Deconstructing the zero-risk mindset: The lessons and future responsibilities for a post-Fukushima nuclear Japan
Tatsujiro Suzuki
This article includes an overview of the challenges facing Japan as it continues to deal with the damaged nuclear power plants.
Nuclear or not? The complex and uncertain politics of Japan’s post-Fukushima energy policy
Masa Takubo
The focus is on the future of nuclear power policy in Japan.

The radiological and psychological consequences of the Fukushima Daiichi accident
Frank N. von Hippel
While the quantity of radioactive fallout from the Japan accident is an order of magnitude less than that of the Chernobyl accident, and hence the physical impact on humans is less, the psychological impact may be just as significant.

Fukushima: The myth of safety, the reality of geoscience
Johannis Nöggerath, Robert J. Geller, and Viacheslav K. Gusiakov
The authors make the case that nuclear power plant operators have not responded adequately to known safety risks, that, for instance, the scientific community had been aware for some time that their safety mechanisms were inadequate to meet a potential tsunami risk.

Surviving the one–two nuclear punch: Assessing risk and policy in a post–Fukushima world
Edwin S. Lyman
The author discusses various potential incidents at U. S. nuclear power plants that could create safety hazards since they have not been engineered for—for instance, more nuclear plants are threatened with significant damage from earthquakes than previously believed.
Three Mile Island, Chernobyl, and Fukushima: An analysis of traditional and new media coverage of nuclear accidents and radiation
Sharon M. Friedman
An overview of media coverage includes not only mainstream media with an online presence but also social media such as Facebook and Twitter.

Adventures in scientific nuclear diplomacy
Siegfried S. Hecker
The author recounts his experiences working on nuclear security issues involving Russia, China, North Korea, and South Africa.

Scientists help make deserts into solar-energy hubs
Toni Feder
Reports on a conference and other initiatives organized by Desertec to capture solar energy in deserts worldwide.

High-energy physicist turns solar-energy activist
Toni Feder
Brief report on Gerhard Knies, the founder of Desertec.

Desert solar hubs not new but risky
Andrew Ochadlick, Jr
Letter to the editor with a skeptical view towards large scale solar energy projects.
Supercomputing has a future in clean energy
David Kramer
Discusses the role of supercomputers in the materials science associated with energy technology.

Energy Critical Elements
Robert Jaffe, Jonathan Price, Murray Hitzman, and Francis Slakey
The article summarizes the findings of an APS panel on elements crucial to the energy industry, looking both at the elements at the heart of the study and at the recommendations of the panel.

The implications of Fukushima: The US perspective
Mark Cooper

The implications of Fukushima: The European perspective
Caroline Jorant

The implications of Fukushima: The South Korean perspective
Soon Heung Chang
A series of three articles on the long term policy implications of the nuclear accidents in Japan that followed the 2011 earthquake and tsunami.
Moving to passive designs
Robert Rosner, Rebecca Lordan, and Stephen Goldberg
The authors make the case for pursuing the development of smaller reactors that incorporate passive safety features, features that kick in automatically in the event of a problem rather than ones that require some form of intervention to be activated.

It’s 2050: Do you know where your nuclear waste is?
Allison Macfarlane
The focus of this article is on developing medium term and long term solutions to the nuclear waste storage problem.

A multinational fuel consortium: Obstacles, options, and ways forward
Olli Heinonen
A plan is suggested for reducing proliferation of enriched uranium and the capability of producing it by leasing nuclear fuel rods to countries that do not possess nuclear weapons, rather than having those countries enrich their own uranium.

Nuclear power and the public
M. V. Ramana
Despite efforts to convince the public of the safety of nuclear plant technology, opinion polls continue to show that the public believes the technology is too risky. Until this issue is dealt with, it is unlikely that nuclear energy will grow.
The article describes the present nuclear power industry as aging and very likely in at least a short-term contraction due to the number of anticipated plant retirements exceeding the number of plants under construction.

Safety reviews, not shutdowns, are ordered in the wake of Fukushima

The spent fuel storage facilities in South Korea are rapidly filling up, and this poses a significant problem in a country that is increasing its reliance on nuclear energy.
Inertial confinement fusion energy R&D and nuclear proliferation: The need for direct and transparent review
Robert J. Goldston and Alexander Glaser
The authors discuss overlaps in technology associated with nuclear weapons and that associated with inertial confinement fusion research.

Thermal Rise Time in Nuclear Reactors after Loss of Coolant or Loss of Power Accidents
David Hafemeister
Written shortly after the Fukushima accident, this article lays out equations at the undergraduate level that provide an estimate for available response time in a class of nuclear power plant accidents.

