

The Strategic Picture of Oil and U.S. Energy Policy Recommendations for the Next Decade

Karen Timmerman
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THE STRATEGIC PICTURE OF OIL IN THE NEXT 10 YEARS

In the next decade, the world will see great changes take place in the strategic picture of oil. World petroleum demand will increase with consumption as countries with emerging markets use oil to fuel their growing economies, though this demand will be slightly lessened as alternative energy options are explored and efficiency improves. Supply will narrowly keep up with demand as new sources of oil are discovered or become available, while the potential for disruption of world oil flows, especially in the Middle East, may take millions of barrels a day off of the market. The shift in the past century from international oil companies to state-owned oil company dominance will either encourage greater transparency in the coming decade in an effort to promote efficient budgeting and good governance or cause economic damage and interfere with production as states succumb to the resource curse. Finally, the world will see an increase in environmental damage related to the exploitation and use of oil that if not checked, may have the potential to disrupt oil production and bring supply down.

Future Demand

The biggest increase in global oil demand will be from nations who are relying on oil to sustain the rapid growth in their economies, such as China, India, Brazil, and other OECD countries. In these countries, especially in China and India, there is a rising demand for oil imports as domestic consumption surpasses supply.

China

As the world's largest country with a current population of 1.4 billion people, China is poised to knock the United States out of its place as the world's largest consumer of petroleum. This is attributable to rapid industrialization and urbanization, increasing per capita incomes, and an expansion of the transportation sector, all of which require a massive injection of oil to keep running smoothly. Oil consumption increased to 7 million b/d in 2005 from 4.7 million b/d 5 years earlier (BP, 2006, 10). Forty three percent of this demand was fulfilled by oil imports and the IEA has predicted that by the year 2030 China will rely on imports for at least two-thirds of its petroleum supply (IEA, 77). To ensure a secure supply for the years to come, China has begun to look to the Middle East, especially the Persian Gulf region and Africa, as well as to its neighbors Russia and Kazakhstan. China's national oil companies have been involved in bilateral agreements with oil producers, offering expertise, investment, and sometimes more controversial arms deals in exchange for oil (Lee, 11). These types of agreements are beneficial to China as they implement economic interdependence between China and oil-producing countries, making it more difficult for the latter to lessen the flow of oil to China in the future. One important bilateral relationship is that between China and Saudi Arabia. The two countries have pursued several projects together, including the Saudi construction of refineries in China in exchange for a 30-year contract for Saudi crude oil (ibid, 19). This ensures a steady supply of oil for China in the years to come, providing a greater sense of energy security and investment opportunities.

China will have an advantage through its dealing with countries that do no business with the West due to disapproval of human rights abuses and corrupt governments, such as Sudan and Iran. This means that China will have a greater competitive advantage in these countries, though if international bodies place sanctions upon them or there is an upheaval of civil unrest, China may no longer be able to rely on oil imports from these areas.

China will share Western attitudes towards stability in the Middle East in order to ensure a steady oil supply, which will help to maintain its diplomatic relations with the United States. We both rely heavily on this regions for petroleum and do not want to see supply being taken off of the market due to domestic disruptions. Iran could prove to be an enormous source of oil for China if the United States and other countries go ahead with proposed sanctions on Iran's oil industry, leaving China to snatch up unclaimed oil. However, China may be cautious in their dealings with Iran to avoid isolating themselves from the Western powers. Another factor that has the potential to damage the US-Sino relationship is our strong influence in Middle East through our friendship with Saudi Arabia and our invasion of Iraq. China may see our presence in the region as a threat to their future oil interests, which will only prompt them to try harder to secure resources. Although China's current state-state bilateral arrangements used to secure their oil imports are preferred by the Chinese government, the next ten years will see an increase in China's presence in the international markets to purchase oil if it wishes to continue its economic growth.

