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Explaining energy security: Oil

By Paul Sullivan

Everyone wants energy security, but few seem to understand what it is.

Energy security relates to the availability of oil as well as of refined oil products, natural gas, coal, and renewable energy and also how these systems operate. In the United States (US), the debate over energy security revolves around how much oil we import. This article therefore focuses on oil security, using the example of the United States.

Oil security is about not just whether a country has enough oil for its needs, but also where imported oil comes from, how much crude oil is imported to the country, and how much refined oil is exported. Oil security increases as the need to import crude oil declines.

In the US, people often just look at where we are getting the oil from and they often misunderstand what those sources are. The largest source of imported crude oil into the US is Canada, a stable democracy and a close ally of the US. The US exports some refined oil products to Canada, but it is not a large amount relative to the amount of crude oil we import from Canada. The second largest source of imported crude oil is Mexico, a country that seems to be increasingly unstable given its violence related to drug gangs. Mexico's national oil company PEMEX is one of the most poorly managed and most indebted companies in the world. Its profits tend not to be reinvested in exploring and producing more oil, which are often the bread and butter of the leading oil companies. Many of the biggest oil fields of Mexico have been in decline for some time.

Mexico imports about half of the crude it sends to the US back from the US as refined products.

So the US net imports of oil from Mexico are actually around half the gross imports.

Other major sources of oil imports into the US are Venezuela and Saudi Arabia. Let's look at Venezuela first. This is a country that has just lost its leader to cancer. Many Venezuelans have known no other leader than Hugo Chavez. Now that he is gone there could be some long term power struggles in the country, which could lead to significant instability. Instability is normally not good for oil production. PDVSA, the national oil company of Venezuela is like PEMEX, a very poorly run company crushed under debt. It likewise does not reinvest its profits into improving production. Venezuela also imports an increasing amount of refined oil products from the US. So the net imports of oil from this country to the US are declining every year. Venezuela is also a country that is not on very friendly terms with the US. It is friendlier with Iran and Cuba than with the US, yet we import a lot of oil from it.

The US imports a lot of crude oil from Saudi Arabia but exports a very small amount of refined products to Saudi Arabia in return. Unlike Mexico and Venezuela, Saudi Arabia has sufficient oil refinery capacity to take care of its own needs, as well as the needs for refined oil of many other countries. The extent to which the US imports oil from Saudi Arabia does not only depend on local demand for oil, but is related to a contractual agreement. Within a contract for a Saudi investment to build the huge Motiva refinery in Texas there is a requirement that Saudi oil be imported to the refinery. That has locked the US into importing Saudi Arabian crude oil. That refinery also bases its production on the type of crude oil that comes out of Saudi Arabia, further restricting the ability of the US to diversify its sources of oil.

The US also imports oil from Nigeria, Russia, Iraq, Angola, Equatorial Guinea, and others, and each of these countries can be problematic at times.

Most of the Mexican, Venezuelan, and Saudi crude oil go to the southern coast of the US, while most of the Canadian crude goes to the Midwest. Much of it could go further to the large refineries that are set up for the mostly oil sands based crude from western Canada, but the infrastructure needed to move the oil is lacking due to the fact that the construction of a major pipeline to move this oil has been stopped by the government as the country debates the environmental, employment, and energy security aspects of that pipeline, the TransCanada XL.

As the country debates this pipeline, the Canadian oil that is often the result of further refining and upgrading of the oil sands is transported by train. The increase in train transport of oil in the US in the last couple of years has been astonishing. Each of the rail cars carries about 30,000 gallons of oil. Often these oil trains can be miles long. Transporting oil by train is more expensive than by pipeline. It is also potentially more environmentally damaging given the higher risks of transporting by rail rather than pipeline. The age, the quality of maintenance, and more of the rail networks and pipelines could add to the safety and environmental risks equations. A pipeline recently ruptured in the US. The pipeline is old and the quality of the maintenance is yet to be reported. A rail car carrying oil also tipped over recently. The rail line is clearly in need of study. As more and more oil is transported by rail, greater understanding of the risk of rail transport of oil is needed.

