Sovereign Energy Independence

Properly Understood and Effectively Achieved in the 21st Century

Spencer Abraham & Mark P. Mills

Energy, like food, is a foundational requirement for civilization. The World Economic Forum's 2012 *Energy Vision Update* begins with the observation: "Energy is the lifeblood of the global economy – a crucial input to nearly all of the goods and services of the modern world."[1] We disagree with the Forum in one respect. Energy is crucial not to "nearly all" but in fact to *all* goods and services.

Ensuring the availability of an economically sustainable and secure energy supply is one of the primary responsibilities of sovereign governments. Energy independence, properly understood, is a central component in achieving both supply and economic security. The policy options for pursuing "independence" depend on the realities of the day. In this paper we will argue that a clear understanding of the landscape is more important than clever policies, and that, in any case, there are precious few options in regards to the latter.

We begin by noting that two central features of the global energy landscape are the same now as they have been for decades, even centuries. These are the underlying character of both geopolitics and geophysics.

The animating forces in geopolitics have been the same

Spencer Abraham is Chairman & CEO of The Abraham Group. He previously served as the tenth United States Secretary of Energy and before that as a United States Senator from Michigan.

Mark P. Mills is a Senior Fellow at the Manhattan Institute and CEO of the Digital Power Group.

for as long as there have been nation states. National goals, political systems, and social objectives vary widely, and always have. Differences can lead to both unintentional and intentional conflicts. Conflicts are ultimately resolved using the same three tools since time immemorial: business arrangements of mutual convenience, diplomacy, or war. Put simply, people have not changed.

Similarly, underlying geophysical realities of the planet remain constant. The asymmetric distribution of easily accessible high-grade resources is incontestably a fact that creates opportunities for economic or geopolitical advantage, or conflict.

On the other hand, some things today are quite different. Indeed, we will argue that the energy landscape has undergone tectonic shifts in the paradigms of supply and demand since the dawn of the modern energy era, an era that arguably began in the fall of 1973.

The modern lexicon of energy "independence" and policies attending thereto began with the one-two punch of the 1973 OPEC embargo and the 1979 Iranian revolution. With the first event, world oil prices roughly doubled nearly overnight. Prices doubled again a few short years later.[2] With the passage of time, the political, economic, and social fallout from such a radical price hike may be muted, if not forgotten. Were prices to double today the fallout would be almost inconceivable. However, such a possibility is far from unimaginable and cannot even be termed a "black swan" given how little progress has been achieved in the underlying issue of Middle East stability.

Energy "independence" policies are no less vital today than they were at the dawn of the modern era of energy policy in providing some measure of insulation against the possibility of events similar to those of 1973 and 1979. In fact, given the current geopolitical environment we would argue "independence" should remain the first priority of sovereign governments when forging energy policies, against which all other goals should be secondary.

The geopolitical objective of "independence" is really about preventing one or a few players from being in a position to undermine or manipulate the marketplace, or from using energy as a political tool.

The question for nations on how to achieve energy independence requires first a definition, itself inherently a policy-centered consideration. For most nations, the concept of independence rarely means seeking closed-border self-sufficiency. For many nations individually and, in particular, collectively through regional or mutual alliances, the geopolitical objective of "independence" is really about preventing one or a few players (Iran and

Venezuela come to mind for many, or Russia, or OPEC) from being in a position to undermine or manipulate the marketplace, or from using energy as a political tool.

In order to develop a framework to understand how best to pursue energy independence, we start with the features that have in fact changed, the facts relating to how the two most important forces – technology and demographics -- have altered the equation of supply and demand. As we earlier noted, human behavior (geopolitics) and nature (geophysics) remain unchanged. But human ingenuity (technology) and populations (demographics) have significantly changed since President Nixon first used the phrase "energy independence" in the epoch-setting speech of 7 November, 1973.[3]

Supply and Demand in a New Era. Throughout the 20th century, the United States in particular and the West in general were the globe's largest users and fastest growing major consumers of energy. In the 21st century demographics, combined with the maturation of emerging economies, have permanently shifted the center of gravity.