There will also be an increase in China's naval presence throughout the Pacific region as it strives to become a regional superpower and obtain disputed territories that are rich in offshore oil. China currently relies on offshore fields for about 15% of its domestic production, which could increase if it is successful in its claim to disputed zones in the South and East China seas (Collins, 25). The South and East China seas are estimated to have approximately 219 and 160 billion barrels of oil respectively, with 210 trillion ft³ of natural gas that could help to reduce reliance on petroleum. However, ownership over islands in these seas have been hotly disputed over the years between the People's Republic of China, Vietnam, Taiwan, Malaysia, the Philippines, and Japan, all of whom want to benefit from the oil riches that are still in the earth (Zhao). There has been recent uproar over China's deployment of marine patrol vessels and planes in these areas as the other countries in the area claim their sovereignty over the islands and sea and no oil will come out of these fields until the situation is resolved. In the next decade, China will more strongly assert their presence in the region and negotiations over territories will most likely begin to take place, as the oil reserves in this area are too great to be ignored.

India

From 2000 to 2009, India's oil imports almost doubled to 2.2 million bpd and in 2011 BP reported that it was the fourth-largest oil consumer in the world after the US, Japan, and China at 3.9% of global consumption (BP, 2011, 11). India is experiencing growth similar to China's though to a slightly lesser degree. In the last decade there has been a 5% increase in oil demand from the Indian transportation

sector and the population is projected to increase by 13% over the next decade. There are about 5.7 billion barrels of proven reserves in India, but this will not be enough to keep up with rising demand (EIA.gov, India). While producing about 826 bbl/d in 2010, India consumed 3319 bbl/d (BP, 2011, 10-11). India will begin to feel greater pressure to secure oil, as it shares an interest in the same region as China and does not want supplies to be impeded by Chinese interest. India does not present a large threat to China in terms of competition, as it lacks the large-scale investment ability of the far-East giant and its government has a slower decision-making process (Collins, 38).

Other Countries

The world will also see an increase in oil consumption in other emerging and developing countries such as Brazil, Argentina, Pakistan, and OECD members. This will only serve to increase demand and tighten world oil supplies. In the aftermath of the 2011 earthquake that caused a tsunami and the subsequent Fukushima nuclear meltdown, 31% of Japanese total refinery capacity was lost as six refineries were shut down (Tsukimori). It has been estimated that Japan must import an additional 280,000 b/d, increasing their oil imports by 6% in order to make up for the gap left in electricity generation capacity by nuclear energy (Kessides). There will also be an increase in the demand for oil in other sectors of Japan, especially transportation, as the country begins its efforts to rebuild and repair what was lost in the natural disaster.

Alternative Energy and Increased Efficiency

The expansion of alternative energy sources and increases in efficiency will take away some of the pressure from increased demand on the world oil market. With uncertainties as to how long oil will continue to be able to run the world and concern over the environmental damage caused from petroleum exploitation, the world has been increasingly in search for cleaner and more sustainable energy technologies. The next decade will see a growth in the use of solar, wind, biomass, geothermal, nuclear, and especially electric power, though not to the extent needed if countries do not invest further in developing these technologies. The same countries that have increased their demand for oil, such as China and India, are also going to become big players in the alternative energy field. China will be investing mostly in wind and solar technology in next decade. On December 15th of this year, the government announced increased development targets for solar and wind power by over 50%. In addition, India has announced plans through its National Solar Mission to produce 20 gigawatts of solar energy by 2020, with government funding to run the entire research and development process (Economy, 2). This will be accompanied by investments from world powers such as the United States and international oil companies into the research and development of new energy technologies. However, most investment in R&D has not been enough to have the strong effects that are needed; the United States government and energy industry revert only 0.3% of funds towards new technologies, while China has been limited in

its innovation due to its lack of work in more sophisticated areas that are integral to development (ibid, 3).

Supply Outlook

In the coming decade supply will narrowly keep up with demand as new sources of oil are discovered and opened up to the markets and potential disruptions interrupt oil flow. Countries such as the United States and Canada will find themselves obtaining larger shares of world oil production as a result of the extraction of oil from shale and tar sands, and Iraq will begin to increase its oil exports following U.S. withdrawal, giving it the potential to become one of the world's largest oil producers in competition with Saudi Arabia. In addition to these new sources however, oil may be taken off of the market in other areas of the world where domestic unrest and effects of the resource curse push some countries' economies into downward spirals.

