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# American Energy Policy in the 1970s





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Edited by  
Robert Lifset

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## Abbreviations

<b>AEC</b>	U.S. Atomic Energy Commission
<b>AIOC</b>	Anglo Iranian Oil Company
<b>API</b>	American Petroleum Institute
<b>BLM</b>	U.S. Bureau of Land Management
<b>CAFE</b>	Corporate Average Fuel Economy
<b>DOD</b>	U.S. Department of Defense
<b>DOE</b>	U.S. Department of Energy
<b>DOT</b>	U.S. Department of Transportation
<b>ECPA</b>	Energy Conservation and Production Act of 1976
<b>EIA</b>	U.S. Energy Information Administration
<b>EPA</b>	U.S. Environmental Protection Agency
<b>EPAA</b>	Emergency Petroleum Allocation Act of 1973
<b>EPCA</b>	Energy Policy Conservation Act of 1975
<b>ERDA</b>	Energy Research Development Administration
<b>FEA</b>	Federal Energy Administration

<b>FPC</b>	U.S. Federal Power Commission
<b>IEA</b>	International Energy Agency
<b>MAFLA</b>	Mississippi, Alabama, Florida region
<b>MMS</b>	U.S. Minerals Management Service
<b>NASA</b>	National Aeronautics and Space Administration
<b>NEPA</b>	National Environmental Policy Act of 1969
<b>NHTSA</b>	U.S. National Highway Transportation Safety Administration
<b>NRC</b>	U.S. Nuclear Regulatory Commission
<b>NSC</b>	U.S. National Security Council
<b>OAPEC</b>	Organization of Arab Petroleum Exporting Countries
<b>OCS</b>	Outer Continental Shelf
<b>OPEC</b>	Organization of Petroleum Exporting Countries
<b>SALT</b>	Strategic Arms Limitation Treaty
<b>Shell E&amp;P</b>	Shell Oil Exploration and Production division
<b>SPR</b>	Strategic Petroleum Reserve
<b>SPS</b>	solar power satellite
<b>UCS</b>	Union of Concerned Scientists
<b>USDA</b>	U.S. Department of Agriculture

## Chapter 7

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# The Development and Demise of the Agrifuels Ethanol Plant, 1978–1988

A Case Study in U.S. Energy Policy

*Jason P. Theriot*

In the 1970s, as the nation grappled with the economic roller coaster created by the energy crisis, it became evident to some Americans that an abundant, cheap supply of petroleum no longer existed. Jimmy Carter, the thirty-ninth president of the United States, entered the White House in 1977 with a country swirling in economic disarray. One of his solutions to America's growing energy crisis was the creation of a domestic alcohol fuels industry—a massive, federally backed crash program to produce ethanol from crops, thereby reducing the nation's dependence on foreign oil imports. The Agrifuels Refining Corporation in south Louisiana became one of several firms across the country that evolved from this era of alternative energy solutions and high oil prices. A history of the Agrifuels plant represents a microcosm of the problems policymakers and private investors faced in developing a new alcohol fuels industry in the 1970s and 1980s.

Looking back to the mid-1970s, the production of alcohol fuels from biomass was certainly technologically feasible. In fact, the commercialization of ethanol as a motor fuel used in this country dates back to before World War I.<sup>1</sup> Since that time, however, the low price of petroleum made

ethanol uncompetitive. But with the dramatic and seemingly irreversible rise in global oil prices beginning in 1973 and extending into the early 1980s, ethanol, as an alternative fuel source with a seemingly abundant supply of domestic raw materials, suddenly became economically feasible.<sup>2</sup> Two main factors made the ethanol industry a reality: private initiative and government support. For nearly a decade, beginning in 1978, government incentive programs enacted through legislation created a profitable business opportunity that attracted corporations, entrepreneurs, and farmers to invest in a new, unproven, yet lucrative, industry. In this essay I examine the rapid creation and subsequent collapse of the U.S. ethanol industry and evaluate the reasons behind alternative energy policy failure.

The case study of the Agrifuels Refining Corporation serves as a lens through which to view change in domestic energy policy from 1978 to 1988. It examines the inadequacies of government-backed crash programs and the apparent inability of the U.S. political system to negotiate successfully through long-term shifts and cycles in economic conditions. The success and failure of alternative energy sources are almost always contingent on oil prices and political ideology. The collision of divergent political ideals, coupled with a debilitating economic recession and the shocking collapse of oil prices in the mid-1980s, resulted in the demise of ethanol and other biomass fuels, leaving behind the rusted remains of dozens of foreclosed ethanol refineries scattered across the nation's landscape at the expense of the U.S. taxpayers and private investors.

### Answers to the Energy Crisis

The energy crisis of the 1970s posed enormous challenges for political leaders in making and managing effective energy policies. For the decades after World War II, energy policies operated under an umbrella of energy surplus. However, beginning with the Arab embargo and the first oil price shock in 1973–74, and with continued high prices throughout the decade, peaking again in 1979 after the Iranian hostage crisis, American political and business leaders scrambled to readjust their strategies and policies to deal with the energy shortage. As new policies sought ways to curtail America's dependence on imported oil, to reduce real energy prices, and

to lessen the burden of high prices on American consumers, consumption continued to rise.<sup>3</sup>

Throughout the 1970s, American policymakers were faced with an array of tough choices to solve the energy problem. Most of the policy decisions centered on price controls and the supply side of the equation, with the goal of improving domestic supplies through alternatives to imported energy, new technologies, and economies of scale. These choices also included, among other things, the expansion of nuclear power, the development of synthetic fuels, and the opening of more domestic oil and gas reserves to exploration and production. Some argued for Americans to take drastic conservation measures—“making sacrifices”—in changing their standard of living to ride out the energy crisis and to secure future energy independence.<sup>4</sup> Others argued for more “productive conservation” measures through more efficient use of energy in homes, businesses, and factories.<sup>5</sup> By the late 1970s, however, energy policymakers could not come to a general consensus on any of these strategies and instead offered a little something for everybody, including environmental groups.

