Peak Oil and Japan's Food Dependence Available in Japanese Translation

Andrew DeWit

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By Andrew DeWit

"Energy will be one of the defining issues of this century, and one thing is clear: the era of easy oil is over." Chevron (http://www.willyoujoinus.com/vision/)

Over the past year, benchmark oil prices shot up from a little over US$40 per barrel and reached just over $70 a few weeks ago. As of this writing, prices have fallen back to about $64, but that probably reflects the end of the summer driving season in the US, which somewhat reduces pressure on gasoline supplies. A lot of optimism also animates the markets, in spite of the havoc Hurricane Katrina wreaked on American oil production and refining capacity. The markets look to the International Energy Agency's (IEA) early September decision to coordinate a release of 2 million barrels of oil and oil products per day, for at least 30 days, from its 26 member countries' strategic reserves and supplies.

These developments appear to have helped the global economy avoid becoming instantly impaled on the over $100 per barrel oil "superspike" predicted by Goldman Sachs last April. Yet supplies of refined products remain tight everywhere, leading Japanese producers for example to look askance at their government's commitment to ship gasoline to the US where refineries are unlikely to be brought online again very soon. On top of that, damage from repeated hurricanes, including Ivan last year and Dennis nearly two months ago, greatly set back production in new fields in the Gulf of Mexico. An anticipated new flow of 600,000 barrels per day by 2007 has been slashed by half. Moreover, as we head towards fall and winter, current projections are that heating oil and natural gas prices are likely to climb by as much as 24 percent from their current elevated levels. These developments have led energy analysts, who last

year predicted an average oil price of $39 per barrel for this year (as of mid-September the average is $54.77), to revise their estimates. For example, after looking at supply constraints and the continuing expansion of demand, the Canadian Imperial Bank of Commerce's chief economist now estimates that oil prices are likely to average $84 a barrel in 2006, $93 in 2007, and $100 in the fourth quarter of 2007.

In short, there is clearly something fundamentally wrong with the oil supply, something that allows temporary disruptions from political unrest, storm damage and the like to become increasingly serious crises. The recent damage from Hurricane Katrina, for example, will depress American oil production and refining by several percentage points of total capacity. In the past, this spare capacity would have filled the gap. Yet now, in spite of the IEA's efforts to coordinate a fix on a global scale, the shortfall in American production threatens instead to ripple around the world and generate further upward pressure on prices.

Many credible analysts and experts suggest that a large part of the problem is peak oil. The peak is from a model of oil production named after the geophysicist M King Hubbert, who worked for Shell Oil. Hubbert estimated total US reserves and calculated when output from them would be at maximum, based on the observed rate of depletion of individual oil fields. Contrary to what a lot of people - especially hyper-optimistic economists - appear to believe, oil fields are not underground lakes of petroleum, waiting to be sucked up like the contents of a milkshake. Rather, they are formations of oil-bearing rock under pressure, and without maintenance of sufficient pressure around the area where a given well is drilled there is no economically feasible way to extract the oil. Oil fields are said to be depleted when it takes an equivalent amount of energy - through injecting water, natural gas, and so on - to extract the oil as is obtained from the extracted oil itself. There is thus plenty of oil - sometimes nearly half of the initial deposit - left in depleted oil fields. Hubbert determined that the exploitation of fields followed a bell-curve shaped trajectory from the initial drilling through to depletion. After the peak of the bell-curve, there is a gradual but inexorable decline in production.

Based on his model, Hubbert predicted that American oil production would peak between 1965 and 1970, approximately 40 years after the peak in US oil discoveries. He gave a paper on his theory in 1956 at a meeting of the American Petroleum Institute, and was regarded as crazy. But he turned out to be right, as American oil production peaked in 1971. Subsequently, about 50 oil-producing countries have reached their production peak. These countries include the former Soviet Union (which peaked in 1987), Brunei (1979), Libya (1970), Iran (1974), and

Indonesia (1997). The peak in global oil discoveries occurred in 1964, and new applications of Hubbert's model suggest that global production should be reaching its maximum rather soon and then start falling. Optimistic studies suggest that 2020 will be the peak; more realistic models indicate that it will arrive later in this decade. The peak oil hypothesis is, therefore, that global oil production is at maximum output already, or shortly will be, and that oil production will subsequently decline. One expects, in this scenario, that easily recovered and cheaply processed oil is the first to peak out, followed by deposits in hard to reach areas (such as beneath the oceans) and/or with plenty of sulfur and other impurities.

