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Mr. Lynch introduces the uncertainty regarding predictions of peak oil demand. His thesis explores the link between peak oil predictions and the hoped-for outcomes of advocates. Readers of peak oil predictions should consume those forecasts with a degree of scepticism.

The Energy Dimension of the Russian Story

Rashid Husain Syed

Since Vladimir Putin, the ex-KGB operative, emerged on the political scene of Russia, his desire and ambition to restore Russia to the previous glory of the Soviet Union days have been no secret. The primary tool in Putin's hand to achieve the bygone days has been the energy assets of the country, and, most now agree, he has deftly used it as a foreign policy tool.

Russia's Energy Riches

Russia is among the world's largest producers of crude oil (including lease condensate). It holds the largest natural gas reserves in the world and is the second-largest producer of dry natural gas. As per a 2017 IEA report, Russia was the world's largest producer of crude oil including lease condensate and in 2016 was the third-largest producer of petroleum and other liquids (after Saudi Arabia and the United States), with average liquids production of 11.2 million barrels per day. Russia was also the second-largest producer of dry natural gas in 2016 (second to the United States), producing an estimated 21 trillion cubic feet (Tcf).

Russia's rebound from the dark days of the early 1990s has largely taken place on the back of its energy riches. President Putin has used the Russian energy prowess to advance his political agenda. In a 2011 paper, F. William Engdahl argued that Moscow appears to hold a winning hand in the one important non-military lever it has to tip the global geopolitical balance of power in its direction and away from Washington's overwhelming dominance. Oil and natural gas are at the heart of this strategy. Engdahl further added that Russian natural gas has increasingly been the foundation of a brilliant series of Russian energy geopolitical initiatives for several years. Gazprom, a closely-held state company, is the centrepiece of this energy strategy, Engdahl said.

To counter the eastward march of NATO into countries of the former Warsaw Pact (such as Poland, the Czech Republic or Romania) and the various US attempts used in the past to lure Ukraine and Georgia into NATO, Putin has used the economic lever of Gazprom with skill. In a bid to neutralize the potential military strategic threat from the NATO encirclement, Moscow has exploited the energy dependence of Europe on Moscow, seeking in the process a stronger foothold and deeper economic ties with major European countries using pipeline politics. No country has been more the focus of this Russian pipeline diplomacy than the former wartime foe, Germany.

Nord Stream Pipeline

The development of Russia's Nord Stream pipeline, officially inaugurated in 2011, entrenched Russia as a principal energy supplier to Northern Europe, particularly the industrial power of Germany. A twin pipeline, the Nord Stream carries roughly 55 billion cubic meters of gas per year under the Baltic Sea and into Germany and the rest of Europe.

The Nord Stream, seen by many as a necessary move by Russia to diversify its energy delivery infrastructure away from total reliance on Ukraine, has increased Russia's leverage when it comes to relations with Europe. The Baltic undersea route was chosen deliberately to avoid potential geopolitical disruptions such as that which occurred a decade ago when a pro-NATO Ukrainian government blocked Russian gas deliveries to

Western Europe, to undercut Russian attempts to come closer to Western Europe. Behind Ukraine was the long arm of Washington, Engdahl underlined in his paper.

Pipelines and the European Energy Market

Every geopolitical conflict between Russia and the West has a distinct energy dimension to it. Since the early years of the post-Soviet era, Russia has endeavoured to grow its energy clout in Europe. During that period, Russia made significant moves to increase its share in the European energy market. It made serious efforts to overcome strategic bottlenecks in the process by building submerged gas pipelines, bypassing Ukraine and other countries which were often perceived in Moscow as non-reliable transit partners. By buying the Turkmen gas and redirecting it into the Russian pipeline network, Putin also ensured undermining the rival pipeline project Nabucco.

Russia is using its energy assets as an instrument of geopolitical power, Geo-Political Futures (GPF) underlined in a paper last August. These provide Moscow with considerable influence over the countries dependent on Russia for their energy needs.

France and Germany illustrate how Russian energy can shape foreign policy. France may rely heavily on foreign energy, but most of its oil and natural gas come from Algeria, Qatar, Saudi Arabia, and Libya – not Russia. France can, therefore, afford to be more aggressive and supportive of sanctions against Russia, GPF pointed out.

Not so with Germany, which receives 57 percent of its natural gas and 35 percent of its crude oil from Russia. Germany relies heavily on pipelines for its energy, particularly Russian natural gas. It has four cross-border crude oil pipelines, four domestic pipelines, and three oil ports in the North and Baltic seas. Simply put, Germany is beholden to the countries with which its pipelines have a connection – something that makes it vulnerable to retaliation. Berlin, therefore, needs to tread a fine line between the US and its primary source of energy, Russia.

