Obama's Toughest Challenge

America's Energy Crunch Comes Home

Michael T. Klare*

Abstract: A brief assessment of future options for the supply of energy in the United States demonstrates that President Obama will face an extraordinary challenge in attempting to overcome the nation's long-term energy crisis. His natural inclination has been to make a series of modest gestures toward 'green energy independence'. But these have been wholly insufficient. In order to meet the energy crisis, a White House-led initiative on the scale of the Manhattan Project that produced the first atomic bomb is needed. Its principal goals should be to drastically reduce the contribution of oil and coal to energy supply in the United States, increase the contribution of renewable energy and demilitarize the reliance on imported oil.

Keywords: Energie, Erneuerbare Ressourcen, US-Sicherheitspolitik, US-Energiepolitik
Energy, renewable resources, U.S. security policy, U.S. energy policy

1. Introduction

President Barack Obama faces many acute challenges, but none is likely to prove as daunting, or as critical to the future of this nation, as that of energy. After all, energy policy – so totally mishandled by the Bush-Cheney administration – figures in so many of the other major challenges facing the president, including the economy, the environment, foreign policy, and the ongoing wars in the Middle East. Most of all, it will prove to be a monumental challenge because the United States faces an energy crisis of unprecedented magnitude that is getting worse by the day.

The United States needs energy – lots of it. Day in and day out, the United States, with only 5 percent of the world's population, consumes one quarter of the world's total energy supply. About 40 percent of the nation's energy is derived from oil: approximately 20 million barrels per day (mb/d), or 840 million gallons. Another 23 percent comes from natural gas, and 22 percent from coal.[1] Providing all this energy to American consumers and businesses, even in an economic downturn, poses a Herculean task, and one that will only grow more so in the years ahead.

According to the latest projections from the U.S. Department of Energy (DoE), net energy consumption in the United States will grow by 11 percent between 2007 and 2030, rising from 101.9 to 113.6 quadrillion British thermal units (BTUs) of energy. Procuring all of this added energy will be a tough enough job in itself, given the difficulties being faced by the world's energy companies in satisfying the ever-increasing demand for their products.[2] But providing this much additional energy *and* addressing international concerns over global climate change will prove even more challenging. Despite the great emphasis being placed on the development of non-polluting renewable energy supplies, fossil fuels are still expected to supply 82 percent of the nation's total energy supply in 2030 (compared to 86 percent today).[3] Addressing the environmental consequences of consuming fossil fuels at such levels only makes this outlook more intimidating.

As President Obama and his colleagues face the nation's energy problem, they will have to address three overarching challenges:

1. The United States relies excessively on petroleum to supply its energy needs at a time when the future availability of oil is increasingly in question.
2. America's most abundant domestic source of fuel, coal, is the greatest emitter of greenhouse gases when consumed in the current manner.
3. No other source of energy, including natural gas, nuclear power, biofuels, wind power, and solar power is currently capable of supplanting America's oil and coal consumption, even if a decision is made to reduce their importance in its energy mix.

This, then, is the essence of President Obama's energy dilemma. Let us take a closer look at each of its key components.

2. Excessive Reliance on Oil

No other major power relies on getting so much of its energy from oil. Although the share of America's net energy supply provided by oil is expected to decline from 40 percent today to about 37 percent in 2030, it will still remain the nation's dominant fuel far into the future. That 40 (or 37) percent dependency figure will prove increasingly daunting because the world supply of oil is about to contract. The competition for remaining supplies will then intensify, while most of what remains is located in inherently unstable regions, threatening to lead the United States into unceasing oil wars.

* Michael T. Klare is the Five College Professor of Peace and World Security Studies, based at Hampshire College in Amherst, Massachusetts, USA.

1 U.S. Department of Energy, Energy Information Administration (DoE/EIA), *Annual Energy Outlook 2009* (Washington, D.C.: DoE/EIA, 2009), Table A1, p. 109. Data is for 2007.

2 For background and discussion, see Michael T. Klare, *Rising Powers, Shrinking Planet: The New Geopolitics of Energy* (New York: Metropolitan Books, 2008), pp. 32-55.

