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Issue 1. Can the United States Continue to Rely on Oil as a Major Source of Energy? 2

YES: Eric Gholz and Daryl G. Press, from “U.S. Oil Supplies Are Not at Risk,” *USA Today Magazine* (November 2007) 6

NO: Tom Whipple, from “Peak Oil,” *Bulletin of the Atomic Scientists* (November/December 2008) 14

Eric Gholz and Daryl Press argue that predictions that global oil production must slow are based on scant evidence and dubious models of how the oil market responds to scarcity. Tom Whipple argues that the coming peak in global oil production and the subsequent decline will decrease standards of living worldwide for decades, until new energy technologies can be brought into production.

Issue 2. Is It Realistic for the United States to Move Toward Greater Energy Independence? 21

YES: Richard N. Haass, from testimony on “Geopolitical Implications of Rising Oil Dependence and Global Warming” before the House Select Committee on Energy Independence and Global Warming (April 18, 2007) 25

NO: Robert Bryce, from *Gusher of Lies: The Dangerous Delusions of “Energy Independence”* (Public Affairs, 2008) 30

Richard Haass argues that energy independence cannot be achieved if it means being able to do completely without imports of oil and gas. We can, however, move toward energy independence by raising gasoline taxes, making cars more fuel-efficient, and developing alternative energy sources. Robert Bryce argues that the American obsession with the idea of energy independence prevents honest, effective discussion of genuine energy challenges. We need to recognize and accept the difference between rhetoric and reality.

Issue 3. Is America Ready for the Electric Car? 37

YES: Michael Horn, from “Roadmap to the Electric Car Economy,” *The Futurist* (April 2010) 40

NO: Rick Newman, from “A Stuttering Start for Electric Cars,” *U.S. News & World Report* (April 2010) 46

Michael Horn argues that the technology already exists to replace gasoline-burning cars with electric cars and thereby save money, reduce

dependence on foreign oil sources, and reduce pollution. All we need is organization and determination. Rick Newman argues that because electric car technology is still new, expensive, and unreliable, it will be at least a decade before consumers are willing to shift from gas burners to electric cars.

Issue 4. Is Shale Gas the Solution to Our Energy Woes? 51

YES: Diane Katz, from “Shale Gas: A Reliable and Affordable Alternative to Costly ‘Green’ Schemes,” *Fraser Forum* (July/August 2010) 54

NO: Deborah Weisberg, from “Fracking Our Rivers,” *Fly Fisherman* (April/May 2010) 58

Diane Katz argues that new technology has made it possible to release vast amounts of natural gas from shale far underground. As a result, we should stop spending massive sums of public money to develop renewable energy sources. The “knowledge and wisdom of private investors” are more likely to solve energy problems than government policymakers. Deborah Weisberg argues that the huge amounts of water and chemicals involved in “fracking”—hydraulic fracturing of shale beds to release natural gas—pose tremendous risks to both ground and surface water, and hence to public health. There is a need for stronger regulation of the industry.

Issue 5. Should We Drill for Offshore Oil? 65

YES: Stephen L. Baird, from “Offshore Oil Drilling: Buying Energy Independence or Buying Time?” *The Technology Teacher* (November 2008) 67

NO: Mary Annette Rose, from “The Environmental Impacts of Offshore Oil Drilling,” *The Technology Teacher* (February 2009) 73

Stephen Baird argues that the demand for oil will continue even as we develop alternative energy sources. Drilling for offshore oil will not give the United States energy independence, but the nation cannot afford to ignore energy sources essential to maintaining its economy and standard of living. Mary Annette Rose argues that the environmental impacts of exploiting offshore oil—including toxic pollution, ocean acidification, and global warming—are so complex and far-reaching that any decision to expand U.S. oil drilling must be based on more than public opinion driven by consumer demands for cheap energy, economic trade imbalances, and politics.

Issue 6. Should Utilities Burn More Coal? 80

YES: Steven F. Leer, from “Role of Coal in Future Energy Policy,” testimony at the hearing on “The Role of Coal in the New Energy Age” before the House Select Committee on Energy Independence and Global Warming (April 14, 2010) 84

NO: Susan Moran, from “Coal Rush!” *World Watch* (January/February 2007) 93

Steven Leer argues that the world will continue to use coal, massively and in rapidly growing quantities. The question is not whether global coal use will continue and grow, but rather whether carbon emissions from coal will grow. That answer depends on whether we can make carbon

capture and storage (CCS) technology both effective and affordable. Susan Moran argues that U.S. utilities are building and planning to build a great many coal-burning power plants, often hoping to get them in operation before legislation restricting carbon emissions forces them to find alternatives.