This seems to be one reason why Germany has been such an outspoken critic of the US sanctions that penalize businesses in any country that collaborate or participate in joint ventures with Russian energy firms, GPF opined. Germany also supports the construction of Nord Stream 2, a pipeline that would run through the Baltic Sea, circumventing Ukraine. This new pipeline would help to safeguard German energy procurement, as it would provide Russia with a lever to punish Ukraine by withholding shipments of natural gas, without punishing countries such as Germany further downstream.

In the currently spread out energy geopolitical chessboard, Moscow has emerged as the single most significant provider of oil and gas to Europe, with roughly one-third of the total European oil and gas imports coming from Russia. This has also led to some consternation in Europe, forcing it to enhance efforts to diversify away from Russian gas.

Russia is aware of this.

In an attempt to reduce its reliance on exports to Europe, Russia has also been attempting to diversify its export markets – away from Europe. At its height, Ukrainian pipelines accounted for nearly 80 percent of all gas deliveries from Russia to Europe. The Russian-Ukraine conflict highlighted how critical Ukraine was to Russia's overall gas exports.

The conflict emerged as one of the principal motivators for Russia's construction of export pipelines bypassing Ukraine. Moscow also worked on the Trans-Siberian oil pipeline to the

markets of China, Japan and Korea, as well as the Sakhalin-Khabarovsk-Vladivostok gas pipeline in the Russian Far East.

The Crimean Crisis

The Russian annexation of Crimea in March 2014 also had energy dimensions. The move unravelled the Ukrainian strategy of energy independence and gas diversification away from Russia. Prior to this, the Yanukovich government had managed to decrease Ukraine's gas imports from Russia from 45 bcm in 2011 to just 28 bcm in 2013. The original plan was to end any Russian gas imports by 2020.

Putin's annexation of Crimea was driven by the desire to undermine Ukraine's energy and gas diversification strategy, Dr. Frank Umbach of the European Centre for Energy and Resources Security opined in a paper in NATO Review. For the Ukrainian strategy to work, the Crimean Peninsula was of strategic importance to the country. It has vast offshore oil and gas resources in the Black Sea, estimated between 4-13 trillion cm of natural gas. With the Russian move to occupy Crimea, the Ukrainian desire to end its dependence on Moscow was delayed – if not finished – altogether.

In an understandable move, the new Russia-propelled government in Crimea entrusted Gazprom to manage the peninsula's energy resources. The Crimean branch of Naftohaz Ukrainy, Chornomor Naftohaz, was already "nationalized" by Gazprom.

Emergence of a New Russia

In his 2011 paper, *"Petrostate: Putin, Power, and the New Russia,"* F. Joseph Dresen rightly points out how under Putin, Russia has regained some of its lost glory. Quoting Marshall Goldman, Kathryn Wasserman Davis, Professor of Russian Economics (Emeritus), Wellesley College, and senior scholar, Davis Center, Harvard University, Dresen underlined that Russia's economy had declined by 40 percent during the early part of the 1990s, and had suffered a financial collapse in 1998.

Since Putin was inducted as the prime minister in 1999 and then as president in 2000, the Russian economy has grown every year.

Conceding the growth of Russia's energy leverage in recent years, Randall Newsham in his paper, *"Oil, carrots, and sticks: Russia's energy resources as a foreign policy tool"* pointed out that under President Putin, Russia's energy influence reached unprecedented heights, underlining that Russia has used its (energy) influence to reward its friends and punish its foes, seeking to regain its influence over the region it considered its backyard and even beyond.

Several factors contributed to this. First, the world market for oil and gas greatly favoured Russia and other producers during 2000-2008. A key factor in the rise of Russia's "energy power" was the state of the world oil and gas markets during Putin's reign. Supplies were tight worldwide, meaning that Russia's customers had few alternatives to buying from Moscow. Countries could not easily evade Moscow's energy sanctions or impose counter-sanctions. For example, the EU would have found it virtually impossible to boycott Russian oil or gas to express its distaste for Putin's strong-arm tactics.

Also, prices soared to record highs after Putin became President in 2000, with oil reaching almost \$150 per barrel by mid-2008. This turnaround from the Yeltsin years allowed Russia to rake in massive profits from oil and gas sales. This, in turn, allowed the Kremlin to pay off Russia's foreign debts, which loomed so high under Yeltsin that

they prevented Russia from fully using its petro power. Today the country is far more solvent than in the 1990s. If a country such as Belarus threatens to temporarily suspend Russian oil or gas shipments through its pipelines, Russia can shrug off the threat. Unlike the Yeltsin years, it knows it can afford a temporary drop in revenue.

To defend its “Petro-Power”, Newnham further pointed out that Russia strives to keep as many of its partners as possible in a state of energy dependence, a dependence which can be manipulated at politically chosen times. A key component of this strategy is the control of pipelines and other energy facilities in neighbouring countries. Russia aims to control pipelines in Poland, Belarus, Ukraine and the Baltic states which take Russian oil and gas to other countries. If it cannot control these transit routes, it will try to bypass them, for example with the new Nord [North] Stream pipeline through the Baltic Sea, running directly from Russia to Germany. At the same time, Moscow controls pipelines through its own territory which carry oil and gas from the Caspian and Central Asian countries and works hard to ensure that these countries cannot find alternative export routes.

