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Gasoline Shortages: Our Inventory Problem

Posted by Gail the Actuary on September 29, 2008 - 10:31am
Topic: Demand/Consumption
Tags: gas inventories, gas shortage, gasoline, gasoline price, original, peak oil
[list all tags]

I am writing this article from Atlanta, one of the places hardest hit by gasoline shortages. A person can drive for miles without finding an open gas station.

One of the major reasons for gas shortages is that fact that inventories were not very high going into the hurricanes. Then when not one, but two, hurricanes hit, inventories dropped to the level where there wasn't enough to go around. (In fact, the shortages started even before the second hurricane hit.) How could this happen? Isn't there anyone who cares about gasoline inventories?

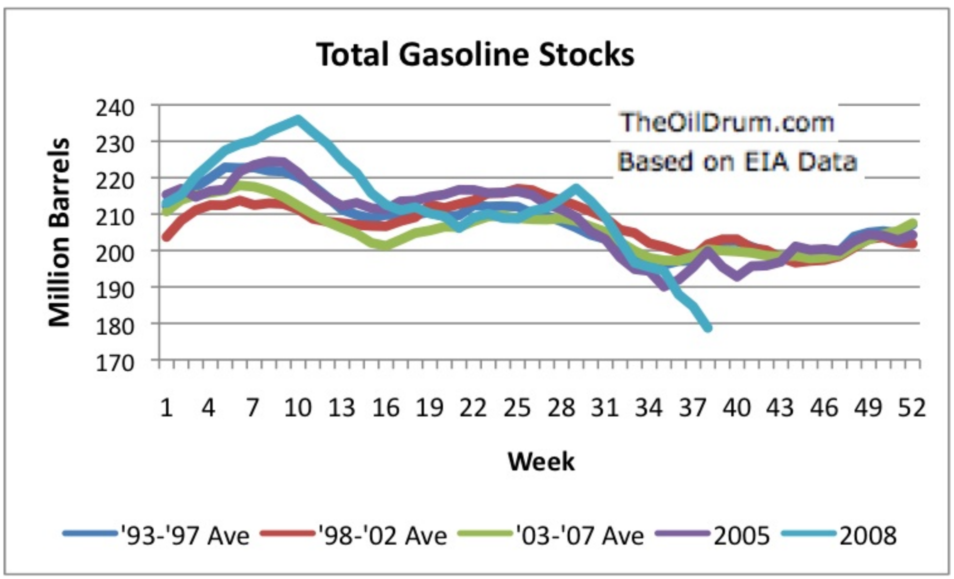

Figure 1. US Gasoline Inventories, Based on US Energy Information Administration Data

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We hear a lot about the strategic petroleum reserve and its intended role in preventing shortages. Yet when there have been gasoline shortages, in 2005 and this year, the problem was that *refineries* were out of commission for long periods of time--almost a month at this point in time. Getting more crude oil wouldn't really solve the problem. What we really needed was more gasoline in inventory, so we had some on hand, when the need arose.

Figure 2 shows a graph of the estimated impact of refinery shutdowns, start ups, and reduced runs, following this year's hurricanes, based on Department of Energy data. The amount is really huge in relationship to the total amount we refine.

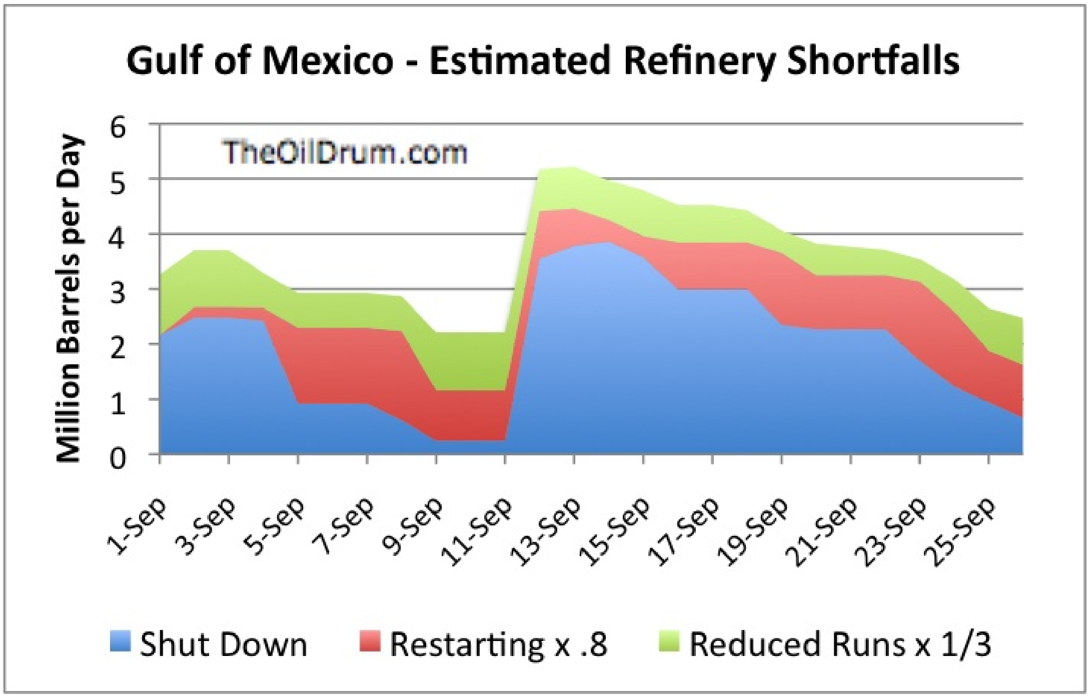

Figure 2. Estimated refinery capacity loss, due to Hurricanes Gustav and Ike, based on DOE data