The Asia-Pacific and emerging regions, with the Asia-Pacific dominating, are now responsible for not only the fastest growth in large-energy demand, but also essentially all net growth in demand. Within a few years, the emerging economies will have completed their transitions and will consume in aggregate more total energy than the entire "West."[4] Indeed, over the coming two decades, the growth in emerging economies will add to global consumption an amount equal to the adding of two United States' worth of energy demand.[5]

This shift in the epicenter of demand means that policies intended to reduce the use of oil in the United States (e.g., improving fuel efficiency of light vehicles) that would once have had a major impact on global oil demand, no longer do so and increasingly have *de minimis* impact on the geopolitics of oil. Arguments can still be made for efficiency on the basis of domestic economic benefits, but geopolitics motivated government intervention in this case of energy demand and security (and many others similar). The modern and now firmly embedded Corporate Average Fuel Economy (CAFÉ) standards were enacted in 1975 in direct response to the 1973 embargo.[6] But today, even radical reductions in total U.S. light vehicle fuel use – whether from the recently enacted expansions in CAFE standards or a political goal of a million electric cars – would moot only a small percentage of future global oil demand. The United States in particular, and the West in general, no longer have a political foot on the accelerator or brake that determines the growth in energy demand. Western nation policies rooted in the 1970s demand paradigm are, if no longer valid, certainly emasculated in impact.

Just as we see a shift in the 21st century metrics on the demand side of energy driven by demographics, so too has there been a shift on the supply side metrics, in this case driven by technology. The world is not in imminent danger of running out of hydrocarbons broadly, nor oil in particular. The central issues for the future will continue to be the same as those in the past, largely ones of costs and access—the former is mainly determined by technology and the latter by government policies which control or own about 80 percent of land where oil resources reside.[7] And, in the face of today's North American glut of natural gas, many have forgotten the passage in 1978 of the Powerplant and Industrial Fuel Use Act (finally repealed in 1986), inspired by a fear of imminent limits to gas resources. The North American glut has already impacted world markets, and the technologies that created the glut are expected to spread around the world as well.[8]

Nonetheless, there continues today an 'industry' if not an intellectual framework that flowered in the post-embargo era, anchored in the thesis of limits, epitomized by the iconic and politically prescient 1972 Club of Rome's "Limits to Growth," and followed in more recent years by the thesis of "peak oil." For policy makers, the existential debate about long-term geophysical resources limits or population expansions are not, or should not, be relevant. The issues that animate policies emerge from practical near-term realities measured in years (though, as an aside, in politics we frequently see even shorter time frames) or at most in a decade or two.

Without regard to historic policy, social, or political objectives, the consensus forecasts from international and national organizations (e.g, the IEA and the DOE/EIA) see the overwhelming share of future energy supply coming from the same three hydrocarbons that today provide 85 percent of global needs: oil, coal and natural gas.[9] These forecasts are doubtless anchored in progressive recognition of the underlying engineering and economic realities rather than aspirational policies. They represent a consensus recognition (some would say, capitulation) of the practical nature of energy resources and technologies.

Dozens of nations, including for example the United States, Germany, Spain, Britain, and China have over the past several decades invested enormous financial and policy resources in attempting to create significant, economically viable capabilities to replace conventional fuels.[10] While many influential policymakers believed otherwise in recent decades, there is now a widespread recognition that there is no realistic prospect of seeing technologies emerge in useful time-frames, and at costs that are acceptable, that can fundamentally displace the central role of hydrocarbons—coal, oil and natural gas—particularly in the context of the magnitudes of projected demand growth.

Some would argue that the failure to see an even larger non-hydrocarbon contribution than is now forecast reflects a failure in the world's nations to establish global treaties, policies, and mechanisms to "de-carbonize" energy production. For our purposes here, without regard to the merits of such efforts, it is sufficient to note that they have not succeeded. The enormous direct and immediate economic (and social) costs of the vast majority of de-carbonization proposals held against the state of world economies, make it highly improbable that anything along those lines will happen in time-frames meaningful to policymakers.

