

Energy Transitions and the Shifting Sands of Energy Geopolitics

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The rapid evolution of energy markets and the policies, regulations, commercial interests, geopolitical forces, and technologies that are impacting the pace of the so-called “energy transition” have increasingly been the focus of the international energy community. But, arguably the two most significant developments in energy markets over the last 15 years are often not the center of focus – the rapid growth in energy demand in developing Asian economies and the emergence of shale oil and gas production in the US. The shifting nature of economic, population, and energy demand growth coupled with emerging sources of new supply presents new challenges for global market participants, opens significant new opportunities, and portends new political and geopolitical stresses.

India, the ASEAN region, and China collectively account for more than 3 billion people, and, notwithstanding an unexpected economic calamity, the region is poised to be economically vibrant for the coming two decades. In turn, this translates into significant potential for energy demand growth, even as demand slows in the OECD. Understanding this emergent reality is of the utmost importance for policy makers everywhere, as it will reshape global energy trade and redirect various foreign policy endeavors. Matters are complicated by international efforts to “decarbonize” economic activity to curb greenhouse gas emissions, but these efforts face significant headwinds.

In general, any discussion of energy transitions must reconcile technology, legacy and scale while recognizing the intersections with economics, local policy and geopolitics.

- First, technology signals how fuels will ultimately compete, working to do so in multiple, sometimes competing, directions by raising the efficiency of use of existing fuels and by introducing new competitive energy sources. Importantly, capital is a vehicle for technology deployment, a point that highlights the roles of scale and legacy, but one that is often ignored in broader discussion of energy transitions.
- Second, scale matters because energy systems are large and must accommodate expanding access to energy services for residential, commercial and industrial consumers to support not only basic energy needs but the also the backbone for economic growth.
- Third, the legacy of infrastructure and energy delivery systems is multi-decadal, meaning turnover of capital is generational. What is done in the present defines the next 20 to 40 years.

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Indeed, this is precisely why coal is losing ground in many western economies – its legacy is old and aging infrastructure, and natural gas and renewables are serendipitously capable of defining the next generation of legacy infrastructure. In other parts of the world, for example in China, coal infrastructure is much newer and expanding, meaning it will likely be a focal point of use for the next 30 years.

- Finally, economics matter because the cost-benefit must be favorable for sustainable diffusion of new technology through capital investment at scale. And, both local policy and international geopolitics play an important role in shaping the landscape for future developments along the entire energy value chain.

So, despite any rhetoric to the contrary, the future is uncertain.

Since the Paris Accords, there has been increasing focus on renewable energy, with an initial aim at eliminating coal from the electricity generation mix. But, the overtures have expanded to include electrification of the transportation sector so that low carbon sources of energy can also displace oil. Technologically, this is becoming more and more possible, leading some to contemplate a coming peak in global demand for crude oil. However, technological feasibility and cost feasibility are different things, and an overhaul of the world's transport sector is daunting and expensive as production lines, supply chains and consumer sentiments all must align for a rapid, large scale turnover.

