Chapter Three

Energy Security Is National Security

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Defining national security can be a difficult undertaking because it can mean different things to different people. George Kennan has offered, in my mind, an uncomplicated but reasonable definition: "the continued ability of a country to pursue its internal life without serious interference."[1]

Over the years, the world has shrunk because of the many technological advances that have become commonplace (for example, the Internet, global positioning satellites, and electronic convergence), and with that shrinking, the context in which the term "national security" is defined has morphed. Forty years ago, no one would have thought it possible to be able to track someone's whereabouts using only a telephone (a phone represented a location, not a person, per se); the same holds true for the idea of stealing government secrets in the middle of the night while sitting in one's home thousands of miles away; and certainly few people would have believed that the survival of the species could be threatened by the thoughtless acquisition and use of carbon-laden fuels. Yet each of these concepts is now an everyday reality, and in their own way, they contribute to our personal and national feelings of insecurity.

Energy security can be described in many ways, but for the purposes of this chapter, to paraphrase the International Energy Association, we will simply call it "the assurance of the uninterrupted supply of energy at an affordable price, while respecting environmental concerns."[2]

We have seen energy insecurity growing at an alarming rate recently. From the ability of hackers to disrupt the flow of power on an international Internet-reliant grid; to the seemingly innocuous decision to make critical parts for energy distribution systems offshore, a decision that backfires the moment our supply base decides they are our competitors; to the growing threat to health and safety from oil spills and the environmental contamination it breeds: it is clear that ready access to cheap energy is becoming ever more problematic. When you factor in the uneven distribution of energy availability in countries

across the globe and the manipulation of fuel pricing that threatens geopolitical stability, the problem becomes even more complex.

This chapter will address the notion of energy security as national security from four points of view that are, in my opinion, strategic priorities:

- Priority 4: widespread increased dependence on domestic energy efficiency
- Priority 3: migrating to alternative (sometimes called "clean") energy sources
- Priority 2: developing and sustaining an alternative energy capability
- Priority 1: creating strong civic, business, and political leadership to quickly implement needed changes that assure energy and national security for this country.

The Facts

Energy supply and demand play an increasingly vital role in our national security and the economic output of the country. It is not surprising that we spend more than $500 billion annually on energy.

The United States, on both domestic and military fronts, is a tremendous user of the world's proven supplies of energy. It is the world's second-largest consumer in total usage, at roughly 100 quadrillion British thermal units (BTUs)[3] annually of a 451-quadrillion BTU flow. Put differently, that means that 4.5 percent of the world's population uses 21 percent of the world's energy. For those who have traveled abroad, it is clear that energy is not only accessible, but also comparatively cheap**.** The majority of our fuels are petroleum-/oil-based (38 percent), followed by coal (23 percent) and natural gas (24 percent). Nuclear power provides 8 percent, and renewables weigh in at 7 percent.[4]

Moreover, our appetite for power and energy is continually growing. Facts pulled from a brutal but honest assessment by financier Michael Milken suggest an unsustainable (translate as "addictive") appetite for oil over the last 35 years (see table).

It is also clear that we are not the only substantial user of the world's energy supplies. In 2010, China overtook the United States as the world's largest energy consumer.[5]

Table. **U.S. Appetite for Energy**

Year	Foreign Oil Dependence (in percent)	Presidential Statement
1974	36.1	Richard Nixon: "At the end of this decade, in the year 1980, the United States will not be dependent on any other country for the energy we need."
1979	40.5	Jimmy Carter: "Beginning this moment, this nation will never use more foreign oil than we did in 1977—never."
1981	43.6	Ronald Reagan: "While conservation is worthy in itself, the best answer is to try to make us independent of outside sources to the greatest extent possible for our energy."
1995	49.8	Bill Clinton: "The nation's growing reliance on imports of oil . . . threatens the nation's security. . . . [We] will continue efforts to . . . enhance domestic energy production."
2006	65.5	George W. Bush: "Breakthroughs . . . will help us reach another great goal: to replace more than 75 percent of our oil imports from the Middle East by 2025."
2009	66.2	Barack Obama: "It will be the policy of my administration to reverse our dependence on foreign oil while building a new energy economy that will create millions of jobs."