The Case for Fission–Suppressed Hybrid Fusion
Wallace Manheimer
The author describes a potential fusion reactor design that would produce large quantities of fuel that could then be used in fission reactors.

Beyond Smoke and Mirrors: Climate Change and Energy in the 21st Century
Burton Richter (reviewed by Steven R. Rogers)
Book Review
DOE looks again at inertial fusion as a potential clean-energy source
David Kramer
An update on the status of nuclear fusion research with a focus on progress at the National Ignition Facility and resource allocation issues.

US pursuit of inertial fusion
Wallace Manheimer
Letter to the editor discussing differing funding strategies in the US and abroad.

US narrows fusion research focus, joins German stellarator
Toni Feder
An update on the U.S. role in international fusion research projects.

Obama calls for increased spending for electric vehicles and solar energy
David Kramer
Provides an overview of components of the State of the Union Address that related to energy issues.
When safe enough is not good enough: Organizing safety at Chernobyl
Sonja D. Schmid
The author argues that we need to look beyond operator error in studying the Chernobyl nuclear accident: structural issues in the Soviet nuclear industry played a significant role.

Landscape portrait: A look at the impacts of radioactive contaminants on Chernobyl’s wildlife
Timothy A. Mousseau and Anders P. Møller
The authors discuss recent evidence that the impact on wildlife of radiation released by the Chernobyl accident is substantially more significant than reported earlier.

The French Approach to Nuclear Waste
Declan Butler
An underground lab is being constructed, at which research into nuclear waste storage would be performed.

Liquid Fuel Nuclear Reactors
Robert Hargraves and Ralph Moir
The authors discuss the design of Liquid Fluoride Thorium Reactors, addressing issues including economics and safety.
Small nuclear reactors raise big hopes
Paul Guinnessy
A discussion of the benefits of using a modular design for nuclear reactors, allowing for their construction in a single, controlled setting before shipping to the point of use.

Reassessing the nuclear renaissance
Paul Nelson
The author looks at nuclear power programs from an international perspective, discussing where nuclear power programs are mostly likely to develop.

Creating the ultimate nuclear reactor
William Sailor
The author describes three different reactor designs that hold promise for mitigating key concerns about nuclear power plants, including the problem of nuclear waste.

NRC Should Perform Non-Proliferation Assessment of Laser Enrichment Technology
Francis Slakey & Linda Cohen
The authors discuss what is known and not known about the uranium enrichment technology known as SILEX.

Book Review
David JC MacKay (reviewed by Peter Schroeder)
CLI/ENE
APS Forum on Physics and Society Newsletter
Volume 39, Number 3 July 2010
Earth: The Sequel, The Race to Reinvent Energy and Stop Global Warming
Fred Krupp (reviewed by Michael DuVernois
Book Review

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MIS, PUB, ENE
Physics Today—July 2010
Volume 63, Issue 7, p. 50
On Fact and Fraud: Cautionary Tales from the Front Lines of Science
David Goodstein; Bernard J. Feldman, Reviewer
Book review

Physics Today—November 2010
Volume 63, Issue 11, pp. 11–12
Cold fusion and reproducibility
Fred McGalliard, Scott R. Chubb, and Bernard J. Feldman

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ENE, SEC
Bulletin of the Atomic Scientists
66.3 (May 2010) pp. 50–56
It’s Time to Give Up on Breeder Reactors
Thomas B. Cochran, Harold A. Feiveson, Zia Mian, M. V. Ramana, Mycle Schneider, and Frank N. von Hippel
An overview of technological, economic, and security issues related to breeder reactors.
ITER collaboration defuses standoff
Toni Feder
Provides insight into the complexities of international cooperation in the context of a large scale fusion energy research project.

Superstation in New Mexico would unite fragmented US electrical grid
Jermey N. A. Matthews
Transmission of electrical energy is an often overlooked but nevertheless key component in our energy structure. Modifications to the existing grid that will help the more efficient integration of renewable energy sources are discussed.

Obama, Detroit push the limits of electric vehicle batteries
David Kramer
A discussion of the limitations lithium ion batteries impose on electric vehicles that rely on them.
These letters discuss issues relating to Cold Fusion and Condensed–Matter Nuclear Science, including the extent to which such research should be treated seriously by the mainstream physics community.

The author argues that we need to be proactive in dealing with proliferation threats associated with increased worldwide reliance on nuclear energy.
Should the United States resume reprocessing? A pro and con
Kate J. Dennis, Jason Rugolo, Lee T. Murray, Justin Parrella, David M. Romps, Christopher D. Holmes, Kurt Z. House, Benjamin G. Lee, Mark T. Winkler
A trip taken by a group of Harvard graduate students and postdocs led to this article, divided into two main sections (one part arguing for reprocessing and one against).