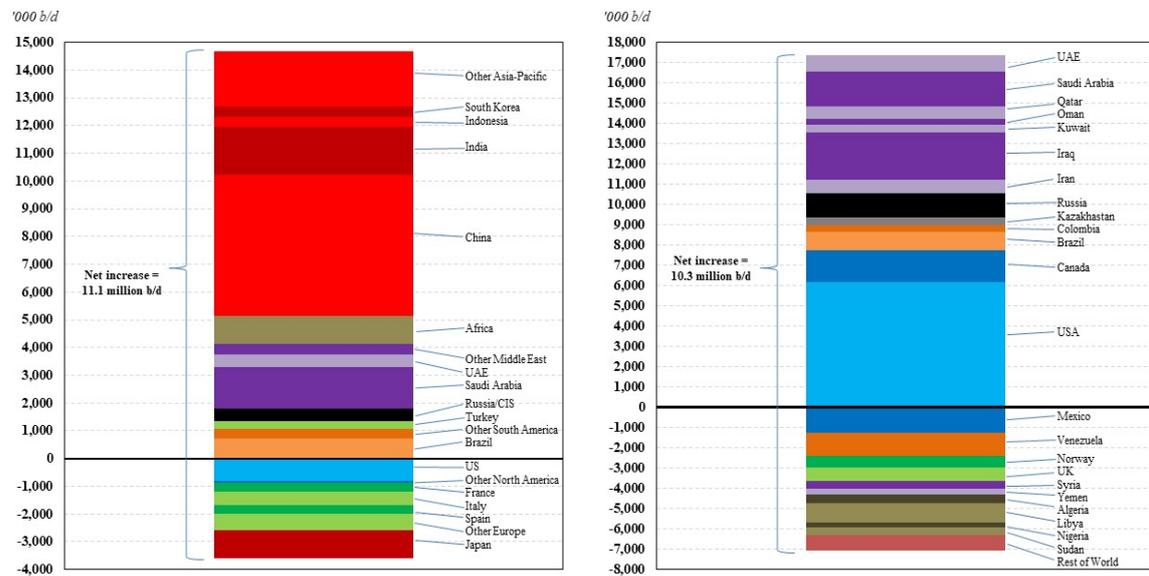
Natural gas, on the other hand, has gained favor amongst many as a “bridge fuel” to a lower carbon future. All else equal, this should drive increases in demand from all regions of the world. Given the scale of global energy demands, the availability of low cost supply, and the local environmental attributes of natural gas, it is highly likely that demand will rise regardless. Thus, the future of natural gas, unlike oil, has been less about *if* consumption will rise and more about *how much* it will rise.

Despite prognostications of an impending peak, the demand for crude oil – just as natural gas – has continued to grow (see Fig. 1, Panel 1). Global oil demand growth has been led by developing Asian countries. From 2008 through 2017, demand increased by about 11 million barrels per day (b/d), with the developing Asia-Pacific accounting for about 9.1 million b/d and China specifically accounting for about 5.1 million b/d. The OECD is a model of contrast where, except for South Korea, demand has generally fallen since 2007 due to weak economic performance, a lack of population growth, and consumer responses to higher prices. But, even if economic growth resumes in the OECD at levels reminiscent of the 1990s, it is highly unlikely that demands will grow significantly; rather, they are likely to remain flat to declining due to their already relatively high levels of economic development coupled with stagnant and aging populations.