New Producers

Iraq has the potential to become one of the world's largest oil producers following our removal of troops from their country after a nearly nine year occupation. Iraq's reserves as of 2010 were at 8.3% of the world total, yet the country only had a 3.1% share in production at about 2.5 million b/d due to the U.S. occupation (BP, 2011, 8-10). The Iraqi government has predicted an increase in production to more than 5 million b/d in the next decade but in reality this growth will occur more slowly. This is due to political barriers and slow decision-making in the government, as well as the need to repair infrastructure for foreign companies to be able to operate in the area (Ellas, 9). The twelve technical service contracts that have been awarded to international firms in recent years will see development of fields increase in the next decade, as Iraq will be anxious to increase its presence in the world oil market. It will rely heavily on oil revenues to repair the economy and infrastructure of the nation after the war left it in shambles. However, Iraq will be tested greatly in the years to come. With the departure of American troops there has been concern that Iraq may plunge back into disorder as the country fails to overcome the ethnic differences in its diverse population. Additionally, if Iraq were to successfully stabilize the nation and jump start oil production there is still the risk that the government will fall victim to the resource curse, which also has the potential to drive the country back into disorder. Most likely, in the next decade Iraq will see a rapid increase in oil production that is facilitated by international investment and the installation of additional buoy systems and pipelines by the government in an effort to maximize export capacity. With the success of Iraq's oil industry, there will be changes within OPEC's structure as Saudi Arabia loses influence in the face of Iraq's massive oil reserves. If threatened by Iraq's ambitions for increased production, Saudi Arabia may take steps to squash their efforts as the swing producer by increasing its own production to lower world prices, as the kingdom did in 2010 when Venezuela attempted to do the same (ibid, 27).

America is home to the largest known oil shale deposits in the world with an average projected 800 billion barrels of oil potentially available for extraction and use located in a region of the Western United States in Colorado, Utah, and Wyoming known as the Green River Formation (Bartis, ix). These massive reserves of oil shale have the potential to bring in billions of dollars in profits each year that can be used for public spending by the government, as well as provide many domestic employment opportunities in the face of the current recession. Such a large source of oil will not only benefit the U.S. economy but also will improve our national security and reduce our dependence on foreign oil. However, it may take up to 16 years to develop the technology needed to reach full production capacity at 3 million b/d (ibid, 25). Thus, in the next decade there will be more development in terms of oil shale extraction technology in an effort to reach predicted production levels.

Canadian tar sands will have more of an impact on oil supply in the next decade as the extraction process for this type of oil has been in place for several decades. Oil sand, mostly found in Alberta, have been estimated to hold about 1.7 trillion barrels of oil by the IEA (Levi, 5). Over the next ten years these sands will become a valuable source of oil for the United States, who will see the money put into importing oil from Canada come back into the domestic economy through the purchase of American goods and services, which is quite rare in dealings with oil exporters in the Middle East and Africa. In 2006, 1.2 million b/d were extracted from oil sands, with the Canadian Research Institute predicting an increase to 2.2mb/d by 2015 (ibid, 6). Despite these optimistic predictions, there are several potential barriers to continued tar sands extraction, including shortages of natural gas and water, which are needed for the extraction process, and public obstruction due to the environmental damage caused. Canada will be exploring more efficient methods of extraction that do not waste as many materials nor cause as much environmental damage.

Venezuela also has a significant amount of tar sands located along the Orinoco Belt that a 2010 U.S. Geological Survey estimated hold 513 billion barrels of oil (USGS). However, these predictions have been met with skepticism within the country, with a Venezuelan geologist stating that only about 25% of the total would be feasibly recoverable (BBC). This would still represent a massive amount of oil coming into the world markets, and in the next ten years we will hopefully see increases in Venezuela's oil sand production as extractive technologies improve.