It bears noting that this observation

neither obviates nor denigrates significant contributions to national strategies from non-conventional energy sources, or from the cost-effective pursuit of conservation measures and energy efficiency. However, we know now that at prices and scales commensurate with expected demand, non-hydrocarbon alternatives, even where regionally substantial, cannot come close to meeting the scale of global economic requirements. Thus for policymakers seeking as a primary objective means to ensure the benefits from energy independence, a preoccupation with non-hydrocarbons, while it may have other merits, cannot be considered central to achieving the goals sought in "independence."

At prices and scales commensurate with expected demand, non-hydrocarbon alternatives… cannot come close to meeting the scale of global economic requirements.

Disruptive Technologies in a Shifting Landscape. It is not just that non-hydrocarbon technology options have not matured at the rate that some hoped or forecast would bring practical economic capabilities, but also that the world has seen substantial progress—in some cases unexpected acceleration—in the technologies associated with hydrocarbon exploration, production, and efficacy of utilization.

The inexorable and remarkable advances in ultra-deep-water oil production hold enormous potential for numerous regions. Significant resource and policy transformations were brought about by the constellation of deep-water technologies that gave rise to increasing production in the North Sea roughly after the 1979 global oil shock. That transformation continues in regions like Brazil's Campos Basin, on-going surprises in the Gulf of Mexico, and, perhaps, West Africa. And, setting aside the challenging policy issues, we now see potentially game-changing access to resources in deep-water expansion in Arctic waters from Russia's Pechora Sea to Canada's Baffin Island region, to the persistent politically challenging Alaskan offshore fields.

On shore, the steady march of technology has substantially improved the efficiency in extracting oil from the hundreds of billions of barrels of potential reserves in Canada's vast oil sands.[11] The geopolitical issues associated with expanding the utilization of those resources were illuminated in the high-profile political tussle over the Keystone Pipeline, which as of this writing continues (and may ultimately take more time than actual construction period for such a pipeline).

The single largest shift in the hydrocarbon landscape has been the unexpected and remarkable rise in U.S. natural gas and oil production in recent years. New technologies have unleashed so much new natural gas production that the flow-direction of major pipelines has been reversed. Moreover, there has been an associated growth in energy-related construction (e.g., fertilizer, steel, and chemical plants) including a rise in foreign direct investment inflows into the United States. And, of course, applications are backed up for reversing LNG terminals to re-orient around exports.

Meanwhile, on the United States' crude production side, output has reversed a forty year decline and in some regions the growth has been so rapid that oil is being carried to market by rail and even truck in significant quantities. By now, this change has been widely reported and while typically it has been attributed to advances in hydraulic fracturing, the reality is that the result is also attributable to a broad and deep advance in the array of enabling technologies, from basic materials science, to sensors and computational tools, to the maturation of tertiary recovery including CO_2 flooding. The combination of low-cost gas for process heat and low-cost crude has opened up the possibility of expanding U.S. refining. In fact, the United States is now a net exporter of refined hydrocarbons for the first time since 1949.

The other emerging technology-centric feature of hydrocarbons is the potential for greater convergence amongst the three hydrocarbons. The low cost and abundance of non-oil hydrocarbons makes them appealing for conversion to liquid transportation fuels, either directly or indirectly. Indeed, a number of technology options are at or approaching economic parity with some regional costs of oil, where coal or natural gas can be used as primary feedstocks to yield viable liquid substitutes for conventional crude.[12] For policymakers, such options cannot be ignored when seeking economically viable options for sustaining global growth in transportation that is essential for commerce and a vital feature of social progress in emerging economies.

In short, the recent and prospective advances in hydrocarbon-related technologies promises a continued expansion in hydrocarbon supply capability. It is of course clearly the case that for both alternatives to hydrocarbons as well as for new hydrocarbon technologies/sources, it is the current and the expected near-term price of oil in particular that serves as a primary gating factor. The consensus of a new 'normal' range (i.e., excluding temporary event-driven spikes) for oil appears to be in the \$50 to \$110 a barrel range.[13] By historical standards, it seems likely that prices will remain in this relatively high range because of the aforementioned demand features and the pace at which new production can be brought on line at the scales the world needs. But this has been the oil price range the

Energy policy in the early 21st century is, despite earlier expectations and great investments, still fundamentally dependent on hydrocarbon realities.

world has lived with now for a number of years, and it is one in which new hydrocarbon sources have flourished, while new non-hydrocarbon production (especially for transportation) have not, at least at the dimension the world needs.

