
The Riddle of Energy Security¹

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Theme: This ARI reviews the complex issue of energy security.

Summary: The issue of energy security has traditionally been confused and confusing terrain. The concept itself is so multi-faceted and complex that intuitive approaches typically turn out to be incomplete, if not simply wrong-headed. A counterintuitive reading on energy issues is more often than not the most accurate, or at least the most revealing.

Analysis:

In August of 1941, with the invasion of Russia well underway, and Moscow within reach, Hitler's generals begged him to make the Soviet capital the first prime German target, a bold move that probably would have set the stage for victory in the East. But Hitler delayed, convinced that the priority should be the oil fields of the Caucasus and Baku –for him, the life-blood of the war and the future of the Reich–. By the time he changed his mind, however, valuable time had been lost, and his forces were stopped just outside of Moscow by fresh Soviet troops and the onset of winter. But rather than persisting with another attempt to chop off the Soviet head, in the spring he headed south instead, throwing all available manpower and resources into a new operation to seize Baku. This monumental effort bogged down in the Caucasus mountains and never succeeded in anything but leaving the Sixth Army stranded just to the north at Stalingrad. Convinced by his intuitive reckoning that the top priority had to be control over the oil fields of Baku, Hitler undermined the strategic viability of much of his forces on the Eastern Front. He paid dearly at Stalingrad for his intuition –which ultimately distorted his strategic view of German prospects in Russia– that he had to control the oil. The rest, of course, is history.

Intuition also tells us that it was Persian Gulf members of OPEC who wanted much higher prices in 1973, to the detriment of the world economy. However, as Sheikh Zaki Yamani has told the world for years, it might well have been Henry Kissinger who convinced the Saudis and the Iranians to increase their prices, by making the counterintuitive case that higher oil prices would not necessarily be detrimental to the interests of the United States, and therefore not something that the US government would refuse to tolerate. Even in the face of the inevitable dismay of consumers and the certain damage to the advanced

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economies that higher prices would provoke, Kissinger would have been hoping that a dramatic price spike would stimulate non-OPEC production (a development that actually occurred). A boom in oil production in the North Sea, Mexico, Alaska and elsewhere, in turn, might ultimately undermine the pricing power of the cartel (something which also occurred), if not the cartel itself. Kissinger may have lost some of his shadowy covert battles over the years, but this –potentially one of the most daring diplomatic moves in modern history– would not have been one of them.

The history of energy security, both in real world politics and in think tank discussions, is littered with a trail of such intuitive fallacies and failures.

Faces and Facets of Energy Security

The standard, and overused, definition claims that energy security is a state of affairs that provides for secure –or reasonably guaranteed– flows of energy to consumers at reasonable prices. Unfortunately, this definition is so vague and incomplete as to be basically useless in any serious discussion of energy economics or geopolitics. Perhaps the only positive thing that could be said of this definition is that while it is almost always mentioned at the beginning of such debates, it is almost always quickly abandoned, at right about this point in the discussion.

The energy terrain must be profoundly dissected and pondered if anything useful is to come of a discussion of energy security. First, there is the dichotomy between energy security for consumers (‘security of supply’) and energy security for producers (‘security of demand’). For consumers this issue (with only few exceptions) basically boils down to price and the perception that price will not experience increases which are economically painful. For producers, the issue boils down to income, and the perceived need for revenues to be maintained at sufficient levels to pursue serious, long-term economic development (or, in a less than optimum scenario, for elites to capture their rents).

For better or for worse, these two perspectives are linked. Excessively low prices stimulate consumption and growth in consumer economies, but they undermine the potential for revenue-driven economic development in producer economies. Furthermore, low prices also limit the incentive for investment in future output in producer countries, setting the stage for much higher prices in the future –unless low prices become the door through which international private oil companies (IOCs) gain cheap access to the vast reserves of producer countries–. However, such a development has often created a perception on the part of producer countries that their economic and political sovereignty is being compromised, provoking various manifestations of energy nationalism which often augur higher prices in the future. Higher prices, on the other hand, tend to have harmful effects both on perceptions and real economic activity in consumer countries, boding dangerously for producer country revenues if demand collapses as a result. Furthermore, high prices can stimulate investment in future output, with moderating effects on prices in the middle run, but they often provide the incentive for the resurgence of energy nationalism which, more often than not, limits the rate of investment in new output over the long run. Finally, high prices can also stimulate the development of non-fossil fuel alternatives, which ultimately might dislodge hydrocarbons from their central role in the world’s economy and in producer state finances.