New anti-Washington Bloc

With a battle of wits going on between Russia and the West, Moscow appears determined to establish and promote strategic ties with countries such as China, Venezuela, Iran, Pakistan and Cuba, who are on the receiving end from Washington. And Russia under Putin has used its energy leverage to promote ties with these countries. In the process, an anti-West group seems to be emerging on the global political horizon to balance the dominance of Washington. China remains the kingpin of this emerging bloc.

China

Russia has thus gone out of its way to enhance its trade and political relations with China – the emerging global superpower. In May 2014, Russia and China signed a 30-year, roughly \$400bn deal for Gazprom to deliver Russian gas to China. The deal underscored Russia's shift towards Asia amid strained relations with the west.

The contract to provide 38 billion cubic metres of gas each year was signed by the state-owned Russian gas company Gazprom and Chinese state giant, CNPC (China National Petroleum Corporation). President Putin – who has been pushing to close the deal after almost a decade of negotiations – called the agreement “the largest in the gas sphere during the era of the USSR and Russia.”

Vladimir Milov, a former deputy energy minister, was quoted as saying that the Russian government wanted to open new markets in reaction to increasingly hostile relations with the West over Ukraine and Crimea. Whereas the US and the EU have threatened economic sanctions against Russia, China has refused to take a side in the conflict, staying independent from US pressure and forging still deeper energy ties with Moscow. On the other hand, Putin seems eager to diversify gas supplies at any expense because he considers it geopolitically significant, Milov was quoted as saying in the press.

The China deal could also be a headache for Western European states. A British energy commentator was quoted as saying that the move could drive up prices for European gas consumers who are becoming increasingly dependent on Russia and now face competition for their supplies.

Venezuela, Cuba, North Korea and Kurdistan

With Venezuela apparently on the verge of imploding, President Putin is also using its energy riches to help the country. Russian state giant, Rosneft, threw the nation an economic lifeline, lending the cash-starved government vast sums of money by agreeing to pay for shipments of oil in advance. This helped the Maduro government import food

and staved off default while the US has been seeking to isolate the government in Caracas with sanctions. How long this could continue remains a question.

At a time of rising instability and isolation, Rosneft has emerged as Venezuela's most important foreign investor, Greg Walters quoted Vladimir Rouvinski, a political scientist at Colombia's Icesi University as saying. Rouvinski said Rosneft's moves in Venezuela are likely driven more by politics than sound business, aimed at supporting a country seen as a Russian ally on American turf. "For the Russians, Latin America remains the US backyard," Rouvinski said. "To show Russia's presence in the US backyard is very important."

Since the anti-American, leftist Chavez came to power in Caracas, Venezuela had been supporting a fellow socialist Latin American country – Cuba – with cheap oil. With Venezuela in political turmoil, it apparently became virtually impossible for Caracas to continue supporting Havana with cheap crude supplies. Russian state giant, Rosneft stepped in to fill the void. Last May, it shipped large quantities of oil to Cuba for the first time in over a decade. Rosneft also announced it would supply about 250,000 tons of crude and diesel fuel to the Cuban state-run firm Cubametals.

As per a report by Greg Walters, US Senator Patrick Leahy, while responding to the Cuba-Russia oil deal, said the Trump White House bid to tighten sanctions on Cuba was leaving "a gaping vacuum" for "our adversaries to fill. The Kremlin has again become the island's saviour amid a Cuban energy crisis caused by the chaos in Venezuela," Leahy wrote in an Op-ed last June. "This alone should set off alarm bells in the White House."

On the issue of North Korea, Russia has been using its energy riches to checkmate the US. Earlier reports indicated that America's efforts to isolate North Korea appear to have run afoul – courtesy of Russian energy riches.

Despite the UN move last summer to restrict crude supplies to North Korea by at least 30 percent, reports later emerged that Russia may be secretly supplying North Korea with crude. At least eight ships that left Russia carrying fuel ended up travelling to North Korea instead of their declared destinations, Reuters reported last September, citing its own shipping tracking data. The Washington Post, citing unnamed US officials, reported that Russian smugglers were keeping North Korea supplied with oil.

Walters also argued in his November 2017 paper that America's attempts to prevent Kurdistan's independence referendum in September failed – both because of the Kurds' long-held determination to establish their own country and because of the big vote of confidence Kurdistan received from Russia's top, state-controlled oil company, Rosneft.

Russian oil is emerging as a powerful counterweight to US political and economic statecraft, Walters hence underlined. "There's no doubt in my mind that Russia has brazenly used the geopolitics of oil, directly propping up regimes that are antithetical to the United States," Rep. Trent Franks, an Arizona Republican, told VICE News. "They have literally used oil as a strategic weapon."