President Carter responded to the nation’s energy crisis by implementing emergency conservation measures, beginning with natural gas deregulation, and enacting legislation to subsidize the multibillion dollar development of alternative energy sources.<sup>6</sup> In 1977 his administration supported the creation of the Department of Energy (DOE) to administer a series of new policy changes and programs. The Energy Tax Act of 1978, an alternative fuel component to Carter’s national energy package, called for federal subsidies in the form of tax incentives for the development and use of biomass-based fuels such as ethanol. The act made alcohol fuel, known then as “gasohol,” exempt from the 4 cent federal excise tax on gasoline up to 1984.<sup>7</sup> Two years later the Biomass Energy and Alcohol Fuels Act under the Energy Security Act of 1980 established the Federal Gasohol Plan, a joint effort between the DOE and the Department of Agriculture (USDA) to meet the goals set forth by the Carter administration. The centerpiece of the act included \$1.2 billion for loans and loan guarantees to finance the construction of ethanol plants.<sup>8</sup> In addition, the controversial Crude Oil Windfall Profits Tax, enacted the same year, extended the federal excise tax exemption for gasohol from 1984 to 1992. It also established an additional incentive, the 10 percent Energy Investment Tax Credit, for plants and refineries that used fuel sources other than petroleum to make biofuels.<sup>9</sup>

Federal government action had planted the seeds for developing an industry to meet a national crisis, applying a technological and political solution to an economic problem. The states soon followed suit. By 1980, twenty-five states had adopted some form of gasohol subsidy to encourage ethanol development and use as a motor fuel. Five states, including Louisiana, exempted gasohol from at least 8 cents per gallon of the respective state's motor fuel tax.<sup>10</sup>

With the new industry's profit potential, albeit contingent on federal and state subsidies, startup plants began to churn out ethanol, and the gasohol blend began to appear in the market. In the summer of 1979, Amoco began marketing the gasoline-alcohol mixture in thirteen midwestern states. That year more than a thousand service stations across the country began selling gasohol. Texaco soon entered the market and led the pack, with 1,700 stations selling the blend. Alcohol fuel sales jumped from 85 million gallons in 1981 to 234 million gallons in 1982. During this time, nine thousand gas stations nationwide sold the gasohol product.<sup>11</sup> The gasohol craze indeed provided American energy consumers with an affordable alternative at the gas pump.

Throughout the late 1970s, numerous independent and government-funded studies highlighted the potential benefits of alcohol fuels and the impact of incentive programs on both the new industry and the economy. In February 1981, the U.S. National Alcohol Fuels Commission—a federal oversight commission established in 1979—released its much anticipated eighteen-month study on the potential near-term use of alcohol as a motor fuel extender. The final report, *Fuel Alcohol: An Energy Alternative for the 1980s*, recommended continuing the government subsidies and expanding ethanol development.<sup>12</sup> Ethanol, it appeared, had a promising future in America.

### Agrifuels Refining Corporation

Louisiana sugar cane is vital to the state's economy and has been for nearly two centuries. Since World War II, the industry has been dependent on federal programs to keep the domestic price of sugar up. In the late 1970s depressed sugar prices, foreign competition, energy shortages, and high energy prices weighed heavy on Louisiana farmers during what one report

called their “darkest hour.”<sup>13</sup> In 1978, five sugar mills in south Louisiana went out of business, and the crisis threatened several more closures.<sup>14</sup>

In the wake of these mounting problems and in response to the promising uses of energy crops for fuel, Carlos Toca, a plant manager at the Cajun Sugar Cooperative in New Iberia, Louisiana, and Dailey Berard, a local businessman, found the answer with a product they called “agri-fuels,” using sugar cane and sweet sorghum to produce ethanol. In April 1979, Toca, Berard, and two other local investors formed the Louisiana Agri-Fuels Corporation, later renamed Agrifuels Refining Corporation, in what appeared to be a profitable and personally rewarding homegrown business venture.<sup>15</sup>

At that moment, support for the new industry had reached the state capitol in Baton Rouge. Pro-ethanol and farming lobbyists, such as the newly formed Louisiana Gasohol Association, led the way. In the regular spring 1979 session the Louisiana legislature passed a handful of laws and resolutions that provided incentives for the development of a statewide ethanol, or gasohol, program. Act no. 793 (House Bill no. 571) eliminated the state’s excise motor fuel tax of 8 cents a gallon for gasohol, providing the underpinnings for expanding biomass-based alcohol fuel production in Louisiana. Coupled with the federal exemption of 4 cents from the gasoline tax (Energy Tax Act 1978), the new state incentives created an investment opportunity for entrepreneurs and potential stakeholders in the lucrative new ethanol industry.<sup>16</sup>

Gasohol quickly became big business in Louisiana. Nine firms announced plans to build ethanol plants across the state. The ten-year exemption of gasohol from the state gasoline tax, signed into law by Governor Edwin Edwards in July 1979, attracted the attention of ethanol’s long-time rival, the oil industry. By decade’s end south Louisiana had merged its refining and farming expertise to the benefit of both industries and “to such an extent that the gasohol industry could become a significant part of the Louisiana economy,” one report boasted.<sup>17</sup>

In June 1980, Oasis Petroleum Corporation, an independent oil producer from California with self-service gasoline stations on the West Coast, agreed to purchase 100 percent of stock in Agrifuels Refining Corporation.<sup>18</sup> The original partners remained on the board of directors and received additional financial considerations. On paper, the concept and production process of the \$40 million Agrifuels ethanol plant seemed

practical and, in many ways, technologically innovative: build an ethanol refinery adjacent to a sugar mill and use the mill's water supply (from the nearby Bayou Teche) for steam; permanently employ eighty to ninety refinery workers; purchase sugar cane and sweet sorghum from local farmers; use bagasse (sugar cane by-product) to fuel the boilers; refine the raw materials to make ethanol; transport the finished ethanol by barge, truck, or rail to be blended into gasohol at a blending facility; and sell the product to consumers. Four hundred thousand tons of sugar cane molasses, syrup, and sweet sorghum furnished by area farmers and a dozen sugar co-ops would produce 35 million gallons of ethanol a year (100,000 gallons a day).