Energy policy in the early 21st century is thus, despite earlier expectations and great investments, still fundamentally dependent on hydrocarbon realities, the features of which are now shifted only in terms of the epicenters of demand and supply.

On Politics and Policy. Sovereign energy policies necessarily and ultimately react to all these fundamental resource and technology realities outlined above. However, while broad macro factors in supply and demand create a framework in which energy policies are formed, it is inevitably the case that specific policies are catalyzed by impactful events. We will doubtless see how this plays out now, both in reacting to the persistent tensions in the Middle East that have changed little in character, as well as what is happening in other parts of the world. Some of the shifts in the geography and features of energy geopolitics are now coming into view, all with implications that ripple out beyond their locus.

While political fallout from Fukushima, for example, may have minimal impact on nuclear energy programs globally, beyond Japan and Europe, the derivative activities in both regions have far-reaching implications. Ironically, it may be Europe and not Japan where a retreat from nuclear energy will be more long-lasting where we already see a resurgent use of coal-fired electric generation,[14] as well as the increased potential for imports of Russian natural gas. Similarly, we now see a proposed $13 billion Vladivostok, Russia, terminal to ship LNG to Niigata, Japan.[15] There is as well discussion of a daunting ultra-deep gas pipeline between those two ports. The geopolitical alignments associated with such projects, and more surely to come, should have relevance to U.S. decisions, for example, where the relatively recent glut of natural gas has opened up the unprecedented possibility of massive natural gas (LNG) exports. Numerous analysts have framed the astounding shift in natural gas resource potential in terms of the U.S. as a new "Middle East" – a phrase that has obvious geopolitical implications.[16]

There are many more examples of major offshore and on-shore projects, of pipelines, refineries, LNG projects (e.g., the colossal Shell bet offshore Australia[17]) and coal port expansions in North America and around the world. We would argue that all this activity emerges from every sovereign nation's first order responsibility to obtain adequate energy supplies. There are always a variety of social and environmental issues that enter into policy considerations, but the primary consideration of sovereign nations will necessarily stay anchored in the inextricable linkage between the economic growth and energy growth – a linkage that has existed since the dawn of time.

Any inability to provide adequate and affordable energy places a nation at risk of such severe economic disadvantage that one sees repeatedly a willingness to trade cost and availability for political, supply-chain and physical risks. We have seen the consequences of these decisions many times, not just with the iconic October 1973 OPEC embargo, but also more recently with Russian tinkering with natural gas supplies to Georgia and the Ukraine.[18]

Thus the question for nations on how to achieve energy independence requires first recognizing and then embracing the implications of a policy definition for "independence." As we earlier noted, this rarely means isolationistic self-sufficiency. Independence comes from recognizing, first, the reality of what energy sources (hydrocarbons) are required by society in time-periods that matter to citizens, and then how to ensure supplies that insulate a country from economic disruption, political manipulation of foreign supplies, and thus affordably achieve the central goals of "independence," to wit, resilience, reliability and security.

There is no escaping the interconnectedness of global markets, trade, and the pervasive role of energy in all aspects of domestic economies.

And, regardless of the ability of some nations to achieve resource self-sufficiency (by definition, net exporters are self-sufficient), there is no escaping the interconnectedness of global markets, trade, and the pervasive role of energy in all aspects of domestic economies. One could say then, in some sense, the simple idea of energy independence is a myth. However nations can achieve adequate levels of insulation, insurance, or resilience against reasonably anticipatable disruptions or malicious manipulations, sufficient to be reasonably called "independence."

