

Prologue: The Journey

It remains a basic fact of American life that, despite forty years of political fulminating, global conflict, and ever-increasing environmental awareness, most of us still take energy for granted. We take for granted that when we come home at night and flip on the light switch, the bulb will illuminate. We assume that when we turn up the thermostat, the heat will come on. And however acutely aware we may be of the price per gallon we pay, we take it as something close to a right of citizenship that when we drive an automobile up to one of the more than 100,000 gas stations in the United States, there will be fuel for our cars and trucks in the tanks beneath the asphalt. Without gasoline, the country would not run, and so there is gasoline, and barring extraordinary circumstances, there is plenty of it.

The fuels that let us take energy for granted come from all over our country and our planet: mines in West Virginia, wind farms in Texas, and nuclear power plants in California. But no doubt the most vexed fuel we use is petroleum, and although we now import it from more than 60 different foreign countries (Canada now first among them, Saudi Arabia second), it has been the need for supply from the Middle East that has exercised such an outsized influence on our foreign policy, our environmental politics, and our national security.

By the accidents of geology, the fossilized remains of prehistoric zooplankton and algae when heated over millennia form crude oil and are nowhere more plentiful than in a 174-mile long reservoir known as the Ghawar Field in Saudi Arabia. Ghawar lies along the eastern edge of the Arabian Peninsula, in the middle east of the Middle East, and buried beneath its sweltering sands is the biggest oil field in the world, having thus far produced 60 billion barrels of crude and providing to this day half the Saudi kingdom's daily output. For decades, Saudi Arabia has been able

to act as a kind of central bank of oil, calming world markets at times of maximum scarcity by increasing output, as it did during the two gulf wars, and cutting supply when prices fall. Ghawar is what allows them to do this. It is their mother lode; in all of Iran, Iraq, Russia, and Nigeria, there is no deposit remotely its size.

The story of how the crude oil pumped out of the ground at Ghawar travels to the United States to become the gasoline, the jet fuel, and the ingredient in tens of thousands of plastics and consumer goods that together keep the American river of commerce flowing tells us much about the shape of our world today: about the vastly complex and tenuous system of global transport whose constant smooth functioning underwrites our complacency about the sprawl that requires two-hour commutes and makes sport utility vehicles (SUVs) even imaginable. It tells us about the consequences of failed states in blood and treasure. And it tells us something about the strange and constantly shifting balance we in the United States have tried to strike between unharnessing all of energy's potential to fuel economic growth and trying to limit its corrosive effects on our environment and our foreign policy. In short, to see how oil moves from Ghawar to our gas pumps depicts many of the most important issues this book confronts.

The journey begins innocuously enough, with oil sufficient to fill 5 million barrels (or 210 million gallons) a day moving from beneath the sands of Ghawar along a pipeline to the coast of the Persian Gulf, where it arrives at Ras Tanura, the largest oil terminal in the world. Already by this point, however, security is an issue. Given Al Qaeda's stated goal of overthrowing the Saudi monarchy and its desire to disrupt Western economies, every yard of pipeline is a potential target. To guard against the dangers of attack and the supply disruptions it would cause, the Saudis have the largest inventory of spare pipeline parts of any nation, much of it stored remotely along the pipeline route itself so that repair teams can be flown in by helicopter, access the needed materials on site, and get the oil flowing again as quickly as possible.

The terminal at Ras Tanura, which processes 10 percent of the global output of crude, is itself a fortress with multiple security checkpoints along the highway leading to it and on the grounds itself. Access to this command center of Saudi Aramco, the largest oil company in the world, is highly restricted. Storage tanks at the terminal house 50 million barrels worth of

crude. Its original port lies along a small peninsula jutting into the Persian Gulf, but because of modern supertankers' need for deep water the Saudis have installed artificial islands in the nearby waters to allow for faster loading.

Once the crude has been transferred onto a tanker, the ship begins its journey westward by passing through the Strait of Hormuz. Only 34 miles across at its narrowest point, with Iran on the western shore and the United Arab Emirates and Oman on the eastern, this strait is the most important choke point in the world oil supply. Roughly 15 tankers a day pass through it, representing 40 percent of waterborne oil shipments. If Iran—attacked perhaps by the United States or Israel—ever decided to shut down the Persian Gulf oil business, this is where it would do so.