This equation is complicated even more by the fact that we cannot so readily assume that all consumer countries will always be price doves, or that all producer countries will always be price hawks. We have already mentioned Yamani’s tale of Kissinger as the

principal architect of the first oil shock. Nevertheless, even US presidents have occasionally claimed that oil prices below US\$18/bbl would not be in the national interest (presumably with the interests of oil producing states like Texas in mind). Europe, meanwhile, has learned to live with high oil prices (its consumers typically pay two to three times what Americans pay for gasoline and diesel –or more– and its consumption growth has flattened out as a result). In fact, Europe is much more preoccupied with the reliability of Russian gas flows, as opposed to prices for oil or gas.

On the other hand, while Saudi Arabia is often vilified as the typical Arab state bent on controlling the world's oil and gouging the world's consumers with higher prices, it has actually long been the steady and consistent voice of moderation in OPEC pricing politics. Iran was first a price dove under the Shah, then a price hawk under the Ayatollahs, and now an increasingly irrelevant voice in the OPEC debate given its sanctions-imposed capacity limitations and its need to import gasoline. Algeria and Libya have waxed and waned over the years on the price issue. Only Venezuela has been a consistent price hawk and, until recently, with severe short-term capacity constraints of its own to deal with, a consistent quota cheater. Even Russia cannot be accused of price gouging: its recent, brief gas cut-offs to neighbours have been part of a negotiation context in which Russia has hoped to eliminate at least some of the large subsidies which it still provides on gas exports to its former brother Republics from the defunct Soviet Union.

A large part of the energy security debate revolves around fossil fuels. This is as it should be, given that fossil fuels provide for about 80% of the world's primary energy mix. Therefore, energy security, what ever it might really mean, is inextricably bound up with the production and consumption of fossil fuels, particularly oil and gas, which are the main internationally traded energy sources and which make up over half of the world energy mix (coal tends to be consumed in the country of production).

Nevertheless, the generation, transmission and distribution of electricity (which accounts for nearly half of the world's final energy consumption and can also be generated by non-fossil fuel energy sources), along with the security and efficient functioning of electricity systems, are also key elements of any discussion of energy security. One could argue that electricity issues are even more relevant than a merely hydrocarbon-centred discussion of the issue, given that electricity is much more important to the foundation of the economy; that is to say, in homes and in government and business office buildings around the world. While transportation to work and movement of merchandise are important, if the power goes off, it does not really matter whether we are able to leave the house or get to work. Furthermore, electricity is certainly the most important energy security concern of the 1.5 billion people around the world who do not even have access to it.

However, there is at least one other relevant angle in the energy security story: the insecurity that may well come if the world fails to displace fossil fuels from their dominant role in the energy economy. Even if the standard energy security concerns surrounding fossil fuels and electricity can be effectively dealt with, such success would paradoxically create a situation in which the world burns more fossil fuels more quickly and reduces carbon dioxide emissions more slowly, setting the stage for higher temperatures and even more difficult instabilities in the world's economic and political systems.

Energy Security and the Energy Supply Chain

Any complete discussion of energy security must address all of these angles. To facilitate such an analysis, it would be useful to address the energy security terrain through the prism of the energy supply chain, including the upstream, midstream and downstream.

