

TRANSFORMING POWER ENERGY, ENVIRONMENT, AND SOCIETY IN CONFLICT

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Introduction: Modern Energy and Modern Society

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Spiking prices, cartel decisions to limit production, regional conflicts to control ever scarcer reserves, periodic accidents, spills, and explosions, all are assured to bring attention to the operations of the global energy system. Rising in importance are headlines that associate modern energy with modern environmental problems ranging from climate change to public health advisories that urban air is, on occasion, unfit for human consumption. Shuttling from background to foreground (and back) are hopeful projections of technological solutions to energy problems. Policy discussions focus on efforts to improve technology and subject the sector to increasing doses of market curatives.

Rarely are modern energy's politics and political economy discussed in a sustained manner. When spiking oil prices and cartel-ordered production reductions send skyward the profits of the megacorporate rulers of the sector, politics and political economy questions surface. When ecosystems are harmed or threatened by energy operations, and when national security advisors become anxious about their capacity to control the system, politics and political economy questions gain importance. But when energy headlines fade, inquiry into the sector returns to a state of hibernation (except for 'breaking news' about innovations to revolutionize and lower the cost and, often these days, the environmental impact, of energy use).

The attention-neglect cycle of inquiry into the energy sector belies its social importance. The modern energy regime is to be credited with creating an integrating quantitative and transcendent logic which catalyzed the economic and technological forces underpinning industrial and, now, post-industrial societies. Long ago, Lewis Mumford captured this social role of the modern energy regime and its synergy with other elements of modernity (1961: 570):

Quantitative production has become, for our mass-minded contemporaries, the only imperative goal: they value quantification without qualification. In physical energy, in industrial productivity, in invention, in knowledge, in population the same vacuous expansions and explosions prevail.

The coevolution of modern energy and modern economies has resulted in “synergistic development”—a process of reinforcing growth between [energy] and...economy” (Byrne et al., 2004: 495)¹ and this synergism is now embedded in both.

The modern energy-economy synergy was propelled neither by energy scarcity nor by a sudden technological breakthrough. As to the former, low-entropy energy from the sun was (and is) available in virtually unlimited quantities and has been socially appropriated for millennia by various means. Indeed, until the industrial revolution, energy technics² were generally focused upon the conversion of biomass into carbohydrates to energize work by humans and animals. These deliver ample energy flows but at lower intensities than modern economic growth demands and were largely abandoned by the Global North early in the twentieth century. It is important to note, however, that movement from a carbohydrate to a hydrocarbon economy could not have been driven by considerations of energy intensity since the modern economy was barely evident when the hydrocarbon substitution was underway. As Mumford (1934) has documented, the transformation of energy systems and economies was coincident, not successive.

On the question of technological breakthroughs, the technology to mine and burn mineral energy had been available at least since the seventeenth century (see Mumford’s 1934 discussion of the eotechnic phase of technology-environment-society relations), but was not deployed until the nineteenth and early twentieth centuries when the institutional framework—the “pentagon of power” (Mumford, 1970)—that could systematize a quantitative and ecologically transcendent political economy was established. Hydrocarbon fuels—oil, coal, and natural gas—that powered the industrial revolution are the result of captured energy in the form of fossilized plant matter from the carboniferous period of the paleozoic era. The rate of exploitation of these fuels is limited by the rate and incremental cost at which they can be extracted and combusted, a chiefly technological and economic, rather than ecological or social, function. In this way, fossil fuels held the promise of transcending the natural rate at which solar energy reaches the surface of the earth and is stored in various forms appropriate to both endosomatic and exosomatic uses.³ As well, fossil fuels enabled a transcendence of social rhythms that had dictated the pace at which energy might be exploited, contributing to the replacement of a largely subsistence-based economy with the modern surplus economy.