UNIT 2 GLOBAL WARMING 103

Issue 7. Is Human Activity Responsible for Global Warming? 104

YES: Mary-Elena Carr, Kate Brash, and Robert F. Anderson, from “Climate Change: Addressing the Major Skeptic Arguments,” Deutsche Bank Climate Change Advisors (September 2010) 108

NO: Alex Newman, from “Global-Warming Alarmism Dying a Slow Death,” *New American* (April 12, 2010) 117

Mary-Elena Carr, Kate Brash, and Robert F. Anderson argue that although scientists continue to work on improving our understanding of how carbon emissions affect climate, it is clear that human activities affect climate and that preventive efforts are justified. So-called skeptics misrepresent the science, the adequacy of computer models of climate, the motives of researchers, and the need for action. Alex Newman argues that critics have revealed so many defects in the science and scientists who support global warming that the climate-crisis crusade is clearly failing, although it is not likely to vanish until after a prolonged battle between the skeptics and alarmists.

Issue 8. Is Global Warming a Catastrophe That Warrants Immediate Action? 124

YES: Global Humanitarian Forum, from *Climate Change—The Anatomy of a Silent Crisis* (May 2009) 128

NO: Bjorn Lomborg, from “Let’s Keep Our Cool About Global Warming,” *Skeptical Inquirer* (March/April 2008) 132

The Global Humanitarian Forum argues that global warming due to human activities, chiefly the emission of greenhouse gases such as carbon dioxide, is now beyond doubt. Impacts on the world’s poorest people are already severe and will become much worse. Immediate action is essential to tackle climate change, increase funding for adaptation to its effects, and end the suffering it causes. Bjorn Lomborg argues that although global warming has genuine impacts on people, the benefits of continuing to use fossil fuels are so much greater than the costs that the best approach to a solution is not to demand draconian cuts in carbon emissions, but to invest globally in research and development of non-carbon-emitting energy technologies and thereby “recapture the vision of delivering both a low-carbon and a high-income world.”

Issue 9. Will Restricting Carbon Emissions Damage the Economy? 138

YES: Paul Cicio, from “Competitiveness and Climate Policy: Avoiding Leakage of Jobs and Emissions,” testimony before the House Committee on Energy and Commerce, Subcommittee on Energy and Environment (March 18, 2009) 142

NO: Aaron Ezroj, from “How Cap and Trade Will Fuel the Global Economy,” *Environmental Law Reporter* (July 2010) 149

Paul Cicio argues that lacking global agreements, capping greenhouse gas emissions of the industrial sector will make domestic production less competitive in the global market, drive investment and jobs offshore, increase exports, and damage the economy. The real greenhouse gas problem lies with other sectors of the economy, and that is where attention should be focused. Aaron Ezroj argues that although restricting emissions (as in a cap-and-trade program) may increase costs for some businesses, it will create many business opportunities in the financial sector, low-carbon technologies, carbon capture-and-storage projects, advanced-technology vehicles, and legal and nonlegal consulting. The overall effect will be to fuel the global economy.

Issue 10. Is Carbon Capture Technology Ready to Limit Carbon Emissions? 160

YES: David G. Hawkins, from “Carbon Capture and Sequestration,” testimony before the Committee on House Energy and Commerce, Subcommittee on Energy and Air Quality (March 6, 2007) 163

NO: Charles W. Schmidt, from “Carbon Capture & Storage: Blue-Sky Technology or Just Blowing Smoke?” *Environmental Health Perspectives* (November 2007) 174

David G. Hawkins, director of the Climate Center of the Natural Resources Defense Council, argues that we know enough to implement large-scale carbon capture and sequestration for new coal plants. Charles W. Schmidt argues that the technology is not yet technically and financially feasible, research is stuck in low gear, and the political commitment to reducing carbon emissions is lacking.