The real path to green energy: Hybrid nuclear-renewable power
Charles Forsberg
Explores how nuclear energy could be used to complement biofuels, solar power, wind power, and a hydrogen fuel economy.

LLNL, industry team boost truck fuel efficiency
David Kramer
LLNL studied the aerodynamics of trucks.
Hot, Flat and Crowded: Why We Need a Green Revolution--and How It Can Renew America
By Thomas L. Friedman
Reviewed by Peter Schroeder
Book Review

Physics for Future Presidents: The Science Behind the Headlines
By Richard A. Muller
Reviewed by Ruth Howes
Book Review

A Contract Between Science and Society: The Canadian Experience with Nuclear Waste Management
Elizabeth Dowdeswell
The author discusses the process by which Canada is moving towards geological disposal of nuclear waste. Particular attention is paid to involving input from the public.

Materials for Sustainable Energy
George Crabtree
This article briefly summarizes technological challenges in seeking solutions to anticipated energy shortages and greenhouse gas emissions.
Dry-cask storage: How Germany led the way
Klaus Janberg, Frank von Hippel
The article describes a process for storing spent nuclear fuel for several decades while a longer-term solution is being sought.

US electricity grid still vulnerable to electromagnetic pulses
David Kramer
Our increasing reliance on electrical energy makes protection against EMPs a growing concern.

The primary objective of the fusion–fission reactor would be to burn nuclear waste.

Practical, near–term fusion power
Robert J. Burke
Physics of Sustainable Energy: Using Energy Efficiently and Producing It Renewably
David Hafemeister, Barbara G. Levi, Mark D Levine, and Peter Schwartz, eds.
Review by Cameron Reed
Book Review
Initiatives to Enhance Nuclear Stability and Non-Proliferation in the 21st Century
Gerald E. Marsh and George S. Stanford
The author identifies initiatives that should be pursued, including ratifying the Comprehensive Test Ban Treaty and building a fast-breeder reactor.

The competition is gaining on platinum as a catalyst for hydrogen fuel cells
Barbara Goss Levi
A news report on advances in the development of catalysts for fuel cells, with an eye towards use in automobiles.

Comments on Yucca Mountain and Nuclear Energy
David Bodansky
A policy-oriented overview of the Yucca Mountain storage facility proposal and alternative nuclear waste proposals.

Light Pipes: An FPS Student Fellowship Research Project
Erin Owens
Discusses the development of an online calculator of savings from installation of a light pipe, as part of an FPS student fellowship program.
Review of the 2008 APS Energy Study, Energy Future: Think Efficiency
David Hafemeister
The author focuses on energy use by automobiles, but addresses use in buildings and appliances toward the end.

Letters to the Editor
Vladislav Bevc
David Hafemeister and Peter Schwartz respond

Superconductors to boost wind power
Jermey N. A. Matthews
High temperature superconductors may allow the manufacture of wind turbines that produce twice as much power as current conventional models.

Earth: The Sequel: The Race to Reinvent Energy and Stop Global Warming
Fred Krupp, Miriam Horn, and Mark A. Ratner, Reviewer
Book Review

Data Trimming, Nuclear Emissions, and Climate Change
Kristin Sharon Shrader-Frechette
The author argues a meaningful account of greenhouse gas emissions associated with nuclear power follows the full life cycle of the fuel.
FutureGen could make a comeback
David Kramer
News report on a clean coal demonstration plant.

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Physics Today -- March 2009
Volume 62, Issue 3, pp. 31-35
Physics in the oil sands of Alberta
Murray Gray, Zhenghe Xu, and Jacob Masliyah
Canada’s oil sands have reserves comparable to those of Saudi Arabia, but there are technical hurdles that need to be overcome to extract the oil.

Physics Today -- December 2009
Volume 62, Issue 12, pp. 8-9
Efficiency and environmental effects in the oil sands of Alberta
Lloyd O. Timblin, Jr, Gary Stiles, Ezra Wood, Murray R. Gray, Zhenghe Xu, and Jacob H. Masliyah

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APS Forum on Physics and Society Newsletter
Volume 38, Number 1 January 2009
Issues in the Storage of Electric Power
By Ruth Howes and Sekazi Mtingwa
Given that demand for electrical energy varies during the day and production, particularly from renewable sources such as wind and solar, varies on its own schedule, there is an increasing need to develop effective energy storage systems. This article surveys existing technology and discusses potential future developments.
The Revised Radiation Protection Standards for the Yucca Mountain Nuclear Waste Repository
By Robert Vandenbosch and Susanne E. Vandenbosch
This overview looks at one major policy issue related to the proposed Yucca facility.