In the upstream of both oil and gas production –at the geographic source of reserves and production– there are a number of concerns. The first is the debate over so-called ‘peak oil’, or the possibility, looming or not, that world oil production will one day peak, before falling off rapidly, or merely flat lining into a long plateau before declining. The well-known radical point of view sees the peak approaching fast, with record high prices one of the tell-tale signs. Most moderate perspectives are more sanguine about a ‘hard’ peak; that is, a situation in which prices skyrocket to choke off demand because supply is no longer capable of rising. This point of view claims that peak theories factor in only conventional oil, ignore the economic viability of unconventional or more difficult and expensive oil in offshore regions or the Arctic zones as prices rise, and simply deny the capacity of technology to increase recovery rates of oil fields, which traditionally have been only 30% of oil in place. Most expert opinion sees the likelihood of a ‘hard’ peak as very low for another 30 or 40 years, at least. Nevertheless, a few maverick voices from the oil industry –including a number of CEOs– feel the idea that the world will ever produce 115mbd (the IEA’s projected demand level for 2030) is nothing more than a pipe dream.

The idea that oil might ‘run out’ soon –which when expressed intelligently simply means that oil might reach a peak capacity in its production level– may seem, intuitively, to be an important concern. Nevertheless, the debate over peak oil, as it is typically framed, is probably irrelevant, however counterintuitive such a conclusion might sound. Yamani’s now immortal quip –‘The Stone Age did not come to an end for lack of stones’– has become something of a cliché in discussions about oil, but like all clichés that last, it draws its power from a simple but undeniable logic. It is not just that some oil will inevitably be left in the ground, whatever happens, because it will never likely be economically or technically feasible to extract. More to the point: demand for oil itself is likely to peak long before any hard geological limitations impose a technical peak on production. Such a ‘soft’ peak in oil production, brought on by moderating demand, is in fact what we seem to be hoping for, if not expecting, in our efforts to curb the rise in carbon emissions and stave off the worse aspects of global warming. If the threat of fossil-fuel induced climate change is real, then a geologically provoked ‘hard’ peak is either irrelevant to us (if indeed it is only a likelihood many decades into the future) or a kind of counterintuitive solution, as economically painful and disruptive as it might be –and the more useful the quicker it might come– given that the attendant supply shortages and prohibitive prices would act as an emergency break on carbon emissions, while the international crisis such a ‘hard’ peak would unleash might jolt the world into creating a carbon-free economy much faster than we otherwise might have done with plentiful supplies on hand and more moderate prices to enjoy in the short run.

Nevertheless, if the peak oil debate is irrelevant in the end, the possibility that hydrocarbon supplies in the upstream might not keep pace with demand –for other ‘above the ground’ reasons– is a very real threat to energy security and to economic and political stability. Most of the world’s hydrocarbon reserves –conventional or not– are concentrated in a small number of countries, almost all of which are underdeveloped economically, unstable politically, lack robust democratic institutions, or feel threatened or left out by globalisation. Nearly 75% of all conventional hydrocarbon reserves are found in the ‘Great Crescent’, running from the Arabian Peninsula and the Persian Gulf through Central Asia

all the way to Eastern Siberia and Russia's Sakhalin Island. To date, this geographic arc is one of the black holes of liberal market democracy and a major stumbling block for globalisation.

Most of the world's *unconventional* oil is also highly concentrated in geographical terms. Nearly half is trapped in the tar sands beneath the forests and topsoils of Calgary in Canada, while nearly another half is bulked in the ultra-heavy oils of Venezuela's Orinoco Belt. While Canada may be a model of stability and democracy, development of its tar sands would emit five times more carbon dioxide than conventional oils pumped from the traditional zones of the Middle East. Venezuela, on the other hand, is a metaphorical powder keg, at least for the moment.

The concentration of hydrocarbon reserves in problematic zones beyond the OECD presents a number of challenges to what is traditionally understood as energy security. As perceptions of globalisation have soured in many parts of the non-Asian, non-OECD world, and as prices have skyrocketed in recent years, energy nationalism is on the rise again for the first time since the 1970s and has taken root in new areas. While the epicentre of energy nationalism was once the Arab and Islamic world (where it remains rooted), the most dramatic new examples of energy nationalism today are Russia and Venezuela, and both have spawned other examples among neighbours under their influence (Kazakhstan, Bolivia and Ecuador). The most significant challenge that such phenomena pose for the energy security of major consuming economies –and indeed for the collective energy security of the world– is the potentially damaging impact that the energy policies of such producer countries could have on the rate of future investment in exploration, extraction and maintenance of oil and gas production.