Fig. 1 Global Oil Supply and Demand Changes, 2007-2017

Panel 1: Change in Global Oil Demand by Country

Panel 2: Change in Global Oil Supply by Country

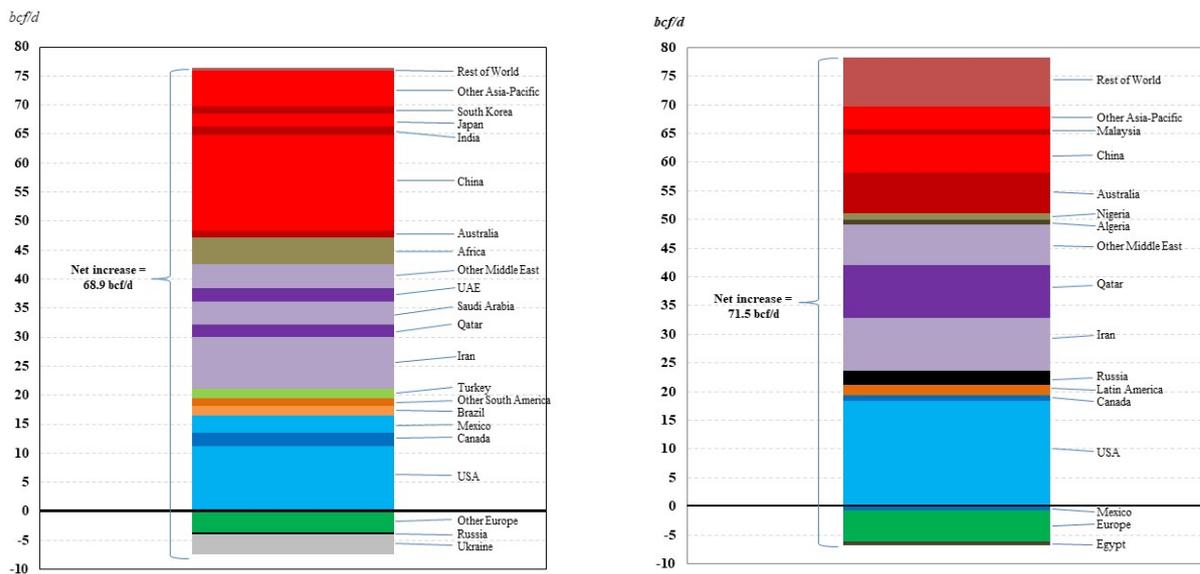


Data Source: BP Statistical Review of World Energy, 2018

Fig. 2 Global Gas Supply and Demand Changes, 2007-2017

Panel 1: Change in Global Gas Demand by Country

Panel 2: Change in Global Gas Supply by Country



Data Source: BP Statistical Review of World Energy, 2018

A look at supply reveals just how dynamic the global oil market has become. Over the last ten years, encouraged by higher prices and new resource plays, production increased in several countries – Saudi Arabia, Iraq, Russia, Brazil, Canada and the US, to name a few. However, a host

of above-ground issues – such as civil strife and sector mismanagement – contributed to production declines totaling over 5 million b/d in Mexico, Venezuela, Syria, Yemen, Algeria, Libya, Nigeria and Sudan (see Fig. 1 Panel 2). US output during this same period increased more than 6 million b/d, meaning US shale was an important source of new, commercially-motivated, reliable supply.

Notably, the two largest actors over the last decade on the supply and demand sides of the crude oil market are the United States and China, respectively. The same is true for natural gas (see Fig. 2), where US production growth has driven it to become a net exporter of natural gas despite strong growth in consumption. Demand growth has been strong in many regions of the world, but Chinese demand growth, and developing Asia more generally, has been a prime mover for global markets.

Enter geopolitics.¹ For clarity, the term “geopolitics” generally refers to the impact of geography on the balance of power in international affairs. Over the last few decades, the term has been used in discussions centered on how various actors could use energy for political gain. Hence, the concept of “energy security” – the concept of ensuring adequate supply at a reasonable and stable price – has been at the center of the broader discourse concerning geopolitics. Absent a severe economic calamity, energy will be at the heart of foreign policy and international engagement for developing countries. We already see energy actors from countries such as China and India engaged in investing across the value chain in countries in Latin America, Africa, the Middle East, and the US. Moreover, in the case of China, supply and infrastructure agreements with Russia may become more the norm as it attempts to secure supplies for its rapidly growing energy needs.

All of this, of course, has relevance for the role of the US in the broader geopolitical context. Given the *net* growth in demand since 2007, driven entirely by the developing world, additional sources of supply have been paramount for market balance. Moreover, since US oil production is commercially-motivated, rather than dictated by government or national oil company policy, US supply is arguably amongst the most secure sources. This makes US oil attractive to consumers everywhere, and has tremendous implications for US foreign policy dealings with countries such as Iran, Venezuela and Russia. For example, the US government may be encouraged to act with greater impunity in using targeted sanctions to dissuade hegemonic behavior.

Regarding natural gas, the role of the US and China for future market development is significant. China’s demand is already growing at a breakneck pace, leading to significant purchases of LNG. On the supply side, as US LNG exports rise, the global market will become physically linked to the North American market, which will have broad commercial and geopolitical implications. Since US LNG is market-driven it is generally understood to be relatively secure,

¹ Much of what follows in this section is also found in recent testimony to the U.S. House of Representatives Committee on Foreign Affairs, which is available at <https://www.bakerinstitute.org/research/testimony-house-subcommittee-terrorism-nonproliferation-and-trade/>.

which means US LNG serves as a “credible threat” to the status quo enjoyed by incumbent regional suppliers – for instance, Russia into Europe or Bolivia into Brazil – which can alter pricing discussions in future negotiations. As a case in point, with the opening of the LNG import facility in Lithuania, Russia renegotiated the price on its gas sales to the region to maintain market position. In the end, Lithuania still imports Russian natural gas, but the cost is now lower and there exists capability to switch suppliers should Russian supplies be compromised. Hence, the credible threat of US LNG supply has altered the status quo in the Baltic region.²