Moscow's relations with Iran also have energy undertones. Both sides have already signed a series of energy cooperation deals focusing on Russian technical investments in Iran's domestic energy sector.

The war in Syria and the subsequent diplomatic standoff between Russia and the West is also being viewed by many from an energy prism. The early days of the conflict in Syria coincided precisely with the signing of the deal for a gas pipeline to deliver Iranian and Iraqi gas to the Mediterranean, and subsequently to Europe, via Syria.

Naturally, such a development would have been a direct assault on the gas hegemony of Qatar, and the Gulf monarchies more generally. Indeed, Qatar was then a part of the Gulf axis that along with Saudi Arabia were funding the anti-Assad coalition in Syria – for their own respective reasons. Some saw it as an attempt by the energy-rich Gulf states to prevent any infringement upon their European gas revenue.

While the US remained hesitant to enter the Syrian war theatre, Moscow embarked on it actively and with real zeal. The result was the annihilation of ISIS in the region. One needs to underline here, the credit went to Moscow and not Mr. Trump, as he claimed in his State of the Union address last January.

In the process, there were economic carrots too for Moscow. In 2016, Syria granted rights to Russia to rebuild its oil and gas industries, including the resources in or near the Kurdish-occupied northeast and offshore.

An energy-induced comprehensive rapprochement with Saudi Arabia has been the elusive prize that Moscow needed to grow its global stature, especially in the Middle East. With global ambitions, Moscow couldn't have wanted the oil kingdom to be on its wrong side. Putin hence used his personal clout to overcome the opposition from Russian oil giants to the output constraint agreement with OPEC and went ahead with the deal. The agreement tilts the balance in Moscow's favour in the region.

Sochi and Not Camp David

The recent Syria peace moot in Sochi, and not Camp David, also highlights the growing stature of Moscow in global affairs. Moscow is now taking a leadership role, sidelining Washington in the process. In an attempt to put together an anti-American bloc in its own backyard, Moscow, in active coordination with Beijing, has been attempting to seduce regional powers Pakistan and Iran within its own ambit.

Courtesy the energy riches of Russia, a new, fascinating Great Game of the 21st century is on. It is a thriller, and we all are a witness to it.

About the Author

Rashid Husain Syed is a Toronto-based analyst, commentator and speaker focusing on energy, the associated geopolitics and the Middle East. He has been writing, for more than two decades now, on the emerging global energy scenario for international publications. These include the Globe and Mail, Toronto Star, Saudi Gazette, Arab News and Dawn. The BBC regularly uses him. He has the honour of being invited to the DoE in Washington and the IEA in Paris to deliver solo talks on energy and the evolving scenario. Having served as the Vice President of a leading Saudi trading and consulting house for almost a quarter of a century, he provides consultancy to various organizations. He can be reached at rhusainsyed@yahoo.ca.

