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Thailand -- An Energy Case Study

Posted by Dave Cohen on June 15, 2006 - 11:05pm
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[editor's note, by Dave] I had some input for this story from jdeely and Henry Coulter (TOD user name?). My thanks to them. These posts of mine on other countries tend to get few responses. I don't know whether to attribute this to lack of interest in other countries--American/Euro centrisim --or other factors. I'd be interested to know your thoughts. We do live in the age of Globalization and high energy prices affect everyone everywhere on the Earth.

I thought I would do another story on how higher energy prices are affecting other parts of the world. In this case, I have picked Thailand. This story will focus a bit on the history of energy in Thailand and more on the affects of current prices on their economy and how this South East Asian country is trying cope with the stress this has caused. While there are large differences, there are eerie similarities with the United States, though on a smaller scale. We will also take a brief excursion to talk about natural gas use in vehicles.

It's always best to give the big picture first. And here it is from the EIA Thailand country brief.

Natural Gas (left) and Oil
Production Imports (right)
Click to Enlarge either image

A casual glance at both graphs reveals that Thailand is in big trouble and it's getting worse--just like America! Let's get into some details about what's currently happening there.

What's Going on Now?

From High oil prices hit Thailand hard (April, 2006), we learn

> "I spend about 1,000 baht (26.60 dollars) to fill up my car, which is twice the amount it used to be when the price of petrol was 17 baht a liter," said Ariya.
>
> The 34-year-old said the four-hour drive to the ferry pier, where she would board a boat to Koh Chang, was unaffordable.
>
> "I was worried when it gradually rose to 21 baht a liter but now, at almost 30 baht, I just think it's a pity to own a car."

> Throughout Thailand, consumers and businesses alike are suffering the impact of soaring global oil prices which have broken 75 dollars a barrel.

Filling up in Thailand

And here comes the inflation, reported at Thai inflation rises on higher fuel costs

> Thailand's inflation rate accelerated in May to a seven-month high due to rising fuel costs, increasing prospects the central bank will raise borrowing costs again next week.
>
> Consumer prices rose 6.2 percent from a year earlier after a 6 percent gain in April, the Commerce Ministry said Thursday on its Web site.
>
> The Bank of Thailand has almost quadrupled borrowing costs in the past 20 months to control inflation amid surging fuel costs....

Thailand uses predominantly diesel fuel which the government had been heavily subsidizing. Naturally, they incurred a huge debt of 65 billion (bhat). So, subsidies are being reduced. TOD user jdeely (link at the top) had noted that in the 1st quarter of this year, citing Thai economy to increase slightly under high oil price and Thai Economy Grew About 6% in 1st Qtr, Thanong Says (Update2), that the Thai economy grew at an astonishing rate. However, with consumer price inflation rising at about 6.2%, one wonders ... well, you know what I mean.

Thai Natural Gas Production

There are remarkable similarities between the history of Thailand energy and that of the United States. We get a fine overview of the past and future of Thai energy policies from Thailand's developing gas and petrochemical industry by Khun Prasert Bunsumpun, the president of PTT Public Company Limited. First let's look at some basic facts about the present. Formed in 1978, PTT is the state-owned Petroleum Authority of Thailand. Bunsumpun tells us that 74% of Thailand's natural gas needs are supplied by indigeneous [controlled by Thailand] sources in the Gulf of Thailand. The rest is imported by pipeline from Myanmar [used to be Burma]. Just like the US, Thailand responded to the oil shocks of the 1970's and 1980's by restructuring their energy usage.

> Three decades ago, Thailand’s dependence on oil import was over 90 percent of total domestic demand. The demand for oil tripled from 1980 to 2003 at an average rate of 8 percent per annum. The oil crisis in 1973 prompted the government to reduce the country’s reliance on imported energy and intensify exploration activities domestically,

> leading to discoveries of natural gas at commercial scale.
>
> At present, oil represents 47 percent of the total energy consumption, followed by natural gas, coal/lignite, and hydro at 36 percent, 15 percent, and 2 percent, respectively.