Recent policy changes in Russia and Venezuela, for example, have significantly raised the fiscal burden on the IOCs operating in their energy sectors, diminishing their incentive to continue investing in new production. High prices have helped maintain the profitability of most current IOC operations, despite higher taxes and royalties, but producer country actions to further restrict access conditions and to favour their own national oil and gas companies (NOCs), at the expense of the IOCs, have left the latter with full access to less than 15% of the world's hydrocarbon reserves, and the former with control over nearly all the rest. These actions –like Gazprom's take-over of Shell's Sakhalin project and BP's Kovytko gas field, or PDVSA's crowding out of IOCs from majority control positions in Venezuela– have further clouded the future investment horizon as IOCs face increasingly uncertain legal frameworks even where they are allowed to remain active.

Perhaps this 'internal' aspect of energy nationalism would not be so worrying from the standpoint of the world's future oil and gas supplies if it were not for the fact that estimated investment requirements for future demand to be met are daunting: the IEA estimates that some US\$22 trillion in energy investment will be needed globally by 2030. Furthermore, while there are some exceptions (like Saudi Aramco and Petrobras), the general rule is that producer states and their NOCs are less than efficient when it comes to channelling revenues in ways which optimise future investment and output levels. Such doubts are particularly acute concerning Russia and Venezuela, whose governments and NOCs appear to have a number of competing interests and priorities which do not coincide with the interests of consumers to see future output maximised. As a result, a scenario is taking shape on the horizon in which hydrocarbons supplies in the middle run (by 2015-20) will be insufficient to meet world demand, with the arbitrating influence ultimately being significantly higher prices. The difference between the implications of this

scenario and that of the 'hard' peak would be miniscule to the naked eye, only the root cause would not be geological limits but rather the influence of politics 'above the ground' on investment. Exacerbating such a scenario would be a continuation of the recent trend of rising costs for inputs of all types (raw materials, equipment and human capital) all along the hydrocarbon supply chain.

Despite the fact that this is one of the most important real threats to global energy security, the media's attention and the public's imagination remain captivated by another 'external' sideline feature of energy nationalism: the potential use of energy supply cuts conceived of consciously by producer countries as a geopolitical weapon. Recent Russian gas and oil cut-offs to the Ukraine and Belarus, along with Venezuela threats to halt the export of petroleum to the US, have rekindled the worst kind of fears that Europe and the US might experience an energy crisis more catastrophic than the Arab Oil Embargo and the first oil shock. Citizens across the West are convinced that these energy producers have the will and the means to turn off their energy taps, generating a reactionary and protectionist attitude towards these countries and their business firms.

Intuitively, such fears would seem reasonable, but they are probably ill-founded. First, the oil market is global. Oil export disruptions will either push up price for all consumers globally, or their diversion into other parts of the global market will provoke a readjustment of flows that will mute any effect on global oil prices. Gas cut-offs represent a greater threat to importing countries highly dependent on pipelined gas from a single hostile source, but even in such cases (Russian gas to Eastern and Northern Europe, Algerian gas to Southern Europe) the risks are overblown. On the one hand, neither Russia nor Algeria is inclined to be as hostile to Europe as many believe. On the other hand, such governments are too highly dependent on their revenues from gas exports to Europe to contemplate killing off the goose that lays their golden eggs. They are as smart and as rational and as humane as any of us in the so-called 'West'. Global interdependence has gone too far to allow for such actions to yield anything more than pyrrhic victories. A Russian gas cut off of any significant impact is limited by similar considerations that checked the useful deployment of the old Soviet Union's nuclear arsenal. The consequences would be too dire to contemplate.