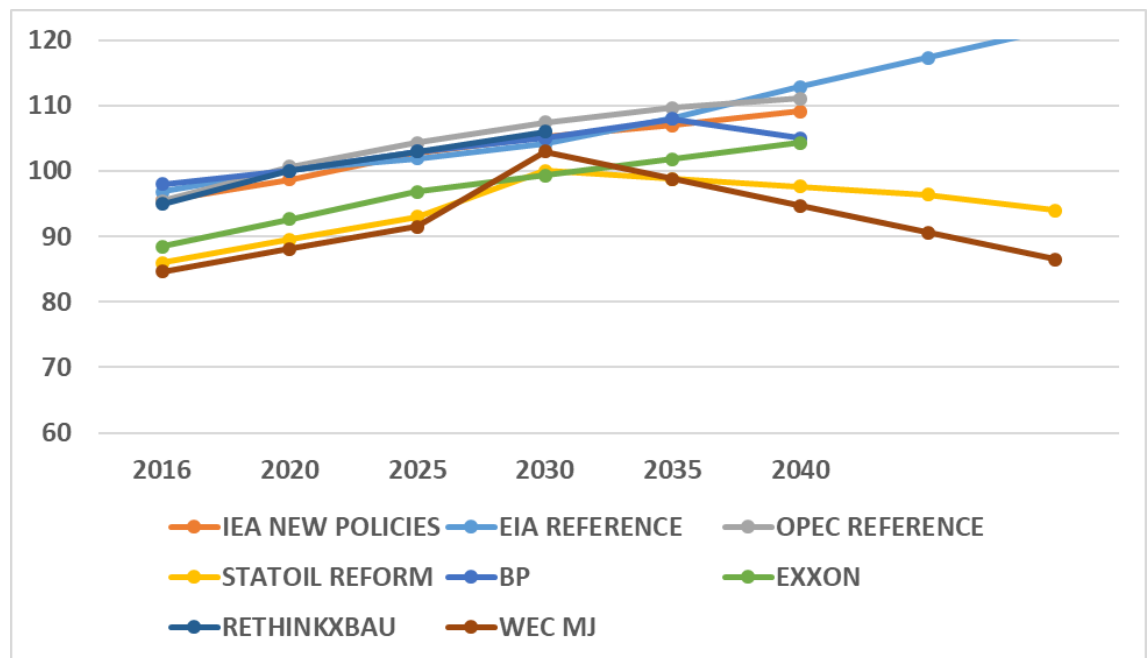
The Prospects for Peak Oil Demand

Mike Lynch

Peak oil demand has become the flavour of the month with a variety of media, NGOs, and consulting firms suggesting its imminence, and the occasional oil industry executive making at least a qualified remark in support of the idea. In many respects, this resembles the peak oil supply arguments of a few years ago, with one basic difference: demand for a commodity can peak and decline, whereas no mineral or energy has either seen its global production fall off because of resource constraints, despite many such predictions from the Club of Rome to the Post-Carbon Institute.

In Figure 1, a comparison of many oil demand forecasts is presented, omitting secondary scenarios for the sake of simplicity. BP sees a 2035 peak and slight demand afterwards, but the others generally do not except where strong reform is projected. Indeed, the oil companies, IEA, OPEC and the EIA project roughly continuous demand growth, albeit it slightly lower than in the past. The oil companies do not discuss oil prices, while the IEA and EIA see sharp increases, which raises the question of the outlook if prices remain near current levels for an extended period.

Figure 1: Recent Oil Demand Forecasts (Reference Cases)



Three primary causes for a peak in oil demand have been suggested: restrictions on consumption due to climate change policies, advances in competing technologies, most notably battery electric vehicles, and demographics, especially the aging of consumers in most advanced industrial nations. The most extreme cases have predicted a peaking in oil demand as early as 2020,¹ although traditional forecasters are much more pessimistic about the odds of it happening in the next two decades. This is shown in Table 1, where most base-case or reference scenarios from mainstream forecasters do not see a peak as far out as they forecast, but in certain cases, such as the IEA's Sustainable Development Scenario or Statoil's Renewal Scenario, the peak occurs earlier.

Table 1: Predicted Peak Oil Demand Date

Source	Date	Scenario	Published
IEA	Post-2040	New Policies	2017
IEA	Post-2040	Current Policies	2017
IEA	2020	Sustainable Development	2017
OPEC	Post-2040	Reference	2017
EIA	Post-2050	Base	2018
WEC	2030-2040	M Jazz	2017
WEC	2030-2040	U Symphony	2017
WEC	c. 2040	H. Rock	2017
BP	Post-2035	Evolving Transition	2018
Exxon	After 2040		2017
Statoil	2030	Reform	2017
Statoil	2020	Renewal	2017
Statoil	Post-2050	Rivalry	2017
CTI/Grantham	2020		2017
CTI/Grantham	2020-2025	Carbon Markets	2008
CarbonTracker	2020	NDC-PV-EV-Low	Feb-17
CarbonTracker	2030	NDC-Orig	Feb-17
RethinkX	2020	Transportation as a Service	May-17

To a certain degree, the fact that so many different developments lead to the same conclusion suggests a bit of “reverse-engineering.” People who want to see the end of the oil industry try to rationalize their conclusions through various methods. This is not unlike the peak oil supply fad of the 2000s when oil was predicted to peak because of: lack of discoveries, insufficient in-ground resources, the collapse of Saudi production, high decline rates, political risks and so forth. Although some in the oil industry supported the idea, environmental activists made up a significant portion of those favouring the idea.

And the most aggressive scenarios come from groups that are focused on climate change policies, as with Carbon Tracker and the Grantham Institute, or technological and social revolutions, as in RethinkX’s abrupt move to ride-sharing of autonomous, electric vehicles. Arguably, the early peaks might be just as much aspirational as predicted, and the split between conventional forecasters and single-issue ones is indeed suggestive. The World Energy Council, seeing a peak but not until after 2030, straddles the two groups.

The fact that some energy commentators, like Joe Romm of Climateprogress.org,² have embraced peak oil demand as ardently as they embraced the discredited peak oil supply theories is not necessarily proof that their arguments are wrong, but certainly means they should be analyzed carefully. A climate change advocacy group’s views on the future of oil are perhaps more valid than a UFOlogist’s opinions on the evidence of alien visitations but still require careful examination.

Few in the oil industry would argue with the title of John Hofmeister's book, *Why We Hate the Oil Companies*,³ and this clearly affects the current discussion. Some groups have urged public institutions to divest their portfolios of fossil fuel stocks, and they have embraced the idea that peak oil demand is suppressing their value, reinforcing their divestment arguments. Again, however, this is reverse-engineering from a preferred outcome – divestment – to the supposed rationale – peak oil demand.

Climate Change

The argument that fossil fuel consumption will have emitted enough CO₂ by 2040 to use up the quotas set in the Paris Accord⁴ and will result in leaving the remainder of reserves in the ground, is very simplistic. It assumes that: a) the targets will be met; b) the targets will be met entirely by reduced burning of fossil fuels, when there are numerous other greenhouse gases, including natural sources, and; c) there will be no impact from mitigating efforts such as carbon capture and sequestration and geoengineering.