So, this restructuring led to the creation of Thailand's natural gas industry starting in the 1970's. The leading developer then as now is Unocal Thailand, a division of Unocal. It is hard to resist saying that you can bet the Thais were probably delighted that the Chinese takeover of Unocal failed.

Given Thailand's poor conventional oil resources, it made sense for them to switch over their energy usage to natural gas. To that end, in an attempt to get away from diesel fuel and avoid their large trade deficits from their oil imports

> PTT introduced natural gas for vehicles (NGV) in the transportation sector as a replacement for diesel fuel. Currently, 4 MMSCFD of gas is dedicated for NGV use. There are 28 stations in service, 17 under construction, and a total of 120 targeted for completion by 2008. There are currently about 4,300 NGV vehicles in operation today, with 40,000 targeted by 2008.
>
> PTT is also in the process of developing a gas district cooling application for Bangkok Suvarnabhumi International Airport to be completed for commercial operation by this year. The firm is also studying the feasibility of implementing gas district cooling at a major shopping and recreation centre. These projects could serve as a prototype for similar projects, enabling Thailand as a whole to benefit from the use of clean, efficient, safe, and environmentally friendly form of energy.

A brief note on natural gas for vehicles

This is often abbreviated as NGV. There are two types of natural gas to fuel vehicles, Liquid Petroleum Gas (LPG, *aka Propane*) and Compressed Natural Gas (CNG). From the LNG Fact Sheet, we learn

> **WHAT IS CNG?**
>
> Compressed natural gas (CNG) is natural gas pressurized and stored in welding bottle-like tanks at pressures up to 3,600 psig. Typically, it is same composition of the local "pipeline" gas, with some of the water removed. CNG and LNG are both delivered to the engines as low pressure vapor (ounces to 300 psig). CNG is often misrepresented as the only form natural gas can be used as vehicle fuel. LNG can be used to make CNG. This process requires much less capital intensive equipment and about 15% of the operating and maintenance costs.
>
> **WHAT IS LPG?**
>
> Liquid petroleum gas (LPG, and sometimes called propane) is often confused with LNG and vice versa. They are not the same and the differences are significant. LPG is

> composed primarily of propane (upwards to 95%) and smaller quantities of butane. LPG can be stored as a liquid in tanks by applying pressure alone. LPG is the "bottled gas" often found under BBQ grills. LPG has been used as fuel in light duty vehicles for many years. Many petrol stations in Europe have LPG pumps as well.

What's the Future for Thailand?

While the NGV experiment made sense when natural gas was cheap, the whole venture is looking more risky now. Dr. Fereidun Fesharaki, president of Facts, Inc. and an energy adviser to PTT, has questioned the NGV investment.

> Dr Fereidun Fesharaki ... said PTT Plc should reconsider its multi-billion investment in a network of natural gas for vehicles (NGV) filling stations....
>
> Speaking at a public lecture on "The New Paradigm in the Global Oil and Gas Industry: Challenges for Thailand", hosted by the Petroleum Institute of Thailand on Tuesday, Fesharaki said that due to an expected convergence in the prices of oil and natural gas, gas will no longer be a cheap fuel and electricity producers will need to diversify to coal and eventually to nuclear power....
>
> Answering a question regarding PTT's huge investments in a network of NGV filling stations, Fesharaki said compressed natural gas was not a sustainable solution, although it may work well as a propaganda tool for governments. "You must ask why the US or Europe hasn't done this. Compressed natural gas is only good in those countries where there are low gas prices, like Saudi Arabia or Qatar," he said.

[editor's note, by Dave] I have always wondered about exactly why high natural gas prices are closely tied to the price of oil. I suspect this may be related to the fact that most natural gas is *associated dissolved* and therefore production of oil and gas are closely linked. However, it probably has to do with energy market forces I don't understand. If someone else has a better idea about why this is so, please feel free to comment so I can become better informed.