Securing Energy Independence. The underlying thesis here is thus one of realism based on recognizing how technology has changed and more importantly how global economies have changed. As we began, policies must embrace the utter centrality of sovereign nations ensuring an economically viable energy supply for its business and citizens.

At a basic level, there are essentially only two mechanisms for achieving energy independence: produce enough on your own to have *de minimis* import dependence (or become an exporter), or import what's needed from reliable sources using low-risk supply chains. Of the two, the former is often preferred over the latter, but the former is not always possible, or possible at a price that is tolerable. Of course policies should pursue both in combination. For sovereign nations then, there are four principals that comprise the core tools available to achieve practical energy independence.

Promote hydrocarbons

There are few nations who are not undergoing some type debate regarding the environmental issues association with the use of hydrocarbons. In some cases countries have moved past debating policy and initiated actions to curb the use or development of hydrocarbons, but in many the discussions rage. In most cases those advocating the reduction—and in more extreme instances the near elimination of hydrocarbon use—contend that replacing oil, coal, and natural gas with alternatives is consistent with energy independence goals since most renewable-centric alternatives are theoretically consistent with freedom from energy imports. The reality is that at this time and for the foreseeable future the goal of a carbon-free energy policy is untenable for the reasons outlined above, and the pursuit of a carbon-minimization policy is economically infeasible. While it might be politically attractive to advocate such policies, doing so is incompatible with economic growth as well as the attainment of anything approaching energy independence in the reasonably foreseeable future. Even though nations can and should seek to diversify their energy mix, and to pursue basic research to expand practical energy options, it is essential for security purposes that nations promote hydrocarbons as an integral part of their energy policies and as a key ingredient in the pursuit of energy security.

Commit to infrastructure

For a country, and often necessarily for a region, a modern energy infrastructure is pivotal, from extraction, to transportation, to processing. This means pipelines, rail, ports, refineries, power plants and transmission systems. It bears noting that most countries understand that power plants are needed to convert fuel into electricity. There has been a puzzling resistance to recognizing the same linkage between refineries and transportation fuels. Iran has historic weakness in this regard, but so increasingly does Europe and North America.[19] To state the obvious; increasing supply of primary resources (whether through domestic production or imports) cannot supply the refined products, kilowatt-hours and gallons, absent significant infrastructure. And, it bears noting, promoting anti-hydrocarbon policies generally translates into inadequate investment in key energy infrastructure across the hydrocarbon supply chain, which places a nation at greater, not less risk to energy disruptions.

Increase domestic production

While there are some nations where this observation has little relevance, in general most major nations have significant geophysical resources. New technologies have increased the prospects for finding and economically extracting hydrocarbons across many geophysical regions. While strategies intended to encourage domestic exploration and production mean different things in different places, it must include streamlining regulations and other impediments to discovery and development. It also means rejecting the notion of placing unreasonable areas of domestic territory off limits to exploration and production or to preventing the deployment of capital from foreign sources to develop resources.

Develop energy alliances

Given the "unfair" geographic distribution of high-quality resources, regional alliances in particular but equally importantly alliances of common political interests, are arguably the single most important policy tool for nations to achieve energy independence. The energy domain is not different than others, and arguably more critical, in terms of capturing the benefits of mutual free trade and similar policies. The North American Free Trade Act serves as one such model, and is particularly relevant in removing unproductive, even artificial inefficiencies that not only harm all three collaborating nations, but are inherently "unfair."

Conclusion. Policies that embrace the above outlined four principles can bring essentially every nation close to the goal of energy independence. As we have noted, this is not in the literal sense of energy isolation, which is in any case unachievable. And there is no bright line that defines when a nation has achieved sufficient insulation from energy geopolitics to be considered "independent." However, it is often clear—sometimes alarmingly so when geopolitical events turn ugly as they did in 1973 and 1979, and regrettably could again —when sovereign nations have failed to make sufficient progress.

The abundance of primary hydrocarbon resources does not of course guarantee low-cost energy, nor the absence of either supply disruptions or of sovereign conflicts. But robust policies can significantly reduce both geopolitical risks and economic shocks. Nations that fail to embrace the goal of energy independence, properly understood, put both their own citizens at risk, as well as others in the world.