Potential Disruptions

Iran is integral to the strategic picture of oil in the next 10 years as it has the third largest reserves and is the fourth largest oil producer in the world (BP, 2011, 8-11). In addition to their high supply, Iran also controls the Strait of Hormuz, which is responsible for transiting 40% of the world's through sea oil supply (Henderson, ix). Over the next decade, the Iranian government has the ability to disrupt these daily flows in response to sanctions or behavior Iran considers intrusive from the West, especially if it completes its nuclear weapons program. Disruption could be

accomplished either directly through an oil embargo on certain countries or indirectly through attacks on Western tankers and pipelines. There has been a recent U.S. proposal to put sanctions in place that punish foreign countries who purchase oil through Iran's National Bank in an effort to reduce funding for the nation's disputed nuclear program (Gjelten). This may only serve to drive up prices on the world market as supply diminishes, hurting those imposing the sanctions. Proponents of these sanctions posit that other countries will boost their production in order to make up for lost barrels, but recent rumors suggest that Saudi Arabia, who was expected to do the majority of overproduction, may side with the Iranians and keep prices high (ibid).

Saudi Arabia has been dealing with internal strife as the kingdom faces domestic terrorist attacks on oil facilities, spending billions to protect infrastructure. As the population booms, reaching 27.5 million in 2011, the government has to respond to the demand for jobs and benefits from oil revenues for the population. There is also a growing Shi'a influence in the region coming from Iran and Iraq that the Sunni dominated government sees as a potential threat due to the fact that the majority of the 15% of the Shi's population resides in oil rich parts of the country (Barnes, 150). In the event of an uprising that disrupts Saudi production, oil prices will skyrocket as the world's major producer is taken off of the map.

There is also the potential for countries that are suffering from the resource curse to be overcome with domestic upheaval as populations revolt their governments for corrupt use of oil revenues. Nigeria is one example of a country that shows the potential for increased domestic conflict, with reports of attacks on oil pipelines and infrastructure in the news every week as local militia groups protest the government's control over oil profits. With the majority of the Nigerian population living in extreme poverty in areas that have suffered from massive environmental damage and not seeing any benefits from the oil riches near their homes, there is a chance that the government will be overthrown and production will cease from Nigeria, tightening supply and increasing world prices. Venezuela is also in danger of collapsing, as Chávez's policy of massive public spending through the use of oil revenues has begun to backfire. By neglecting to invest back into the research and development of advanced extraction techniques, the Venezuelan oil industry is beginning to lose its ability to amass revenues for government spending. As in 2001, the population may riot and an attempt at a government coup could be seen in the next decade if Chávez does not amend his oil policies and decrease the income inequality among his people.

Environmental Impact

Tar sands and shale oil are two sources of crude whose extraction methods have been hotly contested over the years. The extraction of oil from tar sands calls for 2 to 4.5 barrels of water for each barrel of oil produced, putting a strain on water supply in Canada (Levi, 11). The process of oil extraction from tar sands also produces large amounts of toxic wastes that are stored in large ponds, which has been protested by the public. In the next decade there will be an increase in

environmental awareness as the public pushes for more stringent environmental standards in the oil industry. The Keystone XL pipeline from Alberta, Canada to the Gulf of Mexico has been opposed by many who claim that it will cause irreversible damage to ecosystems along its path, but if production begins again the U.S. will see a creation of jobs and an increased amount of crude oil coming from Canada.

COMPREHENSIVE ENERGY POLICY

In light of what the future strategic picture of oil will resemble over the next decade, I propose an energy policy for the United States that focuses primarily on the innovation and implementation of alternative forms of energy in several sectors, especially transportation, to fulfill our goal of reducing oil consumption by 10% over the next 10 years. Efforts must also be placed upon maximizing extraction capacity from the oil shale in the Western U.S. that could provide a buffer against high oil prices. The next concern of the United States is the management of global risks that could be disruptive of supply and demand, especially in the Middle East. Finally, the United States must encourage global transparency for both international and state-owned oil companies through international organizations in an effort to promote budgeting and good governance, which may help to prevent domestic issues that have the potential to disrupt a countries' oil production.

The Development & Application of Alternative Energy Technologies

The U.S. needs to make the move towards cleaner and more efficient energy sources both to reduce the reliance of our domestic sectors on petroleum and to begin to reverse the environmental damage oil exploitation has caused. As stated previously the United States government and oil industry has spent a mere 0.3% on the research and development of alternative energy methods, which will not be enough in the years to come.