Source: <www.businessinsider.com/look-who-failed-to-reduce-foreign-oil-dependence-2010-4>.

The facts are unambiguous. The United States:

- uses more of the world's energy resources than anyone else (except China)
- is using these resources at an ever-increasing rate
- is importing more of its energy supplies each year
- is in competition with our global neighbors for available proven reserves
- needs a cheap, readily accessible supply of energy to continue to thrive.

Clearly, strategies that lessen our dependence on traditional fuels from traditional sources are needed if we are to preserve our place in the global pecking order. So let us look at four strategic priorities that can greatly assist our efforts to have the energy we need when we need it AND to continue our role as a global leader.

Strategic Priority 4: Widespread Increased Reliance on Energy Efficiency

Energy efficiency simply means using *less* energy to produce the *same level* of energy service. For example, insulating a building allows the use of less heating and/or cooling energy to achieve and hold a comfortable temperature for its occupants. The use of fluorescent and natural lighting can in many circumstances provide as much or more light energy as a conventional incandescent light bulb. If there is any path that can quickly and easily move us toward greater energy security, it is energy efficiency.

A McKinsey and Company report titled "Unlocking Energy Efficiency in the U.S. Economy" states, in part, that "energy efficiency offers a vast, low cost energy resource for the U.S. economy—but only if the nation can craft a comprehensive and innovative approach to unlock it. . . . If executed at scale, a holistic approach would yield gross energy savings of up to $1.2 trillion."[6]

This $1.2 trillion savings on energy, which neither includes the transportation sector nor factors in the cost of greenhouse gas emissions, could cut the country's energy usage by as much as 23 percent (~ 9.1 quadrillion BTUs) by the year 2020. That would be more than enough to offset the expected growth in U.S. energy use if we continue at a "business as usual" pace.

Note that this savings comes from a $520 billion investment in energy efficiency improvements such as insulating basements, replacing old, inefficient appliances with newer ones, and sealing leaky building ducts.

With these energy savings comes the opportunity for consumers (whether commercial or residential) to take those same dollars previously used for energy generation and allow them to flow into other portions of the U.S. economy—for example, to offset costs of critical services like education and healthcare, as opposed to an economic model that sends many of those dollars overseas.

For the military, a comprehensive energy efficiency plan focusing on the warfighter would suggest, again, the ability to access the same level of energy services at a much lower energy cost. Lower energy costs in country may very well translate into lower fuel consumption.

Just as important is the notion that as the United States begins a serious effort to downsize its energy use, especially use that depletes precious fossil fuel reserves, more nations of the world will begin to see us as serious partners in the hunt for comprehensive solutions to global warming as well as to health hazards that arise from using oil, gasoline, diesel, and so forth. As that happens, the United States will find itself in better standing with countries that, in my opinion, now see us as addicted to energy at any cost. Their sense of us will change because of our significant efforts to commit to a more sustainable world through a change in perspective and behavior.

Strategic Priority 3: Migration to Alternative Energy Sources Leading to Less Dependence on Carbon-intensive Fossil Fuels

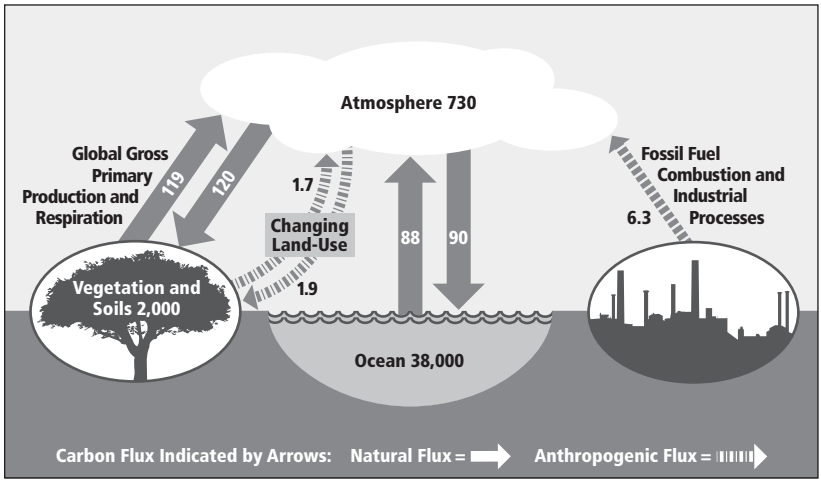
There are at least two significant reasons the United States must migrate from fossil fuels to alternative (sometimes called *clean*) sources (such as solar, wind, geothermal, and biomass) in the near future. Foremost is the fact that power generation by fossil fuels expels significant amounts of carbon into the atmosphere (~ 6.3 billion metric tons globally on an annual basis; see figure). This contributes to an ever-increasing global warming trend, 25 percent of which the United States is fully responsible for.

