

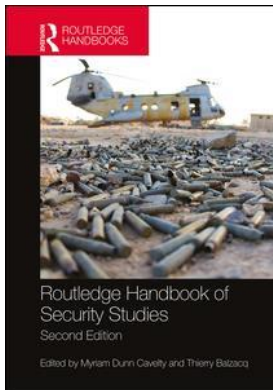
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ENERGY SECURITY

Robert W. Orttung

Oil price volatility, fears of instability in the Middle East, Russia, Venezuela, and other energy-producing regions, rapidly changing technology, and concerns about global warming have moved energy security to the top of the international political agenda. Oil in particular has evolved from being the world's most important traded commodity to a powerful tool in the political and economic relations among countries: whether a country produces oil and gas for the global market or must rely on fuel imports, energy helps define its position in international politics.

Energy is redefining the international security structure, as rapid price swings rebalance power on energy markets. China's maturing economy, marked by slowing growth, is scrambling expectations about future demand on the market, as the country seems to need less energy than once anticipated. State-controlled companies in resource-rich countries seek to use their resources as a weapon to promote state interests. However, behemoths like Gazprom are starting to falter, due to their own inefficiency and pushback from customers seeking to diversify their supplies.

While the unpredictability of the constantly changing international energy market contains the potential for conflict, we argue that the current situation may also present opportunities for global cooperation. Also, as new technologies and alternative energies develop, the relative importance of traditional sources of energy will change and again transform international power relations. Both energy exporters and importers are essentially interested in a stable energy system with functioning market mechanisms. They also have a common interest in ensuring that energy use does not destroy the Earth's environment in terms of climate change, air pollution, and water issues (Brown and Dworkin 2011).

This chapter first examines the various definitions of energy security. Second, it provides a brief overview of the history of energy security. Third, it examines the many sources of change currently affecting the international energy system. Fourth, it analyses the impact of energy on international politics, showing how the search for energy security can alternatively foster conflict and cooperation. The final section looks at challenges for the future.

Differing definitions and strategies

Countries have different perspectives on energy security depending on whether they import or export energy (SIPRI 1974: 17–20). Importing countries emphasize reliable supplies of ample energy, affordable prices, a diversity of producers, and adequate infrastructure to transport oil and

gas (Kalicki and Goldwyn 2005: 9–10). Traditional energy importers include the US, Europe, and Japan. These countries have more recently been joined by rising powers, such as China and India, whose growing economies have outstripped domestic energy production.

Energy exporting countries list other priorities when defining energy security (Yergin 2006): they prefer high prices and stable demand, typically provided by a diversity of customers; maintaining maximum control over their energy industries, while obtaining sufficient domestic or foreign investment to maintain or increase output; and ensuring that their economies are sufficiently diversified so that they are not reliant on fluctuating energy commodity prices. The Middle East, Venezuela, and Russia control the world's largest oil reserves, and Canada joins these ranks if tar sands, an unconventional form of oil, are included. The Organization of Petroleum Exporting Countries (OPEC) controls three-quarters of the world's oil deposits. Russia and Saudi Arabia are the biggest oil exporters. Russia, Iran, and Qatar have the largest natural gas reserves. In addition to the US, they are currently the largest producers (British Petroleum 2015).

The evolution of technology and developing economies is shifting roles among importers and exporters. Consumption is moving from West to East, while supply sources are moving from East to West (Kalicki and Goldwyn 2013: xxv). Although the US has relied on extensive imports to meet its growing energy needs since the 1970s, the shale revolution has dramatically increased domestic production of oil and gas. In 2014, the US overtook Russia as the largest producer of these fuels and is even considering the possibility of launching exports (British Petroleum 2015). Deep-water drilling is also producing new sources not imagined previously. China and India began importing energy in the 1990s, much later than the West, but now their enormous need for all kinds of energy has transformed the market. China surpassed the US as the largest oil importer in 2013. However, slowing growth, beginning in 2014, meant that Chinese markets would not prove as lucrative for exporters as previously expected. European import dependence varies from country to country, but the continent as a whole relies heavily on oil from the Middle East and natural gas from Russia.