This is where the global geopolitical transition takes on broad dimensions. To be clear, the US and China will be principal catalysts in the new world energy and geopolitical order, but other regions will also play an important role. Given the emerging energy resource potential in the Western Hemisphere – ranging from unconventional resources in Canada, the US, Venezuela, and Argentina to conventional resources in frontier regions opened by new exploration and changes in regulation in Brazil, Colombia, Guyana, and Mexico – and emerging demands from China, India and other developing Asian nations, the world is on the cusp of a shift in global energy trade flows that will redefine markets, international discourse and geopolitics. To be clear, the Middle East will remain an important supplier of oil and gas, but policy in the developed nations around the world that shaped the 20th century must reconcile with the impending paradigm shift represented by new supplies and new demands on a massive scale.

While climate policy is likely to be an important factor shaping outcomes at the margin, the sheer scale of developing Asian economies and existing energy infrastructures around the world mean changes driven by climate concerns are likely to play out longer term. And, yes, developing economies are differentiated from developed economies, a fact that often arises as a point of contention in international climate negotiations. As South American and African economies grow they will exert additional pressure on global energy systems. The sheer scale of the energy required to meet demands for more than 9 billion people by 2050 – most of whom are in the developing world – means everything will be needed, with oil and gas playing a critical role. So, the conversation about oil and gas geopolitics will persist with new and old actors taking on different dimensions.

As a final point, the growth of US oil production has led some to question the sustainability of the Carter Doctrine as a mantle of foreign policy.³ In 1980, President Jimmy Carter responded to the Soviet invasion of Afghanistan by declaring that America would use any means necessary to protect its interests in the Persian Gulf. At the time, global oil security had been compromised by the combined impacts of the Iranian revolution and the outbreak of the Iran-Iraq war in 1979 and

² See, “A ‘Credible Threat’ Approach to Long Run Deterrence of Russian-European Hegemony” by Kenneth B Medlock III available at <http://www.forbes.com/sites/thebakersinstitute/2014/03/10/a-credible-threat-approach-to-long-run-deterrence-of-russian-european-hegemony/>.

³ See Jim Krane and Kenneth B Medlock III, “Geopolitical Dimensions of US Oil Security,” *Energy Policy*, March 2018.

1980, respectively. Protecting oil exports from the region took on heightened strategic importance. The Pentagon established the US Central Command in 1983, giving it oversight of operations in the Middle East and Central Asia, and the US Navy's 5th Fleet was re-established in 1995 and housed at the Juffair naval base in Bahrain, which the Navy took over in 1971 after Britain's departure. The emergence of shale in the US has led many to wonder if the Carter Doctrine will remain a tenet of US foreign policy. But, as should be evidenced by Fig. 1 and 2, the Middle East remains an important source of new supply for an increasingly energy hungry world. The geopolitical implications of a shift in the status quo are significant and would resonate for many years, potentially leaving a security vacuum in the region that must be contemplated prior to any policy shift. Moreover, oil security in the Middle East is taking on increased importance in China, which begs the question of whether the US and China will be cooperative partners in the region, or competitors, or whether other parties, such as Russia, will step in opportunistically. In any case, just as with many other matters in energy geopolitics – South China Sea, Iran, Venezuela, etc. – the US and China will be at the epicenter, and the global implications are significant regardless of outcome.

Writer's Profile

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He directs the Baker Institute's Center for Energy Studies and the Masters of Energy Economics Program at Rice University, where he also holds adjunct professor appointments in the Department of Economics and the Department of Civil and Environmental Engineering. Dr. Medlock is a principal in the development of the Rice World Natural Gas Trade Model, which is aimed at assessing the future of international natural gas trade. He is an active member of American Association for the Advancement of Science (AAAS), American Economic Association (AEA), and International Association for Energy Economics (IAEE). He received his Ph.D. in economics from Rice University in May 2000.