Experts believe the effects of this warming will be adverse, especially for the United States: "Likely future changes for the United States and surrounding coastal waters include more intense hurricanes with related increases in wind, rain, and storm surges . . . as well as drier conditions in the Southwest and Caribbean. These changes will affect human health, water supply, agriculture, coastal areas, and many other aspects of society and the natural environment."[8]

Moving to alternative fuel sources will greatly slow the rate at which we add to the problem because the amount of pollutants being put in the air will be reduced. That will be a huge step forward toward slowing, stopping, and eventually reversing global warming.

Second, as competition for these fuels increases, the cost to the United States in dollars and materiel (military equipment, apparatus,

Figure. **Global Carbon Cycle (in billion metric tons)**



Source: Intergovernmental Panel on Climate Change, *Climate Change 2001: The Scientific Basis* (U.K., 2001).

supplies, and so forth) must increase, accompanied by a significant loss in global goodwill. China and India lead a contingent of emerging nations that will need more oil to sustain their rise in economic and military clout, and they will seek those resources from the same places we do: the Middle East (Iraq, Saudi Arabia), Africa (Nigeria), and South America (Venezuela). The United States, no doubt, will fight to keep its energy supply intact. On that subject, the following opinion was voiced: "Some countries such as the U.S. have enormous military expenditures in part to protect global oil areas for their interests. A number of other large countries are getting more involved or active in the international arena due to energy related concerns, including China and Russia prompting a fear of a geopolitical cold war centered around energy security."[9]

Moving to alternative fuels that significantly decrease our dependence on foreign-owned supplies will substantially reduce the level of competition in which we must engage to assure uninterrupted access to power and energy.

Of course, other reasons for making the transition are abundant:

- A "green economy" based on alternative energy will require a workforce skilled in "green jobs," an economy that will be associated with fewer health problems than that of our present energy/power generation industry and that will be built on

"knowledge work." This suggests better paying high-tech jobs that will boost the U.S. economy and stabilize/raise the standard of living for millions of Americans.

- The sooner we make the changeover, the sooner we put the hurdles to such a change behind us, whether they are technological, process difficulties, consumer acceptance, or cost benefits of economies of scale.
- A smaller number of significant oil spills/leakages will occur (such as the BP/Deepwater Horizon mishap in the Gulf of Mexico in 2010) around the globe as these fuels become less important to satisfying our energy needs. Fewer spills mean fewer environmental concerns.

Clearly, then, moving to carbon-based fossil fuel alternatives for power and energy generation is an imperative if we are to overcome a series of key challenges to our present way of life.

Strategic Priority 2: Assuring that Alternative Energy Creation, Refinement, and Manufacturing Prowess Starts and Stays in the United States

Over the past 100 years, the American scientific, research, design, and manufacturing base has given the world thousands of technological advances from motorcars to spacecraft to cancer-fighting breakthroughs. Not only have many of these advances provided a better standard of living for much of the rest of the world, they also have given the United States a competitive global position second to none. However, that standing comes with a significant investment price tag.

A quick look at the numbers reveals that the Federal Government's investment has not been there: "The federal government spends less than 1 percent of its R&D budget on energy—a level less than one-fifth of expenditures in the 1970s and 1980s—clearly insufficient in light of coming challenges."[10] This is true not only in energy but also in most areas of scientific, technological, and manufacturing endeavor we would consider critical to our goal of self-sufficiency.