Agrifuels would be the first major ethanol company in the U.S. to use sugarcane by-products and sweet sorghum as feedstock. Although the technology for using sweet sorghum to produce ethanol on a commercial level had not yet been realized, molasses, on the other hand, held well-known advantages over other biomass products, such as grain, because there was no feedstock preparation involved. Corn, for example, needed to be converted to sugar before beginning the ethanol fermentation process. Sugar cane also offered a high yield of sugar per acre in addition to a high yield of bagasse.<sup>19</sup> What made the plant truly revolutionary was that it would use bagasse, a renewable energy resource not fossil fuels, to power the plant and generate ethanol fuel. The National Alcohol Fuels Commission noted in its formal 1981 report that the bagasse-for-boiler-fuel concept "creates a positive energy balance, which attributes to conservation."<sup>20</sup> Using bagasse instead of natural gas or fuel oil for a plant's industrial requirements produced a net energy balance ratio (output to input) of 1.8:1, according to one report. Given this technological summary, it is not surprising that by 1980, according to Berard, the DOE labeled the Agrifuels project "the most viable in the U.S."<sup>21</sup>

Agrifuels continued on its development timeline. In late September 1980, representatives from Oasis Petroleum Corporation, including the president, and the four local entrepreneurs officially launched the \$40 million Agrifuels plant at its 28-acre site in New Iberia, Louisiana, with a groundbreaking ceremony attended by three hundred invited guests, including Louisiana governor David Treen. Agrifuels president Carlos Toca stated, "We can all be proud of the contribution to the overall energy supply and the infusion of the capital investment of this project into the local economy." Donald P. Segura, president of the Cajun Sugar

Cooperative, hailed the project as the “salvation of the sugar industry.” An editorial that appeared in the local newspaper the day after the ceremony pronounced that the experiment was “bound to be a resounding success.”<sup>22</sup>

More encouraging news came the following year. Researchers from Louisiana State University in Baton Rouge and the University of Southwestern Louisiana in Lafayette and area farmers who participated in test projects reported for the first time that sweet sorghum could be grown commercially and in large quantity throughout the sugar parishes. Moreover, after submitting a loan application and required feasibility study to the DOE, the corporation received a “conditional commitment” for a federal loan agreement, which guaranteed repayment of 90 percent of the original loan to build the plant.<sup>23</sup>

By 1981 it appeared that the Agrifuels plant had real potential to become the nation’s first sugar cane ethanol production facility. The project neared its final planning phase with construction completion and startup date slated for early 1983. Looking back, decades later, Berard shared his misgivings about the plant’s unforeseen outcome: “This was truly the real beginning of an undertaking that had started as a sound idea that would ultimately develop into a mind-boggling nightmare.”

Multiple economic and political factors on both the federal and state levels largely influenced the development of the Agrifuels ethanol plant. Skyrocketing oil prices in the 1970s led to government support for alternative fuel technologies across the country. However, the shifts in administrations and political ideals (from Carter to Reagan and Edwards to Roemer, for example) in the 1980s, along with a sharp decline in oil prices, ultimately led to the plant’s failure. Several key elements of this story must be examined to explain the demise of the Agrifuels Refining Corporation. The combination of increased construction costs, federal energy policies, rapid decline in oil prices, and state politics created an unintended financial sinkhole from which the fledgling company could not survive.

With the federal government’s involvement and the DOE’s conditional commitment for a loan guarantee, additional costs and setbacks, as to be expected, began to mount. For starters, the loan program required a lengthy application and negotiation period, usually up to two years.<sup>24</sup> Administrative problems at the bureaucratic level contributed to the project’s complexity and delay in construction. The National Alcohol Fuels Commission reported that federal efforts to develop and administer

the program “have been not only slow but also fragmented.”<sup>25</sup> Compliance with numerous federal regulations, along with rising interest rates, more than doubled the cost of the plant. Nevertheless, with guaranteed government financing and subsidies, the \$105 million Agrifuels project moved forward.

Ronald Reagan’s entry into the White House created additional problems for the upstart ethanol industry. His administration’s threats to defund and ultimately terminate the alcohol fuel program compounded ethanol’s questionable future. Ultimately, numerous plants across the country had enormous difficulty sifting through the maze of mixed signals from the government, deciphering changes to existing policies, and convincing investors and financial institutions to stick with and gamble on this government-backed program. With millions of dollars already on the line and contracts and construction of plants moving forward, developers, pro-ethanol lobbyists, and their political allies continued to champion Carter’s alternative energy policies from the late 1970s. The subsidies held on, and even increased (by one cent, along with overall gas taxes), although other economic factors stymied ethanol’s growth. Agrifuels, one of the nation’s top alternative energy projects, continued to negotiate its uncertain future with creditors and contractors.<sup>26</sup>

Beginning in 1982 an unexpected, yet steady decline in oil prices had multiple consequences for the fledgling ethanol industry. As the oil glut progressed throughout the decade, the price differential between ethanol (gasohol) and cheap, regular gasoline continued to expand, thereby bringing into question the economics of the alcohol fuel. Oil companies and consumers slowly began to pull away from the gasohol blend. At that point, Berard recognized, “the [ethanol] market began to crater in Louisiana.” Nevertheless, the Agrifuels plant still held promise.<sup>27</sup>

By 1985, Edgington Oil, a refining interest in California and subsidiary of Triad America Corporation, had purchased the plant from Oasis Petroleum, also a Triad subsidiary.<sup>28</sup> It is uncertain why or how this transaction took place. Records indicate that Edgington, a small refinery, faced a financial dilemma when in 1984 the Environmental Protection Agency began enforcing new regulations on refiners to reduce drastically the lead additive they used in gasoline.<sup>29</sup> By the mid-1980s ethanol became a likely substitute for lead as an octane booster in gasoline. In addition to purchasing the Agrifuels plant, according to Berard, Edgington also built a \$21

million gasohol blending facility in California. In September of that year, Agrifuels finally entered the all-important loan agreement with the DOE, and construction began soon thereafter.

Throughout this period of oil price decline and uncertainty, Louisiana actually increased its support for ethanol. With a political eye on waning national support for ethanol and with four ethanol plants already under construction in his state and at least four more pending, in 1984 Governor Edwin Edwards attempted to buoy the struggling industry with new and improved tax incentives for ethanol production. Backed by Edwards and the pro-ethanol camp, the Louisiana legislature increased gasohol's 8-cents-a-gallon tax exemption to a whopping 16-cent exemption. Two years later when the oil market completely crashed and pressure for a policy change began to mount, state lawmakers ended the tax exemption and created a new direct subsidy program for ethanol producers. The new plan called for subsidies of 14 cents a gallon to be paid to ethanol producers.<sup>30</sup> But even with this policy reshuffling, state politicians seemed to be placating the ethanol and farm lobby at the expense of the state highway funds, taxpayers, and gasoline customers.<sup>31</sup> In 1979, Louisiana ranked fifth among states with tax exemptions for gasohol (8 cents a gallon). By 1986 the state had soared to the top of that shrinking list, with New Mexico (11 cents a gallon), North Dakota (8 cents a gallon), Virginia (8 cents a gallon), and a dozen other states (averaging 3–5 cents a gallon) trailing far behind.<sup>32</sup> Berard argued that the new increase in state subsidies was not necessary; even with uncertainties lingering in Washington over energy policy, the loan guarantee and existing federal and state exemptions provided more than enough incentives to make Agrifuels and the state ethanol industry viable. He feared, correctly, that the new wave of state subsidies might torpedo the ethanol industry when the new governor, Buddy Roemer, took office in early 1988, reduced the state budget, and canceled the program.