Yucca Mountain Standards
Benjamin Ross

Batteries and electrochemical capacitors
Héctor D. Abreuña, Yasuyuki Kiya, and Jay C. Henderson
A largely technical discussion of electrical energy storage.

Could 'green gasoline' displace ethanol as the biofuel of choice?
Researchers report advances in making renewable fuels that are compatible with the US petroleum infrastructure.
David Kramer
News story on research into the conversion of biomass into gasoline, an alternative to existing ethanol and biodiesel programs.
Research needs for future internal combustion engines
Dawn K. Manley, Andrew McIlroy, and Craig A. Taatjes
Looks at the chemistry, fluid dynamics, and thermodynamics of internal combustion engines.

Engines for the 21st century
Geoffrey A. Landis

Geoscience research for our energy future
Donald J. Depaolo and Franklin M. Orr, Jr
Understanding how substances migrate through rock formations is of significance for problems such as carbon sequestration and long term nuclear waste disposal.

Geoengineering: What, how, and for whom?
Robert A. Frosch and Kevin E. Trenberth
Nuclear Waste Stalemate: Political and Scientific Controversies
Robert Vandenbosch, Susanne E. Vandenbosch, and John W. Poston Sr.,
Reviewer
Book Review

Grand challenges in basic energy sciences
Graham R. Fleming and Mark A. Ratner
This article outlines five areas where fundamental research can have a
significant impact on energy-related technology.

Energy efficiency in the built environment
Leon R. Glicksman
Discusses what can be done, mostly with existing technology, to improve
energy efficiency in residences and businesses.
Physics Today -- July 2008
Volume 61, Issue 7, pp. 42-47
Home photovoltaic systems for physicists
Thomas W. Murphy, Jr.
This first person account of designing and installing a home photovoltaic system brings relevant technical considerations to a level that most physics students will be able to readily understand.

Physics Today -- July 2008
Volume 61, Issue 7, pp. 48-49
Education for the global energy challenge
Roel Snieder and Sally M. Benson
The authors argue for increased education—both in the classroom and through outreach programs—on energy related issues.

APS Forum on Physics and Society Newsletter
Volume 37, Number 3 July 2008
The Essential Exponential! For the Future of Our Planet
By Albert A. Bartlett with Robert G. Fuller, Vicki L. Plano Clark, and John A. Rogers
Reviewed by Manish Gupta
Book Review

APS Forum on Physics and Society Newsletter
Volume 37, Number 2 April 2008
Carbon-Free and Nuclear-Free: A Roadmap for US Energy Policy
Arjun Makhijani
A mostly policy-oriented discussion of how the triple threat of global warming, dwindling oil reserves, and nuclear proliferation can be addressed through seeking alternative energy sources and improving energy efficiency.
This article begins with a look at the scientific process as applied to nuclear reactor design and goes on to discuss policy implications and future directions for the nuclear power industry.

Arjun Makhijani, Yangbo Du, David A. Kraft, Curt A. Levis (Letters to the Editor)

Paul Gunter and William Wharton Smith III (Letters to the Editor)

This personal history provides a nice case study for the impact that a scientist can have on important legislation.

David Hafemeister
This article gives several simple and explicit examples of how physicists can use their calculational skills to analyze energy issues. Some equations are analogous to those found in introductory physics courses.
Establishing a centralized program for producing nuclear fuel may be the key to growth in the global nuclear power industry without proliferation of nuclear weapons.

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ENE
Getting power to the people
Bulletin of the Atomic Scientists
63.5 (September-October 2007) pp. 26-43
Matthew L. Wald
A wide-ranging overview of energy options and what drives the need for exploring various options. This article may be useful to introduce a class to energy-related policies and technologies.

Bulletin of the Atomic Scientists
64.1 (January-February 2008) p. 4
Eugene (Gene) A. Rosa, Robert K. Musil (Letters to the Editor)
END LINK

ENE
Bulletn of the Atomic Scientists
63.4 (July-August 2007) pp. 19-20
Carbon dioxide on the move
Richard Doctor
This brief article points out the safety hazards of working with large quantities of carbon dioxide.

ENE
APS Forum on Physics and Society Newsletter
Volume 36, Number 3 July 2007
The Grid: A Journey Through the Heart of our Electrified World, by Phillip F. Schewe,
Reviewed by Joe Levinger
Book Review
Physics of Societal Issues: Calculations on National Security, Environment, and Energy, by David Hafemeister
Reviewed by Cameron Reed
Book Review

Big Coal: The Dirty Secret Behind America’s Energy Future, by Jeff Goodell
Reviewed by Louis Schwartzkopf
Book Review

Interim Sites for Spent Nuclear Fuel Are of Limited Value
Jim Dawson
Brief story on a report by an APS Study Group.