Shell Canada, for example, has announced that it will increase its investment in the Alberta tar sands to $7.3 billion from $4 billion, in the hope of producing an additional 100,000 barrels a day. This is a huge capital expenditure for a relatively small increment in output. This and other examples suggested, as peak oil theorists warn, that we are at the end of an era of plentiful and inexpensive hydrocarbon-based energy, which will require a massive commitment to conservation and finding alternative energy sources.The threat of peaking oil output is made all the more serious by demand that continues to surge, driven not only by expanding US consumption, but by rapidly rising demand from China, India and other developing nations. Analysts note in particular that over 40 percent of recent increases in global demand for oil is from China, and that it is driven by the growth of income and almost insensitive to price. According to the IEA's own data, global oil demand of about 84 million barrels per day is running smack into an equivalent production capacity, leaving no spare capacity at all in the event of unforeseen problems.

There is no precedent for this situation, as previous energy crises have been the consequence of deliberate restrictions on supply. Oil - and especially cheap oil - is of course a finite resource, but for more than a century, production volumes have always matched demand. The IEA and other organizations' projections of demand and supply simply assume that increased demand will be met, mostly from the fields of Saudi Arabia. Until recently, Saudi production was even confidently expected to double over the next two decades. Yet neither the IEA nor any other non-OPEC organization has credible data on Middle Eastern reserves and output. To get a measure of how high in the sky this pie of limitless production capacity was, consider that analysts at present are reduced to guesstimating Saudi output by counting the number of tankers that leave the country's oil ports. Saudi authorities continue to promise that they will expand production to meet world consumption needs. But confidence in their ability to do so has

waned sharply in recent months, as promises are one thing and performance is another. Worsening supply constraints appears to confirm skeptics' claims that the Saudis lack the production capacity to continue playing their longstanding linchpin role in global oil markets.

Peak oil theorists thus argue that with recoverable reserves of oil limited, energy costs are likely to increase. However, the serious peak oil warnings are coming from people like Matt Simmons, chairman of Simmons and Company International (www.simmonsco-intl.com), an oil investment bank and an advisor to US Vice President Dick Cheney's 2001 Energy Task Force. In other words, he's an oil industry insider. He even supports drilling in the highly fragile ecosystem of the Arctic, for example, which is anathema to most people outside of the oil industry. But he's also an intelligent and principled player in the oil markets, who began wondering a few years ago if optimistic outlooks for oil production, especially from Saudi Arabian oil fields, were realistic. Saudi Arabia, as noted above, is the only producer with the potential spare capacity to supply increasing demand. The key issue for Simmons was that 90% of Saudi production comes from just 5 big fields, about a half-century old, and there has been no credible data on production for over two decades.

We are, of course, talking about the world's most strategic resource, one used in so many products and processes - transportation, plastics, pharmaceuticals, etc - that you can see dozens of examples without having to get out of your chair. Indeed, probably much of your chair is made out of oil. So ubiquitous is oil in the modern economy that sustained supply constraints can lead to price increases that flow in with the unstoppable force of a storm surge. Oil provides 40% of global energy and over 90% of transport fuel, as well as the fertilizers and pesticides and fuel that make possible the intensive, large-scale farming that feeds the roughly 6.3 billion people who live on the planet. Confronting declining production is an enormous challenge that we should be actively preparing for.

A Blind Eye to Peak Oil

Japan's mainstream media has studiously avoided addressing the issue of peak oil, even though the country has essentially no oil reserves. Searching the databases of the major Japanese newspapers yields one lone Asahi newspaper piece from last January 16. And searching google with the various Japanese translations of "peak oil" renders only a few hundred hits, whereas searching in the original English produces about 1,700,000 hits.

Indeed, there appears to surprising complacency in Japan in general concerning oil prices. Even as China scours the world in search of energy deals, Japan seems content with far less. Moreover, in negotiating energy deals with Russia, for

example, the Japanese state seems as concerned to limit supplies to China as it is secure its own needs. This complacency is perhaps based on the belief that the energy price increases are temporary and are just as likely to be followed by a glut, as Daniel Yergin of Cambridge Energy Research Associates and several other analysts argue. If one believed this line of thinking, then heavy investment in expensive new supplies - as the Chinese are doing - would make little sense except as an expensive form of insurance. It could be that Japan, with the OECD's highest public debt as a ratio of GDP, is reluctant to spend money and thus very open to arguments that it really does not have to.

In addition, the Japanese are rightly proud of their proven ability to weather oil-price increases by increasing fuel efficiency. Static calculations suggest that Japan is far better equipped than the US and EU to deal with another round of price hikes. In its September 12 edition, Morgan Stanley's online newsletter reviewed recent calculations by the Cabinet Office's Maeda Akira. The calculations indicate that oil would have to go to US$129 per barrel before Japan suffered a shock comparable to the 1979 second oil price shock. By contrast, the US and EU were far more vulnerable, as prices would only have to go to US$81 or US$77, respectively, before they suffered damage on the scale of 1979 and afterwards. Before prices went to those latter levels, the EU and the US would presumably do their utmost to bring them down. Japan could thus count on its western allies to act as tripwires and mobilize on oil prices long before it was forced to.