Construction of the \$105 million plant continued throughout 1986, although as oil prices hit rock bottom its future remained on shaky ground. In January 1987 the company's financial situation worsened and the project began to unravel. Edgington Oil, the owner of Agrifuels, began experiencing financial troubles. Its parent company, Triad America, declared bankruptcy in February to protect itself from creditors. Apparently Adnan Khashoggi, owner of the Triad financial empire, had invested heavily in oil and real estate before the market for both industries began to collapse simultaneously.<sup>33</sup>

By late March, Edgington Oil could not come up with the required \$6.5 million in working capital to begin operations and abandoned the Agrifuels plant. The president of Edgington explained to the press that Agrifuels proved to be no longer profitable: “Based on economic projections prepared by Agrifuels,” Mark Newgard explained, “we formally advised the banks and contractors that it would be a mistake to put any additional funds into Agrifuels.”<sup>34</sup> Newgard noted that state subsidies for ethanol were financed by a state motor fuels tax on gasohol sales, but when major distributors, including Texaco, pulled out of the gasohol market and several new plants came on line those subsidies would be depleted. By mid-April, workers at the nearly completed Agrifuels plant were sent home while the DOE and the local governing board—which included Pat Hamilton, the president of Agrifuels, and Berard, the vice president—contemplated the plant’s fate. The DOE, which had guaranteed 90 percent of the loan agreement, cut all remaining financial disbursements to the plant and formally took over the remaining assets once the company defaulted on its loan payment.<sup>35</sup> Throughout that summer and into early fall, Hamilton scrambled to find the required operating capital to stall a DOE foreclosure. Berard read the writing on the wall and resigned from the board in August.

In the end, the DOE paid off the loan, a total of \$78.9 million, and pumped in an additional \$100,000 a month just to keep the equipment from corroding.<sup>36</sup> In 1988 the DOE spent additional funds mothballing the plant. And just as Berard feared, incoming governor Buddy Roemer did not renew the state alcohol fuel program, effectively terminating the ethanol industry in Louisiana. Prior to the drastic shifts in energy prices and policies of the 1980s, Louisiana’s ethanol industry certainly had held promise; production across the state reached a peak of 32 million gallons in 1986. However, when Governor Roemer ended the state ethanol subsidy program, nearly all production stopped, as did the completion of several plants, including Agrifuels. Governors Edwards and Roemer had used the ethanol subsidies as a political tool, Berard believed, and the private investors and farming community were ultimately shortchanged. State politics, were not, however, solely to blame. The oil price collapse of the mid-1980s certainly contributed to the downfall of ethanol across the nation.

Beginning in 1988, Berard and local investors joined forces to purchase the mothballed Agrifuels plant from the government. They offered the DOE \$25 million for the plant, but the agency turned them down, holding

out for an offer of at least \$50 million. Later the partners made a second offer: \$15 million. But again the government held out. In the final chapter, the DOE dismantled the plant a few years later and sold the equipment to a firm from the Midwest. Agrifuels, a technological innovation arguably ahead of its time, never produced a gallon of ethanol.<sup>37</sup>

### U.S. Ethanol Program: National Debates and Final Assessment

Beginning in 1978, the federal government through legislative action provided a variety of tax incentives for developing a domestic ethanol industry. By 1980 the program enjoyed public and private support.<sup>38</sup> But as the program transitioned from the planning to the application phase its weaknesses became apparent, especially to the growing anti-gasohol critics and the larger investment community. A program had been created and funded, yet the management of that program and the institutional constraints of the federal bureaucracy created problems for business models and decision making. President Reagan's ideas about limited government and reducing federal subsidies for various programs created uncertainties within the business community about whether or not support for the newly created ethanol industry would continue and for how long. Policymakers and program administrators apparently did not take into account the emerging economic recession driven in part by declining oil prices. Nevertheless, the federally backed crash program continued, regardless of its deficiencies, shifts in policy, and changing market conditions that threatened the future of this alternative fuel.

For much of the 1980s, factions from both inside and outside of government debated the benefits and drawbacks of the ethanol industry. With the Environmental Protection Agency's mandatory lead "phasedown" program, pro-ethanol interests argued for substituting clean-burning alcohol fuel for the noxious tetraethyl lead as an octane booster in gasoline.<sup>39</sup> Many in the agricultural sector also touted the benefits of ethanol production related to the sagging farm economy in the United States.<sup>40</sup> Opponents of the fuel alcohol plan argued that expanding the industry might severely impact food prices and food supplies. Energy experts and researchers questioned the "energy balance" and efficiency of converting fuel from crops to be used

to power cars.<sup>41</sup> Environmentalists, moreover, contemplated excessive soil erosion and the environmental impact of using more herbicides and pesticides through large-scale land use.<sup>42</sup> Proponents noted the reduction in carbon dioxide emission from car engines that used gasohol.<sup>43</sup> Consumers often complained about gasohol's product performance in their vehicles. Above all, critics of ethanol pointed to the high costs to the economy and the loss of revenue to the states' highway trust funds, which depended on the federal gasoline sales tax (gasohol received exemptions) to repair and maintain the nation's interstate highway system.<sup>44</sup>

The internal problems that hampered the federal alcohol fuel program led some critics to argue that the alternative energy policies were, as one congressman stated, "alarmingly unbalanced." The pundits cited a disproportional level of funds available to the program; less than \$2 billion of the \$20 billion authorized by the Energy Security Act for alternative energy had been "earmarked for biomass energy."<sup>45</sup> In addition, the DOE and USDA decided not to implement the price guarantees and purchase agreements for ethanol that were initially authorized by Congress and further recommended by the National Alcohol Fuels Commission. "This restrained approach," the Commission stated, "dampens the fullest private sector involvement in the program."<sup>46</sup> Looking back at the program and into ethanol's future, Congressman Ed Madison of Illinois stated in 1988, "It seems strange that we do not implement policies that will maximize the benefits we can obtain from this domestically produced, renewable fuel."<sup>47</sup>