Definitions of energy security are largely driven by national interests, particularly by the question of whether a country depends on foreign energy imports or on the income it derives from exports. Importers have sought to keep energy prices relatively low through the development of a highly competitive market for energy resources. This approach favours open access to oil and gas fields, free-flowing investment by private corporations to develop resources, and the use of military force to ensure that supply lines remain open. Exporters seek to maximize the return they receive from selling their energy assets on the market. Accordingly, they have resorted to strategies of asserting state control over assets, blocking foreign companies from exploiting their resources, and even reducing energy supplies if that will increase their profitability.

The strategies of consumers and producers differ in their reliance on market or statist solutions, and the result is increased friction. Whereas consumers favour competitive markets to ensure low-priced, reliable supplies, producers are increasingly asserting control through state-owned companies to maximize their profits. Western companies are more frequently being squeezed out of countries that want to take control of their own resources. At the same time, petrostates find that they now have more money, which makes them important players on the world stage and allows them to assert their interests. However, Russia's state-owned natural gas monopoly Gazprom has lost market share in the lucrative European market and faces an EU lawsuit aimed at what the consumers allege are illegal practices (Aslund 2010; Noel 2013). Another difference between consumers and producers is that importing states are constantly seeking to reduce their demand for foreign energy, whether through domestic sources, increased efficiency, or the development of alternative sources. Currently hydroelectricity and renewable sources make up 9.3 per cent of global energy use (British Petroleum 2015), but that number is expected to rise dramatically in the future. To the extent that consumers actually succeed in reducing demand, it will undermine the position of the exporters.

Despite these differences, producers and consumers share an interest in maintaining the stability of the current international energy system. If prices rise too high or supplies become too scarce, energy costs could undermine economic growth, thereby hurting the economic interests of all countries. The fact that the producers and consumers share similar interests is important, because it makes possible a web of interconnecting trade ties among countries that helps to preserve international stability. Both producers and consumers have an interest in insuring that the energy pipelines and transportation routes are secure from terrorist attack, extreme weather such as hurricanes, and excessive costs imposed by transit country governments (Deutch and Schlesinger 2006: 9).

Historical background

In the twentieth century, oil fuelled Western economic growth and sustained armies worldwide. The control of oil became a key question of national military strategy when First Lord of the Admiralty Winston Churchill, on the eve of the First World War, decided to shift the British navy from domestic sources of coal to foreign sources of oil (Yergin 2006). Oil also played an extremely important role in the Allied defeat of the Axis powers in the Second World War, as Germany ran short of fuel for its offensives in Russia and Africa, and Japan lacked the energy to keep its military machine running (Singer 2008). In the aftermath of the Second World War, the direct influence of oil on military affairs declined, but the control of oil has remained a strategic goal ever since.

The most prominent use of energy as an economic weapon was the Arab oil embargo of the US and several European countries. The Arab countries sought to end US support for Israel after the 1973 Yom Kippur War by slashing energy shipments to the US. This led to a fourfold increase in oil prices, and ultimately imposed some pain not only on the US, but on Western consumers in general. Ultimately, however, the US did not change its foreign policy, and the embargo did not achieve its goal. Higher prices drove down US oil consumption, causing prices to fall and leading to overproduction and a glut on the market. The subsequent era of relatively cheap oil (under US\$30 per barrel) lasted through to the end of the 1990s. The oil embargo had a powerful, but short-term, impact on thinking about energy security. Until that crisis, politicians and analysts had assumed that energy supplies would remain relatively cheap and accessible. In the years after the crisis, Western countries began making plans for dealing with future energy crises. However, the return of cheap energy in the early 1980s took away the impetus for this kind of action, and the topic received little attention until the dramatic rise in prices beginning in 2002.