With that in mind, it should come as no surprise that the U.S. scientific/industrial base has been eroding over the past five decades, and our ability to continue to supply an ever-accelerating series of game-changing technical breakthroughs is heavily dependent on our commitment to such an effort—an investment in dollars as well as in the American creative spirit.

We must now focus our efforts on clean energy advances that improve existing technology while developing the "disruptive" proofs of concept that will lead us to the next level of energy/power generation and storage capability. We need this to happen in a number of areas if a comprehensive green future is to be realized. These advances include investments in power generation, energy storage, sustainable transportation, and smart grid technology, to name just a few.

At the same time, we will need to shore up our crumbling manufacturing base, which not long ago led the world in providing a host of products on a national and international basis. By that I mean the gears, bearings, advanced materials, and electronics that were the bedrock of manufacturing in the "old economy" and that will become the critical elements we need in years to come for wind turbines, solar cells, biomass gasification generators, and so forth to slow the pace of global warming. This will benefit not only us, but also residents of the entire world.

On the other hand, failure to embrace this course of action will lead to a loss of our global innovation leadership. That in turn will downgrade our status in the global pecking order with negative impact to our economy and a substantial downgrading of the American way of life *as we have known it*. Implicit in this loss is the notion that we will have to buy green products, for both domestic and military purposes, from others. From the viewpoint of national security interests, this is an unsafe place to be. The cost to the United States can certainly not be any less, and may be very much more, than the cost of investing in technological, scientific, and manufacturing leadership now.

Strategic Priority 1: Creating Strong Civic, Business, and Political Leadership to Quickly Implement Needed Changes that Assure U.S. Energy and National Security

I have made this the top priority because to me, it is the most important. The best plans in the world are little more than paper and ink unless they are acted upon. Unfortunately, we find ourselves in just such a circumstance. We have known for years how precarious our position has been. We know what we should do about it, and we know, at least in the short term, how to go about implementing the plans.

If we do, we can reduce and eventually stop global warming and the problems it could bring; we can lessen tensions between our global neighbors and ourselves that would otherwise grow because of the increased competition for a precious but diminishing natural

resource (foreign oil); and we can revitalize the U.S. economy (built on alternative energy solutions), create needed green jobs, and rebuild a standard of living that was once foremost in the world. This work can start with the priorities discussed above.

Creating the collective will to make these changes will be a major undertaking requiring the attention and commitment of our nation's principal government, business, and community leaders. It will not be an easy task, but it is one that has been accomplished in many other parts of the world and, on a smaller scale, in the United States. It happens when opinion leaders in the community see the need for change and convince those in power, sometimes one person at a time, to commit to and lead initiatives that change the thinking and behavior of the community at large. Examples across the globe include China and Europe (wind and solar), Brazil (sugar cane ethanol), and projects in Seattle, Washington, Portland, Oregon, and Minneapolis-St. Paul, Minnesota (green jobs in weatherization/energy efficiency). America can take lessons from best practices in these locales and create a roadmap for national implementation.

This same collective will has been a part of U.S. history throughout the country's existence—most notably in the 1940s, when we saw President Franklin Roosevelt's "Arsenal of Democracy" quickly adapt Detroit auto production lines for the building of bombers, tanks, and guns; in the 1950s, when the creation of a national interstate highway system championed by President Dwight D. Eisenhower connected the Nation in a way not previously possible; and when the U.S./Soviet "space race" of the late 1950s and early 1960s was all but won by the realization of President John Kennedy's 1962 vision of having a man on the Moon by the end of the decade. We also will take lessons from these examples to realize the clean, environmentally sustainable, prosperous, and socially equitable future we all desire.

Conclusion

U.S. energy insecurity is growing as more countries of the world compete for a fixed (some would say diminishing) quantity of oil to satisfy growing energy appetites. This insecurity is worsened by the harmful effect that the burning of fossil fuels has on our atmosphere, exacerbating an already dangerous greenhouse gas problem that will negatively impact the rich, diverse environment of the Nation.