Private firms across the country experienced the frustrating reality of dealing with an uncertain energy policy and unstable ethanol program in the wake of a downturn in oil markets. For example, American Energy, Inc., of North Dakota spent five years building an ethanol plant capable of producing 50 million gallons a year. By the summer 1984 the project had been "shelved," because one of the joint-venture partners, Ashland Oil, pulled out citing the fact that the energy investment tax credit had not been extended past 1985. Edward Wilkinson, chairman of National Alternative Energy Associates and president of Agri-Energy, Inc., of Minnesota complained, "We never know from one session of congress to the next what program or incentive is in danger of being eliminated." Wilkinson noted a loss of \$4.3 million in equity to his firm because the "current administration changed their policy midstream." Another Minnesota firm's partner walked out in 1982 because of threats to the existing energy policy. In

addition, that firm had to dish out half a million dollars to have attorneys decipher the complex energy tax credit law. “The tragedy is that we’re four years in and here we are seeking clarification on acts of Congress that occurred back in 1978 and ’79,” the firm’s representative stated.<sup>48</sup>

These frustrations speak to the faults that lay within this crash program initiated during the energy crisis. Throughout the 1970s and ’80s, policymakers chose a short-term, reactive approach to expanding new technologies quickly and with little emphasis on research and development and long-term strategy to solve one of the nation’s major problems. In the haste to develop these crash programs, bureaucratic decisions and institutional arrangements became even more ambiguous and disorganized, which created barriers to communication and cooperation with the private sector. Moreover, federal policymakers overextended their power by setting overly ambitious goals for these crash programs without providing the necessary tools and vision to sustain the program through abrupt changes in market conditions.

By contrast, the Brazilian alcohol fuel program, *Pró-Álcool*, proved successful at obtaining, and in some cases surpassing, near-term policy goals during the oil crises of 1970s and ’80s. What started out in Brazil in 1975 as a “sugar industry bailout scheme” became a major national effort to stabilize the country’s economy by producing and marketing ethanol from sugar cane on a grand scale. Brazil achieved an unprecedented level of production, 3 billion liters (about 800 million gallons) annually by 1979, by implementing long-term policy measures and building a coalition between government agencies, financial institutions, automakers, consumers, small- and large-scale farmers and ranchers, and Petrobras, the national oil company.<sup>49</sup> Over time, as the economics of sugar cane ethanol improved and Brazilian society accepted the shift to an alternative fuel, the government gradually reduced the subsidies, allowing the industry to continue to develop a fully integrated renewable energy economy.

In the United States, the Reagan administration, along with an economic recession, constantly worked against expanding the ethanol industry in America. By mid-decade Congress, which had originally initiated the incentive-based policy, had rescinded a majority of the operating funds to two of the three alternative fuel programs authorized in 1980. The Office of Alcohol Fuels, also created in 1980, barely existed by 1986. Consecutive funding cuts to the program began to limit the range of available financing

for loan guarantees, the only biomass program still viable, incidentally, by 1986. Indeed, by 1985 the DOE had a budget of only \$234 million for the alcohol program, a far cry from the \$1.2 billion it was originally authorized. Ultimately the DOE offered grants to only three firms: New Energy of Indiana, Tennol of Tennessee, and Agrifuels Refining of Louisiana.<sup>50</sup> The New Energy plant defaulted on its federally guaranteed \$126 million loan in 1987. Tennol followed suit by defaulting on its \$64 loan guarantee and closed down in 1989.<sup>51</sup>

The individual states' subsidy programs proved problematic for the industry at times. State lawmakers had the ability and opportunity to increase or decrease their respective ethanol subsidy programs without consulting the federal government. Short of nationalizing the industry, or at least regulating prices, the federal government had absolutely no control over the states' subsidy programs and policy decisions. This institutional constraint actually proved beneficial to businesses during the industry's early years, since additional state subsidies meant additional profits for ethanol producers. But when market conditions changed and state policymakers exercised their political power to alter the subsidies of *their* in-state industry, businesses and investors had to contend with additional problems and uncertainties.

The initial supporters of the economic and free-market potential of ethanol argued early on that with high oil prices alcohol fuels would eventually stabilize and become competitive. Analysts predicted a steady increase in oil prices throughout the 1980s; some estimates reached as high a \$100 a barrel. Thus, much of the support for and impending success of ethanol rested with the market forces of global oil economics. "The market, not Congress," should dictate ethanol's role in the economy, the *Oil & Gas Journal* complained.<sup>52</sup> When the oil market collapsed, oil companies and their lobbyists began to pull away from the gasohol market and pulled back their support for the alcohol fuel program. After crude oil prices dropped below \$10 a barrel in mid-1986, Tenneco, Texaco, and other national distributors discontinued sales of ethanol blended gasoline across the country. "Consumers have told us they don't want gasohol for their automobiles," a Tenneco spokesman stated, "and since we were losing market share we made this decision." Roughly half of the 165 distilleries that produced ethanol went out of business, and twenty closed their doors in 1986 alone.<sup>53</sup> The return of cheap gasoline at the pump and the economic

recession left Americans and their political institutions less interested in energy conservation and less supportive of alternative fuels. The need for energy independence had faded, for the time being, along with high gas prices and the biomass alcohol fuels industry.

The development and demise of the alternative energy sources are definitive examples of the consequences of a complex political system that is, as one scholar explained, “uniquely ill-suited to handle energy policy.”<sup>54</sup> Deficiency in government planning and implementation become compounded during crisis situations and often result in crash programs, as the case for Agrifuels clearly illustrates. With government serving the role as regulator and subsidizer, and with business producing energy products for the nation, it is vital that these two entities coordinate their efforts and communicate effectively during planning. When government programs involve long-term business planning, long construction periods, and financing from the private sector, it is incumbent on policymakers to ensure that the policies remain anchored and are not subject to change at midstream. The alcohol fuels crash program of the late 1970s and '80s illustrates the risks involved in cultivating a new industry that relies on government-backed loan guarantees and subsidies to compete with traditional domestic sources. Some of the policy issues that arose from that era are still being addressed today in government circles and company boardrooms. For historians, this period represents a watershed in energy history and government policy, where many of the questions have still gone unanswered.