Immediately following the 1973 embargo, the major powers set up international institutions to coordinate their energy policies better. The embargo was possible because the oil-producing countries were organized through OPEC, which was established in 1960 and brought together many of the key oil producers. In 1974, the Western countries set up the International Energy Agency (IEA) to coordinate Western energy policies, prevent oil supply disruptions, advocate alternative energy solutions, and provide information about the energy situation. A major limitation on the IEA is that countries must be members of the Organization for Economic Cooperation and Development (OECD) to join, and therefore the new consuming countries like China and India are not members. The only energy-focused organization that includes all major producers and consumers is the International Energy Forum (IEF), which was established in 2003 in an effort to promote dialogue between producers and consumers at the ministerial level. Despite its inclusive character, this organization has had little practical impact. Unfortunately, none of these organizations is designed to address the problems of the twenty-first century, which include climate change, sustainability, energy poverty, and adaptation; so, most likely, bilateral relations will be the most useful way to build broader international support in dealing with modern energy challenges (Ramsay 2013).

Beyond the reformed institutional structure, the West also set up strategic reserves of oil, and began to diversify its sources of energy away from the Middle East. At the same time, the US entered into a bargain with Saudi Arabia in which the US offered protection from Iraqi or Iranian aggression, while Saudi Arabia provided spare capacity, which it used to maintain sufficient supplies during crises, such as the Iraqi invasion of Kuwait in 1990, followed by the US-led effort to repel the threat. With President Barak Obama's efforts to improve US–Iranian relations, and a shift in export markets to Asia, the special US–Saudi relationship is beginning to fray.

Key trends and themes in energy security today

Today, it is widely accepted that the existing energy system is no longer sustainable and that extensive changes are inevitable. First, and most importantly, oil prices are now extremely volatile, rising rapidly following decades of stability from around US\$30 in 2002 to a record high over US\$140 in the middle of 2008, but then falling again well below US\$50 by the end of the year, and rising and falling again by 2015. There are contradictory pressures on oil prices, making it extremely hard to predict what the price will be. On the upside, global demand for energy will continue to grow as China and India modernize their economies and expand access to cars, appliances, and larger homes for their citizens. Additional upward pressure comes from fewer investment opportunities for international oil companies, as governments take over fields in many of the key producing countries; insufficient investment in developing new fields as old ones begin to run dry; and production obstacles in countries like Libya, Iraq, Iran, and Nigeria. However, there are substantial downward pressures as well. As Chinese growth slows, demand is also dropping. Global consumption increased just 0.9 per cent in 2014, the slowest rate of growth since the 1990s. Similarly, supplies are increasing as the US boosts production and the treaty with Iran improves prospects that Iranian oil will return to international markets at previous levels following the lifting of sanctions. Other supply comes from exporters such as Saudi Arabia, which has continued to pump oil, despite low prices, in order to make US shale production unprofitable, and Russia, whose economy is heavily dependent on energy export revenue.

Second, with price volatility as a defining feature, both consumers and producers now realize that they are vulnerable to the market. Over the last forty years, power seesawed between the two sides. Western consumers benefited after the failure of the Arab oil embargo left Saudi Arabia with excess capacity and Western countries as the only customer, leading to an era of cheap energy. The advantage shifted to the producers between 2002 and the summer of 2008, when growing demand in Asia erased the excess capacity and the rise of new customers meant that producers could sell to consumers outside the West. More recently, consumers have been able to take advantage of greater supply on the market. Although energy producers have always benefited financially from their sales, the enormous influx of energy money due to higher prices meant that producing countries, such as Russia and Venezuela, felt that they could play a more assertive role in international politics. By 2015, countries that relied heavily on energy exports were facing a decline in their economic power: the producers no longer look as powerful, while consumers benefit from low energy prices even as other parts of their economy might continue to struggle.

