CHAPTER

1

THE POLITICS OF POLICY

> "You never want a serious crisis to go to waste," [Rahm] Emanuel, the incoming White House chief of staff, said at a *Wall Street Journal* conference last month. "And what I mean by that is an opportunity to do things that you think you could not do before. . . . What used to be long-term problems, be they in the health care area, energy area, education area—things . . . that were long-term are now immediate and must be dealt with."
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> *NPR News,* December 23, 2008[1]

Shortly before 10:00 p.m. on April 20, 2010, the massive drilling platform straddling the deepest drilling well in the world, a symbol of America's quest for energy security, exploded in the Gulf of Mexico fifty miles offshore. The fireball hurling thousands of feet into the tropical night unleashed the worst environmental disaster in US history and the second worst oil spill in world history. What followed the explosion of the Deepwater Horizon drilling platform was a human and ecological tragedy rapidly transformed into a signature event in the narrative of American energy regulation.

The Deepwater tragedy unfolded on the threshold of a decade now predicted to transform profoundly the way Americans use energy. Before 2017, it is expected that the United States will

- overtake Saudi Arabia and Russia to become the world's leading oil producer after decades of increasing dependence upon imported oil,

- become a net exporter of natural gas while natural gas increasingly displaces coal as the major fuel for producing electricity,
- experience a gradual decline in coal production as the electric power industry turns increasingly to natural gas for fuel,
- rely on renewable energy as a significant source of electric power,
- witness the failed revival of the commercial nuclear power industry, and
- enact new regulation to reduce significantly US global climate warming emissions.

The Deepwater explosion itself left a triple legacy. First, the decision to permit the platform and the incompetent regulation that facilitated the disaster were issues of energy governance, and the tragedy intensified an already embittered policy conflict over the future of American offshore energy exploration. Moreover, Deepwater added another disputed matter in the greater national controversy concerning how to govern all the nation's richly abundant energy resources—a deeply contentious and enduring debate pervading the whole history of American energy development. These matters are the substance of future chapters.

This chapter concerns the remaining legacy. Deepwater also created a political arena. The national media swiftly converged on the unfolding disaster to produce, before a huge national audience, a stage throwing into sharp relief many of the actors, institutions, and events inherent to the nation's energy policymaking and destined to appear among others throughout the chapters to follow. Deepwater provides a short but practical introduction to this chapter, which concerns the actors, institutions, and setting of American energy policymaking.

THE "WELL FROM HELL"

The drilling platform, managed by Transcon Corporation for British Petroleum (BP), the world's largest energy corporation, had operated inconspicuously for seven years before the explosion. What followed was a horrific spectacle. The aftermath became a gripping human tragedy staged before a huge national audience produced when national cable and network television devoted more than half their daily airtime to the disaster for more than a month.

"I Had No Idea It Could Do What It Did"

The disaster began when dangerously high methane gas pressure, building up in the underwater borehole, breached the elaborate safety equipment designed to prevent a gas blowout. First, an enormous volume of mud and oil rushed up the pipeline, erupted through the drilling platform, and cascaded down on the rig. A suffocating mist of methane gas rapidly followed, spread across the rig, and ignited. "Crew members were cut down by shrapnel, hurled across rooms and buried under smoking wreckage," reported the *New York Times*. "Some were swallowed by fireballs that raced through the oil rig's shattered interior. Dazed and battered survivors, half-naked and dripping in highly combustible gas, crawled inch by inch in pitch darkness, willing themselves to the lifeboat deck."[2] The crew had been meticulously prepared for the most plausible disasters. This one was wholly unimagined. "I had no idea it could do what it did," later remarked one veteran crew member.

In the furious fire consuming the drilling platform, eleven crew members died. The disaster left 126 survivors, including many badly injured crew members and four executives from BP and Transcon who were visiting the rig to celebrate its seven-year safety record. In little more than a day, the Deepwater platform incinerated, rolled over, and sank, beginning a frantic, eighty-nine-day struggle to cap the well and suppress the steady stream of crude oil leaking into the Gulf.

A Massive Impact

It is an axiom of modern energy politics that energy and environmental issues have become inseparably bonded. The media abundantly demonstrated this reality and the public quickly got the message that an unprecedented environmental disaster was unfolding. The Gulf event quickly engaged hundreds of environmental organizations from international to local in efforts to mitigate the emergency and intensified a continuing environmentalist campaign to reform radically American regulation of offshore energy exploration.

Before the wellhole was finally capped, an estimated 205 million gallons of crude oil and two million gallons of toxic dispersant intended

to counteract the petroleum had spilled into the Gulf. The final magnitude of the environmental impact is still unresolved. The oil fouled 1,100 miles of beaches and marshes along the coasts of Louisiana, Mississippi, Alabama, and Mississippi together with 2,400 miles of levees. Despite a massive cleanup attempt involving at its peak more than 47,000 personnel, large patches of buried oil remain along Gulf beaches. The short-term damage to aquatic flora and fauna, especially to the ecology of coastal wetlands rimming the Gulf was severe; the long-term damage to the deep sea ecosystems, especially marine species, and the human health impact from exposure to the toxic dispersant Corexit are still under investigation. Estimates of the economic consequences of the oil spill also defy accurate calculation but will certainly exceed $8 billion, including a multiyear loss of employment and productivity to offshore fisheries, an especially severe problem for Louisiana, Texas, Alabama, and Mississippi because more than 87,000 square miles of commercial fishing grounds—about a third of the Gulf area—was closed for months, throwing thousands of workers out of employment.[3]

No corporation paid, and continues to pay, a greater price for the Deepwater incident than British Petroleum (BP). Corporate interests are inevitably stakeholders in every form of domestic energy production, but few petroleum producers had made a greater international effort than BP to cultivate a reassuring image of corporate environmental stewardship. The platform explosion made hash of BP's environmental image and depreciated its political clout. BP's subsequent frantic, frustrating efforts to cap the oil leak provoked international censure and anger from a growing legion of critics who held BP responsible for the catastrophe. The damaged corporate reputation was further diminished by the inept performance of the corporation's CEO, Tony Hayward, in a global interview following the event.

BP's economic damage continues to soar, the final cost unpredictable. By 2014, BP's own estimated expenses had exceeded $40 billion, including an initial $20 billion trust fund it has provided to satisfy the first public and private claims for damage, state and local response costs, and natural resource related expenses. Ongoing litigation, enough to employ a convention of lawyers, and large federal penalties for violation of the

Clean Water Act, have driven some estimates of BP's total expense close to $100 billion.

Federalism With Raw Edges

The Deepwater catastrophe from its inception was also a crisis of governance. Federal, state, and local governments are deeply implicated legally, economically, and politically in the production of every major source of American energy, and especially in the regulation of fossil fuel from exploration to consumption. Governmental collaboration in domestic energy management, while never ensured, has usually been cooperative. Here was an unprecedented regulatory disaster requiring an immediate federalized response—incisive, coordinated, and technologically sophisticated. Unfortunately, the Gulf explosion demonstrated that intergovernmental energy collaboration isn't ensured.

Since the Deepwater disaster was a federalized emergency, it quickly mobilized multiple governmental stakeholders. The peak of the response involved more than 45,000 individuals drawn from federal, state, local, and regional governmental agencies. What followed were weeks of difficult and often highly contentious efforts by the federal government to coordinate the rapidly multiplying array of other governmental stakeholders determined to protect their own interests.

The National Contingency Plan (NCP) existed to coordinate federal, state, and local governmental responses to such disasters. The governmental responses to the explosion, however, quickly degenerated into a persistent conflict between federal, state, local, and private interests about their respective roles and responsibilities as each attempted to intervene in some manner to stifle the oil leakage and to minimize their own anticipated risks from the impending environmental and economic damage.

The disaster plan called for the federal government, led by the US Coast Guard, to assume primary responsibility for controlling the spill and coordinating other governmental agency support. Other federal agencies quickly responding included the Department of the Interior, the Department of Homeland Security, the National Oceanographic and Atmospheric Administration, and the Department of Energy.

All the state and local governments within the Gulf, especially those closest to the spill from Louisiana, Texas, Mississippi, and Alabama, were aggressively involved and immediately dissatisfied with the federal response and soon created a "considerable confusion, delay and controversy that still prevails."[4] The contention early reached a level that persuaded the Coast Guard's Admiral Thad Allen, the very experienced and capable response Director, to warn his staff about the onrushing problems. "This isn't a sprint, or even a marathon," he cautioned, "this is a siege."[5] A final report on the Deepwater event noted the confusion:

> *During this spill . . . the Governors and other state political officials participated in the response in unprecedented ways, taking decisions out of the hands of career oil-spill responders. . . . Because the majority of the oil would come ashore in Louisiana, these issues of control mattered most there. Louisiana declined to empower the officials that it sent to work with federal responders within Unified Command, instead requiring most decisions to go through the Governor's office.*[6]

During the more than two months required to cap the stubborn oil leak, the local governments surrounding the Gulf also created their own, improvised responses to the spill without regard to whatever might have been prescribed by the National Contingency Plan. Louisiana's county governments (called "parishes"), for instance, attempted to assume as much independence in controlling the leaked petroleum as the state had asserted. Many parishes purchased their own equipment and created their own disaster management organization. Numerous private organizations, as well, rushed to share in disaster management often without regard for the managers and strategy of the National Contingency Plan.

"A Different Disaster": The Media Sends a Message

The omnipresent national media powerfully influenced the public's interpretation of the disaster and shaped profoundly much of the political repercussions. Once the national media had swiftly converged on the accident, they captured an enormous national audience for weeks

while fashioning a narrative persuasively interpreting Deepwater's significance and shaping a public verdict concerning the responsibility for the disaster.

The Pew Research Center called Deepwater "a different kind of disaster" and observed that the spill "was a slow-motion disaster that exceeded the usual media attention span, commanding substantial media coverage week after week. From April 20 through July 28, the Gulf spill overwhelmed every other story in the mainstream media."[7] And the public was remarkably attentive. During three months following the explosion, an average of more than 54 percent on a major national poll reported that they were watching news of the catastrophe "very closely."[8] Media coverage, deliberately or not, also left most Americans convinced that BP was largely responsible for the tragedy—entirely responsible, according to many polls at the time.[9]

The Challenge of Policy Reform

For more than four decades preceding the Gulf event, a broad coalition of conservationists, environmentalists, and numerous allies had been waging a strenuous campaign to compel federal agencies to become more aggressive and rigorous in their regulation of domestic offshore energy exploration. Seven major Gulf oil spills had already occurred in the decade preceding the Deepwater incident.[10] For the critics, the Gulf had become a flagrant example of environmental risk and laggard regulatory oversight. But progress was slow and unsatisfactory, even though the Barack Obama administration had promised to deliver better regulatory management of offshore energy development.

Energy reformers were confronting a stubborn reality inherent in the design of the national governmental system: the powerful and pervasive tendency for national policy to change slowly and fitfully—an "incremental" policy style created by the American Constitution. But sudden bursts of rapid innovation and expansive policy reform do occur, albeit infrequently. This pattern of persistent incrementalism occasionally interrupted by bursts of accelerated change produces what has been called in policy studies a "punctuated equilibrium."[11] Just such a surge of policy transformation is what reformers might have expected from the Deepwater affair.

Critics had hoped the Gulf catastrophe would pack a political punch potent enough to drive Obama's relatively moderate offshore regulatory reforms in a much more aggressive and ambitious direction. The opportunity seemed obvious. The disaster, it was concluded in a later presidential investigation, had "undermined public faith in the energy industry, governmental regulators, and even our own capability as a nation to respond to crises" and thus seemed a compelling demonstration that something was dangerously deficient in current energy regulation.[12] Even while emergency workers were still fighting to control the underwater spill, the repercussions began to alter the Obama administration's regulatory reform agenda and unsettle the federal government's energy regulatory agencies. But, well into Obama's second presidency, the actual policy impact is disputed, and the sweeping reform of offshore energy regulation apparently so plausible in the wake of the crisis remains elusive.

"Only the First Step"

Some significant policy change was evident in the immediate wake of the Deepwater accident. A month before the accident, Obama had modified his original opposition to new oil exploration in the Gulf and had approved new drilling. The accident immediately compelled a White House reversal and a new drilling moratorium. Blaming the disaster on BP and on the federal Minerals Management Service (MMS) responsible for regulating offshore petroleum exploration, the administration initiated a sweeping investigation of BP's incompetent disaster management and the MMS's deficient regulatory oversight. And there was plenty of mismanagement and negligence to find.

The immediate results from this initial burst of investigations were new, numerous, federal indictments of BP for corporate violation of federal regulatory laws, the abolition of the discredited MMS and its replacement by a new federal regulatory agency with increased regulatory authority, and a wave of congressional hearings to accompany presidential investigations of the disaster and its aftermath. The Department of the Interior (DOI) initiated measures to improve coordination between federal and state governments in Gulf disaster management.

But these policy innovations, and others soon initiated, evolved slowly and contentiously while the public impact of the disaster—a critical

consideration in producing an accelerated and comprehensive redesign of drilling policy—seemed to dissipate within weeks. Four months after the disaster, for instance, while the Gulf oil slick was still invading Gulf beaches, national polls reported that more than 50 percent of the public still approved of offshore oil exploration, and the disaster itself ceased to command major media attention.[13] Moreover, Louisiana and other Gulf states with economies enriched by royalties and employment flowing from Gulf energy exploration wanted no long-term interruption in these benefits—Deepwater explosion notwithstanding—and successfully applied pressure on the Obama administration, which reluctantly relaxed the new moratorium after only a few months.

Within months of the disaster, the federal courts—a certain venue in any important conflict about national energy regulation—were drawn into the conflict and will remain for years to come. The federal government sued BP to recover damages for criminal negligence and for violation of the federal Clean Water Act. Others with claims of injury against BP, including state and local governments, environmental groups, private parties, and other corporations, have initiated litigation.