## Notes

1. August W. Giebelhaus, “Resistance to Long-Term Energy Transition: The Case of Power Alcohol in the 1930s,” in *Energy Transitions: Long-Term Perspectives*, ed. Lewis J. Perelman, August W. Giebelhaus, and Michael D. Yokell (Boulder: Westview Press, 1981), 36.

2. In addition to sufficient feedstock supplies, other “economic feasibility factors” included labor, process water supplies, transportation, and an adequate market; see V. Daniel Hunt, *The Gasohol Handbook* (New York: Industrial Press, 1981), 183.

3. For excellent treatments of energy policy in postwar America, see Richard H. K. Vietor, *Energy Policy in America since 1945: A Study of Business-Government Relations* (Cambridge: Cambridge University Press, 1984); and Martin V. Melosi, *Coping with Abundance: Energy and Environment in Industrial America* (New York: Knopf, 1985).

4. Daniel Horowitz, *Jimmy Carter and the Energy Crisis of the 1970s: The "Crisis of Confidence" Speech of July 15, 1979, A Brief History with Documents* (Boston: Bedforfs/St. Martin's, 2005), 36, 41–42.

5. See Daniel Yergin's chapter, "Conservation: The Key Energy Sources," in *Energy Future: Report of the Energy Project at the Harvard Business School*, ed. Robert Stobaugh and Daniel Yergin (New York: Random House, 1979), 136–82.

6. Horowitz, *Jimmy Carter*, 99, 116.

7. U.S. National Alcohol Fuels Commission, *Fuel Alcohol: An Energy Alternative for the 1980s* (Washington D.C.: Government Printing Office, 1981), 26.

8. The goal of the program was 920 million gallons of ethanol, or 60,000 barrels of ethanol a day, produced by the end of 1982. A more ambitious, if not unrealistic, goal of the Carter administration's energy policy was to produce enough alternative fuels to meet 10 percent (roughly 10 billion gallons) of the nation's gasoline consumption by 1990, thereby replacing 2.5 million barrels of oil a day; Hunt, *Gasohol Handbook*, 18; U.S. Congress, House, Subcommittee on Fossil and Synthetic Fuels of the Committee on Energy and Commerce, *Alcohol Fuels and Lead Phasedown* (Washington, D.C.: Government Printing Office, 1986), 73; "Ethanol Buildup Continues but Shortfall Is Predicted," *Chemical Week*, September 3, 1980, 17. The Energy Security Act also authorized the DOE and USDA to enter into purchase agreements and price guarantees with firms to encourage further interest in ethanol developments; see U.S. National Alcohol Fuels Commission, *Fuel Alcohol*, 15.

9. U.S. National Alcohol Fuels Commission, *Alcohol Fuels Tax Incentive, A Summary: Alcohol Fuels Provisions of the Crude Oil Windfall Profit Tax Act* (Washington, D.C.: Government Printing Office, 1980); see also Hunt, *Gasohol Handbook*, 42. The Energy Security Act also created the U.S. Synthfuels Corporation for production of methane from coal. Funds from the Windfall Profit Tax Act would be used to finance and operate the Synthfuels Corporation.

10. U.S. National Alcohol Fuels Commission, *Fuel Alcohol*, 50; see also U.S. National Alcohol Fuels Commission, *State Initiatives on Alcohol Fuels: A State-by-State Compendium of Laws, Regulations, and Other Activities Involving Alcohol Fuels* (Washington, D.C.: Government Printing Office, 1980).

11. *Environment* 20, no. 6 (1979), 21; U.S. Congress, House, Subcommittee on Fossil and Synthetic Fuels, *Alcohol Fuels and Lead Phasedown*, 72; Hunt, *Gasohol Handbook*, 18; U.S. National Alcohol Fuels Commission, *Fuel Alcohol*, 50.

12. U.S. National Alcohol Fuels Commission, *Fuel Alcohol*, 6–11. The Commission further recommended the implementation of purchase agreements and price guarantees, in addition to design and production of pure-alcohol vehicles by U.S. automakers backed by government incentives. By the late 1980s, however, the government decided not to follow through with these policies and recommendations.

13. "Sugarcane: Old Problems, New Opportunities," *Acadian Profile*, 6, no. 3 (1977), 62. The report also stated that sugar prices fell to 10 cents a pound in 1977, where 17 cents a pound was needed to make a profit.

14. "Gasohol: Blending Agriculture and Oil," *Acadian Profile* 7, no. 3 (1979), 50. Sugar cane acreage in south Louisiana had dropped 36 percent from 1978/79. The Agribusines

review is this section is based on the author's personal communication with Dailey J. Berard, July 24 and 26, 2007, Cankton, Louisiana, along with other cited sources.

15. "Gasohol: Blending Agriculture and Oil," 50.

16. *State of Louisiana: Acts of the Legislature, Vol. 1, Regular Session 1979* (Baton Rouge: State of Louisiana, 1979), 2284–86.

17. "Gasohol," *Acadian Profile* 7, no. 5 (1979), 73.

18. Oasis Petroleum, formed in 1977, had in 1980 an estimated 120 service stations in twenty-one states where it planned to market gasohol. Berard first met with representatives from Oasis Petroleum at an ethanol conference in New Orleans, and there they discussed plans for the joint business venture into Agrifuels.

19. Hunt, *Gasohol Handbook*, 113, 143–44.

20. U.S. National Alcohol Fuels Commission, *Fuel Alcohol*, 6. A second congressional committee hearing, one critical of Carter's alternative energy plan, agreed with the positive energy balance argument from biomass fuel "as long as crop residues are the major fuel for conversion of biomass to ethanol." U.S. Congress, Subcommittee on Energy of the Joint Economic Committee, *Farm and Forest Produced Alcohol: The Key to Liquid Fuel Independence* (Washington, D.C.: Government Printing Office, 1980), 13.

21. C. S. Hopkinson and J. W. Day, "Net Energy Analysis of Alcohol Production from Sugarcane," *Science* n.s. 207, no. 4428 (1980), 302–304; "Alternative Energy Resources Being Developed," *Acadian Profile* 8, no. 6 (1980), 39. As a by-product of ethanol manufacturing, the plant would also produce an estimated 148,000 tons of solubles for animal feed.

22. "\$40 Million Ethanol Refinery Begun Officially at Morbihan," *Daily Iberian*, Oct. 1, 1980, 33; "Sugar as Fuel," *Daily Iberian*, Oct. 1 1980, 14.