For a variety of legal, diplomatic, and logistical reasons, the great majority of tankers are not owned by oil companies or sovereign entities, but by independent shipping firms. A tanker might be built in South Korea, owned by a firm in Texas, fly the Liberian flag, and transport oil bought by the highest bidder. As an environmental matter, the most obvious risk the tanker poses in its 40- to 50-day passage from Ras Tanura to the Gulf of Mexico is the danger of a major spill caused by a storm, poor navigation, or an improperly maintained hull. But incidents such as the 1989 *Exxon-Valdez* spill in Alaska or the *Prestige* spill off the coast of Spain in 2002, which was nearly double the size of the *Valdez* spill, are only the most spectacular form of tanker damage. These ships also discharge large quantities of oil-contaminated ballast water, or bilge, as well as fuel oil, which, when all the ships in the tanker fleet are factored in, adds up to five *Exxon-Valdez* spills each and every year. Oil is a dirty business, not the least for our oceans.

Once a tanker has moved through the Strait of Hormuz and crossed the Gulf of Oman, it enters what, over the past decade, have become the most dangerous waters in the world—the Gulf of Aden. The ancient art of piracy, never entirely eradicated, but for most of the twentieth century more of an irritant than a threat to global supply chains, now thrives off the coast of the Horn of Africa. And what it thrives on is the ransom paid for richly laden ships. Supertankers display the three characteristics pirates like best: they are slow moving; they have a low freeboard—the distance from water to deck; and they carry precious cargo. The pirates operate from the failed state of Somalia, a country eviscerated by decades of armed

conflict involving neighboring states, warlords, Islamic extremists, and botched superpower interventions. Their success has raised shipping insurance costs tenfold in recent years.

To elude the danger, some tankers now avoid the quicker passage through the Suez Canal and navigate around the Cape of Good Hope, extending the journey to the United States up to 95 days. Even this change in route, however, has not made them safe. In 2008, the *Sirius Star*, a Saudi-owned tanker following this route with its cargo of \$100 million worth of crude was captured 520 miles off the coast of Kenya, becoming the largest ship ever hijacked. Making the short-term calculation that a \$3 million ransom was worth it to get their tanker, crew, and oil back, the owners paid up, filling the pirates' coffers for future operations. American and British vessels have begun to patrol the area to ward off the pirates, but now that these increasingly sophisticated gangs have extended their reach to a million square miles of the Indian Ocean, Western authorities admit there is no sea-based enforcement that can stop them. Among the less obvious contributions to the price of the gas in your tank, then, is the fact that a large East African state has no functioning government.

Once through the Suez Canal or past the tip of Africa, a U.S.-bound ship typically makes its long transatlantic journey to the American facility most capable of unloading supertankers. It is called the Louisiana Offshore Oil Port (LOOP), and it lies 18 miles off of Port Fourchon in 110 feet of water. The tanker approaches one of the three floating buoys, which it attaches to via very large hoses that pump the oil into a 48-inch-wide undersea pipeline. It can take 36 to 48 hours to unload a 2-million-barrel supertanker.

The oil began its journey under the jurisdiction of a monarchy in Saudi Arabia; while at sea it was under the control of maritime and international law; and now here, in the Gulf of Mexico, as the black fuel moves through the pipeline to the Marathon Petroleum Company's eight underground salt caverns at Clovelly, Louisiana, which store some 50 million barrels, it enters for the first time the web of U.S. law and regulation. And quite a web it is. At this early stage of the process, the crude falls under the Hazardous Liquid Pipeline Safety Act, the Clean Air Act, the Outer Continental Shelf Lands Act, the National Environmental Policy Act, the Oil Pollution Act, and the Clean Water Act's National Pollutant Discharge Elimination System as well as its Spill Prevention Control and Countermeasure require-

ments, to name only some of the federal statutes involved. As the crude continues down the supply chain, it will encounter dozens of other state and federal controls and standards.

And yet these laws are only as effective as their credible enforcement. The responsibility to oversee more than 2 million miles of oil and gas pipelines, which lined up end to end would wrap the globe 88 times, falls to the U.S. Transportation Department's Office of Pipeline Safety, which employs 55 inspectors and hardly ever imposes a fine for violations, even for explosions and the death of pipeline workers. (And as we learned from the deep-well disaster in the Gulf of Mexico in the spring of 2010, the Office of Pipeline Safety is not the only federal agency performing too little oversight.)