More than three years after the disaster, both the presidential committee originally investigating the Deepwater explosion and a subsequent inquiry by the National Research Council concluded that the Obama administrative reforms were impeded by serious delays and but "a first step" toward a needed comprehensive reform and much more was required.[14] The Gulf disaster had receded so far from public consciousness as to virtually disappear, along with the momentary flicker of public interest in energy itself as a major public issue. Meanwhile, despite almost continuous congressional hearings since the event, by 2014 only two significant bills had been passed in response to the Obama administration's call for a much more comprehensive redesign of federal energy regulation. In short, after a brief burst of modest innovation and reform, policy was moving along incrementally.

MAKING ENERGY POLICY: A PRIMER

The slow and meandering pathway of policymaking unfolding in the aftermath of Deepwater Horizon is not unique to the Gulf tragedy nor to energy policy. The Gulf tragedy became a political stage throwing

into sharp relief many elements common to the design of all domestic American policymaking, energy matters included. The influence of these policymaking fundamentals—along with some distinctive to energy policy—will be evident throughout later chapters as well, and merit a brief introduction.

The Constitution

The Constitution creates a master design for all US public policymaking. It is a document originally written by men deeply suspicious of a government armed with concentrated power and intended for a nation of farmers, shopkeepers, tradesmen, and merchants. What resulted was a government of countervailing forces with the power vested in each major institution limited by others and, in turn, limiting them.

This was not a government intended to "govern" energy production, or much else. The government that controls pollution and petroleum imports, licenses microwave ovens, regulates energy prices, fights oil spills, and oversees a thousand other programs now considered essential to energy management would have been unthinkable to the Framers. The Constitution has survived the enormous changes in American society and politics while preserving the political institutions it originally ordained. At the same time, the embedded cost is a continuing struggle to adapt constitutional institutions to the rapid and apparently accelerating pace of social, economic, and technological change nationally and globally.

Two of the Constitution's fundamental principles for dividing and limiting power—the elaborate checks and balances within the federal government and the division of power between the federal government and the states—fragment policymaking authority, exacerbate conflict between governmental institutions, and slow the pace of innovation. This dispersion of power often encourages deliberation and sensibility to a wide range of interests in policy issues, but at the constant risk of delay, conservatism, and unpredictability in making and implementing policy.

Checks and balances. The Constitution, as Richard E. Neustadt reminds us, creates a government of separated institutions sharing power.[15] This deliberate overlapping of authority, together with the

Constitution's vagueness in describing the nature of these powers and their proper division between governmental institutions, requires the institutions to collaborate if they are to govern and simultaneously incites rivalry between them. The checking and balancing of one institution by others, "ambition made to counteract ambition" in James Madison's words, overlays all policymaking within the federal government.

Institutional collaboration and conflict are most readily apparent at the national level in the relationship between the presidency and Congress. The Constitution invests each institution with unique powers, but it also compels them to share authority in legislating, taxing, and spending; oversight of the executive branch; and many other policymaking activities. Thus, the president may be responsible for ensuring that the Minerals Management Service enforces safety regulations on Gulf of Mexico oil drilling, but Congress writes the law the MMS implements. Without such collaboration, policymaking would be virtually impossible. The president and Congress, however, are divided by responsibility to different electorates, by institutional rivalries, by competing party loyalties, and by a constitutional obligation to check each other. Congress itself is a house divided into partisan factions, one congressional faction always committed to the electoral defeat of the White House incumbent.

Federalism. The Constitution also divides the government "vertically," granting some exclusively to Washington, some exclusively to the states, and some to be shared. This mixture of shared and separated authority encourages political rivalry as well as collaboration among the states and between the states and the federal government. Federalism gives a political form to state and regional interests, arms them with authority, and makes them influential participants in national policymaking. In the United States, policy is often the result of negotiation between a plurality of governmental entities—federal, regional, state, and local—whose distinctive interests are protected by federalism. One has only to observe the collaboration and collision between Washington and the Gulf States over management of the Deepwater explosion to confirm that federalism is alive and well today.

Incrementalism, "Punctuated Equilibrium," and Lurches

The governmental institutions created by the Constitution strongly encourage the incremental pace of policymaking, familiar to American government, in which "what is feasible is that which changes social states only by relatively small steps." Hence, decision makers, concerned with energy or otherwise, typically consider, among all the alternative policies that might be imagined to consider, only those relatively few alternatives that represent small or incremental changes from existing policies.[16]

But institutions and policymakers are sometimes shaken out of this deliberate pace by a potent fusion of sudden events and mobilized political interests that force rapid policy acceleration and innovation, producing what leading policy scholars Frank Baumgartner and Bryan Jones have characterized as a pattern of "punctuated equilibrium." In broad perspective, they note, "American political institutions were conservatively designed to resist many efforts at change and thus to make mobilizations necessary if established interests are to be overcome. The result over time has been institutionally reinforced stability interrupted by bursts of change. These bursts have kept the US government from becoming a gridlocked Leviathan despite its growth in size and complexity since World War II."[17] Thus, American policymaking is characterized by "long periods of relative stability or incrementalism interrupted by short bursts of dramatic change."[18]

These bursts of change, often called "shocks" and "lurches," have power but not always endurance. Perhaps the most powerful shocks to American energy policymaking since World War II were the "energy crises" of the 1970s, created by the sudden blockade of oil exports to America by Middle Eastern states. The resulting domestic petroleum shortfall badly disrupted the American economy, inspired consumer alarm, and rapidly elevated gasoline prices, compelling the federal government to hurriedly initiate new energy price controls, production regulations, and even some energy rationing. But few of these rapid policy lurches survived beyond the mid-1980s.

Governing Energy: Federal Institutions

The federal government dominates the institutional governance of energy. In addition to the White House, Congress, and the federal courts,

at least eighteen other federal agencies are directly involved in more than 160 energy-related programs. These activities span the entire range of energy-related activities and often involve institutions that might seem unrelated to energy issues (such as the US Patent and Trademark Office, and the US Fish and Wildlife Service). The federal government in 2012 collected about $12 billion from energy-related programs including, especially, fees and royalties from development of federal energy resources and more than $35 billion in excise taxes on gasoline and other fuels.[19]

The White House. Since 1976, every president has included special advisors on energy and related policies within the White House staff. Beginning with George W. Bush in 2000, a rising sense of urgency about energy affairs has prompted the White House to initiate more aggressive efforts to coordinate energy policy within the executive branch with new White House staff arrangements. President Obama attempted the most ambitious of these innovations by initially creating, then abolishing, within the White House staff the White House Office of Energy and Climate Change Policy directed by an "Energy Czar," former EPA administrator Carol Browner, who reported directly to the President.[a]

Regardless of who is president and what priority may be given to energy policy, the president quickly discovers that, despite his lofty title as "chief executive," leading the large, persistently contentious, and extremely competitive federal energy departments and agencies, each preoccupied with its own mission and constituency, is a formidable and often frustrating task. The last comprehensive national energy plan, proposed by President George W. Bush in 2003, would have required coordination among twenty-nine different program activities, implemented by eleven different agencies—six agencies, for instance, were involved in programs relating to the impact of energy development and use of the environment.[20] Such coordination is always difficult and contentious.

[a] Browner's job was to promote "integration among different agencies; cooperation between federal, state, and local governments; and partnership with the private sector" in energy-related issues. In January 2011, however, Browner resigned as energy czarina, and the position was eliminated, suggesting that Obama, like his predecessors, had found energy planning too contentious politically to sustain a White House priority.

Congress. In formulating national energy policy, the president may propose and, within bounds usually dictated by Congress, may mandate energy programs, but ultimately, it is Congress that legislates energy policy, raises the revenue to underwrite, and oversees its implementation in the executive branch. The president's freedom to act independently of Congress on energy matters is always limited severely by law, custom, and political circumstance. Even when judges and administrators eventually formulate, interpret, and implement presidential directives, their policymaking is always constrained by congressional guidelines and oversight.

A multitude of committees. The most important centers of power within Congress are its numerous committees and subcommittees, the "little legislatures" inside the big one. The number of congressional committees and subcommittees with *energy* in their title or their jurisdiction is legion. In the 112th Congress (2011–2013), eleven House committees and four Senate committees exercised some authority over energy matters explicitly in their titles. However, numerous other committees, easily exceeding a dozen in each chamber, were also deeply implicated in energy policymaking by virtue of their comprehensive authority in related matters, such as the budget, foreign affairs, conservation, and environmental management.

The vigorous conflict over energy policy produced by each chamber's own squabbling, competitive committees is intensified by rivalries between House and Senate energy-related committees. Energy committees, within and between the chambers, often respond to different energy interests. This dispersion of authority among so many legislative entities can sometimes improve the quality of energy policy. But the bargaining and negotiating imposed by diverse congressional interests with leverage in the energy policy process often yields vague, complicated, and inconsistent legislation. Often, no legislative reconciliation of divergent interests is possible, producing the sort of deadlock that frustrated Obama's efforts in his first term to secure congressional approval of his climate warming proposals.

Five hundred and thirty-five ambassadors. The fragmentation of power in Congress is further advanced by the 535 geographical constituencies represented in both congressional chambers, a vast array of diverse

parochial local interests with a powerful influence in the legislative process. Constituents regard their senators and representatives as ambassadors to Washington from their home districts, sent there to energetically promote and protect "the folks back home." It is hard for any member to resist pressures to act as local agents for their electorate.

With the advent of e-mail, cell phones, and mobile Internet access, legislators are now only a few keystrokes away from constituency voices. It's small wonder that many legislators consider their constituencies as an extension of their own personalities. Many congressional veterans can understand the late Alaskan Senator Ted Steven's angry warning to colleagues who voted against opening the Arctic National Wildlife Refuge to new energy exploration: "People who vote against this today are voting against me, and I will not forget it."[21]

Thus, when the Senate Committee on Energy and Natural Resources' Democratic majority proposed in 2009 a measure to expand the scope of offshore oil and gas exploration in the Gulf of Mexico, state loyalty trumped party for five of the committee's thirteen Democrats. Senator Mary Landrieu from Louisiana, for example, ordinarily a strong supporter of expansive drilling in the Gulf, opposed the measure because none of the potential federal royalties would come to Louisiana, while Senator Robert Menendez (D-N.J.) opposed the measure because it might encourage drilling off the New Jersey coast.[22]

The executive branch. The executive branch of the federal government is a constitutional fiction, even when organization charts confine the welter of administrative agencies called "the bureaucracy" within the boundary of the president's executive authority. Within the executive branch are thirteen cabinet departments, fifty-two independent agencies, five regulatory commissions, and numerous lesser entities. More than 2.7 million federal employees divide their loyalties among these institutions.

Congress and the courts often limit presidential authority. Political obstacles constantly confound White House designs for administrative management. The president must contend with agency self-interest, Congressional involvement in agency affairs, and the claims of an agency's own clientele. The president may be a poor administrator or bored with the job.

The impact of this bureaucratic pluralism is pervasive in energy policy. Congress and the White House personnel rarely formulate major policy without consulting with the affected energy agencies. Moreover, agencies have strong and conflicting preferences about energy management that often grow from their differing constituencies. For example, the Federal Energy Regulatory Commission (FERC), responsible under the 1935 Federal Power Act for promoting abundant, reliable energy supply, is more congenial to expansive energy production than the US Environmental Protection Agency (EPA) with its legislative mandate to control the environmental degradation from fossil fuel energy production.

Bureaucracy's influence in energy policymaking is rooted in the delegated authority and discretionary judgment inherent in the programs implemented by federal agencies. Congress must often grant to agencies very broad, general authority to implement programs, leaving administrators to decide when to apply the law in specific cases and how to interpret vague or inconsistent provisions. When the secretary of the interior decides that a segment of a national forest should qualify as wilderness to be forever free of mineral exploration and mining or when EPA's administrator determines that a coal-fired utility must install new pollution controls to meet air quality standards, policy is being made. Delegated and discretionary authority in energy policymaking also ensures that all major interests with a stake in federal energy programs will gravitate toward the agencies implementing those programs in an effort to sway the exercise of this authority.

Among the 16 federal departments and independent agencies most often concerned with some aspect of energy policy, four cabinet-level departments and four nondepartmental agencies assume particular importance because of their size, the scope of their energy-related authority, and the variety of programs that they implement.

The Department of Energy (DOE). Created in 1977 as a cabinet department, DOE's responsibilities now sprawl across the entire range of energy-related federal government activities.[23] In 2013, the DOE had a budget of $27.2 billion and about 16,000 employees. Currently, the DOE implements policies involving nuclear power, fossil fuels, and alternative

energy resources, and it assumes responsibility for advancing the national, economic, and energy security of the United States, for supervising the national laboratories initially created for the development of nuclear weapons, and implementing the White House's National Energy Policy Development Group. DOE also inherited a double dose of hugely expensive and contentious nuclear regulatory responsibility: the agency administers the enormously costly, technically difficult, and politically volatile environmental cleanup of the nation's former nuclear weapons facilities and also assumes responsibility for the safe disposal of nuclear waste from the nation's commercial and military weapons facilities.[24]

From its inception, the DOE has had too much to do, too few friends, and too little authority. Much of the authority for domestic energy planning remains with the Nuclear Regulatory Commission, the EPA, the Department of Agriculture, and other agencies beyond DOE's statutory reach or political influence.

Notwithstanding these handicaps, the DOE has still improved energy management in significant ways. For the first time, all energy research and development (R&D) planning and implementation is organized through a single agency. The creation of the Energy Information Administration (EIA) within DOE has provided the federal government an increasingly large and richly diversified source of energy data independent of energy producers, the largest independent source of credible energy data within the United States, and the most commonly cited of all domestic energy information sources.