Yet with prices nearing those tripwire levels, much of the world is waking up to the threat. Though lagging far behind the internet, the mainstream international media certainly is catching on. On August 3, the Wall Street Journal ran an online special concerning peak oil with two experts, James Hamilton of the University of California at San Diego and Robert Kaufmann of Boston University's Center for Energy & Environmental Studies. Kaufman noted that "the peak isn't just an economic problem, it is one of the biggest social and political challenges for this century" and Hamilton agreed that "it's critical that we put all our resources to their best use" in confronting it. In short, these two mainstream economists (with reputations to protect in a very conservative age), went so far as to argue that there is a large role for government in organizing the response to peak oil. When two prominent American economists tell the Wall Street Journal that there's a big role for government in dealing with a problem, you know that the equivalent of a mountain-sized asteroid is on the way. And on August 21, the New York Times ran a long and well-researched article on the essential issues.

Unlike America, Japan's challenge isn't upping gasoline taxes in order to encourage fuel

efficiency and discourage unnecessary driving in the world's most wasteful society. Japanese and European taxes on petroleum burden a barrel of oil by about $US80 to 90, while American fuel taxes are a very light touch at about $US11. Japan thus already has high fuel taxes, which in turn promote fuel efficiency and encourages use of mass transit. It also has perhaps the best record of cutting energy use per unit of economic output. Data for 2000 compiled by the Japanese Natural Resources and Energy Agency indicate that if Japan's unit energy consumption per GDP in the industrial sector is set at 1, then that of the US is 1.65, the UK 1.33, France 1.1, and Germany 1.17. On the other hand, Japan has the worst performance among the industrialized states.

Eating Oil

How are food and oil related? They're actually intimately related, because we use oil for fertilizer, to fuel farm machinery, to make the plastic wrap and packages, to transport the produce, and so on. We literally and figuratively eat oil. For every calorie of food we eat, probably 10 or more calories of energy have been used in producing it.

Japan only produces 40 percent of its food supply. According to the Food and Agriculture Organization (FAO), ranking 28th out of the 29 OECD countries. By comparison, the UK's food self-sufficiency ratio is 74, Germany's is 96, America's 125, and that of France is 132. Moreover, FAO data show that Japan's self-sufficiency is declining, having dropped from 60 percent in 1970 to its present low level. By contrast, the UK has gone from 46 percent self-sufficiency in 1970 to its present ability to supply about three-quarters of its consumption. And German self-sufficiency in 1970 was a relatively low 68 percent compared to its nearly complete self-sufficiency today. These data underline the failure of Japan's postwar agriculture policy. The self-sufficiency rate for rice in Japan is 100 percent, but only 14 percent for wheat, 6 percent for beans, 82 percent for vegetables, 44 percent for fruits, 54 percent for meat and 57 percent for seafood.

As noted above, Japanese consumers already "eat" a very great deal of oil. Not only is there much domestic haulage, but the more than 60 million tons of food imported annually is transported over great distances as in the case of North American grain and fruit, and Australian beef. Japanese attention to the food problem, however, has thus far centred on the amount of food wasted and the environmental impact of the greenhouse gases give off. For example, Japanese government calculations indicate that in fiscal 2002, 725 kilocalories per capita of food were thrown out per day. The cumulative total represents about 11 trillion yen in wasted food, which is about twice what Japan will spend on national defence in 2005 and thus hardly small

potatoes. A Food Recycling Law passed in 2001 will compel food-related businesses to trim 20 percent from the amount they discard by fiscal 2006.

The food-waste focus of this law has deflected Japanese concern from the fossil-fuels consumed in producing and shipping the country's food. The UK became a world leader in studies of energy use and food transport in the wake of the 1994 release of the UK SAFE Alliance's "Food Miles Report (http://www.sustainweb.org/chain_fm_index.asp)". Some of the research results stimulated by this report are striking. The British group, Sustain, authors of a 2001 report, "Eating Oil" (www.sustainweb.org/pdf/eatoil_sumary.PDF) calculate that 127 calories of fuel are burned for each calorie of lettuce flown into the UK from Los Angeles. In effect, oil is being squandered to distance airlift a product that is essentially water. Japan is hardly alone in failing to produce data on these critical issues. But the magnitute of the problem for Japan is acute.