Kicking the Carbon Habit: Global Warming and the Case for Renewable and Nuclear Energy and Energy for the Public: The Case for Increased Nuclear Fission Energy
William Sweet, R. Stephen White, and Andrew C. Kadak, Reviewer
Book Review
Physics Today -- March 2007
Volume 60, Issue 3, pp. 37-42
Solar Energy Conversion
George W. Crabtree and Nathan S. Lewis
Provides a good overview of various means to harness solar energy and
the technological advances that will be needed to improve efficiency.

Physics Today -- October 2007
Volume 60, Issue 10, pp. 12-14
Solar Energy Conversion can be Small-Scale and Low-Tech
Robert Levy

Physics Today -- December 2006
Volume 59, Issue 12, pp. 80-81
Reprocessing Spent Nuclear Fuel
David Bodansky
Discusses new approaches to reprocessing used nuclear fuel, addressing
proliferation concerns.

Physics Today -- October 2006
Volume 59, Issue 10, pp. 38-44
Water in Polymer Electrolyte Fuel Cells: Friend or Foe?
Michael Eikerling, Alexei A. Kornyshev, and Anthony R. Kucernak
The focus of this article is on the science of fuel cells rather than policy
implications.

Physics Today -- September 2006
Volume 59, Issue 9, pp. 27-28
Portugal Builds on Renewables Effort with $78M Solar Plant
Karen H. Kaplan
A report on an 11-megawatt photovoltaic plant under construction.
Reprocessing: Just within reach?
Stephanie Cooke
An overview of current nuclear reprocessing technology and policy proposals.

Should the U.S. Reprocess Spent Nuclear Fuel?
Robert Vandenbosch and Susanne E. Vandenbosch
Primarily a policy-oriented discussion of a proposal to reprocess fuel.

Advanced Nuclear Reactors- their Use in Future Energy Supply
John F. Ahearne
Defines terminology and discusses policy issues.

Bombs, Reprocessing, and Reactor Grade Plutonium
Gerald E. Marsh and George S. Stanford
The authors argue that nuclear power will become increasingly important in the energy economy and therefore nuclear fuel will need to be recycled. The primary issue then is how it can be done safely.
Stuck on a solution
Allison MacFarlane
An overview of both policy and technical issues related to the proposed Yucca Mountain nuclear waste storage facility.

Bulletin of the Atomic Scientists
62.5 (September-October 2006) pp. 5-7
Issue Volume 62, Number 5, September / October 2006
Letters to the Editor
Kenny C. Guinn, John Ensign, Luther J. Carter, Thomas H. Pigford, Rod McCullum, Allison MacFarlane

Chernobyl: Hardly the last word
Michael Flynn
A critique of the IAEA report on the health impact of the Chernobyl accident.
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ENE
Physics Today -- February 2006
Volume 59, Issue 2, pp. 19-20
Stronger Future for Nuclear Power
Paul Guinnessey
A comparison of the nuclear industry in the U.S. to that in other
countries. Also includes some near term projections in the U.S. which
probably were not borne out.

Physics Today -- January 2007
Volume 60, Issue 1, pp. 13-14
Nuclear Power's Costs and Perils
Walter Scheider and Alan Robock

Physics Today -- February 2007
Volume 60, Issue 2, p. 81
US Lack Nuclear-Power Infrastructure
Jim McEwen

Physics Today -- September 2007
Volume 60, Issue 9, pp. 14-16
Nuclear Power Challenges and Alternatives
William Morse, Wallace Manheimer, Richard Wilson, Gerry Wolff, Alan
Robock, and Walter Scheider

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ENE
APS Forum on Physics and Society Newsletter
Volume 35, Number 1 January 2006
The End of Oil: On the Edge of a Perilous New World by Paul Roberts
The Hydrogen Economy: The Creation of the Worldwide Energy Web and
the Redistribution of Power on Earth by Jeremy Rifkin
Both reviewed by John L. Roeder
Book Reviews
Some interesting, basic physics is involved in this discussion of the use of straw bales for building walls.

Robert Breche
More on Strawbale Construction

Overview of design considerations for small sodium-cooled fast reactors and a discussion of potential uses in remote areas.

Gerald E. Marsh and George S. Stanford
The authors critique an APS study and suggest that the Nonproliferation Treaty should be modified to address proliferation issues that will arise as nuclear power expands globally.
The Status of Nuclear Waste Disposal
David Bodansky
After a n overview of the history of nuclear waste disposal in the United States, this article focuses on Yucca Mountain.