Research & Development

The main area of interest for the United States in the future of energy policy is investment in the research and development of clean, efficient, and sustainable energy technology. In order to cut oil consumption by 25% and lower greenhouse gas emissions, the IEA has recommended average global spending of \$50-100 billion annually on the development and implementation of clean energy technology (Economy, 2). In order to achieve goals of reduced consumption and increased use of alternative energy, the U.S. must not only domestically encourage R&D but also begin to collaborate internationally. By using market incentives, the American government can persuade private companies to collaborate with those in other nations to develop technology. This method would allow for greater innovation as each country involved will bring in different ideas that can be put together to make for stronger development programs. Market incentives such as tax credits and

grants to alternative energy developers would encourage both innovation and public use of these technologies.

Transportation

The transportation sector in the United States currently accounts for 70% of oil consumed at 14 million b/d (SAFE, 3). In order to decrease the heavy dependence of our transportation system on petroleum, higher levels of vehicle efficiency must be pushed for. This past July, you, President Obama, announced new CAFE standards for vehicle fleets that call for an average of 54.5 mpg to be reached by 2025, hitting 35.5 mpg by 2016. In order to reach this goal the American population must be urged to begin purchasing hybrid electric vehicles, which can be done through a system of indirect tax incentives and mandated fleet purchases. It is possible to follow the example of other countries for the former by instituting ownership taxes that are based on the type of fuel, efficiency, and emissions of a particular vehicle as well as taxing fuel in an effort to reduce demand. Individuals will take advantage of cheaper taxes on hybrid cars, and the taxing of gasoline and diesel can be made up for by cutting income taxes and will also push the population towards the use of public transportation, which will also need to undergo a transformation. The government can also require federal and commercial fleets to use only hybrid vehicles that meet efficiency and emissions standards, which will save the country money in the long run. The government should also invest in the electrification of public transportation and improvements to infrastructure. Over the next decade, public transit industries such as buses and taxis should phase in hybrid vehicles, as well as improve train routes in order to reduce the amount of oil consumed by individual cars.

Agriculture

A sector that is often overlooked when examining the U.S. dependence on petroleum is that of agriculture. Petroleum is integral to the food manufacturing process and can be seen in every aspect, from when the seeds are put into the ground to the moment it is consumed by an individual. Oil products can even be found in the commercial pesticides and fertilizers used to develop America's food supply, which increase the average yield of crops by providing nutrients for growth that would otherwise have been depleted from the over-farmed soil (Davis, 20). If the world oil supply were to drop or prices were to hit a high, the agriculture sector of the U.S. would take a hit and food prices would increase. I propose that the government invest in the agricultural sector, though not through subsidies but by increasing research and development of alternative fuels to power the food manufacturing process. In the next 10 years, the U.S. should begin implementing the use of more sustainable forms of energy in the agricultural sector as quickly as possible. This will not only promote faster innovation, but it will prepare our country for the inevitable decline of oil well ahead of time. This research can be done by gathering the nation's leading biological and chemical engineers together to come up with alternative energy sources as well as genetically engineered crops that yield large amounts of food at low energy costs.

Domestic Supply

The United States must begin to take steps to bring oil shale production up to full capacity. A recent Rand study on commercial development in the oil shale industry predicts that the transition from the research stage to initial operations could take 6 to 8 years, producing less than 0.1 million b/d that would increase to over 3 million b/d in the next 4 to 8 years as production capacity is reached (Bartis, 22). If the United States immediately begins to invest in the research and development of oil shale extraction technologies, we could potentially reach initial operations in the next 10 years, which would provide the U.S. with increased domestic supply and revenues to invest further in extraction technologies.

Management of Global Issues and Risks

In 2010, the U.S. depended on the Persian Gulf region for 18% of its petroleum imports, and the many bodies of water and pipelines in the region have been integral to the flow of oil to world markets (EIA 2011). With OPEC operating at 99% of its total oil productive capacity since 2006, any major disruption in the area could prove disastrous for oil prices (Barnes, 145). Following our withdrawal from Iraq, the United States should continue to offer advice and provide help to the newly formed government in order to assure future steady Iraqi oil production. This can be done directly, by investing in the oil industry through joint production contracts or indirectly by educating Iraqi industry and government officials on how to efficiently run the oil sector. We will also have to combat the increasing anti-American attitudes in the region, especially those coming from Iran. I do not recommend placing sanctions upon Iran's oil industry, as that has the potential to jack up world oil prices. Rather, the American government, in coalition with its allies, should work with the Iranian government on developing the nuclear power facilities that it claims to be working on. While this move will improve U.S.-Iranian relations and provide a more secure oil supply, it also will allow for our government to investigate more closely the rumors of a nuclear weapons program while in the country.