There are, nevertheless, a number of factors –other than producer state use of the energy weapon– which do provoke supply disruptions. Some of them –like weather events (hurricanes in the Gulf of Mexico) and local instabilities (social unrest in the Niger Delta)– are found in the upstream. Many others, however, occur in the midstream, at the level of oil and gas transportation. Oil and gas pipelines often lose flow or are shut down as a result of accident or sabotage (often one masquerades as the other). Examples include corrosion-induced leaks in BP's Alaskan pipeline, explosions at Russian gas pipelines in Georgia, sabotage of Iraqi oil pipelines by insurgents, siphoning off from Shell's pipelines by Nigerian militants, etc. The most significant transportation vulnerability, however, comes from threats to oil and liquefied natural gas that must be shipped along the world's sea lanes and pass through a number of well-known 'chokepoints', like the Straits of Hormuz, the Straits of Malacca, the Bosphorus and Dardanelles Straits and the Suez and Panama Canals. Nearly half of the world's 86mbd of oil must flow through these potentially vulnerable chokepoints every day. It is estimated that by 2030, if current trends continue, some 30% of the world's oil will have to pass daily through both the Straits of Hormuz and Malacca, almost all of it bound for East Asia. Accidents, sabotage, piracy, terrorist or military action are all capable of stopping or slowing the flow of petroleum through certain chokepoints, at least temporarily, unleashing potentially devastating

effects on world prices. The most likely possibility for such action in the minds of many right now is the potential for Iran to affect the flow of oil through the Straits of Hormuz, possibly as a retaliatory action for a military strike on its territory.

The downstream scenario is dominated, on the hydrocarbon side, by refineries, petroleum product distributions systems, internal gas pipeline networks, and strategic reserves. On the electricity side of the fence, energy security means sufficient, reliable and safe generation, transmission and distribution, along with adequate international electricity and gas connections, particularly in relatively isolated countries like the UK or Spain. The energy security of the downstream in most countries boils down to regulatory regimes that optimise investment and maintenance of the refinery/generation systems, the distribution/transmission networks and storage facilities. Although as a rule there are relatively few breaches of energy security in the downstream, the nature of the regulatory regime is of extreme importance in order to avoid an undermining of sufficient investment or a weakening of maintenance which can, in given moments, produce blackouts like those in California and New York in recent years, or even like that experienced in Barcelona last year. The extreme importance of downstream security is highlighted by the fact that such disruptions hit consumers most directly and most suddenly, typically in the form of supply cuts only ameliorated with great difficulty and distress, as opposed to the more gradual price increases produced by the kinds of disruptions mentioned above that can occur in the upstream and the midstream.

Diversity is the Key

The key to increasing energy security is not the intuitive assumption that the ideal would be national energy independence and the capacity to control one's own (or another's) energy sources. Rather the key is to be inserted into the globally interdependent energy reality in the most diversified and, therefore, least vulnerable fashion. Diversity across the plane of the energy field is a more appropriate –and realistic– goal than energy independence. This means, where possible, diversity not only in energy types and geographic sources, but also of modes and routes of transportation. Better to have oil and gas from as many different geographic and political sources as possible, as well as a broad range of types of energy, ranging from fossil fuels to bio-fuels, from renewable energies to nuclear power, from combustion engines to electric hybrid motors and fuel cells.

It also means diversity in the matrix of energy transportation from the upstream to the downstream. For example, rather than depending just on transit countries, like Ukraine, to pipeline Russian gas into Europe, or depending only on Russian pipelines which bypass the transit states and come directly into Germany, like the projected North Stream pipeline, Europe should encourage a balance between dependence on Russian gas that must pass through transit countries and dependence on Russian gas piped directly to the EU. This would produce a balancing effect on lobby pressures which either Russia or Ukraine might bring to bear on the EU. Likewise, Spain should attempt to transform itself from a mere gas import terminal into a transit country funnelling much of Algeria's gas (and re-gasified LNG from Trinidad and Tobago or Qatar) into France. It might also encourage Algeria to become, in addition to its key role as gas producer and exporter, a transit country for Nigerian gas passing through a future Trans-Saharan pipeline, on its eventual path to Europe via future trans-Mediterranean pipelines.