23. "Sorghum Experiment Could Change Face of Acadiana Agriculture," *Acadian Profile* 9, no. 4 (1981), 58. Bagasse from sweet sorghum could be used as an additional source for boiler fuel. The 90 percent loan guarantee was enacted by the Biomass Energy and Alcohol Fuels Act 1980 (Title 11).

24. The DOE used a "batch review" process to evaluate each loan proposal. This process included meeting very specific criteria during a limited time period. However, priority was given to projects that used biomass as the primary boiler fuel and "new technologies that use different biomass feedstocks" such as cane molasses and sweet sorghum; see Hunt, *Gasohol Handbook*, 27–28.

25. The report also noted that, prior to the passage of the Energy Security Act of 1980, six different departments and agencies administered nine different financial support programs for alcohol fuels. Most of these programs remained intact with little change in their bureaucratic functions after the passage of the new act; see U.S. National Alcohol Fuels Commission, *Fuel Alcohol*, 140–41.

26. One 1984 report noted that as much as \$1 billion in capital investment had been spent on the new industry since 1979. However, the program apparently reduced the trade deficit by \$210 million and created nearly twenty thousand jobs in that five-year period; see U.S. Congress, House, Subcommittee on the Oversight of the Committee on Ways and Means, *Tax Incentives for the Production and Use of Ethanol Fuels* (Washington D.C.: Government Printing Office, 1984), 1–5, 141.

27. "Federal Subsidies Foster Ethanol Industry Growth," *Washington Post*, Dec. 8, 1985, H6. The report noted that even with the depressed corn prices a gallon of ethanol cost 40–55 cents more than gasoline. As in the 1930s, oil companies launched an anti-ethanol campaign using brochures and billboards to discourage the public's support for gasohol.

28. Triad America was a holding corporation of Adnan Khashoggi, a wealthy Saudi arms dealer.

29. "If Leaded Gas Goes, So Will Some Small Refiners," *Business Week*, July 23, 1984, 77.

30. Louisiana Department of Natural Resources, *Summary: Fuel Alcohol in Louisiana* (Baton Rouge: Department of Natural Resources, 1987). The plan called to reduce the subsidy even further to 12 cents from 1988/89.

31. In 1985 the state exemption for ethanol in Louisiana amounted to \$28 million. In accordance with the Agricultural Ethanol Production Law (1985), payments to state ethanol producers were capped at \$52 million. However, if the five plants in operation and the five plants under construction during that time produced to their capacity, the total payments for subsidies would exceed \$217 million. It is not clear how the Louisiana government planned to subsidize the plants once they became fully operational; see Louisiana Department of Natural Resources, *Summary: Fuel Alcohol in Louisiana*.

32. "Ethanol Tax Exemptions under Fire," *Oil and Gas Journal*, Jan. 20, 1986, 35.

33. In early 1987 national news outlets began reporting that Khashoggi owed millions to creditors; "Creditors Putting Pressure on Saudi," *New York Times*, Jan. 17, 1987, 6; "Payouts on Loans to Khashoggi Firm Stopped by U.S.," *Wall Street Journal*, Apr. 13, 1987, 1; "Khashoggi's U.S. Company Files for Bankruptcy," *Washington Post*, Jan. 29, 1987, A30.

34. Newgard in "Edgington Abandoned Agrifuels in Late March," *Daily Iberian*, May 2, 1987, 1. "U.S. Pays Project's Creditors; Fuels Firm in Default Owned by Khashoggi," *Washington Post*, Sept. 4, 1987, F1.

35. "Workers Off at Agrifuels; Talks Begin," *Daily Iberian*, Apr. 15, 1987, 1–2.

36. "New Iberia Journal; Tanks Are Tombstones of Ruined Fuel Policy," *New York Times*, June 16, 1988, 16.

37. "Ethanol . . . Ahead of Times," *Daily Iberian*, Apr. 16, 2006, 2.

38. The National Alcohol Fuels Commission noted the following benefits of an ethanol industry: creates jobs, disposal of waste products (e.g., bagasse), and environmentally friendly (meaning less carbon emissions). The report confirmed that gasohol's performance matched that of gasoline in cars; see U.S. National Alcohol Fuels Commission, *Fuel Alcohol*, 2.

39. See U.S. Congress, *Alcohol Fuels and Lead Phasedown*.

40. "Federal Subsidies Foster Ethanol Industry Growth," *Washington Post*, Dec. 8, 1985, H6. The article reports that ethanol production increased the price of corn by 10 cents a bushel, which "pumped an extra \$849 million into the depressed farm economy." A congressional subcommittee further noted that farm-based ethanol offered opportunities to the agricultural sector, in which "3,700 family farms a month are disappearing from the map of rural America"; see U.S. Congress, *Farm and Forest Produced Alcohol*, 5.

41. Nicholas Wade, "Gasohol: A Choice That May Buy Grief," *Science* n.s. 207, no. 4438 (1980), 1450–51; C. S. Hopkinson, "Net Energy Analysis of Alcohol Production from Sugarcane," *Science* n.s. 207, no. 4428 (1980), 302–304. Automobile efficiency tests from

Illinois, Nebraska, and Iowa in the late 1970s indicated that gasohol performed as well as if not better than gasoline; see Hunt, *Gasohol Handbook*, 31.

42. "America's Home-Grown Fuel," *Nation*, Sept. 27, 1980, 275–76.

43. U.S. Congress, House, Subcommittee on Forests, Family Farms, and Energy and the Subcommittee on Wheat, Soybeans, and Feed Grains of the Committee on Agriculture and the Subcommittee on Energy and Power of the Committee on Energy and Commerce, *Review of the Role of Ethanol in the 1990's* (Washington D.C.: Government Printing Office, 1988), 19. The report noted that gasohol reduced carbon dioxide emission by 25 percent.

44. "Ethanol Industry Booms amid New Controversy," *Washington Post*, Dec. 8, 1985, H1. The federal and state tax incentives for gasohol cost the federal government an estimated \$420 million a year and a "drainoff" of \$280 million annually from the federal highway fund. The revenue loss, "with no end in sight, is simply counterproductive in meeting the highway needs of this nation," a representative from the auto industry lamented; see U.S. Congress, *Tax Incentives for the Production and Use of Ethanol Fuels*, 77.