Nuclear Renaissance: Technologies and Policies for the Future of Nuclear Power
W. J. Nuttall and Michael T. Coyle, Reviewer
Book Review

Mortgaging the future: Dumping ethics with nuclear waste
Kristin Shrader-Frechette
A critique of proposed changes in regulations governing radiation exposure associated with long-term storage of nuclear waste.
World Wind Speeds Suggest Plentiful Energy
Toni Feder
Researchers used publicly available wind data to create a global map for wind energy potential.

Tough Questions About Wind Energy
Kenneth Perry, Frits de Wette, Terry Goldman, Cristina Archer, and Mark Z. Jacobson

Proliferation Is Key Issue in Nuclear Power Resurgence
Jim Dawson
An APS study group looks at the overlap in technologies associated with peaceful and military use of nuclear energy.

Yucca Mountain E-mails Indicate Data Were Falsified
Jim Dawson
The emails include a reference by one scientist to keeping two sets of data files, one for his use and one to show Quality Assurance.
Nuclear Power Needs Government Incentives, Says Task Force
Jim Dawson
A Department of Energy task force recommended financial incentives for a few nuclear power plants as a way to jump start the industry.

Funding US Nuclear Power Plants
Edwin A. Karlow

Windy Island Hosts Energy Trial
Toni Feder
Brief discussion of a wind energy trial in Norway, but useful for the practical considerations raised.

Three Mile Island: A Nuclear Crisis in Historical Perspective
J. Samuel Walker and Bernard L. Cohen, Reviewer
Book Review

Energy at the Crossroads: Global Perspectives and Uncertainties, by Vaclav Smil
Reviewed by Cornelius C. Noack
Book Review
The Hydrogen Economy
George W. Crabtree, Mildred S. Dresselhaus, and Michelle V. Buchanan
A fairly comprehensive look at the challenges with hydrogen production, storage, and end use.

Thoughts on Starting the Hydrogen Economy
Peter J. Feibelman, Lewis A. Glenn, Phil Stripling, George W. Crabtree, Mildred S. Dresselhaus, and Michelle V. Buchanan

Transforming the Electric Infrastructure
Clark W. Gellings and Kurt E. Yeager
Contains a nice introduction to the development and functioning of the electrical grid, as well as to the changes necessary for the future.

Three Mile Island: health study meltdown: a quarter century after the accident at Three Mile Island, remarkably few questions about the health effects of that near-catastrophe have been asked--let alone answered.
Joseph Mangano
Reviews scientific literature on this issue.
Three Mile Island: A Nuclear Crisis in Historical Perspective by J. Samuel Walker
Reviewed by John Abbotts
Book Review

Physics Today -- September 2004
Volume 57, Issue 9, pp. 29-30
Court Rules Against 10 000-Year Radiation Safety Standard at Yucca Mountain
Jim Dawson
The court ruled that the EPA must appropriately account for National Academy of Sciences findings.

Physics Today -- December 2004
Volume 57, Issue 12, pp. 12-14
Yucca Mountain Nuclear Waste Containment Standard a Hot Topic
Dick Schmidt, Thomas Bjerstedt, Wenonah Hauter, Ron Bourgoin, and Cameron Reed

Out of Gas: The End of the Age of Oil by David Goodstein
Reviewed by Don Lichtenberg
Book Review

Basic Choices and Constraints on Long-Term Energy Supplies
Paul B. Weisz
Good resource on facts and figures regarding energy use.
Thoughts on Long-Term Energy Supplies: Scientists and the Silent Lie
Albert A Bartlett
The author argues that the energy supply issue cannot be addressed without looking at a primary underlying cause of anticipated shortages: population growth.

Long-Term Energy Solutions: The Truth Behind the Silent Lie
Mark Meier, Douglas Davidson, Frank R. Haig, Gregory Weston, Brian Cluggish, David J. Wesolowski, David B. Goldstein, Bernard L. Cohen, Eric Swager, Caroline L. Herzenberg, William Morse, Albert A. Bartlett, and Paul Weisz

More Options Offered for Long-Term Energy Solutions
Karo Michaelian, Brian A. Tinsley, Arthur Smith, Russell Seitz, James A. Van Vechten, Paul B. Weisz, and Albert A. Bartlett
PUREX AND PYRO ARE NOT THE SAME
William H. Hannum, Gerald E. Marsh, and George S. Stanford
The authors point out that not all nuclear fuel reprocessing techniques are the same and hence the risks and benefits of each should be analyzed on a case by case basis.