The Department of the Interior. The US Department of the Interior, is the nation's largest public land manager, the steward and trustee of America's vast public domain and all its energy resources. The secretary of the DOI heads a department that in 2012 employed 70,000 people, including expert scientists and resource-management professionals, in eight different bureaus and offices.[25]

Several of these bureaus and offices are especially important to federal energy management. The Bureau of Land Management (BLM) is responsible for leasing and oversight of energy exploration and production on more than 256 million acres of public domain, most of this land west of the Mississippi River, and 1.7 billion acres of the Outer Continental Shelf. These public lands are a primary source of current

domestic energy production, a bountiful source of federal revenue, and a huge reserve for potential future energy development. The bureau has historically been the epicenter of controversy and competition between conservationists and energy developers over access to the energy reserves on these vast federal lands.

The public lands currently produce more than 30 percent of the nation's energy production, including 39 percent of natural gas, 35 percent of oil, 42 percent of coal, 17 percent of hydropower, and half the nation's geothermal energy.[26] In 2013, the Department of the Interior collected more than $11 billion from energy production on public lands and offshore areas.[27] Additionally, the federal lands provide rights of way for energy transmission lines, rail systems, pipelines, and other energy development infrastructure. Federal lands are also estimated to contain approximately 68 percent of all undiscovered US oil reserves and 74 percent of undiscovered natural gas.[28]

Rising concern over domestic energy supply now casts the public lands as an "energy frontier" where potentially vast new sources of renewable energy await development. The DOE estimates, for example, that federal lands can potentially generate 350,000 megawatts of electric power (a megawatt will produce enough energy to power as many as 900 average homes), provide 23 million acres for solar energy production, and produce significant new geothermal electric energy.[29] Currently, for example, almost three thousand wind turbines on California's public lands are producing electric power for 300,000 people.

The Office of Surface Mining Reclamation and Enforcement is responsible for implementing the Surface Mining Control and Reclamation Act (1977), the federal regulatory program to control the adverse environmental impacts of surface coal mining and to restore abandoned surface mine sites to ecological vitality. An estimated 5,200 abandoned mine sites, many extremely hazardous environmentally currently require remediation.[30] The Bureau of Ocean Energy Management, Regulation, and Enforcement (BOEMRE) regulates the development of energy resources, administers leasing of energy exploration, and enforces environmental protection laws related to energy production on the Outer Continental Shelf. The Deepwater Horizon accident underscored the growing importance of the BOEMRE and the Outer Continental Shelf,

which is estimated to contain about 60 percent of oil and 40 percent of natural gas reserves still undeveloped in the United States.

Federal Energy Regulatory Commission. The Federal Energy Regulatory Commission (FERC) exercises its important energy development and regulatory authority, like BOEMRE, largely beyond the scope of public attention and interest. Nevertheless, the FERC, an independent regulatory agency composed of five commissioners appointed by the president, exercises critically important energy management authority, including jurisdiction over interstate electricity sales, wholesale electric rates, hydroelectric licensing, natural gas pricing, and oil pipeline rates. It also reviews and authorizes liquefied natural gas (LNG) terminals, pipelines, and nonfederal hydropower projects. The Energy Policy Act (2005) significantly enlarged FERC's authority by investing it with responsibility for tracking federal government progress on the act's mandated energy developments including liquefied natural gas projects, electric supply, the Alaska natural gas pipeline, requirements for new energy market transparency, pipeline land planning, and much else.

Nuclear Regulatory Commission. The Nuclear Regulatory Commission (NRC) is responsible for ensuring the safe use and environmental security of radioactive materials for nonmilitary purposes. The NRC, composed of five commissioners, appointed by the president and confirmed by the Senate for five-year terms, is primarily responsible for regulating all nonmilitary reactors, nuclear materials, and the transportation, storage, and disposal of all nuclear waste.

These responsibilities produce a high political profile and predictably thrust the commission into public controversy over the management of the nation's commercial nuclear power sector, as chapter 5 illustrates. Critics of the nuclear power industry almost ritually indict the NRC for regulatory failures, and proponents of commercial nuclear power just as often complain that the NRC is insufficiently energetic in protecting and promoting the industry.

Environmental Protection Agency. The EPA, created by an executive order of President Nixon in 1970, is the largest federal regulatory agency in terms of budget and personnel. Its responsibilities embrace an extraordinarily large and technically complex array of programs ranging across the whole domain of energy-related environmental management. These programs

include regulation of energy-related air and water pollutants, hazardous and toxic wastes, and chemical substances, including radioactive waste. The agency presently has about 18,000 employees and an annual budget exceeding $7 billion.

The agency, whose administrator is appointed by the president, consists of a Washington, DC, headquarters and ten regional offices, each headed by a regional administrator. Political controversy is the daily bread of the EPA's leadership. Almost all its significant energy-related regulatory decisions, such as rules for the disposal of coal ash from coal-fired electric power plants or limits of toxic air emissions from industrial boilers, are predestined to conflict, often enduring for years or decades, among regulators, the regulated, and their respective allies. Thus, EPA's mission is bound to create problems for the White House. "The White House—any White House—doesn't want to hear an awful lot from the E.P.A," observed former EPA Administrator William Reilly. "It's not an agency that ever makes friends for a president. In the cabinet room, many of the secretaries got along with each other, but they all had an argument with me. It's the nature of the job."[31] Nonetheless, the EPA is a major, inevitable participant in almost all the significant energy-related White House policymaking.

Governing Energy: The States

The States are important policymakers and stakeholders in US energy affairs. As policymakers, states share with Washington regulatory agencies the authority over energy production and distribution. Energy producing states, such as Oklahoma, Louisiana, and Texas, set the allowable rate for oil and gas production from existing wells, but the federal government, until recently, mandated the wellhead price of natural gas moving through interstate pipelines. The Energy Policy Act of 2005 requires that federal and state regulatory agencies share authority for the siting of interstate power transmission lines.[32] State regulatory authorities customarily set rates and other standards for investor-owned utilities—how much electricity, for instance, must be produced from renewable energy sources. Both federal and state governments regulate the siting of commercial nuclear power plants, tax energy production, such as coal production, and set health and safety standards for energy facilities. By 2014, federal-state collaboration in promoting energy

conservation had emerged as an important aspect of national energy policy.[33] Most federal energy regulations are also enforced through the states.[b]

States are also stakeholders in the energy economy. The states well-endowed with fossil fuel or hydropower resources (sometimes called the "energy patch") are heavily dependent economically upon energy production, highly sensitive to changes in the supply, demand, and price for energy, and fiercely protective toward the political and economic interests of their energy producers. Any sharp decline in world petroleum prices, or significant increases in global petroleum production, can create sometimes severe, adverse impacts upon the energy states. Few states are more vulnerable to changes in the domestic petroleum supply and prices than Alaska, where all state enterprises have been subsidized by petroleum revenues. In 2013, Alaska's fossil fuel royalties were about $2.14 billion, or more than 90 percent of the state's total revenue income. (Every Alaska citizen also receives an annual share of this wealth, which has varied in recent years between $ 1,600 to $878 for each individual).[34] "Energy poor" states heavily dependent upon imported petroleum and natural gas, primarily in the Northeast, are vigilant to promote favorable regulation of national energy prices and energy transportation infrastructures essential to their economic growth.

Historically, the energy-producing states have been aggressive in creating regional energy alliances to protect or to expand their domestic and global energy markets and to limit petroleum production, if possible, when it seemed expedient to protect domestic petroleum prices. The energy producers, especially the coastal states, have also been ambiguous and vacillating about federal government efforts to promote more energy production within their jurisdictions. This has been a contentious matter for states with potential fossil fuel reserves on their Outer Continental Shelf (OCS) lands—especially California, Louisiana,

[b] During the energy crises of the 1970s, Congress authorized the states to enforce many other regulatory programs including the development of emergency preparedness plans, heating and cooling standards for buildings, weatherization programs for residential dwellings, and reform of electric utility pricing policies.

Oregon, Washington, Texas, Hawaii, Massachusetts, North Carolina, and Alaska—where fears of an environmental disaster, such as Deepwater Horizon, continually clash with the economic enticements of energy production.

There is no ambiguity, however, about the constant enthusiasm among almost all states to capture a portion of federal spending on energy-related activities, especially when the spending is generous. For example, after Congress enacted the American Recovery and Reinvestment Act (2009), providing $3.4 billion in federal support for innovative "clean coal" technology development, public officials in Texas, Illinois, and several other states immediately launched an extensive media and political campaign to convince Energy Secretary Steven Chu to invest in their competing clean-coal power plants, which would be among the most costly electric power plants ever proposed and a huge economic stimulus to the winning state.[35]

The states have also been energy "policy laboratories" where innovative energy policies have originated, sometimes becoming models for federal policy and often generating pressure on a reluctant Washington to act on energy issues. Recently, numerous states have enacted legislation or regulations creating Renewable Portfolio Standard (RPS), requiring utilities to generate a portion of their power from renewable energy sources. And, while Congress and the White House have debated and deadlocked since 2000 about creating a national regulatory policy to control climate-warming emissions (greenhouse gases, or GHG), a number of states have enacted various regional "cap-and-trade" regulatory strategies and other innovations to initiate their own regulatory regimes to cap their GHG emissions.[36]

POLICY DRIVERS

Energy policy is shaped in a political environment often subject to unpredicted and shifting public moods, to cultural and technological change, global military and economic affairs, contentious organized pressure groups, a legacy of inherited and possibly troublesome existing policy, and other realities—what have been called policy "drivers." These inevitable drivers make policymaking as much an art as a craft.

Public Opinion

Elective officials work in a culture saturated with sensibility about the public mood and dense with information about public attitudes. Most of the time, however, energy issues hover at the outer edge of public interest, neither compelling attention, nor lapsing into irrelevance to policymaking.[37] Between 2009 and 2013, for instance, most national opinion polls seldom, if ever, listed energy among any major issues concerning the public. Public understanding of energy issues confronts public officials with an especially formidable task. Energy management, observes public opinion expert Daniel Yankelovich, is a "unique challenge to policy makers: the combination of a fast-moving, complex problem and a comparatively slow-moving public trying to come to grips with it."[38] It usually requires an international crisis, a dramatic media event, or a powerful economic shock to the consumer's pocketbook to compel public attention to energy matters.

Gas pumps have become a national public warning system about energy affairs. The pump price of gasoline will most readily connect the public with energy policy. "When it comes to energy prices," writes economist Jon Krosnick, "voters are likely to think the same way—they are likely to blame the White House at least partly for gas prices across the country but not for their own personal pain at the pump. So a person's vote is likely to be influenced by perceptions of the nation's gas prices and efforts to reduce them. People will debate many questions—'Why exactly are gas prices as high as they are? Is it the speculators? Is it the supply? Is it the war in Iraq?' And the more they see the White House as having responsibility for current national conditions, the more people will vote accordingly."[39]

Even when Americans react with barometric sensitivity to short-term fluctuations in domestic petroleum prices, energy affairs are otherwise low on the scale of public issue concerns. In 2011, for example, at a time when retail gasoline prices were approaching $4.00 a gallon, "energy" ranked well below ten other issues in the public's issue priorities, and global climate change, perhaps the most constantly discussed energy issue by public media in the last five years, ranked next to last.[40]

The Economy

If energy seldom earns a mention among public issue concerns, the economy seldom fails to get attention—lots of it. Since 2009, opinion polls have shown that the public has almost always rated the economy the most important national issue.[41] In fact, energy and the economy are inseparably related. The nation's energy markets are deeply embedded in the larger setting of national and international economics. Energy markets respond, often rapidly, to macro- and microeconomic events and, in turn, constitute a powerful influence upon domestic and global economic affairs. This profound interdependence between energy markets and their broader national and international setting affects the domestic energy economy in several significant respects.

One characteristic of the domestic energy economy is the interdependence of market supply, price, and demand among major energy sources. Domestic energy prices, supply, and demand characteristically fluctuate as the market status of one or another source alters.

Another potent influence upon energy development is the availability of investment capital. The domestic commercial nuclear power industry has required large infusions of capital from both private business and federal government to evolve and survive. Renewable energy sources, such as wind, solar, geothermal, and biomass, have historically depended largely for their development upon federal subsidies, tax incentives, and R&D funding. Even so, wind farms, especially, require so much space for giant wind turbines that they often depend upon banks to finance 50 percent of the project cost. And corporate planning for future energy development is usually contingent upon the availability of new capital.[42]

Energy policy also reacts with acute sensitivity not only to changes in existing supply but also to estimates of future energy availability. While concern over future global crude oil reserves has haunted all national energy policy discourse for many decades, a more recent, if less widely publicized event has been the discovery of significant new domestic natural gas reserves. New estimates, based upon innovations in gas recovery technology, have fortified proponents of new natural-gas fueled electric power plants likely to emit less climate changing gasses than primarily coal-fired installations.

Energy prices are also a major component in the government's cost of living index and numerous other federal programs, such as entitlements, also indexed to consumer prices. Energy prices are considered by government policymakers to be a measure of consumer economic health and national economic vitality, thus, easily becoming a major cudgel to batter the political opposition or brandish in defense of existing policy in political debate.

Crisis

Crisis, especially when dramatic, media magnified, and ominous, is a potent driver of policy change, often *the* most powerful force. Over time, crises can release—at least temporarily—energy policy mired for years or decades in Washington political deadlock, creating the punctuated equilibrium characteristic of contemporary energy policymaking since the initial Organization of the Petroleum Exporting Countries (OPEC) oil embargo of 1972. The political force of crisis is not lost on policy practitioners and stakeholders, who often labor in policy venues to anoint a favored issue a "crisis" and thereby invest it with an urgency it might otherwise lack.