Thailand is apparently ignoring Fesharaki's advice so far, no doubt due to the skyrocketing price of diesel fuels. See PTT takes on NGV conversions. But, Thailand is also making the usual moves. The natural gas future for the Thais is--you guessed it--imported LNG. To supplement new supply from additional pipelines still under construction, we learn from Bunsumpun that

> LNG has become a major factor in the global gas industry. There are now abundant potential supply sources for Thailand, such as Malaysia, Indonesia, Australia, Russia, and the Middle East. LNG price has come down because of technology improvement and competition. The supply is more flexible with an increasing trend of spot or short term contract sales.
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> For Thailand, LNG will be one part of PTT's long term gas supply solution. As the Third Pipeline will be filled by 2010, LNG will serve as a bridge before the Forth Pipeline is commissioned. PTT recently set up a company to joint invest in LNG's full value chain. A location for the regasification terminal has also been planned to optimize the use of the organisation's current distribution system. As cryogenic energy generated during re-

> gasification can also be used in other processes, the terminal will be developed in conjunction with gas separation or petrochemical plants to collectively optimize energy efficiency.

However, disturbingly, Thailand is turning to another energy source, coal. This Gulf Times article Coal gets Asia boost as LNG proves risky reports that "`Everyone thought the future was gas but the price has not come down and the flexibility on supplies has not been there. Government policy is emphasising coal`, said Bishal Thapa of ICF Consulting in New Delhi. Other Asian countries such as Pakistan and Thailand, hurt by the high cost of oil imports, are set to boost coal for power this decade". Thus we find reports like Egat plans coal-fired power plant for 2010 [Electricity Generating Authority of Thailand]. Aside from their use of NGV's I find all of this quite similar to what is going on in the US and elsewhere.

On the bright side, Thailand is making considerable investments in cleaner alternative energy sources. As we find in Thailand to develop own palm oil industry, the future is biofuels. [Sorry, you'll have to register to see this article]. Thailand wants to expand its production of biofuels to augment the sugar-cane, molasses and cassava sources they already use.

> The Energy Ministry insists it see no need to import raw palm oil for bio-diesel production since local supply remains sufficient. Caretaker Energy Minister Viset Choopiban revealed on Wednesday that the ministry is going ahead with a plan to encourage local bio-diesel consumption so that farmers could earn alternative incomes from growing oil plants.
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> Under the plan approved by the cabinet in its roving meeting in the northeastern province of Burirum recently, bio-diesel with a 5 per cent mixture of palm oil (B5) will be made available countrywide by 2011 and with a 10 per cent mixture (B10) by 2012.
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> In other words, around 8.5 million litres of bio-diesel will be consumed daily.

But there are problems with the transition.

> However, gasohol's sudden popularity has resulted in demand outstripping domestic production capacity, forcing oil firms to go overseas to secure ever-growing quantities of ethanol.
>
> "The situation is tough for the government. We're facing complicated problems with regard to the supply of sugarcane, molasses and cassava, which are domestic materials for ethanol," said Chumnong Sorapipatana, energy chairman at the Joint Graduate School of Energy and Environment at King Mong-kut's University of Technology Thon Buri.
>
> The operations of three ethanol plants have been suspended and construction of 18 delayed due to the uncertain supply of materials, he said.
>
> Global prices of sugar and molasses are on the rise, so ethanol-producers cannot compete with other buyers who export them as foodstuffs.

Hence, the move toward palm oil. Whether use of biofuels in Thailand will be cost-effective depends on the nature of their agricultural practices, which are probably far less fossil fuels intensive than growing corn as in the US. Perhaps the Thais will be able to emulate some of Brazil's success with sugarcane.

In Conclusion....

We find that Thailand, like many other nations including the US, is having trouble coping with higher energy prices. They are using the best strategies available to them just as other countries try to maintain economic growth in the face of rising fuel costs. This concludes the Thailand case study.

[editor's note, by Prof. Goose] And what is Asia's growth going to look like? Look here.