3 DoE/EIA, *Annual Energy Outlook 2009*, Table A1, p. 109.

Just how much of the world's untapped oil supply remains to be exploited and how quickly we will reach a peak of sustainable daily world oil output are matters of some contention, but recently the scope of debate on this question has narrowed appreciably. Most energy experts now believe that we have consumed approximately half of the planet's original petroleum inheritance and are very close to a peak in daily production. No one knows whether the peak will arrive in 2010, 2012, 2015, or beyond, but it is certainly near. In addition, most energy professionals now believe that global oil output will peak at far lower levels than only recently imagined – perhaps 90-95 million barrels per day, not the 115-125 million barrels once projected by the U.S. Department of Energy. (Note that we are speaking here of 'conventional', liquid petroleum; there are various 'unconventional' sources of oil – Canadian oil sands, Venezuelan extra-heavy crude, Rocky Mountain shale oil, and the like – that may boost these numbers by a few millions of barrels per day, but without altering the global energy equation significantly.)

2.1 Shrinking global production – growing global demand

What underlies these more pessimistic assumptions? To begin with, the depletion rate of existing fields is accelerating. Most of the giant fields on which the world now relies for the bulk of its oil supplies were discovered 30 to 60 years ago and are now well past their most productive years.

It used to be thought that the depletion rate of these fields was about 4 to 5 percent a year, but in a study released in November 2009, the International Energy Agency (IEA), an affiliate of the Organization for Economic Cooperation and Development (the club of wealthy industrialized nations), reported that the decline rate is closer to 7 percent, a truly worrisome number. In fact, the rate of decline would be even greater — 9 percent per year — were it not for heroic efforts on the part of oil producers to avert further reductions in output through costly investment in advanced recovery technologies. But even these efforts are not expected to prevent a further deterioration in the output of major existing fields to 8.6 percent per year by 2030.[4] "The implications are far-reaching," observed the IEA. "Investment in 1 mb/d of *additional* capacity — equal to the entire capacity of Algeria today — is needed each year by the end of the projection period [2030] just to offset the projected acceleration in the natural decline rate."[5]

At this rate of decline, the world's major fields will be depleted of their remaining supplies of oil relatively quickly, leaving us dependent on a constellation of smaller, less productive fields — often located in difficult to reach or unstable areas — as well as whatever new deposits the oil industry is able to locate and develop.

And this is the second big problem: Despite huge increases in the funds devoted to exploration, the oil companies are not finding giant new fields comparable to the 'elephants' discovered in previous decades. According to the U.S. Army Corps of Engineers, the largest volume of new oil reserves was discovered in the decade of the 1950s, when deposits holding approximately 480 billion barrels were identified. Since then, the rate of discovery has declined in every decade, yielding only 150 billion additional barrels in the 1990s.[6] Only two giant fields were discovered between 1970 and 1990, and only two since then — the Kashagan field in Kazakhstan's corner of the Caspian Sea and the Tupi field in deep waters of the Atlantic off Brazil. Both Kashagan and Tupi will add several billion barrels to global reserves, but will prove very costly to develop and will begin pumping oil only after numerous physical and geological obstacles have been overcome.[7]

When you combine the accelerating decline of existing fields and the paucity of new fields awaiting development, it is obvious that the global supply of oil is destined to begin contracting in the not-too-distant future. Many analysts also believe that the global peak in production — when it does arrive — will be at a level much lower than previously assumed. Consider: In 2005, the Department of Energy predicted that worldwide oil production would reach a staggering 122.2 million barrels per day in 2025, nearly twice the world's current level of output. By 2009, however, the DoE was projecting that global production of conventional oil would reach only 89.6 mb/d in 2025, and that even with the addition of unconventional petroleum liquids, the total would rise to but 96.0 md/d — a huge shortfall of 26.5 mb/d over the 2005 projection.[8] If the DoE continues to revise its projections downward — as it has for each of the past five years — we can expect a dramatic contraction in the future availability of petroleum products.

America's excessive reliance on oil is made all the more problematic by the fact that, just as supplies are dwindling, global demand is expected to rise — to a great degree because of increased consumption in China, India, and other developing nations.