NOTES

1 World Economic Forum, *Energy for Economic Growth Energy Vision Update 2012*, (Geneva: 2012). "Energy is the lifeblood of the global economy – a crucial input to nearly all of the goods and services of the modern world. Stable, reasonably priced energy supplies are central to maintaining and improving the living standards of billions of people."

2 Energy Information Administration, Annual Energy Review 1997, DOE/EIA-0384(97). (Washington, DC, July 1998), Table 5.19.

3 Richard Nixon, "Presidential Address to the Nation," (7 November 1973). Can be found at: http://www.cvce.eu/content/publication/2003/7/3/1158015d-8cf9-4fae-8128-0f1ee8a8d292/publishable_en.pdf.

4 Where, of course, South American economies properly belong in the maturing economies category, despite the nomenclature weakness of the label "the West."

5 U.S. Energy Information Administration, *International Energy Outlook 2011*, (Washington, D.C., September 2011); British Petroleum, BP Energy Outlook 2030, (London, January 2013); ExxonMobil, *The Outlook for Energy: A View for 2030*, (Irving, Texas, 27 January 2011).

6 Allan R. Hoffman, "The Origins of CAFE," *Forum on Physics and Society by the American Physical Society* 36, no. 4 (October 2007).

7 Valerie Marcel, "States of Play: National Oil Companies Control 80 Percent of the World's Oil," *Foreign Policy*, (September/October 2009).

8 See for example an overview that one of us has written see: Mark P. Mills, "Unleashing the North American Energy Colossus: Hydrocarbons Can Fuel Growth and Prosperity," Manhattan Institute (July 2012); Another, by the International Energy Agency can be found at: http://www.iea.org/aboutus/faqs/gas/.

9 U.S. Energy Information Administration, *International Energy Outlook 2011*, (Washington, D.C., September 2011); British Petroleum, *BP Energy Outlook 2030*, (London, January 2013); ExxonMobil, *The Outlook for Energy: A View for 2030*, (Irving, Texas, 27 January 2011); International Energy Agency, "IEA Sets out the 'Golden Rules' needed to Usher in a Golden Age of Gas," Internet, http://www.iea.org/newsroomandevents/pressreleases/2012/may/name,27266,en.html (date accessed: 15 January 2013).

10 United Nations Environmental Programme, *Global Trends in Renewable Energy Investment 2012* (Nairobi, June 2012).

11 American Petroleum Institute, *Canadian Oil Sands: Enhancing America's Energy Security* (Washington, D.C., January 2011).

12 "Liquid Transportation Fuels from Coal and Biomass: Technological Status, Costs, and Environmental Impacts," National Academy of Sciences, (2009).

13 U.S Energy Information Administration, *Annual Energy Outlook 2013* (Washington, D.C., 5 December 2012).

14 See for example: Tino Anresen, "EON Loses as RWE's Coal Plants Win Germany's Green Shift: Energy," *Bloomberg News*, 7 December 2012.

15 See for example: Center for Environment, Commerce & Energy, "Japan Turns To Russia For LNG," Internet, http://cenvironment.blogspot.com/2012/09/japan-turns-to-russia-for-lng.html (date accessed: September 2012).

16 "ENERGY 2020: North America, the New Middle East?" Citi GPS: Global Perspectives & Solutions, 20 March 20 2012.

17 Stanley Reed, "Shell Bets on a Colossal Floating Liquefied Natural Gas Factory Off Australia," *New York Times*, 12 November 2012.

18 See for example: Bernard Gelb, *Russian Natural Gas: Regional Dependence*, Congressional Research Service (5 January 2007); Richard B. Andres and Michael Kofman, *European Energy Security: Reducing Volatility of Ukraine-Russia Natural Gas Disputes*, Institute for National Strategic Studies, (February 2011).

19 *Iraq Energy Outlook*, IEA (Paris, 2012); *Refining Capacity*, American Fuel & Petrochemical Manufacturers, U.S. Refining and Storage Capacity Report, (1 January 2012).