The United States should also seek to improve its relations with China. Collaboration on the research and development of new energy technologies will serve to bring the countries together, and would allow for the U.S. to monitor the disputed territory situation in the South and East China seas. In addition to maintaining a presence in the Pacific, we should also urge China to venture into Joint Development Zones, in which several nations share the costs and benefits of oil production in a disputed territory (Collins, 27). This will increase the amount of oil available on the market and will also provide chances for these countries to work together and collaborate on offshore extraction technologies.

Encourage Transparency

Finally, the United States should encourage transparency among all oil producing nations and international and state-owned oil companies. This will serve to

promote better budget transparency, especially for governments who exhibit rent-seeking behavior that has been damaging to their economies. The Extractive Industries Transparency Initiative (EITI) is one such body. EITI is an international organization committed to transparency in revenues and government accountability in order to maximize sustainable growth from oil revenues. Though membership is not mandatory, many countries, including those seen as corrupt, such as Nigeria, have applied to become a part of this organization. In addition, the United States should attempt to create an international forum in which all oil producing countries and companies can come together and make decisions regarding production levels and market prices. However, persuading the international community to join or form new international organizations will be a great obstacle, as it is hard to find incentives to make a government join an organization that condemns the opaqueness in revenues that they are benefiting from. A more feasible plan would be to encourage the formation of regional groups that focus on the maximization of efficiency in their area. For example, the United States could collaborate with Canada, Mexico, and Latin and South America in order to develop more cost-effective methods of oil extraction and transit. Rather than continue to rely on manufacturing in the Far East for which oil accounts for half of the shipping costs, the U.S. could outsource work closer to home, for example in Mexico, sharply reducing transportation costs (Rubin, 1).

Conclusions

As the next decade progresses the United States will see many shifts in the strategic picture of world oil as supply and demand fluctuate and progress towards alternative energy sources is made. World oil demand will increase due to the reliance on petroleum of emerging countries such as China and India and constantly increasing global population. Supplies will seem tight as most producers extract at almost full capacity, with alleviation coming from unconventional oil sources such as shale oil in America and Canadian tar sands, and the opening up of Iraq to the world markets following U.S. withdrawal of troops. Potential disruptions due to conflicts in the Middle East and poor government management of oil revenues could at times push prices up and increase the push for the development of alternative energy sources. In addition, more resistance will be seen towards those technologies that are seen as environmentally disruptive, such as the extraction of oil from tar sands.

The comprehensive energy policy that I have presented in this paper focuses primarily on the research and development of new energy technologies in our effort to reduce oil consumption by 10% in the next decade. Increased investment and collaboration with businesses in other countries will help to diversify alternative energy options and encourage further innovation. The U.S. transportation and agricultural sectors, which currently rely heavily on oil to run, must be transformed into highly efficient industries that have a reduced need for petroleum. This can be accomplished by pushing for the electrification of the transport sector through the use of tax incentives and mandates to increase both public and private use of hybrid

technology and public transportation. In the agricultural sector, alternative means of energy must be found and implemented in order to ensure a supply of food for the nation in the future. We must also keep our focus on the Middle East in order to maintain stability in the region, especially in Iraq, Iran, and Saudi Arabia, as they are integral to U.S. oil consumption. Finally, the United States must encourage global transparency and collaboration between both countries and companies in order to promote good governance and budgeting, which will help to stabilize prices and lessen the amount of shocks to the system. If the majority of these policies are implemented effectively, the United States will see a decrease in domestic consumption of oil while enjoying enhanced national security due to abundant oil shale in the West, reduced dependence on oil imports, and the use of more clean and efficient technologies.

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