ANOTHER VIEW OF THE ROLE OF NUCLEAR POWER
Richard L. Garwin

RESPONSE TO GARWIN’S PAPER
William H. Hannum, Gerald E. Marsh, George S. Stanford

OIL, CO2, AND THE POTENTIAL OF NUCLEAR ENERGY
Robert W. Albrecht and David Bodansky

A LIMIT TO GROWTH OF NUCLEAR FISSION POWER?
Arthur Smith

THERE IS NO SUCH THING AS A PROLIFERATION-PROOF NUCLEAR FUEL CYCLE.
W.K.H. Panofsky
Response to Arthur Smith's Letter
Robert Albrecht and David Bodansky

Nuclear Power Know-how is Here and Should be Used
William H. Hannum, Gerald E. Marsh, George S. Stanford

Weaponizability of Reactor-Degraded Plutonium
Alex De Volpe

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By itself, this article does not raise many ethical issues, but put into the larger context of the cold fusion story, it can raise issues related to how resources are allocated (time, money, journal space) when a large portion of the scientific community is skeptical about an idea.

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Cold Fusion Gets Chilly Encore
Toni Feder

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MIT Study Sees Nuclear Power as Green Weapon Against Global Warming
Jim Dawson
The report, summarized by the article, looks at issues related to cost, safety, proliferation, and nuclear waste.

Nuclear Power One of Several Green Weapons Against Global Warming
Edwin Norbeck, Robert Clark-Phelps, and Ernest Moniz

Up on the Roof, Another Green Weapon
Iain R McNab

Atoms for peace: did the 50-year-old Atoms for Peace program accelerate nuclear weapons proliferation? The jury has been in for some time on this question, and the answer is yes.
Leonard Weiss
Discusses the origin of the program and looks at links between it and nations joining the nuclear club.
Energy for Society From Space
Arthur Smith
This commentary arguing that satellites can be used to capture more of the sun’s energy sparked two follow-ups.

Steve Fetter

Earth vs. Space for Solar Energy, Round Two
Arthur Smith

Between MOX and a hard place: it costs more, it's as dangerous to make as a bomb, and burning MOX creates almost as much plutonium as it gets rid of. Other than that, it's a great idea.
Adolfo Reparaz
Does it make sense to convert weapons-grade plutonium into mixed oxide fuel for nuclear power plants?

The New Economy of Nature: The Quest to Make Conservation Profitable,
Gretchen C. Daily and Katherine Ellison
Reviewed by Marty Epstein
Energy and Society (An Introduction), by Harold H. Schobert, Reviewed by William J. Makofske

Energy and the Environment
James A. Fay, Dan S. Golomb, and Marc H. Ross, Reviewer
Book Review

Reviewed by Jennifer Weeks
Book Review
Nuclear Power and Nuclear Proliferation
H.A. Feiveson
The author argues that an expansion of the nuclear power industry significant enough to make a significant dent in the global warming problem will cause an unavoidable increase in the risk of proliferation of nuclear weapons.

Pro Nuclear Power
Bertram Wolfe
Point/No Counterpoint
Bruno Comby
Two letters related to the previous article.

Ethical and economic issues in the use of zero-emission vehicles as a component of an air-pollution mitigation strategy
Tim Duvall, Fred Englander, Valerie Englander, Thomas J. Hodson and Mark Marpet
The authors argue that the California mandate for zero-emission vehicles is unethical and should be replaced by a policy that is more market-driven.

Wasted at the wellhead. (Energy).(natural gas).
Paul Gretton-Watson.
Discusses the practice of burning off natural gas that is a byproduct of pumping oil from the ground.
The Causes of the Chernobyl Event
Jacques Frot
A brief summary of both the causes and effects of the Chernobyl accident. This does not delve deeply into technical details.

Chernobyl: The Effects on Public Health?
Andre Aurengo
A fairly detailed look at radiation levels, predicted cancers and observed cancers following the Chernobyl accident.

Lowering the bar: the government wants to save money by loosening radiation exposure standards--how low will it go?
LeRoy Moore.
This discussion of radiation standards looks at competing exposure models: the linear, no-threshold model and the threshold model. It also provides interesting insight into policy formulation in a political and scientific environment.

Megawatts and Megatons: A Turning Point in the Nuclear Age?
Richard L. Garwin, Georges Charpak, and John F. Ahearn, Reviewer
Book Review
A brief overview of energy use and carbon dioxide emission issues; not designed as a stand-alone article.

As the title suggests, this is a policy-oriented article. National and global energy data and projections are used as the basis for the discussion.

A variety of techniques are used to identify petroleum reserves, including resistivity measurements, [precision gravitational measurements, and satellite imaging. Sensors have also become part of the drilling process.

Provides a concise overview of reactor design (present and proposed) and design challenges.