Food Mileage

The extent of this transportation of foodstuffs can be calculated as "food mileage" by multiplying the transportation distance with the volume of food transported. The higher the food mileage, the larger the burden that a particular country places on fossil-fuel resources, as well as the global environment. In the era of cheap oil, these burdens were negative externalities that were largely ignored. But as the costs mount and become more visible, increasing questions are being raised about food mileage and other energy issues shaping food consumption.

Japan's total food mileage in 2001 was a massive 900 billion ton-kilometres. This was more than three times that of the United States. But the numbers are even more startling when seen in per capita terms. Each Japanese consumer annually consumed 7093 ton-kilometres of food whereas consumers in the US consumed 1051. Even Britain, another island nation, took only 3195 ton-kilometres per capita.

And note the cost in CO2. Intuitively, we assume that the heart of the carbon problem is associated with auto emissions. Probably this is because the US, with 4 percent of the world's population, produces about 25 percent of CO2 emissions and has an enormous number of very polluting automobiles. Yet even in the US, automobile emissions make up only 20 percent of the total. We can see why if we look at the UK's "Eating Oil" report again. It turns out that the family car is not the biggest domestic culprit in producing CO2. For the UK, "The food system is a significant contributor to climate change. A typical UK family of four would, each year, emit 4.2 tonnes of CO2 from their house, 4.4 tonnes from their car, and 8 tonnes from the production,

processing, packaging and distribution of the food they eat." Though comparable data apparently do not yet exist for Japan, the relative breakdowns are probably comparable to Britain's. If anything, the relative amounts emitted from the average Japanese family home and automobile are perhaps less than in the UK, while Japan's much greater food mileage likely means that more CO2 is emitted getting food to their tables.

Moving towards food self-sufficiency will not resolve Japan's food mileage problem. Imports are unlikely ever to be displaced entirely, and it is not even clear that they ought to be in a number of bulk commodities. Yet increased food self-sufficiency is a reasonable goal for Japan. Other countries have boosted their self-sufficiency in the interests of food security and for other reasons. Even with cuts in food miles, the long-distance transport of produce in domestic markets would remain, in spite of Japan's emerging boom in "chisan chisho" (produce and consume locally) activism. Yet the fossil fuel consumed by – and pollution emitted from - domestic transport can generally be greatly reduced through the use, wherever possible, of rail transport in place of air, water and road transport. Marine shipping is regarded as energy efficient; but it generally involves very long distances and consumes the dirtiest fuel available, bunker oil, making a large bulk carrier as polluting as about 12,000 cars

Of course, even to talk of the need to promote agricultural self-sufficiency in Japan is to elicit guffaws or even outright condemnation in an era when leaving things to the market is generally seen as the only responsible and realistic course. Promoting agricultural self-sufficiency is seen as particularly wasteful and pointless because it generally requires subsidies and higher prices than the free market. The clear threat of peak oil, however, makes it unwise to wait and see whether accelerating oil prices will make domestic production more attractive. In 2001 Japan produced a "food crisis manual" that envisioned a crisis of supply due to abnormal weather in Japan, poor harvests overseas, reduced agricultural production due to global warming, and disruption of world trade due to regional conflicts. The manual essentially advises that potatoes and other starchy tubers be grown virtually everywhere and even in place of the rice crop. Surely it would be prudent to use this ongoing crisis to save oil and build up a sustainable agriculture sector to boot.

Sources

Oil and Peak Oil

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http://www.theoildrum.com/

The Energy Bulletin (http://www.energybulletin.net/index.php) is a regularly updated index of articles, sorted into a wide range of useful categories.
http://www.energybulletin.net/index.php

Matthew Simmons, Chairman of Simmons International, uploads his presentations (http://www.simmonsco-intl.com/research.aspx?Type=msspeeches) here.
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Food Mileage

The UK Food Miles site is managed by Sustain (http://www.sustainweb.org/chain_fm_index.asp): The alliance for better food and farming
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The BBC introduction to food miles (http://www.bbc.co.uk/food/food_matters/foodmiles.shtml)
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A new Japanese site Japanese site (http://www.food-mileage.com/) on food mileage and CO2 emissions (rather than oil consumption)
http://www.food-mileage.com/
(This site is run by the "daichi wo mamoru kai" or "association to protect the earth"; their home page is
http://www.daichi.or.jp/)

Notes on Japan's food mileage in English can be found in a translation of the Environment Ministry's 2003 report (http://www.env.go.jp/en/w-paper02/2003/full.pdf)http://www.env.go.jp/en/w-paper02/2003/fulll.pdf

A Japanese government page (http://www.chushi.maff.go.jp/chisanchisyo/) on the "local production, local consumption" movement is
http://www.chushi.maff.go.jp/chisanchisyo/

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