Political Partisanship

National energy issues since the 1970s have been characterized by a gradually increasing partisan cleavage over policy options between presidents, within Congress and among the public. Such vital energy issues as exploration for petroleum reserves in the Arctic National Wildlife Refuge (ANWR) and the Outer Continental Shelf (OCS), the pace of future fossil fuel mining, the relative priority for renewable and conventional energy, and the credibility of global climate warming now tend to divide Democrats and Republicans in Washington and among the electorate. Proclaiming an energy issue, or a proposed solution, to be a "Democratic" or "Republican" matter, moreover, arms policymakers with an evocative symbol that may attract to policy debate certain segments of the public with strong partisan sympathies who rally partisans behind a proposed solution.[43]

In general, Republicans in the White House and Congress have been more favorable than Democrats to relaxing environmental restraints on energy development, to accelerated petroleum and other fossil fuel

exploration and utilization, to decreased taxation of energy production and, generally, to less governmental involvement in energy markets. Even before Obama's presidential commission investigating the Gulf disaster submitted its report to Congress in 2011, combative partisanship surfaced. In the House of Representatives, Republicans alleged, and Democrats denied, that the commission's secret agenda was to promote Democratic efforts to limit, if not prohibit, future offshore energy exploration.[44] When the commission subsequently submitted its recommendations to Congress, Democrats and Republicans on the House committee reviewing the report renewed that debate.

Partisanship has, in many instances, also polarized public opinions about the scientific and technical information supporting one energy policy option or another. This partisan politicization has been especially conspicuous in recent years over the credibility of global climate warming and its scientific basis. For example, Republican voters have been considerably more likely than Democrats to disbelieve in the existence of global climate warming, to attribute climate warming (if it occurred) to nonhuman sources, and to question the credibility of climate warming science and scientists.[45] When energy science becomes politicized, the resulting debate may be powerfully polarizing, placing scientists and other technical experts under intense pressure to shape their professional opinions in favor of one side or another and thus to compromise their scientific objectivity. The inherent tension between the objectivity essential to scientific inquiry and the partisanship deeply rooted in contemporary conflict over national energy policy now predictably invests conflict over policy options with assertions that one side or another has compromised the integrity of scientific information to its advantage.

Environmentalism

The environmental movement created a political fusion in which energy and environmental issues are now tightly and durably bonded. A political symmetry emerges: energy policy is now environmental policy; environmental policy is energy policy. The presence of environmentalism in all public discourse about energy policy has become an elemental force in shaping energy regulatory policies and public attitudes about energy regulation.

A recurrent theme in subsequent chapters on specific energy resources is their environmental implications. A few preliminary statistics can suggest the pervasive scope of environmental effects at every stage of energy use—extraction, refining, transportation, and consumption:

- Electric utilities produce about 66 percent of the sulfur oxides air emissions in the United States.[46]
- More than 33,000 abandoned hard rock mines, primarily associated with coal extraction, created serious environmental degradation in the twelve western states and Alaska.[47]
- Fossil fuel mining is a major source of surface and groundwater contamination by acid mine drainage; heavy metal contamination; and leaching, soil erosion, and sedimentation.

Environmental standards also influence the market price and competitiveness of different energy sources. Safety standards, for example, raise the capital cost of commercial nuclear power facilities and diminish the competitiveness of nuclear power in many markets where it competes with fossil fuels for electric power generation.

The compounding of environmentalism with energy production defines contemporary public debate about national energy management in several important respects. Current public discussion about energy policy is often framed as a "trade-off" between the various benefits of energy development and environmental protection—or, more fundamentally, as a debate about whether such a trade-off even exists. Public opinion polls, for example, frequently suggest that most of the public perceives, or can be persuaded to perceive, that energy and environmental protection are competing priorities.

Coupling environmental values with energy production has also become a defining framework in policy debate over the future of the public domain that constitutes one-fourth of America's continental land, the greatest natural inheritance still held by the federal government in trust for the American people. The western public lands are estimated to have a potential to generate wind and solar energy equal to almost three times current US electric generating capacity.[48] But much of this ecologically valuable land is fragile biosphere, inhabited by endangered species or valued

culturally and esthetically by those who fear the degradation may come in the form of renewable energy technologies like solar and wind power.

Another increasingly significant instance of environmentalism's impact upon the course of national energy development is the association of conventional energy production with global climate warming. Environmental opponents of aggressive new fossil fuel development and proponents of increased fossil fuel production both recognize that public belief about the credibility of human-induced global climate change and its basis in fossil-fueled combustion can powerfully influence public preferences for future domestic energy production.

Interest Groups

So embedded in government are organized interests that it often seems to critics of interest-group power, such as political scholar and commentator George Will, that if "you want to understand your government, don't begin by reading the Constitution. Instead, read selected portions of the Washington telephone directory containing listings for all organizations with titles beginning with the word National."[49] Interest group access to the inner citadels of energy policymaking is treated with public ambivalence. It is the excesses, not the existence, of group claims to influence that invite censure. That privately organized interests should share in formulating public energy policy excites almost no one.

Energy-related interest groups have been among the largest contributors to congressional and presidential election campaigns, and, among the top spenders for lobbying among all national interest groups. In 2010, for instance, the nonpartisan Center for Responsive Politics, which monitors interest group political activities, reported that more than 1,600 individuals lobbied Congress and the White House on behalf of conventional and nuclear energy organizations.[50] Since 1990, most of the money spent on political campaigns by the energy sectors has gone to Republican candidates.[51] The energy sector is also among the largest of all interest groups contributing money to political campaigns and lobbying: in 2012–2013, this sector spent an estimated $144 million on such activity.[52] Fossil fuel and nuclear power interests dominate the energy sector in campaign spending, lobbying, and other political activities.

The rise of new issues on the governmental agenda often triggers the formation of new groups and, conversely, new issues on the agenda reflect the growing political influence of new interests. In recent decades, traditional energy sector groups have been increasingly challenged politically by a relatively small but growing array of energy-related environmental groups, state and regional interests, and new technology advocates, especially groups promoting renewable and nonconventional energy.

Energy administrators routinely consult, formally and informally, with representatives of affected organized interests who become "stakeholders." Congressional legislation frequently mandates that agencies responsible for implementing important legislation create advisory committees that include representatives of the programs affected by the legislation. If Congress fails to create an advisory committee, agencies often create their own. This ensures that these interests will be informed and solicited for their opinions during the program's implementation. In the Department of Energy (DOE), for example, the National Petroleum Council, consisting of almost 100 individuals representing major energy producers, research institutions, technology producers and related groups, is among the high-level DOE advisory groups, reporting directly to the secretary of DOE. The agency assuredly does not lack advisory help. DOE has at least 20 high-level program advisory groups and has terminated another 60 since its creation. However, compared with older federal departments, many of which have more than 100 advisory groups, DOE is hardly in the business.[53]

Administrative agencies also collaborate with organized groups by "working the clientele." Agencies turn to organized interests strongly supportive of their mission when help is needed. Thus, when DOE and the Environmental Protection Agency (EPA) struggle over congressional proposals to increase or relax pollution controls on public utilities, both sides mobilize their clientele to bring pressure on Congress. EPA appeals to environmentalists, DOE to utilities.

The Tyranny of the Electoral Cycle

Elections have an imperious hold on presidents, members of Congress, and their respective staffs. For elected officials, the clock segmenting the time during which decisions are made ticks away in four- and eight-year

intervals. These are Washington's constitutionally appointed electoral cycles. Within these time frames, federal officials will continually sift policy decisions for their electoral implications. "Good" and "best" policy is often defined as much by electoral impact as by its substantive merit.

Elections affect energy policymakers in two particularly important ways. First, the short term dominates the long term. Presidents and legislators may talk about programs enduring for decades or defend the interest of unborn generations, but their eye is usually upon the program's impact on the next primary or general election. "Presidents and their staffs arrive at the White House charged up to produce results, to make good on the pledges of the campaign," observed presidential scholar Thomas Cronin. "The President and his staff think in terms of two- and four-year frames, at most. They strive to fulfill campaign pledges and related priorities with a sense of urgency, seeking ways to build a respectable image for the forthcoming electoral campaign."[54]

Members of Congress are similarly preoccupied with elections. The constituency is an unseen presence at any deliberation about public policy, the electoral impact on the folks back home a continual preoccupation. Any congressman or senator could probably sympathize with the two-term Democratic congressman caught between the dominant economic interests in his constituency and his own desire to support a decades-long regulatory program to reduce acid precipitation. "I feel," he lamented to a reporter, "as if I pitched my tent on an anthill, there are so many people crawling over me. . . . I can't win either way. This is how representatives get whipsawed. . . . I vote one way and the people say 'Aren't you supposed to represent the national interest? I vote the other way and people say, 'We sent you there to represent us.'"[55]

Globalization

The most potent impact of the domestic energy crises of the 1970s was the harsh message that the United States was increasingly vulnerable to the vicissitudes of global energy supply, politics, and economics. In the years since 1970, the United States has had to recognize, among other unwelcome realities, that it controls a significant but diminishing proportion of the remaining global petroleum reserves and may never achieve "energy independence." In this twenty-first-century world, the United

States competes increasingly with rapidly developing non-Western nations for available petroleum supply, still stakes much of its national security on insecure foreign petroleum and unstable national governments, and confronts potentially severe domestic environmental risks from global fossil fuel consumption it cannot control. Economically, the domestic energy markets are increasingly sensitive to global macroeconomic events such as fluctuations in international energy exploration and production. All these global interdependences are tethered to equally significant economic implications and political complexities.

Reserves and Resources: How Much Energy?

Succeeding chapters concerning specific energy sources begin with a brief assessment of the domestic energy supply, a fundamental consideration in all energy policymaking. However, disagreement over the available amount of a resource, especially fossil fuel energy, is a predictably contentious prelude to many discussions about how to manage the resource. Experts with respectable credentials frequently disagree about the precise amount of an energy resource physically available domestically or internationally.

One reason for this disagreement is different estimates concerning how much energy is recoverable under current economic and technological conditions (an *energy reserve*) and how much of the total energy source exists (an *energy resource*). A petroleum producer or a coal mining company, for instance, would define its reserves as the amount of petroleum or coal it is reasonably sure exists and can be located, extracted, and marketed under current conditions. Such companies would usually have a much larger energy resource. Additionally, experts may agree about the size of an energy resource or reserve, yet predictions of future availability may vary because of differing assumptions concerning future market demand. Chapter 3, concerning petroleum and natural gas, illustrates how predictions about a future natural gas "boom" depend, in good measure, upon whether the environmental impact of rapidly developing *fracking* technology that extracts natural gas from oil shale will be environmentally and economically acceptable.

Estimates of energy reserves and resources constantly change as new sources are discovered, older ones depleted, and economic or

technological conditions alter. Consider the example of petroleum production. The rising price of domestic petroleum after 2000, for instance, made extraction of petroleum from the oil shale—previously considered too expensive to produce in quantity—now attractive to petroleum producers and refiners. Stated differently, with the right combination of technological innovation, market price, and anticipated demand, an energy resource can become a reserve.

National Security

It is a measure of the impact of domestic energy management upon national security that discussions of US energy policy are now commonly framed as "energy security." In the years since the energy shocks of the 1970s, national security has become increasingly vulnerable in all important senses—military, diplomatic, economic, political—to alterations in global energy markets. Slowly, very reluctantly, most American policymakers have accepted the reality that this vulnerability is likely to continue for decades, perhaps permanently.[56] Since 2010, however, the US boom in fossil fuel fracking, discussed in chapters 3 and 7, has prompted many experts to suggest that a new era of energy independence with its implied improvement in national security may be imminent. Others aren't so sure. In any case, *any* issue concerning US energy development will sooner or later involve a discussion of the national security implications.

In an effort to buffer the future impact of sudden imported petroleum shortfalls, the United States in 1975 created the Strategic Petroleum Reserve (SPR) located in salt domes along the Gulf of Mexico. The SPR, the world's largest emergency petroleum reserve, containing as much as 727 million barrels of crude oil, could provide, at best, several months of crude oil to meet a heavy domestic demand. Despite these and other measures to diminish the security risks posed to the United States by sudden adverse international energy events, the United States remains intricately embedded in the global energy system. Thus, exposed to the impact of global energy disturbances, practically all significant domestic energy policies, and their modification, compel domestic national policymakers to conceive the issues in the framework of national security.

WHAT FOLLOWS: AMERICAN ENERGY IN TRANSFORMATION

This chapter is a prelude to chapters that explore the unfolding transformations in the sources of American energy, together with the politics, and policy challenges emerging with this transformation. Institutions, actors, and themes inherent to energy policymaking, which constitute this prelude, will reappear in different combinations throughout these succeeding chapters.

The design of the succeeding chapters, each involving a different energy source, is similar. Each discussion includes these sections:

- The Energy Source: Its Significance and Changing Status
- Policy Prologue: Currently Important Resource Policies
- Contending Issues: The Flashpoints of Current Controversy
  - Policy Alternatives
  - The Play of Politics: Issue Activists
  - Venues: National, State, Global

In two of the following chapters, the discussion focuses upon the nation's primary sources of carbon fuels, petroleum, and natural gas (chapter 3) and coal (chapter 4). The subsequent narrative (chapter 5) concerns the continuing policy controversy over the future of domestic nuclear power. The final chapters concern electric power, renewables, and conservation (chapter 6) and the global policy arena (chapter 7).

CHAPTER

3

CARBON POLICY

Petroleum and Natural Gas

On February 2, 2012, one of the most significant events in sixty-four years of American energy history was virtually ignored by the media, the public, and all but a small cadre of energy experts and policymakers. The Department of Energy reported that not since 1949 had the United States exported more refined energy products—gasoline, heating oil, and diesel fuel—than it had imported.[1] And this, moreover, occurred in a remarkable year when US petroleum exports exceeded imports for the first time since 1989.[2] These and similar data seemed prophetic to many energy experts, policymakers, and stakeholders: a gateway on the road to a new American "energy independence" had been passed. Others weren't so sure.