The track record of international environmental agreements does not support the first contention. The case of the widely hailed 1997 Kyoto protocol on climate accord is illustrative: even though only the industrialized nations were required to reduce emissions, only half of the targeted reduction was achieved. More recently, the closure of nuclear power plants in Germany and Japan has seen increased fossil fuel usage, subsidies for renewable power have been reduced in several major countries, and the US government has announced plans to pull out of the Paris Accord.

Even then, the prospect of reducing petroleum consumption needs to consider the relative costs of various policies. Increased energy efficiency and switching coal-fired power generation to natural gas are the most cost-effective approaches of reducing GHG emissions by far, and the growing political resistance to expensive policies like subsidies for battery electric vehicles implies that the threat to oil in transportation is exaggerated, at least in terms of the role of climate change policies.

Geoengineering approaches from adding aerosols into the upper atmosphere to placing giant “shades” in space to block incoming solar radiation have seen minimal experimentation to date, with fervent opposition in some quarters to deliberate interference in the climate (as opposed to the current, incidental interference), but if emissions targets continue to be missed, pressure to attempt such will grow. Carbon sequestration appears at present to be economically prohibitive, but research remains at an early stage and costs could come down, just as they have for photovoltaics and lithium-ion batteries.

Should a broad effort be undertaken, including reducing non-CO₂ emissions and employing carbon sequestration and geoengineering, then the necessary reduction in fossil fuel consumption will be much smaller and the heaviest burden will probably fall on coal. This assumes, of course, that rationality drives climate change policy-making, which is hardly assured.

Demographics and Economics

Beyond a doubt, world population growth has slowed and many countries, such as Japan, are even experiencing declines, and this will suppress future oil consumption. Oil demand in the European Union peaked in 2006 and has since dropped by 2 mb/d, aided by a weak economy and dieselization of the automobile fleet. Japan's consumption peaked two decades ago, and has been falling irregularly since. Of

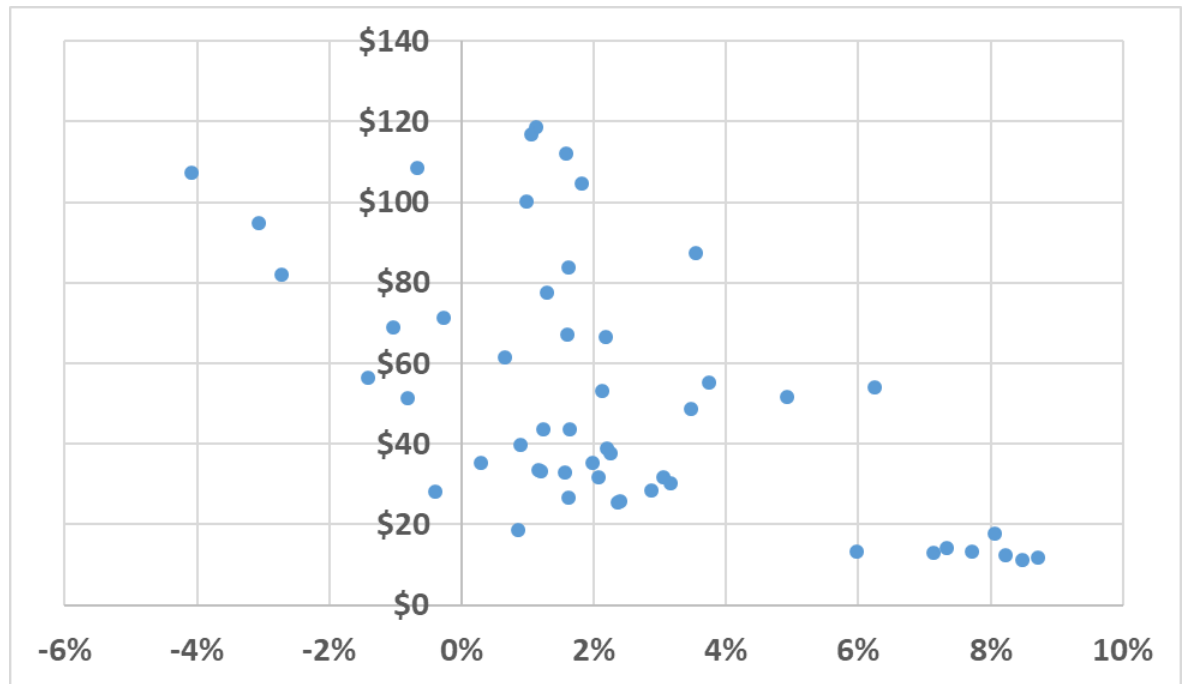
course, in both instances, high prices from 2004-2014 encouraged conservation, and in fact, several observers like Exxon CEO Rex Tillerson thought US gasoline demand had peaked a decade ago, only to see new records set after prices fell in 2014.⁵

The case of Japan is telling. Japanese population did peak in 2008, it is true, after which oil consumption fell by over 600 tb/d. However, Japanese oil consumption peaked in 1996, twelve years earlier, and had seen an earlier peak, decline and recovery from 1979 to 1996, all while population grew. High oil prices created an incentive for fuel-switching and conservation, while the 1986 price crash partly reversed that.