At this point, I estimate that there is a shortfall of more than 2 million barrels a day of refining capacity--more than 10% of US total, nearly a month after Hurricane Gustav hit.

In the American Petroleum Institute's bloggers phone call last week, (here or here), I asked (at 22:13) Red Cavaney, President and CEO of API, if higher gasoline inventories weren't key to preventing shortages. These are excerpts from his response, together with some of my thoughts:

> By all means, inventories are obviously key to being able to have the flexibility needed to ensure that all the outlets that need to have gasoline have got it.

My thought: Red agrees that me that large enough inventories are key.

> Our big problem, Gail, is that when you get two back-to-back hurricanes that are this close together chronologically, and given extended startup time it takes to bring refineries back on stream, and the fact that hurricanes are notoriously known for at the last minute adjusting their paths. . . So it is a challenge – much, much more difficult than if you just have one come through and you can start to move off and work can handle as you would.

My thought: Right. Except this happened in 2005 as well (Hurricane Katrina and Rita). At some point, it would seem like we would start catching on that this can happen.

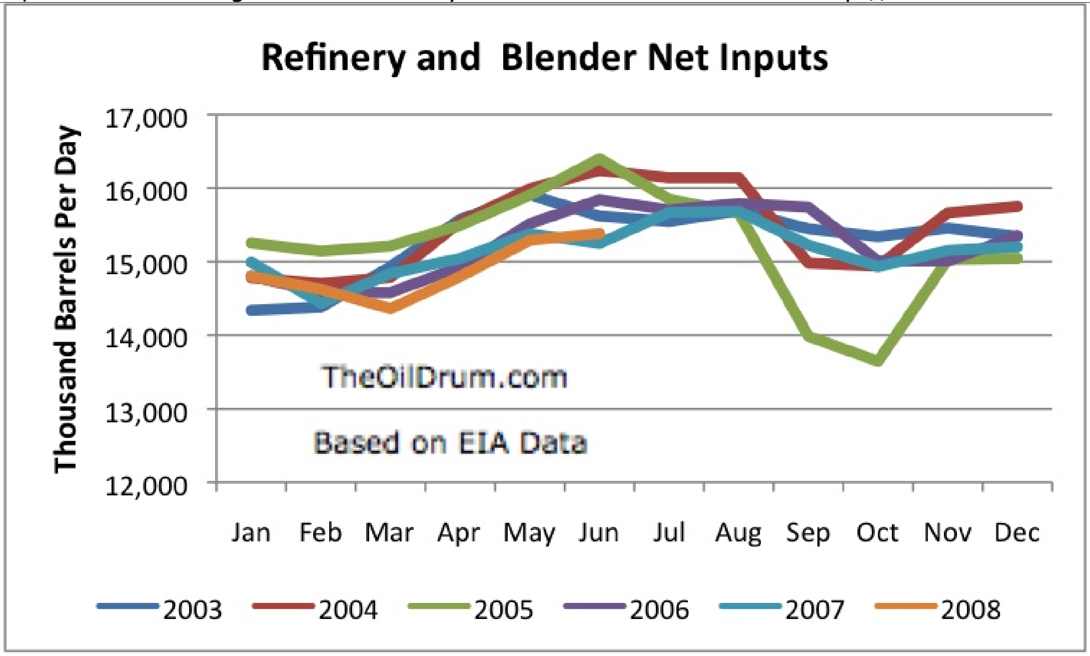

Figure 3. Graph showing dips in refinery inputs in 2005, following hurricanes. In 2008, our refinery inputs are already lower, so a dip could have greater impact.

> . . . when people are concerned about getting enough, everybody tops off and you all know what that means. That means even if we had sufficient gasoline, you know, people would still have to stand in line.

My thought: We hear this in every newspaper article. In Atlanta, lines are so long at the occasional gas station that is open that I doubt that topping off is a major issue at this point. Anyone who is going to drive 10 miles and wait in line for an hour to top off their tank is pretty persistent. The are a lot more issues with people just plain running out of gas before they can find it.

Of course, after people are burned this time, they will be more cautious. If there is another hurricane, people are likely to plan ahead better. And once there are finally adequate supplies, they may be more cautious about letting their tanks run low.

> We were low, but you have got to remember we were low because demand was falling pretty much to unprecedented levels here in recent amounts of time.

My thought: If the industry is selling 2% or 3% less gasoline, it theoretically needs 2% or 3% less inventory, but I don't think that is what Red meant.