45. U.S. Congress, House, Subcommittee on Energy of the Joint Economic Committee, *Farm and Forest Produced Alcohol*, 1.

46. Hunt, *Gasohol Handbook*, 24–25; U.S. National Alcohol Fuels Commission, *Fuel Alcohol*, 15.

47. U.S. Congress, House, *Review of the Role of Ethanol in the 1990's*, 1.

48. U.S. Congress, *Tax Incentives for the Production and Use of Ethanol Fuels*, 42–45, 59, 101. This incentive allowed businesses to claim a tax credit on their income taxes for purchasing equipment that was used in the production of ethanol from crops.

49. Michael Barzelay, *The Politicized Market Economy: Alcohol in Brazil's Energy Strategy* (Berkeley: University of California Press, 1986), 22, 172.

50. U.S. Congress, *Alcohol Fuels and Lead Phasedown*, 73, 76–77.

51. "Payouts on Loans to Khashoggi Firm Stopped by US," *Wall Street Journal*, Apr. 13, 1987, 1.

52. U.S. National Alcohol Fuels Commission, *Fuel Alcohol*, 29, 43; "The Market, not Congress, Should Determine Role for Ethanol in Fuel," *Oil and Gas Journal*, May 23, 1988, 13.

53. "Demand Dries Up for Gasohol," *Chemical Week*, Mar. 4, 1987, 16; "Alcohol Fuels Move off the Back Burner," *Business Week*, June 29, 1987, 100.

54. Personal communication with Joseph A. Pratt, Aug. 1, 2007.

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## Contributors

**Bruce Beaubouef** is the managing editor of *Offshore* magazine, a monthly trade periodical published by PennWell that covers the worldwide offshore oil and gas industry. Prior to that, he served as editor of *Pipeline and Gas Technology*, a Hart Energy trade periodical that covered the oil and gas pipeline transportation industry. He has more than thirteen years of experience writing about the oil and gas industry and earned his Ph.D. at the University of Houston in 1997. Beaubouef's dissertation was published in book form by Texas A&M University Press in September 2007 as *The Strategic Petroleum Reserve: U.S. Energy Security and Oil Politics, 1975–2005*.

**Brian Black** is professor of history and environmental studies at Penn State—Altoona, where he currently serves as head of Arts and Humanities. His research emphasis is on the landscape and environmental history of North America, particularly in relation to the application and use of energy and technology. He is the author of several books, including the award-winning *Petrolia: The Landscape of America's First Oil Boom* (Johns Hopkins, 2003) and *Crude Reality: Petroleum in World History* (Rowman and Littlefield, 2012).

**Jay E. Hakes** is the former administrator of the highly regarded Energy Information Administration at the U.S. Department of Energy. In recent years he has focused his research on American presidents and U.S. energy policy. He has also published the book *A Declaration of Energy Independence* (Wiley, 2008) as well as numerous articles on energy. He holds a Ph.D. from Duke University and began his career teaching political science at the University of New Orleans. In 2013 he stepped down after thirteen years as director of the Jimmy Carter Presidential Library in Atlanta, Georgia.

**Robert Lifset** (Ph.D., Columbia University) is the Donald Keith Jones Assistant Professor of Honors and History in the Joe C. and Carole Kerr McClendon Honors College at the University of Oklahoma. His research focuses on energy and environmental history. Lifset is the book review editor of *H-Energy*, an H-Net website devoted to the history of energy, and the author of *Storm King Mountain and the Emergence of Modern American Environmentalism, 1962–1980* (forthcoming from the University of Pittsburgh Press).

**Steve Marsh** is a fellow of the Royal Historical Society and a reader in international politics at Cardiff University, United Kingdom. His research interests lie primarily in American foreign policy, Anglo-American relations, and European Union external relations. His latest books are the coauthored *The European Union in the Security of Europe* (Routledge, 2011) and the coedited *Anglo-American Relations: Contemporary Perspectives* (Routledge, 2013).

**Yanek Mieczkowski** is professor of history at Dowling College. His books are *Eisenhower's Sputnik Moment: The Race for Space and World Prestige* (Cornell University Press, 2013), *Gerald Ford and the Challenges of the 1970s* (University Press of Kentucky, 2005), and *The Routledge Historical Atlas of Presidential Elections* (Routledge, 2001). He has worked as a writing fellow for *The American National Biography*, to which he has contributed thirty-seven biographies. He has also served as an exam leader for the Educational Testing Service's AP U.S. History Exam grading.

**David S. Painter** teaches international history at Georgetown University. His publications include *Oil and the American Century: The Political Economy of U.S.*

*Foreign Oil Policy, 1941–1954* (Johns Hopkins University Press, 1986), *The Cold War: An International History* (Routledge, 1999), and *Origins of the Cold War: An International History* (Routledge, 1994, coedited with Melvyn P. Leffler), and articles on U.S. policy toward the third world, U.S. oil policies, and the cold war. His current project is a study of oil and world power in the twentieth century.

**Tyler Priest** (Ph.D., University of Wisconsin–Madison) is associate professor of history and geography at the University of Iowa. In 2010 he served as a senior policy analyst on the President’s National Commission on the BP Deepwater Horizon Oil Spill and Offshore Drilling. He is the author of *Global Gambits: Big Steel and the U.S. Quest for Manganese Ore* (Greenwood Press, 2003) and *The Offshore Imperative: Shell Oil’s Search for Petroleum in Postwar America* (Texas A&M Press, 2007) and coeditor of a special issue of the *Journal of American History* (June 2012) on “Oil in America.”

**Jason P. Theriot** is an independent consultant and has a Ph.D. in history from the University of Houston. In 2011–12 he held a post-doctoral appointment at the Harvard Kennedy School of Government as an energy policy research fellow. His research interests and consulting practice focus primarily on energy development and environmental impacts in the Gulf Coast. He is the author of the forthcoming book *America’s Energy Coast: Pipelines, Wetlands, and Louisiana’s Coast Crisis* (LSU Press, 2014).

**J. Samuel Walker** is a former historian of the U.S. Nuclear Regulatory Commission. He is the author of *Three Mile Island: A Nuclear Crisis in Historical Perspective* (University of California Press, 2004), *The Road to Yucca Mountain: The Development of Radioactive Waste Policy in the United States* (University of California Press, 2009), and other books on nuclear power regulation.

**Jeffery Womack** is a Ph.D. candidate in the Department of History at the University of Houston, where he studies the historical impact of energy technologies on culture, politics, and medicine. His current work focuses on the adoption of ionizing radiation as a therapeutic medical technology.