Demographics are certainly important but tend to change at glacial rates compared to the impact of prices, as population changes are usually on the order of 0.1% per year in developed countries, especially when immigration is minimal. Annual changes in oil consumption, on the other hand, are typically 3-5%, positive or negative, and often much more.

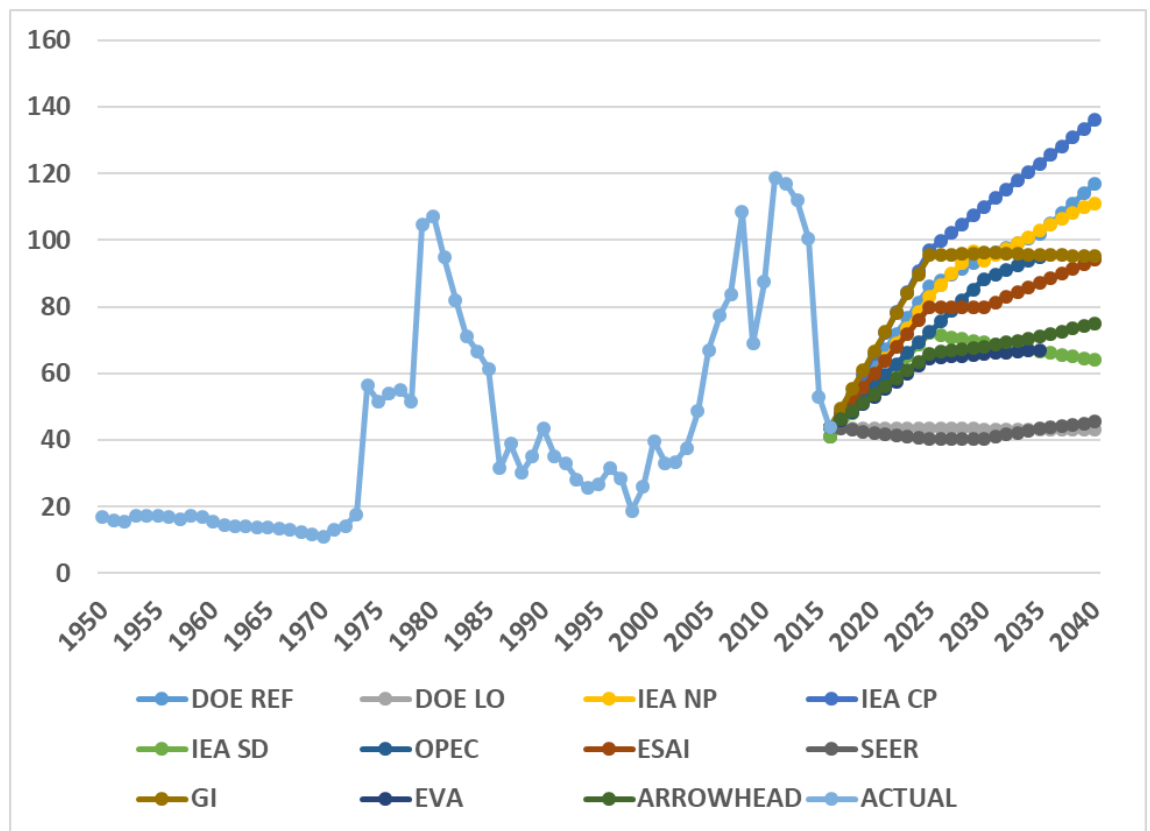
Which highlights the dominant role of price, often neglected by forecasters. As Figure 2 shows, there is a rough correlation between oil price and the rate of demand growth: 4% growth is never seen at prices above \$60/barrel, while demand never grows above 2% per year – and often declines – when the price is over \$90/barrel. (Factors like the 2008 financial crisis and the collapse of the former Soviet economy, and oil demand, in the 1990s, also influence demand trends in the short term.)

Figure 2: Global Oil Demand Growth and Price, 1966-2016 (2015\$)



If, as so many expect, oil prices will recover to triple-digit levels within a decade, then it follows that demand growth will be affected accordingly (Figure 3). At the same time, other factors will affect both price and demand, and almost anything likely to suppress demand should also put pressure on prices, so that in most scenarios, prolonged periods of high prices appear unlikely.⁶

Figure 3: Recent Oil Price Forecasts



Technological Revolution and Behavioral Change

Groups such as RethinkX⁷ and Bloomberg New Energy Finance⁸ have become very optimistic about the prospect for battery electric vehicles and autonomous unmanned vehicles transforming personal transportation and thus suppressing demand. The core idea is that consumers want transportation services, not automobiles, and will soon substitute ride-sharing for vehicle ownership. These shared vehicles are assumed to be overwhelmingly electric and self-driving.