AN ERA OF TRANSFORMATION

Few eras in US energy history since 1970 have been more surprising or unexpected than the remarkable transformation in the status of US petroleum and natural gas supplies that began shortly before Barack Obama's presidency and is now predicted to prevail well beyond 2030. The primary responsibility for these transformations cannot be claimed by the White House, Congress, nor the major political parties. Rather, these transformations result from a mix of technological innovation, increasing energy efficiency, changes in the domestic and global energy economies, and increased petroleum imports from Canada. Riding this

wave of change in the domestic energy economy are increasing predictions of a growing energy independence that will fortify future national security.

Predictions about future energy conditions and their security implications, however, always depend upon assumptions about the future of the domestic and global energy economies, about frequently uncertain environmental and political events, and about the reliability of emerging technologies. Despite encouraging energy data and optimistic predictions of many experts, the future impact of recent transformations in domestic petroleum and natural gas status remains uncertain in many respects. Even as the new era of petroleum and natural gas development was apparently arriving, for example, a former high official in the Obama administration was warning about America's continuing vulnerability to a global energy economy in which the United States is only one participant. "We have allowed ourselves to be worked slowly into a very delicate position with this international oil market controlled largely by countries who are at best neutral toward the United States, at worst antagonistic," he said. "It's all so delicate that one little quiver here can shake the whole thing."[3] In short, the United States never completely controls its own energy destiny.

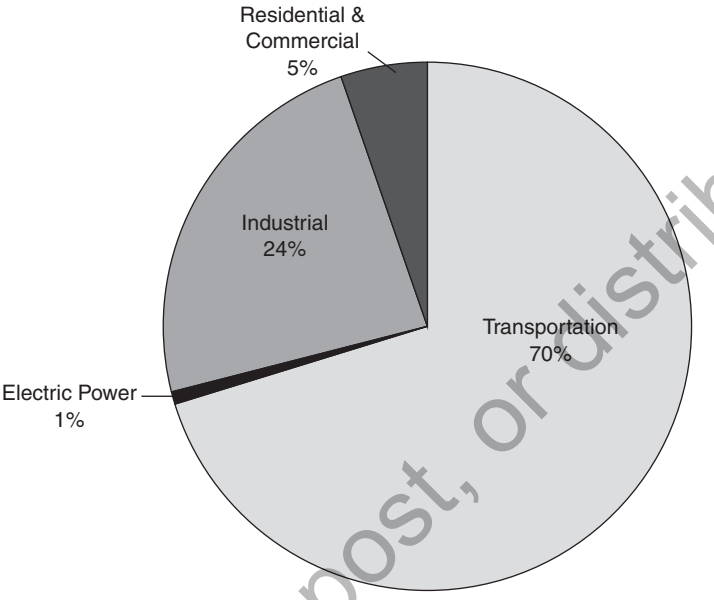
PETROLEUM

Virtually all the petroleum, produced domestically or imported, ends in the gas tank of a light vehicle, bus, or truck. As Figure 3-1 indicates, about 70 percent of domestic petroleum consumption is created by the transportation sector. At the same time, domestic production of petroleum continues to grow with the boom in "fracking" technology, which is discussed later in the context of natural gas. By mid-2013, US oil production reached the highest level since January 1992, encouraging energy experts to expect more increases in the future.[4]

Growing Exports, Decreasing Imports

How recent has been the transformation in the US petroleum economy is evident in the changing status of petroleum imports and exports since 2000. In Figure 3-2, which illustrates the long-term trend in US petroleum imports and exports since 1990, the most important lines are

FIGURE 3-1 **United States Petroleum Consumption by Sector, 2012**



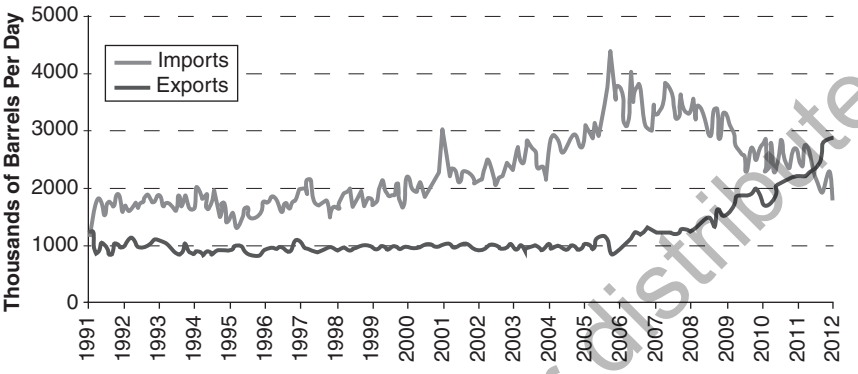
Source: U.S. Department of Energy, *Total Energy: Monthly Energy Review*, Tables 3.7a, b, and c (March 28, 2012).

the sharply rising size of exports beginning about 2006 and the intersection of imports and exports in 2011, marking the first time since 1990 that the United States became a net exporter of petroleum products (which include other petroleum fuels besides gasoline).

A second important indicator of the rapidly changing petroleum economy, and a closely watched statistic for energy policymakers, is Figure 3-3 that reports the percentage of US petroleum consumption dependent on imported oil. The proportion of imported oil has been rapidly decreasing. In 2005, the nation imported 60.3 percent of its oil. In 2011, that figure was 40 percent and will likely drop further as domestic production continues to grow.[5]

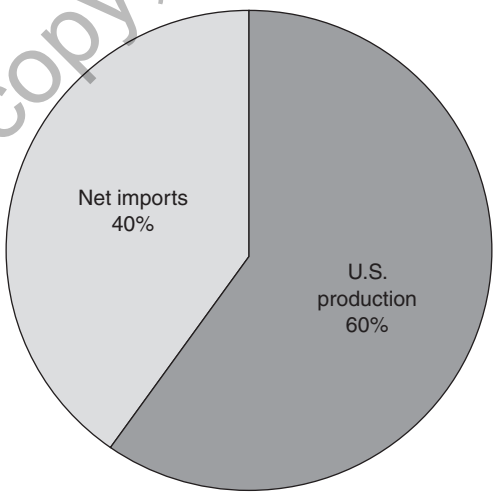
Many factors have contributed to these changes. Since 2008, Americans have been driving less while auto energy efficiency has been increasing.

FIGURE 3-2 **US Imports and Exports of Petroleum Products, 1991–2012**



Source: Energy Information Agency. Presented by Morgan Housel, "3 Huge Recent Economic Developments You May Have Missed," *The Motley Fool*, January 20, 2012, at www.fool.com/investing/general/2012/01/20/3-huge-recent-economic-developments-you-may-have-.aspx.

FIGURE 3-3 **US Net Imports of Petroleum as a Proportion of All Domestic Petroleum Consumption, 2012**



Source: U.S. Energy Information Administration, *Monthly Energy Review* (April 2013).

Ethanol, now required as an additive, has enlarged the domestic gasoline supply at a time when foreign demand for exported American gasoline has grown. Increased use of biofuels, ethanol, and diesel fuels continues. The severe recession beginning in 2008 has inhibited domestic petroleum consumption in most economic sectors. And fracking technology, soon to be discussed, is creating a surge in both petroleum and natural gas production.

The growing size of US domestic petroleum production has prompted the federal Energy Information Administration (EIA) to predict that by 2017, the United States will become the largest global petroleum producer, replacing both Saudi Arabia and Russia.[6]

Risks As Well As Rewards

Predictions about growing US energy independence sustained by a continually rising petroleum and natural gas production are safest when forecasters are nearsighted and fix their vision on an energy horizon confined to a decade or less. As predictions reach increasingly into the future, risks increase. Economic models commonly used to predict future domestic and global energy markets depend upon numerous assumptions concerning future domestic energy policy, technological change, global politics, and much else that may prove unpredictable. In 2000, for example, most energy experts were predicting a continuing decline in domestic petroleum production and increasing national security risks by heavy US dependence on imported Middle Eastern oil. Moreover, future political events can surprise all policymakers.

The US Energy Information Administration, among the most reliable and competent of America's important sources for energy information and energy modeling, has suggested a number of uncertainties that arise in making its current long-term energy forecasts. First, major global energy producers, such as Saudi Arabia and Russia, will continue to have significant influence in setting global petroleum prices, which can affect future demand for US petroleum abroad and the price of domestic oil. Additionally, domestic economic trends, such as a continuing recession, or sudden economic shocks from an unexpected source, such as international conflicts, can upset future energy scenarios. Federal energy

policies can also change. Finally, important current and anticipated future energy technologies may not develop as anticipated.[7]

The Politics

The federal government continues to exert its most potent influence on the domestic petroleum industry through taxes, tax subsidies, regulation of worker safety, and environmental impacts involved in energy production and consumption. Tax subsidies have been by far the most politically contested of all federal and state energy policies for more than five decades. The petroleum industry is among the most heavily subsidized of all domestic industries. Tax breaks at almost every stage of petroleum production have resulted in an effective tax rate estimated to be lower than virtually any other industry.[8]

Petroleum tax subsidies have been a favorite target of criticism by the Obama administration. The petroleum industry continues to fight fiercely and successfully to protect its presently generous tax subsidies. The Obama White House, moreover, has had to accept what every Democratic president has experienced since World War II: When it comes to petroleum subsidies, state loyalty trumps party loyalty among congressional Democrats. Oil-state Democrats seldom vote against the industry when subsidies are at stake.

The traditionally close ties between oil-state Democrats and the industry is testimony to the importance the oil producing states assume in America's energy governance. Petroleum and natural gas exploration has created geographically large and politically influential petroleum royalty dependencies throughout the American West, the Gulf of Mexico, the Atlantic coast, and Alaska. At the outset of the Obama administration, "Alabama, Louisiana, Mississippi, and Texas receive [d] 37.5 percent of the revenues collected by the federal government for offshore energy production," reported the Southeast Energy Alliance, and onshore states "such as Colorado, Montana, New Mexico, and Wyoming receive 50 percent of the royalties collected for energy development on federal lands."[9] The Alliance asserted that North Carolina, ambitious for a share in potential OCS energy production, could receive as much as $577 million annually. Energy industry visions of future state income from new energy production are frequently exaggerated, but there is

doubtless enough potential income to whet the appetite of income-strapped state and local governments.

Much of the responsibility for regulating the petroleum industry's workplace safety, environmental impacts, and infrastructure management is shared by the federal government with the states. Historically, states with significant petroleum or natural gas resources have given the responsible regulatory agencies duel and potentially contradictory mandates both to regulate and to promote petroleum or natural gas exploration and production. "Wyoming regulators," as noted in a survey of these state regulatory agencies,

> *are expected to "serve" the industry. Pennsylvania's Bureau of Oil and Gas says its goal is to "facilitate" development. And nearly every other oil and gas agency has a mandate or mission statement establishing increased development as a goal. "We're there to regulate and promote, if you will," Wyoming Oil and Gas Supervisor Tom Doll explained. "Protecting the environment—that's part of the task."*[10]

The Deepwater Horizon tragedy discussed in chapter 1 is a reminder of how deeply the energy states are committed to petroleum production. The West is equally ambitious about its petroleum resources. The White House and the Department of the Interior (DOI) are continually pressed by western state political leaders, including particularly congressional Republicans representing Utah, Colorado, Wyoming, and Montana, to facilitate greater development and further expansion of federal petroleum and natural gas exploration leases.

The political weight of petroleum-dependent geographic constituencies is powerfully amplified by trade associations representing the petroleum and natural gas industry and the hundreds of satellite advocacy organizations for industries and trade groups dependent upon petroleum and its by-products. Petroleum dependent industries, moreover, are a very substantial constituent of the much larger and politically powerful "energy lobby," a broad coalition representing all current conventional energy producers who are estimated to collectively employ more than 1,500 registered lobbyists to look after their interests in Washington.

GOVERNING PETROLEUM: SEEKING A POLICY FUTURE

The energy crises of the 1970s set in motion a variety of federal government interventions in the national and international petroleum markets intended to relieve the short-term, adverse political and economic impacts of domestic shortfalls in petroleum supply. The history of subsequent US petroleum policy is a complex skein of federal attempts to protect national security and to stabilize the domestic petroleum market. The mélange of policies included efforts to control domestic petroleum prices, to buffer the US economy from the shock of future restrictions on oil imports while encouraging more domestic petroleum production, to guarantee domestic reserves sufficient to protect short-term national security, to create an equitable allocation of existing supplies in case of further import shortfalls, and to prevent domestic petroleum producers from harvesting "unfair" profits from sudden escalations in domestic retail gas prices, among other measures.

The substance and impact of these policy experiments have been exhaustively studied and continue to be debated. Energy policy analyst Peter van Doren's conclusion seems reasonable:

> *America's experience with oil regulations from the 1930s through the 1970s has been much studied, and an academic consensus is that those regulations had large negative effects on both oil producers and consumers. Congress has typically responded to petroleum-market problems with inappropriate legislation that has damaged markets and prompted further rounds of legislation and regulatory action.*[11]

By the early 1990s, in any case, most federal efforts to regulate the domestic petroleum market ended, or transformed into emergency measures, as a result of improving domestic petroleum supply, general price stability, and the absence of effective blockades of imported petroleum.

As the United States heads into the second decade of a new century, numerous policy options continue to be debated to ensure greater security and economic stability of petroleum supply in the future. Equally important, plausible policy options—those politically feasible and potentially effective economically—will often depend to a considerable

extent on whether the policy horizon is short term (a few decades) or longer. As a practical matter, noted in chapter 2, short-term policy alternatives are likely to receive greater attention from the White House and Congress and consequently to define the energy policy debate in the political marketplace. Among these policy options, several assume continuing prominence.