Looks at photovoltaic, wind, and biomass energy sources.
Physics Today -- April 2002
Volume 55, Issue 4, pp. 69-75
Hydrogen: The Fuel of the Future?
Joan M. Ogden
A comprehensive look at hydrogen as an energy carrier, examining production, distribution, end use, and safety issues.

Physics Today -- October 2002
Volume 55, Issue 10, pp. 10-12
Energy Possibilities: Windows, Windmills, and Satellites
Claes G. Granqvist and Ken Dragoon

Physics Today -- November 2002
Volume 55, Issue 11, pp. 12-95
Daniel R. Cohn, John B. Heywood, Ernest J. Moniz, Ramesh Gopalan, Vladislav Bevc, and Joan Ogden

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ENE
APS Forum on Physics and Society Newsletter
Volume 31, Number 2 April 2002
Gaps in APS Postion on Nuclear Energy
Gerald E. Marsh and George S. Stanford
Commentary on the APS position paper "Nuclear Energy: Present Technology, Safety, and Future Research Directions: A Status Report". Includes a link to the original paper.

APS Forum on Physics and Society Newsletter
Volume 31, Number 2 April 2002
Nuclear Energy--A POPA Status Report
David Bodansky
A review of the above referenced report.

END LINK
This overview of advanced fast nuclear reactors addresses issues such as passive safety, nonproliferation, and nuclear waste.

The big "what-if." (Nuclear Transport).
Bret Lortie.
Puts potential risks of transporting nuclear materials by rail in the context of a train accident in Baltimore.

Losing Weight to Save Lives: A Review of the Role of Automobile Weight and Size in Traffic Fatalities
Marc Ross and Tom Wenzel
The authors analyze crash statistics to make the case that one cannot assume that reducing vehicle weight will increase the fatality rate associated with automobile accidents.

As Decision Time Approaches for Radioactive Waste Repository, a Mountain of Issues Still Unresolved
Jim Dawson
Discusses environmental issues associated with the proposed nuclear waste storage facility.
Our National Energy Situation is a Mess!
Albert A. Bartlett
A physicist testifies before Congress.

Why Nuclear Power Failure in the Market Place is Irreversible
Amory Lovins
The author argues that the reason the nuclear power industry is not continuing to grow in the U.S. is primarily economic: there are cheaper ways to accomplish the same ends.

Expanding Nuclear Power Worldwide to Prevent Climate Change: William Sailor
The author presents a case for nuclear power playing a major role in the global energy mix, arguing that proliferation concerns can successfully be addressed.
Is Radiation an Essential Trace Energy?
John Cameron
The author discusses two studies indicating that low doses of ionizing radiation can actually be beneficial to humans rather than problematic, as commonly assumed.

Our Daily Minimum of Uranium
John Williams

Criticism of a Criticism
John Laughlin
and
Validity of Epidemiology
Tom Rokoske
The Pebble-Bed Modular Reactor (PBMR): Safety and Non-Proliferation Issues
Edwin S. Lyman
A new nuclear reactor design is discussed. While it shows potential for addressing safety concerns, the timetable for development is critiqued.

Pebble Bed Reactors: Andrew Kadak
A different perspective on the pebble Bed Reactor.

A waste of space? (nuclear waste disposal on the sun)
Mike Moore
A brief summary of the challenges and costs of disposing of radioactive waste by shooting it to the sun.

Chernobyl Record: The Definitive History of the Chernobyl Catastrophe
Richard F. Mould and Gennady Gorelik, Reviewer

How to Think About Proliferation and Nuclear Power
William C. Sailor.
The author explores the relationship between a civilian nuclear power program and a nation acquiring nuclear weapons.

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“The world is growing, is using up the available fossil fuels that are contaminating the globe. The only available solution is a major worldwide expansion of nuclear power.”

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Magical THINKING.
Arjun Makhijani, Hisham Zerriffi and Annie Makhijani
This is an early look at transmutation as one way to handle nuclear waste. It could be interesting to compare it with more recent articles.

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Remember the Maine Yankee.(controversial plan for disposal of nuclear power plant waste).
Colin Woodard
This article discusses issues related to nuclear waste disposal from the perspective of a decommissioned nuclear power plant.
Edwin Lyman and Steven Dolley. Accident prone (analysis of the accident at the Tokaimura nuclear facility in Japan). This article is useful not only in the context of a study of the nuclear energy fuel cycle but also for its illustration of the perils of cutting corners in safety procedures.

Bertram Wolfe

Dean E. Abrahamson

David Bodansky

Text of a talk in which the author argues that the nuclear power debate has, up until this point, not focused on the most important risks.