Issue 11. Is It Time to Think Seriously About “Climate Engineering”? 183

YES: Kevin Bullis, from “The Geoengineering Gambit,” *Technology Review* (January/February 2010) 187

NO: James R. Fleming, from “The Climate Engineers,” *Wilson Quarterly* (Spring 2007) 194

Kevin Bullis, Energy Editor of *Technology Review*, reviews the latest thinking about “geoengineering” as a solution to the global warming problem, and concludes that despite potential side-effects and the risk of unknown impacts on the environment, it may be time to consider technologies that offset global warming. James R. Fleming, professor of science, technology, and society, argues that climate engineers fail to consider both the risks of unintended consequences to human life and political relationships and the ethics of the human relationship to nature.

UNIT 3 NUCLEAR POWER 207

Issue 12. Is It Time to Revive Nuclear Power? 208

YES: Allison MacFarlane, from “Nuclear Power: A Panacea for Future Energy Needs?” *Environment* (March/April 2010) 212

NO: **Kristin Shrader-Frechette**, from “Five Myths About Nuclear Energy,” *America* (June 23–30, 2008) 219

Allison MacFarlane argues that although nuclear power poses serious problems to be overcome, it “offers a potential avenue to significantly mitigate carbon dioxide emissions while still providing baseload power required in today’s world.” However, it will take many years to build the necessary number of new nuclear power plants. Professor Kristin Shrader-Frechette argues that nuclear power is one of the most impractical and risky of energy sources. Renewable energy sources such as wind and solar are a sounder choice.

Issue 13. Should the United States Stop Planning for Permanent Nuclear Waste Disposal at Yucca Mountain? 226

YES: **U.S. Department of Energy (DOE)**, from “Motion to Withdraw,” filed before the Nuclear Regulatory Commission (March 2, 2010) 230

NO: **Luther J. Carter, Lake H. Barrett, and Kenneth C. Rogers**, from “Nuclear Waste Disposal: Showdown at Yucca Mountain,” *Issues in Science and Technology* (Fall 2010) 234

The U.S. Department of Energy (DOE) moves to withdraw its application for a license to operate a permanent repository for spent nuclear fuel and high-level radioactive waste at Yucca Mountain, Nevada, calling Yucca Mountain “not a workable option” and saying that it has no plans ever to refile the application. Luther J. Carter, Lake H. Barrett, and Kenneth C. Rogers argue that the decision to withdraw the application for a nuclear waste repository at Yucca Mountain was motivated by politics rather than by evidence. If successful, it will impede future efforts to use nuclear power to combat global warming.

Issue 14. Should the United States Reprocess Spent Nuclear Fuel? 243

YES: **Phillip J. Finck**, from Statement before the House Committee on Science, Energy Subcommittee, Hearing on Nuclear Fuel Reprocessing (June 16, 2005) 247

NO: **Charles D. Ferguson**, from “An Assessment of the Proliferation Risks of Spent Fuel Reprocessing and Alternative Nuclear Waste Management Strategies,” testimony before the U.S. House of Representatives Committee on Science and Technology Hearing on Advancing Technology for Nuclear Fuel Recycling: What Should Our Research, Development and Demonstration Strategy Be? (June 17, 2009) 254

Phillip Finck argues that by reprocessing spent nuclear fuel, the United States can enable nuclear power to expand its contribution to the nation’s energy needs while reducing carbon emissions, nuclear waste, and the need for waste repositories such as Yucca Mountain. Charles Ferguson, president of the Federation of American Scientists, argues that even though reprocessing can help reduce nuclear waste management problems, because as currently practiced it both poses a significant risk that weapons-grade material will fall into the wrong hands and raises the price of nuclear fuel (compared to the once-through fuel cycle), it should not be pursued

at present. There is time for further research. Meanwhile, we should concentrate our efforts on safe storage of nuclear wastes.

UNIT 4 ALTERNATIVE ENERGY SOURCES 265

Issue 15. Is Renewable Energy Green? 266

YES: **Andrea Larson**, from “Growing U.S. Trade in Green Technology,” testimony before the U.S. House Committee on Energy and Commerce, Subcommittee on Commerce, Trade and Consumer Protection (October 7, 2009) 270

NO: **Jesse H. Ausubel**, from “Renewable and Nuclear Heresies,” *International Journal of Nuclear Governance, Economy and Ecology* (vol. 1, no. 3, 2007) 278

Andrea Larson argues that “green” technologies include, among other things, renewable energy technologies and these technologies are essential to future U.S. domestic economic growth and to international competitiveness. Jesse Ausubel argues that renewable energy technologies are not green, largely because when developed to a scale at which they might contribute meaningfully to society’s energy requirements, they will cause serious environmental harm. He considers nuclear power a much “greener” way to meet society’s energy needs.