The irony of modernity’s successful quantification and ecological transcendence is now obvious. Combustion of fossil fuels has led to rapid exhaustion of mineral energy, with oil reserves, for example, expected to peak and decline early in this century (Deffeyes, 2001; Goodstein, 2004; Roberts, 2004). Modern societies have consumed 12 million years of decayed biomass in 300 years (Dukes, 2003) and now have no natural feasible replacement.

But an additional legacy of modern energy's attempted transcendence is increasing atmospheric concentrations of greenhouse gases, which cause global warming and are traceable to our overactive appetite for "buried sunshine" (Dukes, 2003). Both the industrial and post-industrial eras—despite the latter's purported dematerialization—have descended into this continual state of fossil fuel scarcity and global ecological risk in no small measure because of the carbonization of their energy systems.

In *Technics and Civilization*, Mumford describes (1934: 151 - 211) the rise of "carboniferous capitalism" in the "paleotechnic phase" of technology-environment-society relations. During this phase, "an alliance of science, capitalism, and carbon power" reorganizes social order for the purposes of fulfilling an underlying imperative of ceaseless growth (Byrne et al., 2002: 267). The accompanying concentration of political and economic power has a specific ecological manifestation: energy pollution as "a functional element of human progress" (Byrne et al., 2002: 267).

While ecological degradation is the focus of much criticism regarding the effects of carboniferous capitalism, Mumford also stressed the social relations engendered by the conventional energy system. Indeed, despite many important advances, human life and livelihoods have been risked under the modern energy regime. Since the emergence of carbon-mediated social relations, an ever present social crisis can be observed, but has been largely ignored (Mumford, 1934: 161): "What paleotect dared to ask himself whether labor-saving, money-grabbing, power-acquiring, space annihilating, thing producing devices were in fact producing an equivalent expansion and enrichment of life." Contemporarily, the intersecting social and environmental consequences of modernized energy can be described as follows (Byrne et al., 2002: 268):

Environmental costs of production and wealth creation were considered, when considered at all, in the aggregate and not the particular. Accordingly, pollution became a "social cost," implying that the burdens were collective, as were the benefits. Nothing could be more misleading; the costs and benefits of pollution were sharply and equivocally divided within society and between societies from the onset of industrialization to the present day.

Energy systems have underpinned and constructed deeply unequal social relations, as well as imbalanced nature-society relations, since the dawn of the fossil fuel era.

The synergies of industrialization and conventional energy are now everywhere evident. Just as industrialization has been largely co-evolutionary with the conventional energy regime (see Norgaard, 1994), their coevolved social project is predictably similar: environmental conditions constructed by the combustion of fossil fuels mediate social relations in much the same way as described by Mumford, concentrating the capacity to valorize and

distribute privilege among wealthy communities and their preferred ecologies, while concentrating environmental and social harm among the marginalized and vulnerable. The confluence of the forces of fossil energy, market power, and engineered social existence has produced a global order that is “beyond nature,” operating on the shared, quantity-based logic of modern technology and economics (i.e., more, faster, and bigger are better).

This volume of the *Energy and Environmental Policy Series* examines conflicts evident in the current energy regime and latent in emerging proposals to correct them. After an initial chapter assessing the scope and depth of the contemporary discourse on energy-society relations, the volume addresses four theaters of conflict. Chapters 2 and 3 examine modern energy’s role in alternately deepening and alleviating poverty. Chapters 4 and 5 take up the security implications of the sector’s operations and vulnerabilities. In Chapters 6 and 7, neoliberalism’s agenda of economic globalization is analyzed in the context of energy system development. Finally, chapters 8 and 9 investigate the environmental reform strategies of modern energy, questioning the nature and extent of ‘green’ energy promises.

Chapter 1 explores the social project of modern energy, characterizing the origins and implications of conventional and sustainable strategies. John Byrne and Noah Toly reveal the discursive continuities between conventional and sustainable proposals to further modernize the modern energy regime, finding both preoccupied with technical and economic criteria. Their chapter concludes that neither strategy furnishes a serious inquiry into the governance and political economy of energy.