As recently as 1990, the developing nations of Asia accounted for only a relatively small 10 percent of global oil consumption. Their economic growth has been so rapid, however, and their need for oil so voracious, that they now consume about 18 percent of the world's supply. If current trends persist, that will rise to 27 percent in 2030, exceeding North American net consumption for the first time.[9] This means — if energy habits and present energy use do not change radically — that Americans will be competing with Chinese and Indian consumers for every barrel of spare oil available on world markets, driving up prices and jeopardizing the health of America's petroleum-dependent economy.

4 International Energy Agency (IEA), *World Energy Outlook 2008* (Paris: IEA, 2008), pp. 221-48.
5 Ibid., p. 43.
6 Donald F. Fournier and Eileen T. Westervelt, *Energy Trends and Their Implications for U.S. Military Installations* (Washington, D.C.: U.S. Army Corps of Engineers, 2005), fig. 3, p. 13. See also Kenneth F. Deffeyes, *Beyond Oil* (New York: Hill and Wang, 2003), pp. 47-51.
7 On the Kashagan field, see DoE/EIA, "Kazakhstan," Country Analysis Brief, February 2008, electronic document accessed at www.eia.doe.gov on July 24, 2009. On the Tupi field, see DoE/EIA, "Brazil," Country Analysis Brief, October 2008, electronic document accessed at www.eia.doe.gov on July 24, 2009.
8 DoE/EIA, *International Energy Outlook 2009* (Washington, D.C.: DoE/EIA, 209), Tables G2 and G3, pp. 226-28, and edition for 2005.
9 DoE/EIA, *International Energy Outlook 2009*, Table A5, p. 126.

2.2 Oil, instability and military force

To make matters worse, more and more of the world's remaining oil production will be concentrated in chronically unstable areas of the Middle East, Central Asia, Latin America, and sub-Saharan Africa. According to the DoE, approximately 62 percent of the world's oil output will be concentrated in these areas in 2030, compared to 54 percent today.[10] That these areas are chronically unstable is hardly accidental: many bear the scars of colonialism or are delineated by borders drawn up by the colonial powers that bear no resemblance to often fractious ethnic realities on the ground. Angola, for example, continues to face a separatist insurgency in the oil-rich enclave of Cabinda — a small sliver of its territory entirely cut off from the rest of the country by Democratic Republic of the Congo. Iraq also suffers from sectarian strife and regional schisms that can be traced back to the colonial era, when Great Britain forged the modern Iraqi nation out of remnants of the collapsing Ottoman empire.

Many of these countries also suffer from the 'resource curse': the concentration of power in the hands of venal elites that seek to monopolize the collection of oil revenues by denying rights to the rest of the population, thereby inviting revolts, coups and energy sabotage of every sort.[11] Nigeria, for example, is suffering from a bitter insurgency in the oil-producing Niger Delta region that is driven in large part by bitterness over the failure of government elites in Abuja, the capital, to allocate any of Nigeria's vast oil wealth to the inhabitants of the poverty-stricken, environmentally-devastated Delta.[12]

As it has grown more reliant on oil deliveries from these areas, the United States has attempted to enhance its energy 'security' by an increasing reliance on military force, even though such efforts have largely proved ineffectual. America's reliance on military force to guaranty its access to foreign sources of oil can be traced to the final days of World War II, when President Franklin D. Roosevelt met with King Abdul Aziz ibn Saud aboard the U.S.S. *Quincy* at the entrance to the Suez canal and pledged to protect Saudi Arabia and it oilfields in return for privileged U.S. access to Saudi oil. Later, when America's ability to extract Persian Gulf oil was threatened — or *seen* to be threatened — by the Soviet invasion of Afghanistan, President Jimmy Carter explicitly warned of U.S. military action to ensure such access. "Let our position be absolutely clear," he declared on January 23, 1980. "An attempt by any outside force to gain control of the Persian Gulf region will be regarded as an assault on the vital interests of the United States of America, and such an assault will be repelled by any means necessary, including military force."[13] It was in line with this edict — known since as the "Carter Doctrine" — that President George H.W. Bush authorized the use of force to drive Iraqi forces out of Kuwait in 1991, and then to impose an economic blockade on Iraq; when this policy failed in its intended outcome of "regime change" in Baghdad, his son, George W. Bush, ordered the invasion of Iraq in 2003.[14]