Federal Subsidies and Related Petroleum Production Incentives

In July 2011, during the impassioned partisan battle in Congress over extending the limit on the national debt and thereby avoiding a rapidly impending national crisis, contention broke out anew over federal energy subsidies. Apparently, there is seldom a time too troubled for Congress to deny itself an opportunity to debate about energy subsidies. Controversy over the scale and apportionment of federal energy subsidies is a perennial congressional event, beginning with dispute over how the allocations are measured and to which energy sector's advantage. There is no uncertainty, however, that federal subsidies for petroleum exploration and production are generous and fiercely defended by the petroleum industry and its partisans. The EIA has estimated, conservatively, that federal support for the US petroleum and natural gas sector equaled at least $2.8 billion in 2011. Equally important, and unlike support for most unconventional energy resources, particularly solar and wind energy, federal subsidies for petroleum and natural gas, like other fossil fuels, is written into the US Tax Code and is not time limited.[12]

Partisan dispute over the extent of these petroleum subsidies has intensified in recent congressional sessions, with Republicans generally defending existing subsidies against Democratic initiatives to reduce their scope and duration or, alternatively, to increase the tax burden, particularly on petroleum. This partisan polarization is complicated, as we earlier noted, by the political stakes in petroleum production held by states dependent upon energy royalties, or hoping to become so. Disagreements about the magnitude of federal support for petroleum are often grounded, as well, on embedded disputes over how much federal support should be invested in renewable energy and over the comparative proportion of the federal budget allocated to the two energy sectors. Equally important, the economic, political, and national security

stakes involved in new petroleum policies are increased because policies intended to significantly influence the future of domestic petroleum production and consumption must necessarily be framed in terms of policy impacts over many future decades.[13]

Environmentalists have been consistently critical of the scale and duration of federal petroleum and natural gas subsidies. They have often been joined by partisans with other, sometimes different policy priorities and professional perspectives, such as national security experts, physical and biological scientists, who nonetheless share a concern with reducing US dependency upon petroleum, domestic or imported. When it comes to policy strategies, discussion almost always focuses upon reducing subsidies, or increasing corporate taxes, or some combination of both. As usual, the devil in the details becomes a divisive influence, even among allies of restrained petroleum production, and thus further complicates an already tangled array of policy options for future petroleum subsidies.

Accelerated Domestic Exploration and Production

Proponents of increased domestic petroleum supply customarily look mostly to a combination of four options: OCS lands, onshore federal lands, Canadian reserves, and oil sands or shale. All these options involve environmental risks whose magnitude is a major source of controversy between partisans and opponents of increased domestic petroleum supply.

OCS lands. The Deepwater Horizon disaster in 2010 again forced upon national attention the contentious political and environmental controversy inseparable from energy development on the Outer Continental Shelf (OCS lands). The controversy is compounded by federalism issues, as well. Jurisdiction over OCS lands is divided between the coastal states, whose authority extends three miles from their ocean borders (except for Texas and the west coast of Florida where state jurisdiction extends to nine nautical miles), and the federal government, which controls OCS lands for 200 miles beyond the state three-mile limit.

Altogether, production from existing state and federal energy leases accounts for about 30 percent of domestic petroleum production and 25 percent of natural gas. The Energy Policy Act (2005), which passed during the G. W. Bush administration and was intended to encourage

more domestic production, also increased federal subsidies for OCS energy production. Estimates of the remaining OCS petroleum and natural gas reserves vary considerably, but most suggest very substantial known and potential reserves. The DOI, for instance, estimated in 2006 that reserves of 8.5 billion barrels of oil and 29.3 trillion cubic feet (tcf) of natural gas exist (the United States consumes about 19 million barrels of petroleum and 1.6 million tcf of natural gas daily).[14]

Regulation of energy exploration on the vast federal OCS is vested in the Department of the Interior and, until recently, primarily in the DOI's Minerals Management Service (MMS). The DOI has historically strong ties to petroleum, natural gas, and other fossil fuel interests because DOI's historic, and inconsistent mission, has been to both encourage and regulate exploration and production of resources on the public domain. The Deepwater Horizon oil spill thrust the MMS into unwelcome national attention and dramatized the agency's failure to enforce federal environmental regulations upon petroleum corporations drilling in the Gulf of Mexico. The MMS became a classic example of the problem created when federal agencies are responsible for both regulating and promoting the same industry.

Investigation by the DOI's own inspector general, a bipartisan congressional committee, and numerous other official and unofficial entities between 2007 and 2011 revealed the MMS's close identification with regulated petroleum corporations and the congenial collaboration that resulted even before Deepwater Horizon. "Federal officials who oversaw drilling in the Gulf of Mexico," the inspector general reported in 2008, "accepted gifts from oil companies, viewed pornography at work, and even considered themselves part of the industry." A Louisiana MMS district manager was unapologetic about his agency's regulatory soft touch. "Obviously, we're all oil industry," he said.[15] He continued,

> *Almost all of our inspectors have worked for oil companies out on these same platforms. They grew up in the same towns. Some of these people, they've been friends with all their life. They've been with these people since they were kids. They've hunted together. They fish together. They skeet shoot together . . . They do this all the time.*

In the aftermath of more investigations following the 2010 Gulf oil spill, the Obama administration radically reorganized the MMS to end this intimate and pernicious collaboration between regulators and the regulated.

The White House and Congress continue to share a keen and, increasingly, partisan interest in the future of the OCS lands. While congressional Republicans have pressed for accelerated OCS energy development and Democrats have usually advocated restraint, political and economic cross pressures often blur partisan differences, particularly concerning the OCS lands under state jurisdiction. Thus, for example, Florida's Senate and House delegations of both parties are usually together in opposing any OCS development likely to create environmental damage to the state's coast. President Obama initially appeared to favor restrained energy development on OCS lands but, even in the aftermath of Deepwater Horizon, was compelled in the presence of the country's persistently deep economic recession to modify his stance and to advocate "safe and responsible" oil production. He went so far as to declare that his administration officials were working to speed up the leasing process for exploration in the already developed National Petroleum Reserve-Alaska (ANPR), "while also giving oil companies better financial incentives to use and extend certain existing leases in the Gulf of Mexico and elsewhere."[16] The president also indicated his support for accelerated testing of areas off the East Coast for possible future drilling.

ANWR. In addition to the Gulf of Mexico, another continuing flashpoint of OCS controversy has been the waters close to the Arctic National Wildlife Refuge (ANWR). The ANWR constitutes 16.6 million acres of prime polar bear wilderness in the remote northeastern coast of Alaska, among the wildest and most inaccessible of US public lands. Like most public lands owned by the federal government, ANWR's size and purpose are defined by Congress, and the responsibility for its oversight is vested in the DOI.

Much of ANWR has been opened to oil and natural gas exploration. The Trans-Alaskan pipeline, created in 1971, has been producing almost one million barrels of petroleum daily from Prudhoe Bay on Alaska's North Slope, and 90 percent of the adjacent coastal lands remain open

for gas and oil leasing. However, about 1.5 million acres of the coastal plain, considered to be the most biologically rich and vulnerable within the ANWR, has been restricted from energy exploration unless such activity is specifically authorized by Congress. This region is the epicenter of the political conflict over the ANWR.

The ecological riches of this area, known as "1002 Area," are undisputed. This natural endowment includes 160 bird species; the most important onshore denning area in the United States for polar bears; the principal calving ground for 130,000 migratory porcupine caribou; habitat for grizzly bears, arctic foxes, wolves, wolverine, and numerous whales; and many endangered plant and animal species. Ruggedly beautiful wilderness and vast Arctic panoramas invite recreation and tourism. Alaska's natural endowment resonates powerfully among environmentalists who believe much would be sacrificed to produce exaggerated quantities of petroleum unlikely to alleviate significantly the nation's energy problems.[17]

Some of the stakeholders in the ANWR conflict are highly visible: Congress, the White House, the DOI, environmental advocates, energy industries, labor unions representing workers employed in related energy production, and foreign governments, including Japan and China, that might become large consumers of the petroleum produced from the 1002 Area, and Alaska. Alaska's situation is unique. Royalties from energy production are the state's economic foundation. Every Alaskan resident—man, woman, and child—is reminded about this economic dependence by an annual check representing his or her share of more than $660 million in annual dividends from state oil royalties.[18] Alaskans largely support energy exploration in ANWR and resent what they consider interference by Washington, DC, and other interests, especially environmentalists, in what should be Alaska's own affair. Many of Alaska's Native Americans, however, are unlikely to cheer. The Inupiat Eskimos and the Gwich'in Indians, an indigenous subsistence culture, are among the native tribes heavily dependent on the 1002 Area's continued ecological vitality for food and fuel. The state's commercial fishing interests were also disturbed by the possible degradation of their offshore stocks.

Proponents of energy exploration in the 1002 Area speak primarily about national security, energy supply, and coexistence between energy

production and environmental protection. They assert, for instance, that drilling in the area could produce petroleum equal to thirty years of oil imports from Saudi Arabia. They also contend that newer, more efficient energy production technologies will limit the amount of land that would be disturbed by energy production to a few thousand acres and, in any case, that the ecological disruption involved is vastly exaggerated by environmental opponents. Most important, proponents of further energy production argue that the reserves now untapped under the 1002 Area will improve US security by decreasing dependence on imported oil.[19]

Since 1980, the DOI has been ready to sell energy exploration leases on the 1002 Area, but, because Congress must first agree, the political battle over exploration has been waged largely within Congress and the White House. Since 1996, legislation permitting the leases has been approved in the House of Representatives twelve times and then defeated, usually in the Senate.[20] Generally, the ANWR issue has been a partisan affair, dividing pro-development Republicans from Democratic opponents and leaving Congress deadlocked over the ANWR issue throughout the Obama administration.

Obama declared his opposition to ANWR development, during his first presidential campaign. However, the Obama administration has become increasingly irresolute on the issue. Generally, the Obama administration has repeatedly declared that the Alaska refuge "is a very special place" that must be protected but energy exploration has not been precluded if it can be proved environmentally safe. Public opposition to OCS development, including the ANWR, appeared to grow in the immediate aftermath of the Deepwater Horizon oil spill. However, with the passage of time and the persistent increase in retail gasoline prices through much of 2012, public approval for new OCS development appeared to increase significantly while opposition to ANWR exploration seemed to diminish, thus, leaving the ANWR insecure and destined for continual contention among a multitude of political and economic interests.

Oil shale and the Keystone XL pipeline. The price of global crude petroleum has risen almost continually since 2000, providing petroleum producers with incentive to seek or to expand once unprofitable alternative

petroleum sources and to develop technologies for their exploitation. "Oil shale" has become the prime candidate for accelerated development to supplement traditional petroleum reserves.

Oil shale, sometimes called "oil sands" or "tar sands" is primarily three different petroleum products: oil shale (rock that releases petroleum-like liquids when heated in a special chemical process); tar sands (heavy, thick, black oil mixed with sand, clay, and water); and heavy crude oil (thicker and slower flowing than conventional oil). Significant quantities of petroleum are usually mixed with these materials "like an egg in cake batter," requiring a much more complicated and expensive technology for extraction and refinement than traditional petroleum reserves. Global oil shale contains an enormous volume of potentially extractable crude petroleum, often called "bitumen."

> *The most extensive deposits . . . are in North and South America. A region covering parts of Colorado, Utah, and Wyoming contains oil shale totaling about three times the proven oil reserves of Saudi Arabia. About two-thirds of the world's supply of tar sands (estimated at 5 trillion barrels, though not all of it recoverable) is found in Canada and Venezuela. Venezuela also has the largest known reserves of heavy crude oil, estimated at 235 billion barrels.*[21]

Canada and oil shale. Canadian oil shale has been especially attractive to American energy policymakers because it is a large and secure oil and natural gas source. The Canadian deposits, mined since 1967, cover an area approximately the size of England, primarily in Alberta province, and contain an estimated 170 billion barrels of oil. The Keystone XL project would double the amount of Canadian petroleum presently imported into the United States and would itself provide 5 percent of current US petroleum consumption and represent 9 percent of US petroleum imports.[22]

Three existing portions of the pipeline now extend from Alberta Province to Oklahoma. The fourth component, the proposed Keystone XL, would add several additional segments to the existing line to create a new route from Alberta Province to the Gulf of Mexico. This new route

would extend the pipeline for the first time through Montana, Nebraska, and Oklahoma to the Gulf Coast. The 485-mile southern leg of the new pipeline is virtually complete. After initially opposing the southern segment, Obama approved it in March 2012 after the developers made sufficient changes to satisfy the White House. What remains in dispute is the so-called Northern leg, a 1,179-mile northern line yet to be built between Hardisty, Alberta, and Steele City, Oklahoma.

The "fracking" controversy. The fracking technology rapidly spreading across the United States and Canada for oil shale drilling has been environmentally controversial, as the later discussion about natural gas further illustrates. What is undisputed is that oil shale mining requires extensive surface and subsurface geological disruption with potentially adverse environmental impacts. A National Academy of Sciences report notes that oil shale mining "is much more costly, energy intensive, and environmentally damaging than drilling for conventional oil. The processes by which we mine and refine oil shale and tar sands to produce usable oil, for example, involve significant disturbance of the land, extensive use of water (a particular concern in dry regions where oil shale is often found), and potential emissions of pollutants to the air and groundwater. In addition, more energy goes into these processes than into extracting and refining conventional oil, and more CO_2 is emitted."[23] Canada's Alberta oil shale production has removed thousands of acres of Boreal forest, requiring the displacement of 100 tons of surface soil for every barrel of refined petroleum eventually produced. Surface water is often polluted with potentially harmful levels of heavy metals—including cadmium, copper, lead, mercury, nickel, silver, and zinc.[24] However, evidence of fracking's adverse environmental impact has been fragmentary and inconclusive. The US EPA is expected to issue an important report on the environmental aspects of fracking in late 2013 or 2014.

Because the proposed XL line crosses international borders, responsibility for its environmental assessment and eventual permitting rests with the US Department of State (USDOS). The State Department's required environmental review of XL, completed in 2011, declared the project would have "no significant impact" on the environment, a decision quickly renewing an already heated controversy over the pipeline.