The concept of providing services instead of goods is not new, but was pioneered in a similar form by Amory Lovins in 1976, when he suggested that “People do not want electricity or oil, nor such economic abstractions as ‘residential services,’ but rather comfortable rooms, light, vehicular motion, food, tables, and other real things.”⁹ In fact, subsequent experience suggests that people are not likely to switch from buying the goods they need (cars and gasoline) in favour of transportation services. For example, four decades after Lovins’ article, some companies provide energy services to large users, but individual consumers still buy electricity and natural gas for their homes.

There is an analogue to ride-sharing services: large cities like Tokyo and New York have dense mass transit systems, as well as abundant taxi service (the former more than the latter), and extremely high costs for automobile possession. In both cities, there is widespread ownership of private automobiles, roughly 1 for every two inhabitants. That is certainly lower than in the US, but the ReThinkX suggestion that by 2021, sales of internal combustion engines will be replaced entirely by ride-sharing vehicles that are autonomous and battery powered, appears unlikely.¹⁰

The other argument is that rapid advances in battery technology will make battery electric vehicles competitive with internal combustion engine vehicles, reducing oil demand. Bloomberg New Energy Finance is a major proponent of this view, and they predict that battery costs will drop from the current \$209/kwh to \$100/kwh by 2025.¹¹ This would bring the cost of a typical BEV down by about \$6,500.

Of course, in the US, federal subsidies of \$7,500 per vehicle will expire long before then (mostly within 2 years, depending on the manufacturer), so that even if the battery savings are achieved as projected, there will be a period where BEV costs rise from current levels and even the projected competitiveness at \$100/kwh will be delayed.

Future demand for electric vehicles remains speculative, but two data points are indicative. For one thing, Ford offers its Focus model in an EV and ICE version. The former has sold 1,704 vehicles in the year through November 2017,¹² while total Focus sales for the period are 147,000.¹³ Possibly, this particular model is not very representative, although in total auto sales, ICE's outnumber BEVs by an even greater margin, about 200 to 1.¹⁴

The other indicator of the competitiveness of BEVs is the impact of reduced subsidies. In Hong Kong, Denmark and the US state of Georgia, lower subsidies have meant a crash in sales. The first two had substantial subsidies, but in Georgia, the state ended a \$5,000 subsidy only to see sales of BEVs drop by 90%.¹⁵

So, while it is entirely possible that more cars in the future will have self-driving capabilities, it seems unlikely that this will have the dramatic impact on vehicle ownership projected by the technophiles. And the falling cost of batteries, while conjectural, should improve competitiveness with ICE vehicles, but the shorter driving range, uncertainty about range under different driving situations, and the inconvenience of recharging, seem significant impediments to consumer acceptance. Electric vehicle advocates tend to downplay these challenges, but they appear to be very real.

Combine that with the fact that electric vehicles only make a minor contribution to reducing greenhouse gas emissions since most of the world's electricity is generated by fossil fuels (7% from wind, solar, biomass and waste according to BP), promoting electric vehicles to reduce CO₂ emissions appears inefficient. Considering the number of countries that have reduced support for renewable power (Spain, Japan, Germany, Britain) because of the expense, the possibility that the financial support and other benefits offered to BEV buyers (no tolls, travel in HOV lanes, etc.) will be withdrawn seems as likely as subsidies being extended.

Irrational Exuberance

The energy sector has seen numerous cases of irrational exuberance, where support for a technology or idea is driven by enthusiasm founded in aspirations or assumptions rather than facts. Two decades ago hydrogen fuel cells were all the rage, and the auto industry announced plans to mass produce such vehicles. In the 1980s, diversification of the oil industry was pushed, followed a few years later by insistence that oil companies should focus on their core competence. During the dot-com and Enron era, talk of monetizing assets and operating as a "virtual" company dominated the media. None of these panned out.

Which doesn't mean peak oil demand will prove to be another strategic fad. Still, the enthusiasm for electric vehicles which seems dominated by advocates rather than consumers and the assumption that, despite all previous experience, the world will meet the carbon targets of the Paris Accord, suggests that skepticism is appropriate. A significant fraction of the world's population underutilizes commercial energy, including petroleum, and there is as yet no attractive substitute. Given development and market penetration lead times, it is difficult to believe that peak oil demand will occur in the coming decade, and possibly not until much further in the future.

About the Author

Mike Lynch is President and Director of Global Petroleum Service, Strategic Energy & Economic Research Inc. (SEER). Mr. Lynch has over twenty years of experience analyzing international energy, particularly oil and gas markets. He has numerous publications in four languages and speaks regularly at international conferences. He is the primary author of Global Petroleum SEER and Global Petroleum Outlook, which provide short- and long-term oil market analyses.

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