Third, the Western-based international oil companies (IOCs) that once controlled most of the world's energy reserves have lost much of their past power to national oil companies (NOCs). Until the Arabs started privatizing their oil industries in the 1960s, privately owned Western oil companies, once defined as the 'Seven Sisters,' controlled 85 per cent of oil and gas reserves. These companies were the dominant players until the rise of OPEC (Sampson 1975). In 2011, NOCs controlled 'approximately 90 percent of the world's oil reserves and 75 percent of production (similar numbers apply to gas), as well as many of the major oil and gas infrastructure

systems' (Tordo et al. 2011). The rise of the NOCs means that producer countries now have much greater control over how their reserves are used and gain a greater share of the profits than in the past. China's NOCs have also caused concern in the US, though sober analysis sees much of their alleged aggression as more myth than reality (Downs 2010).

In the face of the rising power of NOCs, Western countries have imposed sanctions to force these countries to change behaviour. In the case of Iran, the US and EU imposed crippling restrictions on Iranian energy sales abroad, which cut that country's exports by 400,000 barrels per day by mid-2012 (Kalicki and Goldwyn 2013: 5) and may have led Iran to agree to negotiations on its nuclear weapon capacity, leading to a deal in 2015. After Russia's annexation of Crimea, Western countries imposed sanctions on companies selling technology necessary for Russia to develop potential Arctic resources, but these restrictions have not induced Russia to end its occupation (Oxenstierna and Olsson 2015). As these cases illustrate, consumers are much more likely to impose energy sanctions than oil exporters (Shaffer 2009: 4). Russia, however, has frequently limited gas supplies to countries it does not favour, most prominently Ukraine and Georgia.

A fourth change is the type of fuel dominant in the international system. Traditionally, oil has been the most important fuel, particularly in the US, and will remain an important fuel source for many decades to come (Vaitheeswaran 2007: 24). Although oil is a finite resource, new technology is making production possible where previously the costs had been prohibitive. Peak oil theory suggested that once oil production hit its apogee, output would drop off sharply (Hubbert 1956), with potentially catastrophic economic consequences for oil-consuming countries if they did not take proper preventive action (Hirsch 2005). Expectations that the world had passed or would soon pass peak production (Deffeyes 2006) or that non-OPEC oil production would peak by 2010 (Pagnamenta 2008), proved incorrect. With the addition of non-conventional sources of oil, current global reserves are approximately 5 trillion barrels – to put this number in perspective, the world has burned about 1 trillion barrels since the beginning of the nineteenth century (Yergin 2011: 239). From 2012 to 2014, the US increased its oil production by more than a million barrels per day each year.

Fifth, even as oil prices remain volatile, consumer countries are looking for new types of energy. In the near future, natural gas will become increasingly important, particularly with the extension of the liquefied natural gas infrastructure. Nuclear power in 2014 provided 4.4 per cent of total global energy production. The 2011 Fukushima accident, the worst since Chernobyl, raised questions about the safety of existing plants, but construction continued in some areas. New technologies are bringing down the price of alternative fuels, such as solar and wind power, making them competitive with fossil fuels (*New York Magazine* 2015). However, such sources currently make up just 2.5 per cent of total energy consumption and their widespread implementation remains a question for the future.

Finally, a growing awareness of climate change provides another source of change in the international energy system (Solomon 2007). Fears that continued use of hydrocarbon-based energy at current or accelerating rates would lead to catastrophic environmental changes have altered the way that many individuals view their energy habits.

Impact of energy on international security

Energy became a matter of national security when countries began to depend on imports in order to secure the continued operation of their economies. Since energy is now essential to most aspects of civilized life, it has become a central issue in politics at both the international and national levels (Proninska 2007). If managed poorly, energy resources can provide the basis for tensions and potentially even violent conflict within and among states. If managed wisely, however, energy can stimulate international cooperation and the development of a conflict-inhibiting environment.

