

# *Introduction—Energy Controversies: Reversing Course*

The attack on the World Trade Center and the Pentagon and the subsequent military campaign in Afghanistan have resurrected interest in a subject not widely discussed for 20 years—energy security. By most accounts, national security depends, at least in part, on a continuing flow of energy resources. For industrial countries, large portions of their energy needs are supplied from politically sensitive areas such as the Middle East. According to mainstream thinking, conservation and the exploitation of renewable resources such as wind and solar energy can only modestly contribute to national security. This position is premised on a belief that modern society runs on an “abundant energy machine” (Byrne & Rich, 1986). The recently released U.S. National Energy Policy (2001) resurrects such an idea. With energy security as a prominent goal, it proposes drilling in the ecologically sensitive Arctic National Wildlife Refuge and restarting the country’s nuclear energy program (and several other actions) in an effort to protect the country’s “prosperity.” In effect, ecological and technological risks are to be expanded to serve the national need for energy security.

The contributors to this volume offer a detailed, analytically based challenge to the mainstream paradigm. At global, national, and regional levels, careful analyses of practical energy options such as conservation, renewables, micropower, new urban design, and environmentally sensitive rural development underscore the availability of sustainable futures that make the energy brownfields and blackouts and global ecological threats (such as climate change) of mainstream strategy unnecessary.

In the first contribution to this special issue, Seth Dunn offers a comprehensive approach for reorienting society away from the modern fixation on both fossil fuels and centralized power production. Although much of the immediate post-September 11 commentary focused on the vulnerability of the nation’s nuclear generating stations, the potentially catastrophic effect of an attack on nuclear power facilities is far

from the only vulnerability in the power system. As Dunn points out,

An aging, centralized, and primarily fossil fuel-based electricity system is also susceptible to price volatility and interruptions in supply—as seen in California in early 2001. And it is also the source of the most significant negative ecological impacts among all human activities. (p. 72)

Dunn argues that the socially, economically, and ecologically responsible way to address current vulnerabilities is the creation of a revolutionary system of micropower that would replace our dependency on large, central-station generation with a variety of technologies—solar cells, microturbines, fuel cells, and other devices—that have capacities as low as 1 kilowatt, 1 millionth the amount of power generated by a typical nuclear plant. The benefits of the micropower revolution include a scale of energy development that enables democratic governance and ecological sustainability.

The second article likewise provides a revolutionary framework for thinking about approaches to satisfying the world’s increasing appetite for energy. Peter Droege points out that the modern age of industrialization includes great achievements in science, technology, medicine, communications, and even the dream of universal human rights and peace. These achievements, however, are largely reserved for a global minority, existing alongside persistent social inequity, military instability, local and regional environmental disasters, and global climate change. Much of this legacy is traceable to modern dependence on fossil fuels, which made very large cities a central feature of our landscape. In examining the central role played by cities in the fossil fuel economy, Droege finds that

fundamental changes in urban power regimes that are in keeping with sustainable development practices promise to revitalize regional and rural

development and boost urban business and technological innovation. . . . By pursuing energy reform strategies in keeping with globally sustainable [greenhouse gas] emission levels, local urban leaders can also act globally by helping achieve greater equity and justice in international development. (p. 99)

The transition to a clean energy system must, of course, take place within national and regional decision-making processes as well as within international contexts and discussions. National and regional action is the focus of the remaining articles in this volume.

Alan Noguee and fellow researchers of the Union of Concerned Scientists contrast the U.S. Energy Information Administration's recent analyses of national energy strategy with scenarios developed for the union's *Clean Energy Blueprint*. The benefits the U.S. would enjoy under the blueprint are significant: Total energy use would be 19% lower than business as usual by 2020 and only 5% higher than 2000 levels, due to increased energy efficiency in homes, offices, and factories. Natural gas use would decrease by 31%, coal-fired electricity generation would fall by 61%, and oil use would be reduced by 5%, saving more than 400 million barrels per year by 2020. More oil would be saved in the buildings and industrial sector over the next 18 years than is economically recoverable from the Arctic National Wildlife Refuge over 60 years. Implementation of the *Clean Energy Blueprint* would also result in significantly cleaner air because carbon dioxide emissions from power plants would be nearly one third lower than under business as usual by 2020, whereas sulfur dioxide and nitrogen oxide emission levels would be 8% and 15% lower, respectively.