Overcoming these challenges starts with actions in the four specific areas outlined above (increased energy efficiency, increased clean energy use, assurance of a U.S. clean energy technical/manufacturing capability, and the will to act). Of all of these strategies, the most important one, and the one we have done the least to implement, is *moving to real action*.

We know what we need to do to increase U.S. energy efficiency. Energy audits to gauge need, installation of improved lighting systems and upgraded insulation, as well as the use of energy-efficient appliances are off-the-shelf strategies we can implement immediately. When paired with thoughtful growth planning, especially in urban areas and state-of-the-art Leadership in Energy and Environmental Design–sustainable building design, we can move the country to an increasingly smaller carbon footprint over the next few decades.

Mandating a national energy policy that calls for increased use of low carbon or carbon-free renewable energy sources can be done *now*, and the manufacturing of clean energy products in the United States for installation and use all over the country is feasible *now*.

The creation of a series of new U.S. energy research laboratories where innovative, disruptive concepts can be discovered, explored, and proven is within our means at this very moment. The ability to safeguard the intellectual property from these discoveries as well as the means to produce such products here in the United States is ours if we want it.

The creation of millions of new higher paying jobs driven by the demand for clean energy technology from entry level/green collar jobs to engineers and scientists can begin *now*. Those jobs can be shared by every segment in our society.

The question we must collectively answer as a nation is this: If we really want to remain in control of our own destiny, and if the means to do it are clearly at our disposal, why have we not done so?

I suspect the answer to that question is not an easy one, or if it is, it is not an easy one to hear. The answer may have to do with intestinal fortitude and the willingness to sacrifice short-term comfort for longer term/longer lasting gain. I also believe the answer to that question tells us a lot about our ability to act in unity for the good of the entire nation as opposed to the good of narrow-minded and somewhat insular interests. Whatever the case, those of us who understand the critical role energy security and environmental sustainability play in assuring national security have no other option but to endorse and encourage in the strongest ways the implementation of these priorities.

The comments made by Lou Glazier, head of Michigan Futures, when outlining the path forward for the state's economic revitalization are just as applicable for our nation:

> It's inconceivable to us that the big changes we are recommending can happen without *strong civic and business (and ultimately political) leadership*. If this project is going to avoid just sitting on the shelf, *there needs to be some group with clout that takes ownership of this agenda*. It is an essential ingredient in our future economic success.[11]

This chapter is written to urge action on energy security issues at the highest levels of government, industry, and civic engagement. We have many examples to draw lessons from both here and abroad that can inform our actions. But we must act; we must engage. It is the only path available for our survival.

Notes

[1] Robert E. Ebel, comments on the Economic and Security Implications of Recent Developments in the World Oil Market; before the United States Senate Committee on Governmental Affairs, Washington, DC, March 24, 2000.

[2] See <www.iea.org/subjectqueries/keyresult.asp?KEYWORD_ID=4103>.

[3] Wikipedia, World Energy Resources and Consumption, available at <http://en.wikipedia.org/wiki/Energy_in_the_United_States>.

[4] See <www.eia.doe.gov/aer/pecss_diagram.html>.

[5] See <www.iea.org/index_info.asp?id=1479)>.

[6] Kate Galbraith, "McKinsey Report Cites $1.2 Trillion in Potential Savings from Energy Efficiency," *The New York Times*, July 29, 2009, available at <http://green.blogs.nytimes.com/2009/07/29/mckinsey-report-cites-12-trillion-in-potential-savings-from-energy-efficiency/>.

[7] U.S. Department of Energy, available at <www.eia.doe.gov/oiaf/1605/ggccebro/chapter1.html>.

[8] Thomas R. Karl, Jerry M. Melillo, and Thomas C. Peterson, eds., *Global Climate Change Impacts in the United States* (Cambridge: Cambridge University Press, 2009).

[9] Anup Shah, "Energy Security," *Global Issues*, August 2010, available at <www.globalissues.org/article/595/energy-security>.

[10] James Duderstadt et al., *Energy Discovery-Innovation Institutes: A Step toward America's Energy Sustainability* (Washington, DC: Brookings Institution, February 1, 2009).

[11] Lou Glazier, "A New Agenda for a New Michigan," Michigan Futures, Inc., June 2006. Emphasis added.