Originally, the Carter Doctrine was applied solely to the Persian Gulf region. As the United States has sought to diversify its oil imports, however, it has been applied to other oil-producing regions. Although, in these situations, no formal equivalent of the 1980 Carter statement has been enunciated, the United States has established military ties with oil-producing countries in the Caspian Sea area, Africa, and Latin America. In each case, moreover, such ties are said to be related to America's need for more imported oil and the risk that deliveries from these areas will be endangered by local instability and violence.[15] In justifying U.S. aid to Nigeria, for example, the Department of State noted that "Nigeria is the fifth largest source of U.S. oil imports, and disruption of supply from Nigeria would represent a major blow to U.S. oil security." American assistance was especially needed, the department noted, to boost Nigerian internal security capabilities "in the vulnerable oil-producing Niger Delta region."[16]

In the constant search for secure oil supplies abroad, therefore, the United States has come to rely more and more on military means to ensure uninterrupted access to areas of chronic instability. This has led to an increasing U.S. military presence in the major oil-producing areas and, on occasion, to direct U.S. military intervention. American leaders consistently justify such action in terms of U.S. national security — that the safe delivery of foreign oil to the United States is a vital national interest and that military action is needed to protect such deliveries from hostile attack. But the war in Iraq and attacks on U.S. military personnel and installations elsewhere have demonstrated that military action is a costly and unreliable mechanism for ensuring the safe delivery of oil to the United States. Despite the billions of dollars spent on oil-industry security in Iraq between 2003 and 2008, oil output never rose above the levels achieved by Saddam Hussein in the years prior to the U.S. invasion. The close association between U.S. military policy and the global protection of oil supplies has also become a potent rallying cry for Islamic militants, who claim that America's presence in the Middle East is driven solely by oil — not democracy, not human rights, not fear of nuclear weapons, nor any of the other objectives touted by Washington to justify its presence in the region.

America's over-reliance on oil, then, is its greatest energy vulnerability. But what are the alternatives?

10 Ibid., Table G2, pp. 226-27.

11 For background and discussion, see Terry Lynn Karl, *The Paradox of Plenty* (Berkeley: University of California Press, 1997).

12 For background and discussion, see Okey Ibeanu and Robin Luckham, "Nigeria: Political Violence, Governance and Corporate Responsibility in a Petro-State," in Mark Kaldor, Terry Lynn Karl, and Yahia Said, eds., *Oil Wars* (London and Ann Arbor, Mich.: Pluto Press, 2007), pp. 41-99. See also Lydia Polgreen, "Blood Flows with Oil in Poor Nigerian Villages," *New York Times*, January 1, 2006.

13 For background on the "Carter Doctrine," see Michael A. Palmer, *Guardians of the Gulf* (New York: Simon and Schuster, 1992), pp. 101-11.

14 For background and discussion, see Michael T. Klare, *Blood and Oil* (New York: Metropolitan Books, 2004), pp. 45-50, 94-105.

15 See ibid., pp. 132-45.

16 U.S. Department of State (DoS), *Congressional Budget Justification for Foreign Operations*, Fiscal Year 2007 (Washington, D.C.: DoS, 2006), p. 307.

3. Consider the Alternatives

3.1 The problem with coal

The energy source which the United States possesses in greatest abundance is coal. This country has the world's largest reserves, 247 billion metric tons, and is second only to China in using coal. In this country, coal is primarily employed to produce electricity, but it can also be converted into a diesel fuel — known as coal-to-liquids (CTL) — to power cars and trucks.[17] Although CTL, widely used by Germany during World War II to power its military vehicles, is still in its infancy in the United States, it could conceivably be used to supplement future declining petroleum supplies.

When coal is burned in the conventional manner, however, it emits more climate-altering greenhouse gases than any other fossil fuel, twice as much as natural gas and one-and-a-half times that of oil to produce the same amount of energy. As a result, any increase in America's reliance on coal will lead to ever greater emissions of carbon dioxide, only accelerating the already perilous rate of global warming. In addition, an increased U.S. reliance on coal would only flash a green light to China, India, and other countries eager to do likewise. What is the bottom line? Any hope of reversing the accumulation of greenhouse gases in the atmosphere in time to avert the most severe consequences of climate change would quickly disappear.