Issue 16. Is Wind Enough? 289

YES: **Xi Lu, Michael B. McElroy, and Juha Kiviluoma**, from “Global Potential for Wind-Generated Electricity,” *Proceedings of the National Academy of Sciences* (July 7, 2009) 292

NO: **John Etherington**, from *The Wind Farm Scam: An Ecologist’s Evaluation* (Stacey International, 2009) 300

Xi Lu, Michael McElroy, and Juha Kiviluoma argue that a network of land-based 2.5 MW wind turbines operating at as little as 25 percent of rated capacity would be more than enough to meet total current and anticipated future global demand for electricity. In the contiguous United States, the potential is enough to supply more than 16 times current consumption. Offshore turbines add to the potential. John Etherington argues that wind power has been vastly oversold. It cannot provide a predictable electrical supply, saves remarkably little on carbon emissions, is not cheap, and has a huge landscape footprint. We would be better off without it.

Issue 17. Are Biofuels a Reasonable Substitute for Fossil Fuels? 307

YES: **Keith Kline, Virginia H. Dale, Russell Lee, and Paul Leiby**, from “In Defense of Biofuels, Done Right,” *Issues in Science and Technology* (Spring 2009) 311

NO: **Donald Mitchell**, from “A Note on Rising Food Prices,” The World Bank Development Prospects Group (July 2008) 319

Keith Kline, et al. argue that the impact of biofuels production on food prices is much less than alarmists claim. If biofuels development focused on converting biowastes and fast-growing trees and grasses into fuels, the overall impact would be even better with a host of benefits. Donald Mitchell argues that although many factors contributed to the increase in internationally traded food prices from January 2002 to June 2008, the

most important single factor—accounting for as much as 70 percent of the rise in food prices—was the large increase in biofuels production from grains and oilseeds in the United States and European Union.

Issue 18. Can Hydropower Play a Role in Preventing Climate Change? 328

YES: Alain Tremblay, Louis Varfalvy, Charlotte Roehm, and Michelle Garneau, from “The Issue of Greenhouse Gases from Hydroelectric Reservoirs: From Boreal to Tropical Regions,” United Nations Symposium on Hydropower and Sustainable Development, Beijing, China (October 27–29, 2004) 332

NO: American Rivers, from “Hydropower: Not the Answer to Preventing Climate Change” (www.americanrivers.org) (2007) 337

Alain Tremblay, Louis Varfalvy, Charlotte Roehm, and Michelle Garneau, researchers with Hydro-Quebec and the University of Quebec in Montreal, argue that hydropower is a very efficient way to produce electricity, with emissions of greenhouse gases between a tenth and a hundredth of the emissions associated with using fossil fuels. American Rivers, a nonprofit organization dedicated to the protection and restoration of North America’s rivers, argues that suggesting that hydropower is the answer to global warming hurts opportunities for alternative renewable energy technologies such as solar and wind and distracts from the most promising solution, energy efficiency.

Issue 19. Is It Time to Put Geothermal Energy Development on the Fast Track? 344

YES: Susan Petty, from “Testimony on the National Geothermal Initiative Act of 2007 Before the Senate Committee on Energy and Natural Resources” (September 26, 2007) 348

NO: Alexander Karsner, from “Testimony on the National Geothermal Initiative Act of 2007 Before the Senate Committee on Energy and Natural Resources” (September 26, 2007) 354

Susan Petty, president of AltaRock Energy, Inc., argues that the technology already exists to greatly increase the production and use of geothermal energy. Supplying 20 percent of U.S. electricity from geothermal energy by 2030 is a very realistic goal. Alexander Karsner, Assistant Secretary for Energy Efficiency and Renewable Energy at the U.S. Department of Energy, argues that it is not feasible to supply 20 percent of U.S. electricity from geothermal energy by 2030.

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