The point is that diversity of supply increases energy flexibility and reduces vulnerability to any form of supply disruption, while diversity of transport modes and routes mitigates the

political capacity –and the political will– to be tempted into using supply cuts as a political weapon.

Intuitive Realism and Independence or Counterintuitive Collaboration and Integration

Perhaps the biggest potential trap for intuitive thinking with respect to energy security comes from consumer governments insisting that energy is a strategic –as opposed to merely economic– good, even as they accuse producer states of letting politics poison their energy policies. In the downstream, this threat to energy security has recently been underlined by the battle to create a single unified European energy market, and the resistance to it that has been mounted by certain governments and their ‘national champions’ in the gas and electricity sectors. Regulatory regimes and practices (and tolerance of breaches) which might be perceived by some governments as maximising their own national energy security often have the effect of undermining optimum energy security across the broader integrated economic space. In the upstream, large consumer states, like the US or China, exhibit an all too easy tendency to use foreign policy and corporate might to try to ‘secure’ access to hydrocarbon reserves, even if this produces geopolitical tensions, threatens military conflict, or fragments the global economy, and slows or reverses the trend towards global economic integration –the key development that holds out the single greatest chance for optimal levels of peace and prosperity around the world–.

All too frequently, discussions of energy security begin with a statement which is believed to be obvious (or intuitive): that energy is a strategic issue of national (even military) security, far too important to be left to the market to sort out –even if this argument, as it often does, merely masks the corporate interests of ‘national champions’–. Churchill said it in so many words; Roosevelt acted on these words in his dealings with King Saud. The Americans have been acting on such instincts ever since, and many Europeans fear that they lack the resources and tools to deal with what they feel is an obvious strategic challenge now. The Chinese have been behaving in a similar fashion through the expansion of their NOCs in recent years, although they seem to be wising up (through their interactions with the International Energy Agency) to the trap they may have been setting for themselves.

It may be obvious to some that energy cannot be left to the market alone, but it should be obvious to everyone that *nothing should be left to the market alone*. Effective, efficient and playing-field levelling regulatory regimes are necessary so that markets do not fail, so that markets produce sufficient levels of investment for future supply, moderate unnecessary demand, allow prices to reach the optimum (and, all other things being equal, lowest) equilibrium, and generate at least minimal levels of research and development into new technologies, new sources and modes of goods, services and energy.

Most national economies in the OECD world have long since reached this conclusion, even if they frequently forget or ignore it. When dealing with international trade, of any sort, the key is to knit together national economies, based on the market but girded by sufficient regulatory frameworks, into a single global market founded upon an international regulatory regime rooted in either shared sovereignty or robust international collaboration. While many other non-OECD economies have not yet firmly accepted this axiom, or continue to favour state regulation over market mechanisms, the priority should be placed upon international collaboration to extend the reach of market mechanisms and behaviour, and to forge an international regulatory system –a global governance– to deal with energy production, trade and consumption in a way in which the broadest number of

national actors have their interests intertwined as much as possible. It may be true that geopolitical competition –which is both the source and product of the ‘realist’ frame of mind– has an increasingly tight grip on the world’s energy systems. But the only ‘realistic’ strategy is to resist this tendency with market principles and international collaboration – even if this means accepting asymmetrical advantages or exceptions for producer states in the short run (like allowing Russia or Algeria access to the downstream in Europe before Europe has equal and free access to the upstream and midstream in such countries; or like continuing to tolerate cartel practices among OPEC oil exporters, to say nothing of the formation of a new gas exporters’ cartel)–.

Conclusions: While many may intuitively feel that energy is a special case, and that energy security is an issue of national security (something we could also say of microchips, steel, food and most everything else), the inescapable reality, however counterintuitive it may taste as we swallow it, is that energy security can only be collective. To act otherwise is to set the stage for a (different and more interesting, perhaps, but probably more dangerous) repetition of the first half of the 20th century.

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