Pessimistic scenarios suggest that competition over increasingly scarce energy supplies will inevitably lead to more frequent international conflicts (Klare 2001). In the most straightforward example of such a 'resource war', Saddam Hussein invaded Kuwait in 1990 to gain control of its oil. Because of the size of its population and resulting energy needs, China is frequently portrayed as potentially fomenting conflict over resources in part because it is willing to invest in areas of the world shunned by the West, such as Sudan, Iran, and Zimbabwe, to secure the energy it needs to fuel its rapid growth. Additionally, disputes over energy exist in a variety of areas, such as the Caspian, Central Asia, the Middle East, Africa, and Latin America (Heinberg 2005: 210–20). Expanded offshore oil drilling has led to greater maritime conflict over time (Nyman 2015).

Given energy's centrality to economic life, the most extreme theorists of resource wars expect struggles over energy to override all other considerations (Klare 2008: 7). They argue that states will increasingly use their powers to ensure that they have sufficient supplies of energy. Oil will no longer be a commodity to be bought and sold on the international market, but will be an object of armed confrontation. Likewise, energy-deficient countries will seek to ensure their energy supplies by building alliances with energy producers through massive arms transfers, particularly to unstable regions in Africa, the Middle East, and the Caspian basin (Klare 2008: 239). A more nuanced version of the resource wars thesis argues that resource stress is an indirect cause of violence that interacts within a complex web of factors by causing social dislocations that include widening gaps between rich and poor, increased rent-seeking by elites, weakening of states, and ethnic cleavages (Homer-Dixon 2008). Jeff D. Colgan provides greater nuance to our understanding of the connections between energy and international conflict by arguing that petrostates are more likely to be aggressive towards their neighbours following a revolution than other states because the income from oil sales provides the means for aggression after a domestic revolution has eliminated any domestic political constraints on the leader's behaviour (Colgan 2013).

In addition to contributing to international conflict, energy supplies are a source of instability in the countries that produce them. According to an extensive literature on the 'resource curse', since the 1970s, when producing states wrested control of energy income from the Western IOCs, the extensive wealth generated by the exploitation of natural resources has had a negative impact on these countries' growth tempo (Sachs and Warner 1995), has given authoritarian leaders the ability to resist global democratizing trends, has created more opportunities for men than women (Ross 2012), and has greatly stimulated the prevalence of corruption (Kang 1999: 46). Oil wealth has a particularly corrosive effect on a country's institutions if the state plays a dominant role in the petroleum sector (Jones Luong and Weinthal 2010). One additional consequence of the resource curse is that oil-producing countries are much more prone to civil wars and internal conflict than countries without such resources (Ross 2008: 2). Besides disrupting a country's economics and politics, oil makes it easier for insurgents to fund their uprisings and intensifies ethnic grievances. In places like Iraq and Nigeria, insurgents have sold oil on the black market to continue their war-fighting efforts.

Such predictions of resource wars are not universally accepted, however (Hamilton 2003; Tompson 2006; Victor 2007). The resource wars literature basically argues that energy consumers are fighting over a shrinking supply of energy in what amounts to a zero-sum game. However, if countries view energy as just another commodity, then the problem becomes how best to build efficient markets to deliver this commodity, regardless of its physical location. In that sense, the zero-sum game is transformed into a mutually advantageous task where energy-consuming countries have a common interest in managing markets effectively (Victor 2007).

Cooperation could be facilitated by recognition of common interests on the part of energy consumers. The US and China, the world's two largest energy consumers, could work together on alternative sources of energy that are environmentally friendly and reduce oil dependence (Zha and Hu 2007: 111). The two countries could also develop new ways of saving energy in industrial and residential applications.