The pipeline issue creates an unusual mix of partisans and opponents. On the supporting side are business groups, oil companies, labor unions (plumbers, pipefitters, operating engineers, construction unions), the Canadian government, numerous congressional Republicans and construction equipment manufacturers, and congressional representatives of Utah, Colorado, and Wyoming who contended that the Obama administration was "locking up" their own states' large oil shale reserves.[25]

On the other side are environmentalists, ranchers, and farmers in Nebraska and other states designated potential pipeline sites; political conservatives who "don't like the idea that TransCanada [the pipeline builders] might say that their land had to be used for this pipeline"; proponents of renewable energy development; and many congressional Democrats and conservationists, among others.[26] There was no doubt that many environmental organizations, normally dependable Democratic presidential supporters, had been prepared to penalize Obama in the 2012 election if he permitted Keystone XL.[27]

No final decision about Keystone XL. In November 2011, the State Department, with the President's endorsement, announced that it would delay an XL decision because "it was concerned about the Nebraska part of the route and . . . finding and reviewing an alternate path could take until 2013," apparently leaving a prickly political legacy for the next White House occupant.[28] Then, in January 2012, the president postponed a decision about the northern segment of the Keystone, arguing that more time should be given to study that portion after the 2012 presidential election. Later in 2012, Obama approved the southern XL extension, still leaving the fate of the northern segment unresolved. So the issue remained into 2013 when it appeared that a final White House decision might not appear until 2014.

Regardless of the pipeline's eventual fate, many petroleum industry spokesmen, policy analysts, and political representatives from states with significant oil shale deposits are predicting a vigorous "boom" in domestic petroleum production driven by the new shale fracking technology. One group of experts has predicted that at least twenty US shale formations can yield significant new crude oil. But other energy industry experts, wary of the economic uncertainties in future petroleum markets

and the durability of the newer mining technologies, are less certain about the long-term implications of accelerated oil shale mining. Once again, predictions about long-term petroleum use, like predictions about the future of other energy sources, rest uneasily on a shifting foundation of assumptions about future economic, political, and social conditions. The increasing development of oil shale drilling and the generally benign regulation it currently experiences from federal and state governments suggest a high probability that it will account for an increasing proportion of domestic crude oil production, perhaps accounting for as much as 10 percent of total annual domestic crude oil production within a decade.[29]

Creating More by Using Less: Petroleum Conservation and Substitution

Increased conservation of petroleum usage remains an important and feasible strategy for diminishing the rate of growth in domestic petroleum production and consumption. Usage conservation can displace otherwise consumed petroleum and thereby extend the future supply of petroleum. Most experts believe presently available technologies, together with existing and proposed future federal, state, and local legislation, could reduce annual domestic petroleum consumption by 10 to 15 percent.

Since energy policies are always related, many policies not targeted primarily at reducing domestic petroleum consumption may directly, or indirectly, encourage greater petroleum conservation. Federal air pollution standards, for instance, encourage the use of cleaner burning auto fuels and greater fuel efficiency. State policies intended to reduce emission of climate warming gases, such as CO_2, may also encourage industrial and commercial installations to substitute biofuels, such as ethanol or natural gas for petroleum.

Federal and state governments have already enacted numerous laws explicitly promoting petroleum conservation. These include the following:

- Auto and truck fuel efficiency standards—federal law currently requires that all new automobiles and light trucks purchased in the United States achieve an average fuel efficiency of 35 miles per gallon by 2020

- Labeling, which provides consumers comparative information on fuel efficiency
- Incentives, both financial and nonfinancial, which target manufacturers and consumers to encourage market front-runners to develop and purchase more efficient vehicles
- Technical assistance, which assists the public and private sectors in adopting fuel-efficient technologies and implementing policies to reduce fuel consumption
- Urban planning and behavior change, including zoning, traffic design, and idle reduction rules to reduce fuel consumption
- Research and development (R&D) support to encourage development and testing of more energy efficient technologies—for example, incentives to increase efficiency and market competitiveness of hybrid and alternative fuel engines
- Replacement of petroleum in the transportation sector with biofuels, or blended petroleum and biofuel[30]

Alternative fuels for petroleum became one of the most significant energy conservation issues crowding the Washington policy agenda at the end of Obama's initial term when the federal government's continuing promotion of ethanol—the nation's most important transportation fuel additive—was entangled in congressional controversy over reducing the national debt.

Ethanol

In 2011, at a time when the virtues of "renewable energy" had become virtually a cliché in American political discourse, ethanol fuel producers and blenders faced a paradox. For the first time in more than three decades, they confronted a fierce political battle to protect their privileged status in federal and state law.

Most Americans may know little about ethanol, but they use lots of it. Ethanol is as close to the average American as the nearest gas pump. Virtually all gasoline now sold in the United States contains ethanol, a "biofuel" distilled from corn. Producers and marketers of gasoline customarily blend ethanol and gas in the cargo tanks of gasoline delivery trucks before the mixture is transported to energy markets. Most

gasoline consumed in the United States is blended in a mixture of 10 percent ethanol and 90 percent gasoline (often called E10), the legal limit of ethanol additive permitted by federal law until 2010.

Domestic corn ethanol is an example right out of Government 101, exemplifying how energy resources, like numerous other commodities in the American energy economy, are politically promoted, protected, and defended through the institutional, legal, and economic structures of the American policy process. In this respect, as subsequent chapters will illustrate, there is nothing unique to corn ethanol, which joins other energy resources like coal, petroleum, and nuclear power in acquiring economic advantages through public law and which, once attained, are formidably difficult to diminish and powerfully defended by the beneficiaries.

A financially privileged biofuel. In the aftermath of the energy shocks during the 1970s, the federal government passed the Energy Policy Act (1978), creating a subsidy for blenders, and created a tariff to protect domestic producers from imported ethanol. Ethanol gained additional federal patronage as a result of two major congressional acts passed during the G. W. Bush administration. The Energy Policy Act of 2005 required an increasing volume of ethanol and biodiesel to be blended with the US fuel supply between 2006 and 2012. The Energy Independence and Security Act of 2007 mandated a progressive increase in domestic renewable fuel use to 36 billion gallons annually by 2022. These combined incentives created an increasingly strong ethanol market growing from two million gallons in 1981 to about thirteen billion gallons in 2010. By 2011, combined federal ethanol subsidies exceeded $6 billion annually.[31]

Most experts believe that the two Bush-era programs practically ensure a continually growing market for ethanol fuel. Moreover, the EPA ruled in October 2010 that cars and light trucks in model year 2007 and thereafter can also use a richer blend of 15 percent ethanol and 85 percent gasoline ("E15"). The newer blend requires a *flex fuel vehicle* that is expected to become more common as environmental regulations and increasing gasoline prices increase ethanol's market appeal.[32] Producers and blenders of ethanol fuel, having successfully defended this federal largesse for more than three decades, now confront increasing opposition

to continuing federal subsidies and import tariffs in the aftermath of the severe economic recession beginning in 2008 and the resulting federal budget crises.

End to subsidized ethanol? The federal subsidy for ethanol producers and blenders created in 2005 was mandated to expire at the end of 2011. The mandate was renewed for five additional years in 2011, however, despite considerable opposition from an unusual alliance of environmentalists, fiscal conservatives, producers of competing biofuels, and many congressmen in both parties. Fiscal conservatives and a substantial bipartisan congressional coalition believe that federal law now ensures a growing future demand for fuel ethanol that precludes the need for continuing subsidies, especially when federal budget deficits have created an economic crisis requiring severe reductions in federal expenditures. The battle against the mandate has continued well into Obama's second term.

Many environmentalists assert that ethanol has been unwisely exempted by Congress from a provision of the 2007 Energy Independence and Security Act requiring all other, potentially competitive biofuels to reduce greenhouse gas (GHG) emissions by 20 percent compared to gasoline, thereby, giving ethanol a competitive advantage over alternative, and more environmentally beneficial, biofuels. (Corn-based ethanol creates more GHG emissions than alternative biofuels, such as cellulosic and sugar cane.) Additionally, they argue that federal subsidies have encouraged the increasing conversion and environmental degradation of farm land—about 40 percent of all corn cultivated domestically is used for ethanol production—that could be used for more environmentally beneficial crops. Additionally, corn ethanol production is asserted to be more energy intensive than potentially competitive biofuels.[33] Moreover, the critics add, the subsidies aren't needed to ensure corn ethanol an attractive market. Ending federal subsidies, remarked a spokesperson for the influential Environmental Working Group, "is definitely overdue. We think of it . . . as a 50-year old that needs to move out of their parent's basement."[34]

Ethanol growers are concerned that the end of federal subsidies will also be accompanied by termination of the tariff on imported ethanol that has protected domestic producers from global competitors,

particularly Brazil, the second largest global producer of corn ethanol and an aggressive marketer internationally. Competitive ethanol imports, argue corn ethanol proponents, also will cost Americans jobs and income. "Ethanol is America's fuel: It's made here in the United States, it creates US jobs, and it contributes to America's national and economic security," asserted retired Gen. Wesley Clark, cochairman of Growth Energy, a major ethanol industry interest group.[35] And, striking a note intended to resonate with environmental advocates, corn ethanol proponents have warned that opening the domestic market to imported Brazilian ethanol will accelerate further destruction of the already badly reduced Brazilian rain forest ecosystem.

NATURAL GAS: A MIX OF REWARDS AND RISKS

Natural gas in its several different forms is, in many respects, the most attractive of all the fossil fuels in the nation's near future. Natural gas is commercially produced primarily from oil fields and natural gas fields, although the industry is now aggressively extracting natural gas from unconventional sources such as shale gas and coal bed methane. Traditional *casinghead*, or "associated" gas, principally methane mixed with numerous impurities, is refined into ethane, propane, butanes, pentanes, and other commercial forms, which for convenience are often collectively called "natural gas." While the largest proven natural gas reserves are located in Russia, Iran, and the Arabian Gulf states, US proven reserves are significant and, as new extraction technologies develop, steadily increasing. To many US energy sectors, natural gas is increasingly attractive, economically and environmentally, as an alternative to petroleum and coal *if* its entailed risks prove acceptable. And, like all projections about future domestic energy use, predictions depend upon numerous assumptions or "scenarios"—such as continued economic growth and absence of major political crises—that caution against treating predictions as if they are destiny.

Domestic Resources: Increasing Supply and Demand

Proven reserves of domestic onshore and offshore natural gas have grown annually since 1999 as a result of improved technologies and the development of economically practical extraction from shale with

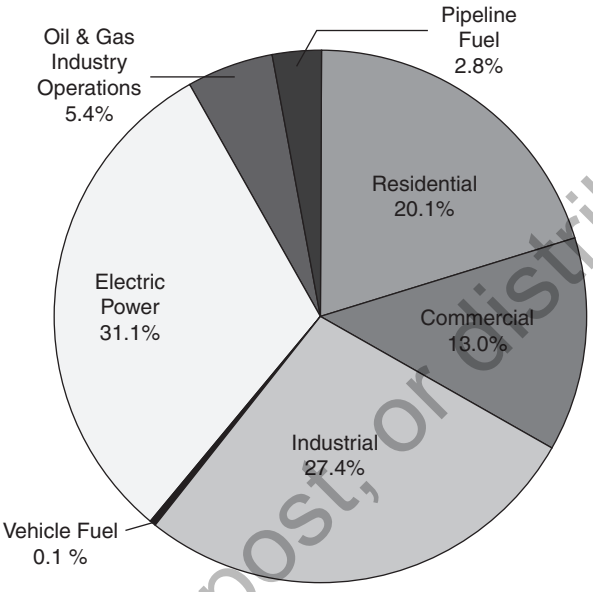
fracking technology.[36] According to the EIA, the United States possesses 2,543 trillion cubic feet (tcf) of potential natural gas resources. At the 2010 rate of US consumption, this is enough natural gas to supply over one hundred years of domestic use. More than 90 percent of current domestic natural gas originates from onshore sources, the rest primarily from the Gulf of Mexico. Nineteen states are estimated to possess significant natural gas reserves.[37] Domestic production of natural gas is expected to increase significantly in the future, but so is total US energy demand; the EIA has predicted that by 2030 natural gas will provide about 25 percent of domestic energy consumption—about the proportion of current consumption. However, the predicted changes in how natural gas is produced and consumed are important.

A Versatile Fuel

Natural gas is the most versatile of domestic fossil fuels. As Figure 3-4 indicates, it provides a significant portion of energy to several important US economic sectors. The anticipated growth in natural gas supply into a widely predicted boom is the result of increased profit margins for gas extracted from shale, and especially from the technological improvements in horizontal hydraulic fracturing, or fracking. The potential productivity of fracking has also incited increased pressure upon Washington from many states to accelerate gas exploration on federal lands within their borders. The environmental controversy is certain to magnify as expectations for future gas production from hydraulic fracturing increases: the DOE has estimated that fracking may provide as much as 20 percent of the nation's total natural gas supply by 2020.