The need, and potential, for change is, of course, not limited to the United States. Significant contributions can be made and will be needed by Asian nations, including South Korea and China. As Young-Doo Wang and colleagues point out, over the past 30 years, South Korea has sought to ensure rapid economic growth with a formula of pro-export policies and the negotiation of stable, cheap energy supplies from fossil fuels and nuclear power. By 1999, imported coal, oil, natural gas, and uranium accounted for 98% of South Korea's national energy supply. The country's energy intensity has been and remains above the world average and is actually increasing. Energy consumption in South Korea has grown so dramatically that it is now the 10th largest source of carbon dioxide (CO<sub>2</sub>) emissions in the world. Under the auspices of the

recently developed Joint Institute for a Sustainable Energy and Environmental Future, Wang et al. have developed a strategy that would give South Korean society a nuclear free future that cancels 15 planned nuclear power plants, reduces CO<sub>2</sub> emissions by more than 20%, saves a significant amount of capital for consumers and businesses (compared to the existing unsustainable energy path), and restores the balance between human life and nature that has been a key reason for Korean culture's long and successful history.

Too often, social and technical analyses—including those of energy systems—presume an urban-industrial context for their work. Yet the majority of human beings live in rural settings. If a sustainable energy future is to be pursued, a rural strategy is needed. Aiming Zhou and John Byrne investigate possibilities for a sustainable rural future by learning from the considerable achievements of China's western provinces. Using the work of an 8-year collaboration between several Chinese organizations (especially the Center for Renewable Energy Development) and the Center for Energy and Environmental Policy at the University of Delaware, the authors demonstrate that rural knowledge and experience with renewable energy has and can build sustainable pathways—if modernist pretensions do not imperialize China's and the world's futures.

Impressive plans for greening the energy system are being proposed for the colder regions of the Upper Midwest as well. Clean energy proposals recently developed by the Chicago, Illinois-based Environmental Law and Policy Center (ELPC) and Saint Paul-based Minnesotans for an Energy-Efficient Economy (ME3) are discussed by Michael T. Noble and Steven M. Hoffman. Both the ELPC and ME3 studies conclude that a transition away from the region's dependency on fossil and nuclear fuels is both necessary and inevitable if the region is to be a source of solutions to the problem of climate change. For these authors, the Upper Midwest is well positioned to take advantage of the transition because it is home to some of the world's most abundant and economical wind and biomass resources. Although a number of issues must be resolved, including a host of electricity transmission-related difficulties, Noble and Hoffman provide a portrait of a region on the cusp of a sustainable energy future.

Rick Gilliam reports on a comprehensive proposal for the American intermountain West developed by the Land and Water Fund of the Rockies (LAW Fund). Titled *How the West Can Win*, this strategy is intended

to counter the rapid growth recently experienced in the West that would lead to another round of construction of fossil fuel-fired power plants and associated adverse environmental impacts. LAW Fund points to restructuring of the utility industry as a potential risk factor as well as a possible means of changing course. As Gilliam notes, in the wake of the California restructuring fiasco and after the September 11, 2001, attacks, which remind us of continuing energy security vulnerabilities, the urgency for action on behalf of a sustainable energy future is greater than ever.

The need for national-level policy is clear. However, at least in the United States, such leadership has been sorely lacking. As a result, many regional and state-level groups are beginning to develop farsighted, aggressive, and perhaps most important, achievable clean energy strategies. Patrick Maaza's article offers a portrait of civil society-based agenda building. The Olympia, Washington-based Climate Solutions has developed a viable regional strategy to the problem of global climate change in which "clean energy" industry clusters in the cities of the Pacific

Northwest are built while seeking to improve the region's rural economy through the aggressive pursuit of clean energy crops (especially wind and biomass).

The articles in this second *Bulletin of Science, Technology & Society* special issue on energy provide a serious challenge to the mainstream belief that modern life must rely on conventional energy systems. The authors offer, at international, national, and local scales, agendas for weaning society of its long-standing fossil and nuclear fuel addictions and pursuing instead sustainable energy alternatives that can allow us to be at peace with our future.

John Byrne  
Steven M. Hoffman  
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### Reference

- Byrne, J., & Rich, D. (1986). In search of the abundant energy machine. In J. Byrne & D. Rich (Eds.), *The politics of energy research and development*. New Brunswick, NJ: Transaction Publishing.