Another reason why railways have been used more to move oil in the US is that the country has had a huge increase in shale oil production in areas where pipeline systems lack the capacity to transport the amounts of oil being produced – or lack capacity altogether. Production in the Bakken shale oil fields in North Dakota, for example, was tiny until the last few years. Now it is approaching 1 million barrels a day. A lot of that oil is moved by rail. There are pipelines close to some of the fields in North Dakota, but some of the oil has to be moved by truck to those pipelines or even to the rail cars. Oil production in Bakken and other places in the US is growing faster than the infrastructure to transport it.

Once the infrastructure is built to move the oil, then refinery capacity may also be needed to be developed to refine the oil so it can be used for transport, industry, etc. Building further infrastructure can help make the overall US market for oil and refined oil products more fluid, so to speak, and connected. There are currently large differences between the prices for West Texas Intermediate (WTI) and Brent oils due to the lack of pipeline and other transport infrastructure to allow all types of oils to move freely from where they are produced to where they are needed.

Many refineries on the US East Coast have shut down or have slowed production because they are using the more expensive Brent oil, whereas the refineries in the Midwest and other places are using the much cheaper WTI to produce their refined products. Connecting these two types of oil will allow more competition in price and will likely lead to the difference in the prices becoming lower.

There has been an increase in the amount of refined oil products being exported out of the US in recent years and a subsequent outcry against this. Some say that there should be no exports of such products, saying that the US needs the oil. This indicates the confusion over oil security. Exporting crude oil requires special licensing due to laws passed many years ago. This is especially the case for crude oil produced on federal (public) lands. Exporting refined oil products is not restricted by those laws. Also, many of the refined products are not needed by US consumers. Much of the US exports are of fuel oil, diesel, and other products that are in excess supply from the refineries, due to the current economic situation in the US. These products are therefore exported to countries that demand them. This is a matter of business and plain and simple economics.

But if anyone thinks that the US has a free and unfettered market for oil, forget it. There is a massive array of regulations, laws, and other restrictions that oil companies have a large staff to manage. They also hire large numbers of lawyers to handle the legal requirements and regulations.

As one can see, oil security is a lot more complicated than just how much oil a country imports. It also involves understanding net imports and what is exported from the country. It involves having the right infrastructure for transport and refining, given the types of oil a country has—and these things can change quickly. It means keeping up with internal production and external imports when changes happen. It also involves legal, regulatory, and other “soft infrastructure” aspects exploration, production, transport, refining and more related to the oil markets.

Like many other countries, the US is going through huge changes in its oil markets, and hence its energy security as seen via oil. Mongolia imports most of its oil and refined oil products from Russia. It is therefore highly dependent on Russia for its oil supply, which means that the country is “energy insecure” in terms of oil.

Mongolia could produce more of its own oil, given the country’s geology. The infrastructure to process this Mongolian oil and refine it is mostly lacking, however. Laws, regulations, and even education on how to find, produce, refine, and transport oil are also weak in Mongolia.

Oil, coal and gas are hydrocarbons. They are sometimes found in the same places. Natural gas can be extracted from and produced from coal. Diesel and other fuels can be produced from coal and natural gas. Mongolia has massive amounts of coal. It could have a lot more potential natural gas production than most are thinking about now. Furthermore, there is potential to produce shale oil in Mongolia. The options that many happen in the future for energy production in Mongolia could bring some great surprises.

Mongolia, like every other country, has to consider the implications and complexities of what these changes might mean, however. What infrastructures are needed? What laws, regulations, and more would be needed to make these new opportunities safe for the people and the environment of Mongolia, without crushing the potential for energy development? Could Mongolia start to export other energy resources in the coming decades well beyond coal?

Energy transition can be a very complex, and even dangerous, process, both economically and politically for a country. It requires good and intelligent leadership at many levels, from the government, private companies, to local leaders. Social license is also needed at many levels. Sometimes the “soft” part of energy development is forgotten in the rush to getting the energy out. This can often make things far more complex and costly than most would want.

Energy security is a part of human security. It is not independent, however. It is connected with many other aspects of human security, such as water, food, health and environmental security. If any of these are damaged, energy security could be damaged. Oil carries with it the elements that could damage or improve those other parts of human security, but it need not be so. One cannot simplify the complex and variable natures of energy security too much without potentially walking into real problems.

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