In short, as soon as the oil reaches our waters and makes its way landward, it enters a different kind of conflict zone, where slow-moving bureaucratic battles between private corporations, government regulators, affected cities and towns, and environmental organizations have been fought continuously since at least the late 1960s. From its origin, the petroleum has acted to control and in many ways distort our foreign policy; now it enters domestic politics.

It will take roughly fourteen days for the vital liquid to make its way from LOOP via Capline, a major oil thoroughfare that parallels the Mississippi River, to, say, a refinery in southern Illinois, traveling at about four miles an hour, roughly walking speed. There it will spend another four to eight days being processed into gasoline, diesel, kerosene, jet fuel, and various other chemical distillates.

On its journey across the ocean, the shipment has already entered into the planning and formulas of various oil companies' supply-chain management systems, which constantly attempt to maximize profit by fine-tuning what quantities of oil will be processed into which products depending on daily changes in prices and supplies across the region and the country. Major refineries, the biggest of which handle more than half a million barrels a day, constantly adjust their product mix as the market changes, until finally the individual products are sent down the next set of pipelines to reach what in the industry is called "the rack"—that is, one of the fifteen hundred oil terminals spread throughout the country—triggering, as they travel, the attention of different environmental and taxing authorities with every state line they cross.

After spending less than a week on the rack, the gasoline or diesel is loaded into an oil truck, which typically drives no more than a couple of hours to reach the convenience stores and retail gas stations that dot our landscape. Depending on the sea route and refining time, it has taken anywhere from nine weeks at the shortest to more than four months at the longest for the fossilized zooplankton beneath the sands of Ghawar to travel halfway around the globe and end up in the tank of your automobile. Strangely enough, barring spills or accidents, no human eyes have seen it. And nor will they ever see it because it burns in engines and enters the atmosphere as invisible carbon dioxide and is not visible in the products it helps produce.

For most of the twentieth century, the process described here did not occur. We produced domestically the oil we used. And importing the relatively small quantities we sometimes needed to top off our domestic supply was far less complex as a technical and logistical matter—and given the remnants of colonialism, a much less tense geopolitical matter. That was another time. The decade that changed all that was the 1970s. It was then that the journey became the problem. Energy in America has never been the same since.

This book is about the problems, policies, and politics of energy in America, beginning with the crises of the 1970s, the varied responses to which continue to shape our current predicaments. It is about all the major forms of energy—oil, natural gas, coal, nuclear, hydro, solar, and wind—and how our government's attempts to control and decontrol, subsidize and command, legislate and repeal over the past four decades have produced a system and economy of energy production and consumption that fails to well serve our needs or those of our environment. The book is, then, in one sense a story of failure, but a story from which a great deal may be learned about how our democratic society might go about making better decisions for its energy future.

As this story unfolds—in all its complexity—many villains will come to the fore, including, no doubt, the Organization of Petroleum Exporting Countries (OPEC) cartel and in particular some of its members. At home, we have suffered from poor political leadership from both ends of Pennsylvania Avenue, where short-term political expediency has trumped sensible long-term policies. Key legislators far too frequently have elevated parochial regional interests over our national needs and have been overly

responsive to the potential for short-term partisan gains. Our leaders have also commonly been seduced by sweet visions of technological silver bullets. Environmental organizations have sometimes insisted on unrealistic goals, now and then forged inapt alliances, and been used to further elite not-in-my-backyard (NIMBY) agendas. Energy companies have frequently underestimated risks and shifted to taxpayers those costs that the companies themselves should properly bear.

Amid all the currents and crosscurrents, however, one character plays a particularly central role: price. Although our government has enacted thousands of pages of energy legislation since the 1970s, it has never demanded that Americans pay a price that reflects the full costs of the energy they consume. Nothing that we did or might have done has had as much potential to be as efficacious as paying the true price. The contrast with tobacco, for example, where taxes have been used over time both to reduce its consumption and to help finance some of the costs it imposes on public budgets and society at large can hardly be more stark. This book makes clear that this failure, alongside many others, accounts for the state of affairs we face today.