During the 2008 presidential election campaign, Senators Barack Obama and John McCain both spoke of speeding the development of 'clean coal technology'. In the present context, however, clean coal is a deceptive term, if not an outright misnomer. It generally refers to low-polluting coal, not to coal free of all carbon emissions. Coal that would burn without damaging the climate is best referred to as climate-friendly coal, or 'safe coal'. At present, there are no operating power plants anywhere on the planet capable of burning coal in a completely climate-safe manner.

Right now, only one technology is being seriously considered that would burn coal safely: carbon separation and storage (CSS), or carbon sequestration. Under this process, powdered coal is combined with steam and turned into a gas; then the carbon is stripped away and buried. This is a tricky and costly technique that has yet to be fully tested. But, at the moment, it is the only foreseeable path to using coal in a climate-friendly way.

America's first attempt to build a CSS-type power plant, called 'Future Gen', was initially undertaken by the Bush administration but was cancelled in 2008 when anticipated costs exceeded US$1.8 billion. After a 2009 review concluded that a math error had produced an overstated cost estimate, the Obama administration chose to reinstate the project using US$1 billion in economic stimulus funds. If all goes as planned, the nation's first CSS plant will be built in Mattoon, Illinois with support from both the federal government and a consortium of private energy firms.[18] But this plant will take years to build and there is no indication that it will be followed by others. In the meantime, more coal plants of a conventional type will be constructed in the United States, no doubt conforming to tougher anti-pollution standards — but without any significant decrease in the overall rate of CO2 emissions.

3.2 The prospects of natural gas

Natural gas is the next biggest source and it possesses a number of advantages. Of all the fossil fuels, it releases the least amount of carbon dioxide when burned. The United States possesses substantial, if not overwhelming, domestic reserves of natural gas. But like oil, it is a finite substance. Eventually, it, too, will peak and begin a decline of its own. Energy experts are less certain about when exactly this is likely to occur, but most see it coming a decade or so after oil's peak.

Like oil, natural gas can be divided into 'conventional' and 'unconventional' supplies. Many of America's conventional supplies, found in large underground reservoirs, have already been exploited, leaving the nation increasingly dependent on unconventional deposits and 'stranded gas' — reservoirs located far from any existing transit infrastructure, like those in Alaska.

Recently, the United States has come to rely increasingly on shale gas — an unconventional gas type contained in cavities in shale rock formations. To obtain this gas, producers use a technique called hydraulic fracturing, in which water laced with small particles ('proppants') is forced into the shale formations, splitting open the rock. Although effective as a means of releasing the gas, environmentalists and others worry that widespread use of the technique will contaminate water supplies and trigger seismic effects.[19] It is unclear, then, how much gas will be obtained in this manner. Efforts are also under way to secure permits and financing to build a natural gas pipeline to Alaska, but with costs estimated at $30 billion and mounting, and with the growing competition from shale gas, it is unclear at this point whether the project will ever move toward implementation.[20]

3.3 The limits of nuclear power

Some say the U.S. should increase its reliance on nuclear power. Nuclear power's attraction is that, once in operation, it does not emit carbon dioxide. It does, however, raise enormous proliferation and safety issues and produces toxic radioactive wastes that must be stored for thousands, or even tens of thousands, of years in ultra-safe containers — a technological challenge that has yet to be overcome. Given these problems,

17 DoE/EIA, *Annual Energy Outlook 2009*, Tables A1 and A15, pp. 109, 138-39.

18 Kate Galbraith, "U.S.-Private Bid to Trap Carbon Emissions Is Revived," *New York Times*, June 13, 2009.

19 For background and discussion, see Mireya Navarro, "Proposed Gas Drilling Upstate Raises Concerns About Water Supply," *New York Times*, December 19, 2008; Jad Mouawad, "Estimate Places Natural Gas Reserves 35% Higher," *New York Times*, June 18, 2009.