Much of the expected change in future natural gas production and consumption is expected to result not only from increased fracking but also from changes in fossil fuel consumption by the electric power and industrial sections, which together consume almost two-thirds of current natural gas production. Both economic sectors have responded to tougher air pollution regulations and the increasing economic attractions of natural gas by substituting gas for coal-fired facilities in existing or planned installations. Progress Energy, for example, one of the nation's largest electric utilities, has announced plans to shut down eleven North Carolina coal plants by 2017 and to substitute natural gas in two of them.[38]

FIGURE 3-4 **US Natural Gas End Use, 2012**

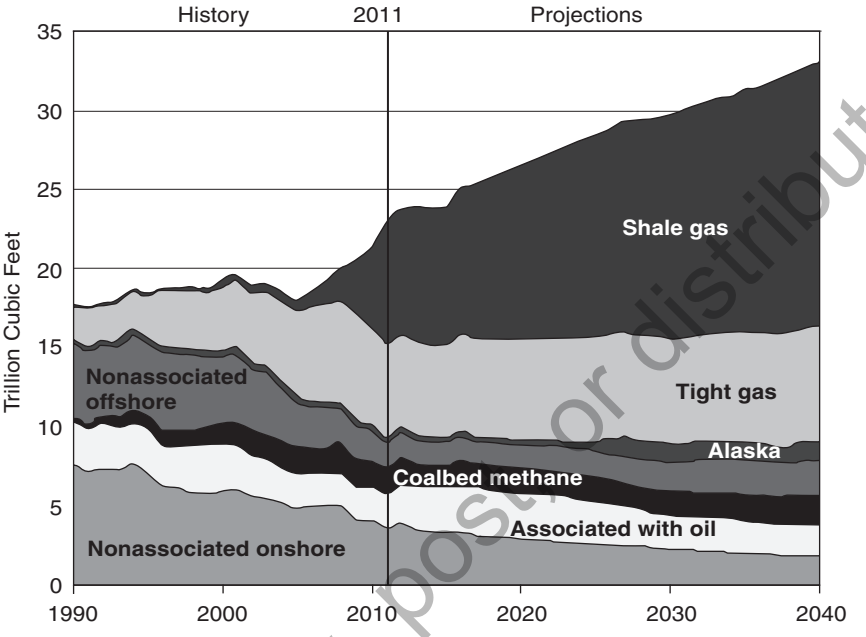


Source: Center for Climate and Energy Solutions, "U.S. Natural Gas Overview of Markets and Use, 2011," at http://www.c2es.org/publications/natural-gas-markets-use-overview. Based upon U.S. Energy Information Administration, *Natural Gas Annual*, 2012 (Washington, DC: Energy Information Administration, 2012), Table 1, p. 1.

"Almost a Miracle" or an Environmental Menace?

In 2000, the future domestic supply and economic competitiveness of natural gas seemed problematic, an important concern because natural gas has many environmentally attractive qualities. It releases fewer emissions of regulated air pollutants and CO_2 per Btu than coal or petroleum, a major reason electric utilities consider it an attractive substitute for more environmentally polluting coal. Thus, the prospect for an unanticipated growth in future gas reserves sufficient to enhance its economic competitiveness with other fossil fuels has been potentially good news for natural gas consumers and, especially, for the industry itself.

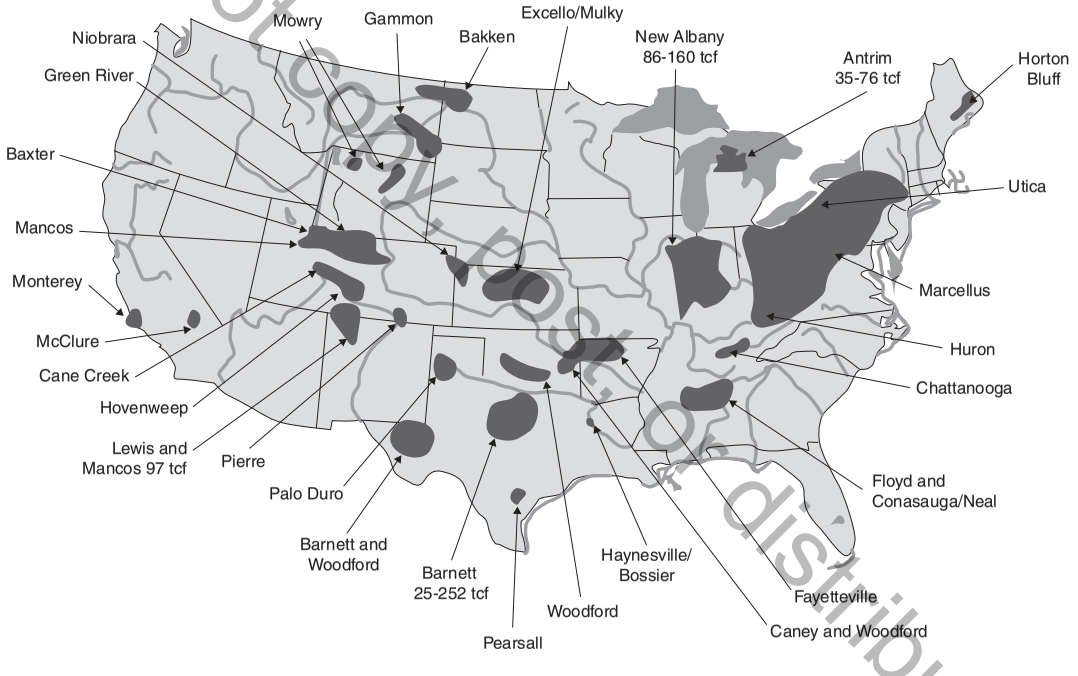
FIGURE 3-5 **US Dry Natural Gas Production by Source, 1990–2040**



Source: U.S. Energy Information Administration, *AE02013 Early Release Overview* (Washington, DC: Energy Information, 2013), 2.

The fracking boom. Enormous deposits of oil shale underlie the United States, as illustrated in Figure 3-6. The natural gas industry is riding a rising tide of optimism sustained by fracking technology. At the outset of the Obama administration, the new drilling boom incited by fracking seemed to many industry leaders a certain path toward a bright future. "It's almost divine intervention," burbled Aubrey K. McClendon, chairman and chief executive of the Chesapeake Energy Corporation, one of the nation's largest natural gas producers. "Right at the time oil prices are skyrocketing, we're struggling with the economy, we're concerned about global warming, and national security threats remain intense, we wake

FIGURE 3-6 **US Shale Oil Formations, 2011**



Source: Charles R. Anderson, "The Real American Energy Opportunities," *An Objective Individualist*, at http://objectivistindividualist.blogspot.com/2011/02/real-american-energy-opportunities.html. Based on U.S. Energy Information Administration, *Natural Gas: Shale Gas and Oil Plays, Lower 48 States* at http://www.eia.gov/pub/oil_gas/natural_gas/analysis_publications/maps/maps.htm.

up and we've got this abundance of natural gas around us."[39] Not all industry experts share this confidence. Still, steadily increasing gas production throughout the Obama administration's first term encouraged most energy experts and financial markets to view the industry's future with cautious optimism.

A disputed environmental impact. The issue that most conspicuously threatens to dissipate optimism about a coming boom in natural gas production is the environmental risks entailed with fracking technology.

Hydrologic fracturing "involves pumping liquids under high pressure into a well to fracture the rock and allow gas to escape from tiny pockets in the rock." Millions of gallons of chemically treated water called "brine" mixed with sand is blasted down a drilling hole to shatter petroleum shale and release the embedded gas. The return water, called "flowback," is a cocktail of water, chemical toxins, and carcinogens; other chemical wastes sometimes including radioactive components; and inert substances that must be purified before the flowback is suitable for other uses. Most of the return water, however, is pumped back underground into shale sites for containment. Almost all natural gas exploration and production from leases on federal lands, most west of the Mississippi River or in the Gulf of Mexico, use fracking technology regulated by the Department of the Interior. The largest private fracking operations are sited on the Barnett Shale formation near Fort Worth and on the vast Marcellus Shale underlying portions of Pennsylvania, New York, West Virginia, and Ohio. Pennsylvania alone has more than 57,000 gas producing wells. These nonfederal sites are presently regulated by the states.

Environmentalists and many residents in communities near fracking operations regard hydrologic fracturing ambivalently. They recognize fracking's economic appeal, especially amid a severe economic recession, but they also contend that fracking disrupts surface and ground water and eventually can infiltrate community water supplies with a variety of environmentally hazardous chemicals, such as dissolved or ambient methane, and inert materials.[40] Because many existing and planned fracking operations are located near sources of drinking water for large population centers, such as Chicago, Philadelphia, and New York, state

and local officials have become increasingly insistent that federal EPA and state environmental regulators investigate the environmental risks associated with the technology. Federal law does not now require drilling companies to disclose the ingredients for their mining water.[41] Under considerable political pressure from oil shale states, environmentalists, Congress, and communities near fracking operations, the EPA has initiated studies to characterize the content and dispersion of flowback. The final report is scheduled in 2014.

Many gas production companies contend their brine formula is a trade secret and refuse to disclose its composition. Also, they contend that their brine is environmentally safe because it is injected thousands of feet below drinking water aquifers, sufficiently deep to avoid groundwater contamination, and that the flowback not returned deep underground is purified before it's released for other purposes. Moreover, drillers assert that proven technologies are available for distilling an environmentally safe liquid from flowback when needed. (The CEO of Halliburton Co., a major energy consulting firm, was so convinced of the safety that he invited an associate to drink some of it during a meeting of the Colorado Oil and Gas Association, and the media reported that his associate consumed a "bit of the liquid.")[42]

Many states overlying large oil shale deposits are not waiting upon EPA's final determination about fracking and have initiated their own investigations with a view toward possibly regulating fracking themselves. New York is among the earliest to impose constraints on hydrologic fracturing until more is known about its environmental consequences. Environmentalists and many residents of communities near fracking operations maintain that the flowback has already created surface and groundwater contamination, air pollution, and residual solid wastes from brine processing including heavy metals and other chemicals toxic to humans and ecologically dangerous.

Governance: Future Policy Options

The future of domestic natural gas policy is a fabric bound together with "ifs" and "buts." With no economically and technologically viable short-term substitute, further domestic exploration and production of natural gas seems inevitable. The Obama administration continued a

long-standing federal policy of encouraging domestic natural gas exploration and production on both public and private lands, while simultaneously assuring it would vigilantly regulate the adverse impacts if fracking proves an environmental hazard, thus, leaving the future unsettled. Washington is also under considerable pressure from natural gas producers, the economic sectors dependent upon natural gas—especially the electric power industry—and some states to open additional public and private land overlying gas shale to further exploration and natural gas production. Since the Energy Policy Act (2005) currently exempts fracking operations from federal regulation and a final EPA determination of fracking's environmental impacts, an essential requisite for any future federal regulation is several years in the future; thus, the short-term regulatory initiative has been assumed by the states—unless an environmental disaster on the scale of the Deepwater Horizon crisis compels rapid federal attention to hydrologic fracturing.

At the same time that natural gas is expected to constitute at least a quarter of domestic energy consumption over the next several decades, federal and state governments also have the ability to create additional incentives to fortify the electric power industry's already strong desire to increase its consumption of natural gas as a primary fuel. These incentives might include federal or state tax subsidies for increased production, state regulatory commission requirements that utilities use an increasing proportion of natural gas for power generation, or federal and state regulations that encourage greater utility and industrial reliance on natural gas to replace fossil fuels with higher CO_2 emissions for energy units, and much else. Major policy studies concerned with future domestic energy consumption show that natural gas is, at the very least, an environmentally attractive alternative to other fossil fuels in creating a "bridge" to greater reliance on renewable energy and all the more attractive because it is a secure domestic resource.

Environmentalists have been divided and tentative about the role of natural gas in the nation's energy future. They recognize that continued reliance on natural gas perpetuates the importance of fossil fuels, with all their recognized environmental liabilities, in future energy production. The emergence of fracking as an important production technology awakens apprehension about the long-term environmental risks involved in

future natural gas consumption but, at the same time, the availability of natural gas as a less air polluting substitute for coal, especially in electric power production, may enhance its appeal.

Several states overlying large gas shale deposits, such as New York and Pennsylvania, have either adopted, or are considering adopting, short-term moratoriums on new fracking operations until federal or state environmental agencies can make a reliable assessment of the environmental risks entailed in the technology. States may also have an option to control some aspects of fracking by regulating CO_2 emissions, thus, creating a strategy for encouraging greater natural gas consumption as a substitute or alternative for coal consumed in industrial and commercial sectors. Some communities near fracking sites are also contemplating regulation, and in a few instances, they have already initiated efforts to characterize the environmental impact of the process. The three-layer deep governmental concern about fracking regulation also creates a classic federalism issue involving uncertainty and potential conflict over regulatory powers and responsibility for drilling oversight.

CONCLUSION: THE FOUNDATION OF ENERGY POLICY

Petroleum and natural gas remain the foundation fuels of the American energy economy. Since World War II, petroleum has provided almost exclusively the energy powering domestic transportation and will continue to be the primary source of transportation for many future decades. Beginning in 2005, new and unconventional technologies associated with fracking have vastly increased the potential supply of natural gas and petroleum, leading many experts to predict a surge in domestic petroleum that within a few decades will vastly improve national energy security now hostage to imported petroleum. Fracking technology, additionally, is widely predicted to create a boom in future petroleum and natural gas supplies. The policy implications of a fracking boom might be profound. A growing future supply and diminishing cost of natural gas, already a significant fuel source of electric power, could accelerate the substitution of gas for coal as the primary fuel for power generation. Since natural gas also creates significantly lower emissions of air pollutants and climate warming chemicals than coal combustion, the collateral value of natural gas in future environmental regulation could also be important.

Petroleum and natural gas also pose significant policy challenges for national policymakers. The long-running conflict over federal government subsidies and tax concessions for petroleum producers remains. Controversy prevails about access to domestic petroleum and natural gas reserves; about the priorities to be accorded renewable energy, nuclear power, and energy conservation; and about governmental subsidies for alternative energy from biofuels, such as ethanol. Environmentalists and their allies continue to press Washington and the states for more vigorous environmental regulation of the production and consumption of carbon fuels and, especially, for an aggressive national regulatory program for climate changing emissions from carbon combustion. Domestic petroleum producers have urged the White House and Congress to accelerate their access to domestic petroleum reserves on interior public lands and the OCS. These controversies have been intensified by a growing polarization between Republicans and Democrats in Congress and the White House across almost all domains of energy policy.

In many respects, the resolution of these essential policy issues will also depend upon often problematic, contested estimates of domestic and foreign energy reserves and upon the accuracy of the economic and scientific models upon which policymakers often rely when attempting to anticipate future energy supply and demand. Additionally, the optimistic glow attending many predictions of future energy supply associated with new fracking technology cannot conceal the dark uncertainties about fracking's potential environmental risks yet to be accurately characterized.