Such cooperative efforts need not be limited to energy consumers. Net energy producers such as Saudi Arabia and Russia are consuming increasing amounts of energy and have a strong interest in increasing their energy efficiency in order to prolong existing supplies of fossil fuels and develop alternative sources when those limited supplies run out. Therefore, both consumers and producers share an interest in developing new technologies for solar and wind energy, efficient building design, electric cars, and a host of other technologies. The problem is that these common interests first need to be articulated on a political level in order to facilitate cooperation among consumers and producers.

Challenges for the future

The quest for energy security in the future faces a number of challenges. First, a key challenge for the West will be addressing potential threats posed by possible instability among energy exporters. The crises that disrupted energy supplies after the Second World War usually happened 'unexpectedly,' as Daniel Yergin has pointed out (2011: 4). As a result of high energy prices, Western countries have transferred a significant amount of wealth to countries that do not support Western foreign policy interests, such as Iran, Russia, and Venezuela. On one hand, the enormous transfer of wealth from energy-consuming to producing countries is creating a new situation where states can play a much larger role on international financial markets than they ever did in the past, potentially using their growing leverage for political purposes (Teslik 2008). On the other hand, low energy prices make it difficult for the leaders of energy exporting countries to fulfil promises made to their populations, such as maintaining rising standards of living. For example, as economic conditions worsened inside Russia, President Vladimir Putin took the previously unimaginable step of invading his western neighbour and annexing part of its territory.

Second, in order to address challenges posed by climate change, both energy producers and energy consumers will have to reorganize their societies over the coming decades to increase energy efficiency and find new sources of energy in order gradually to transform the existing fossil-fuel-based energy system into one that is sustainable over the long term. Since increased energy efficiency will reduce the rate of consumption growth and eventually absolute demand, it will likely favour consumers more than producers. For the foreseeable future, an interdependent energy market is a fact of life and likely a stabilizing influence in the world. In general, the international energy market supplies importers with stable supplies of relatively cheap energy while generating economic growth in producers (Verrastro and Ladislav 2007: 99). The energy market also sets constraints on the amount of violence in the system. Even at the height of the Cold War, the Soviet Union reliably supplied energy to Europe, and Venezuela still supplies oil to the US despite strong anti-US rhetoric on the part of Venezuelan leader Hugo Chavez and his successor Nicolas Maduro. Likewise, for all of its upheavals, the Middle East has been a generally reliable energy supplier to the West (Fattouh 2007).

Third and finally, future research should focus on addressing the key technological and policy challenges that must be overcome to transform existing energy usage patterns into more sustainable practices that will serve the security interests of current energy producers and consumers. There are several key technological challenges facing energy scientists today. One example is the development of cheap photovoltaic cells along with distribution and storage systems that can efficiently convert sunlight into electricity, move the voltage from where it is produced to where it is needed, and store it until the final customer wants to consume it (Woods 2008). There are similarly important technical challenges in the field of wind energy and biofuels. Technologies considered 'near at hand' can improve recovery of natural gas from shales, improve solar photovoltaics, expand grid-scale electricity storage, stimulate production

of electric cars and LED lighting, and greatly increase the energy efficiency and effectiveness of US military energy use (Shultz and Armstrong 2014).

In addition to addressing the technical issues, researchers also need to define energy policies that will encourage greater energy efficiency and the use of alternatives to fossil fuels. Researchers particularly need to define how governments can best intervene, through tax incentives, mandates, and other measures, to encourage more sustainable energy usage when markets do not provide these kinds of incentives.

To be sustainable over the long term, any new policies must meet the differing needs of countries that import energy and those that export it. While policies that improve efficiency and promote alternative sources have obvious applications for today's energy importers, they also benefit energy exporters. Many of the exporters are trying to diversify their economies away from a reliance on energy and therefore are beginning to consume more energy as they develop other industries. Since energy-rich countries are among the most inefficient energy users in the world, they too will benefit from the development of new technologies. A gradual evolution away from fossil fuels has the potential to preserve the cooperative aspects of the current energy system, while moving it in an environmentally sustainable direction.

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