20 See Jad Mouawad, "Exxon, in Switch, Joins Plan to Build 1,700-Mile Natural Gas Pipeline From Alaska," *New York Times*, June 12, 2009.

the rising costs and legal problems of building new reactors have deterred all but a few utilities from considering their construction, putting distinct limits on nuclear power's capacity to overcome the U.S. energy crisis.[21]

3.4 The promise of renewable energy

By far the most attractive alternative to oil and coal is obviously renewable energy, especially wind and solar power. These need no fuel source (save the sun and wind), are never used up and emit no carbon dioxide. They seem the perfect solution to the planet's energy and climate crises.

The full potential of wind and solar power, however, cannot be realized until at least two other hurdles are overcome: the development of efficient storage systems to collect energy when the sun and wind are strong and release it when they are not, and the construction of an expanded nationwide electrical grid to connect areas of reliable wind (especially in the mountain states and high plains) and sunshine (the Southwest) with the areas of greatest need (the Midwest and the coastal states). These are bound to be very costly undertakings, but, until they are funded on adequate scale, wind and solar power will not be capable of replacing more than a tiny fraction of oil and coal in the nation's overall energy mix.[22] President Obama has promised to provide some of the necessary investment, using funds made available in the 2009 economic stimulus package. But far more will be needed in the future to fully exploit the potential of wind and solar energy.

Much can be said about the future potential of advanced biofuels (those not reliant on food crops like corn), along with geothermal energy, wave power, hydrogen power and nuclear fusion. But these all remain in the same category as wind and solar (only more so): they show a lot of promise, but without substantially more research, testing and investment, they cannot help wean us from our reliance on oil and coal.

4. The Challenge to be Met

If this assessment is accurate, President Obama will face an extraordinary challenge in attempting to overcome the nation's long-term energy crisis. Having come into office at a time of extreme economic difficulty, he will be besieged by a host of immediate crises and demands for funds. On energy, his natural inclination, given limited financial resources, has been to make a series of modest gestures toward 'green energy independence'. But the energy crisis cannot, unfortunately, be solved via relatively modest course corrections.

What is needed, instead, is a major White House-led initiative on the scale of the Manhattan Project that produced the first atomic bomb or the Apollo Moon Project. The principal goals of such an epic undertaking would have to include:

1. Reducing oil's contribution to the U.S. total energy supply by half over the next quarter century. This would require a comprehensive program of conservation, increased development of public transport, the accelerated development of advanced biofuels and electric-powered vehicles, and other technological innovations.
2. Gradually reducing U.S. reliance on coal, unless consumed in a climate-friendly manner through the accelerated development of carbon separation and storage technology.
3. Increasing the contribution of renewable energy to America's total energy mix from its current rate of 6 percent to at least 25 percent by 2030. This would require, among other things, increased public investment in new battery storage technology and the rapid expansion of the nation's long-range electrical transmission grid.
4. Demilitarizing the U.S. reliance on imported petroleum. This means repudiating the Carter Doctrine of January 1980, dismantling the vast military apparatus created since 1980 to enforce that policy, and using the resulting savings – as much as US$150 billion per year, according to a new report from the National Priorities Project[23] – to help finance the renewable energy initiatives described above.

Only by embracing a comprehensive blueprint of this sort and getting Congress to embrace its basic principles can President Obama hope to overcome the long-term, potentially devastating energy crisis now facing this nation. Each one of these initiatives, moreover, must proceed alongside the other — without a commitment to the full panoply of measures described above, the success of the whole cannot be assured. The United States has been stuck with a dysfunctional energy system for a very long time, and it is essential that it now move toward another and more rational system.

21 For background and discussion, see Matthew L. Wald, "Getting Power to the People," *Bulletin of the Atomic Scientists*, September/October 2007, pp. 32-35. See also James Kanter, "Not So Fast, Nukes," *New York Times*, May 29, 2009.

22 For background and discussion, see Wald, "Getting Power to the People," pp. 25-43.

23 Anita Dancs, *The Military Cost of Securing Energy*, National Priorities Project, October 2008, electronic document accessed at www.nationalpriorities.org on July 27, 2009.