Chapter 2, by Joan Martinez Alier, explores the modern relationship between energy, the environment, and poverty. A history of the discourse is offered that reveals the preponderance of economic and physical concerns about energy transitions. Martinez-Alier organizes a critique of this tendency, engaging the ecological and social relations mediated by energy regimes. He concludes with a discussion of agendas for integrating concerns for ecological integrity and social equity.

Margaret Skutsch and Joy Clancy examine the relationship between energy, gender, and poverty in chapter 3. The authors give special attention to the gender dimension of energy poverty, exploring the personal and social effects of sustained biomass use as well as the promises and perils of transitions to other fuels. Skutsch and Clancy explain the lack of attention to poverty and, more significantly, gender, in the debate regarding energy transitions.

Michael Klare analyzes the security dimensions of the conventional energy program, focusing on military conflict as a social implication of continued dependence upon oil. Building on his recent books addressing *Resource Wars* and the relationship between *Blood and Oil*, chapter 4 discusses the globalization of the U.S. Carter Doctrine and its implications for continued

military deployments in the face of increasing oil demand and decreasing supplies.

Kenneth Bergeron and Andrew Zimmerman train a critical eye on the resurgent nuclear power lobby in the face of global terrorism, finding that, in spite of its past social failures and present risks of terrorist attack, the commitment to atomic fission as a solution to the problems of the fossil energy regime remains strong. Chapter 5 explains why neither a record of catastrophe nor vulnerability to terrorism are likely to derail embedded political support for nuclear power.

Navroz Dubash and James Williams explore the underexamined social dimensions of electricity liberalization in chapter 6. The authors analyze many of the aims of electricity reform as part of a broad policy critique of economic globalization. Their chapter identifies shortcomings in the reform strategy concerning matters of governance, equity, and environmental protection, and concludes with observations on the future of liberalization.

Chapter 7 inquires into the origins and implications of the World Bank's commitment to financing large hydroelectric projects. While some regard large-dam hydroelectricity as potentially sustainable, its poor social and environmental record argue against such a characterization, according to Peter Bosshard. Despite past failures, the World Bank continues to support projects, which Bosshard explains is a result of the politics of developmentalism as embraced by multilateral organizations and, often, their nation-state partners which serve global economic interests at the expense of livelihood needs.

In chapter 8, the most abundant conventional fuel—coal—is critically analyzed. Proposals to address its environmental deficiencies through geosequestration are considered as a means of saving the coal industry. Many have proposed geosequestration of carbon dioxide from coal combustion as part of a “clean coal” initiative that would abate this fuel's contribution to climate destabilizing greenhouse gas emissions. Mark Diesendorf, however, finds that the discourse has lacked serious consideration of coal's multiple environmental and social problems, and the risks attendant to geosequestration itself.

Leigh Glover closes the volume with an analysis of the increasing corporate support for renewable energy. Chapter 9 examines the transition of renewable energy enthusiasts from counter culture to mainstream and the corresponding movement of renewable technologies from the domain of small-distributed generation to large-scale applications suitable only to the centralized mode of energy distribution that has been the hallmark of modern energy. Glover finds that this evolution undermines renewable energy's potential to spark ecological improvement or, more generally, social transformation.

Notes

1. While Byrne et al. (2004) deploy the concept of synergistic development to analyze the modern electricity sector, it can be applied to the whole of industrial and postindustrial energy.
2. Mumford (2000: 15) coined this term, which, in a series of lectures at Columbia University, he defined as “that part of human activity wherein, by an energetic organization of the process at work, man controls and directs the forces of nature for his own purposes.”
3. In Chapter 2 of this volume, Joan Martinez-Alier (2006) describes these two uses. Endosomatic use of energy is as food and exosomatic uses include “fuel for cooking and heating, and as power for the artefacts and machines produced by human culture.”

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