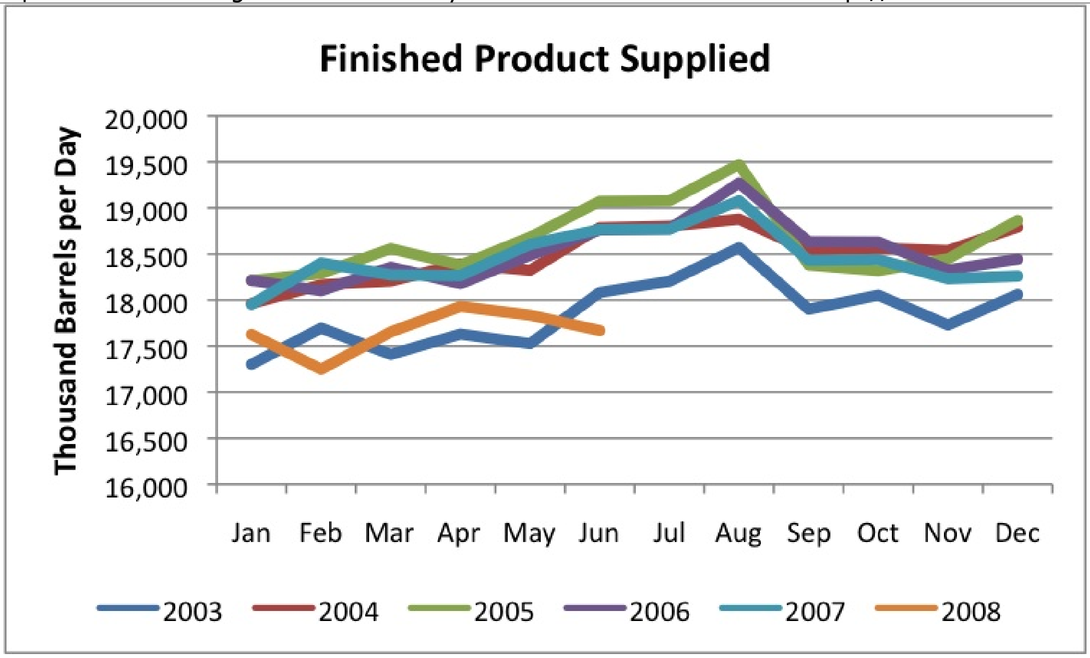

Figure 4. Total refined product supplied to US drivers (including gasoline, diesel, home heating oil, jet fuel, asphalt, and other refined products.

If you look at the data underlying Figure 4, you discover that the big drop in product supplied has come in products *other than gasoline*. These are the products whose price has risen most (think diesel). As a result, people are using less of these products whose prices have risen. But these aren't the products whose inventories have dropped.

The product whose inventory was low was gasoline, but it had only a relatively small drop in supply. I think that what Red meant was the *profit margin that refiners could make was low*, because the retail price of gasoline was too low, relative to the cost of making it. There are several reasons this seems to be happening. One of them is that world demand is now greater for diesel, and the world market is willing to pay a higher price for it. Another reason is that Europe has leftover gasoline, and is willing to sell it on the world market at a fairly inexpensive price. Another reason is that the ethanol is cutting into the need for gasoline. Yet another is that there seems to be *too much* refining capacity geared toward light crude oil. I discuss these issues in the article [Why isn't the cost of gasoline even higher?]

It is not very comforting to think that the level of our inventories depend on how much gasoline Europe decides to use, or how much ethanol is produced.

> And at the time you would have had to start building inventory, you couldn't have predicted that you were going to have hurricanes to the extent that you did. The last two years, we didn't have any hurricanes to speak of that really significantly bothered production.

My thought: It sounds like the industry doesn't worry about gray swans. There really is no overall industry plan regarding inventory levels, so one shouldn't be surprised if no one plans at the 1 in 100 level or 1 in 50 level. This is not a government program. The total inventory is just the aggregation of the amounts various producers choose to have on hand.

> But it costs to keep inventory. . . It is a commodity business. And every decision has an impact in terms of balancing off the customer service and the cost and the return to shareholders.

My thought: This is really the issue. Now that inventory is expensive and profit margins are under pressure, no one wants to pay the cost of keeping adequate inventory. A related issue is credit problems, which Red addressed later in the call, at 57:54.

> And what most people don't understand – I used to be a banker in one of my former lives – what most people don't understand is our economy runs on credit. All the way from people who make most of their purchases on credit cards, to small businesses who usually get a line of credit to help them get the materials in to sell to people who are out running businesses like those that are out, particularly onshore. And got a couple of rig crews that are out there that he's got to pay before the stuff comes in. They are all on credit.
>
> What has happened is basically, the commercial credit market, or commercial paper has pretty much – (inaudible) – by some of the actions that are being proposed, which has forced those borrowers into limited amounts of capital. And if you are hearing from all parts of the sector now, the strain of not being able to get access to the amount of borrowing that they usually have, and that's why there is a sense of urgency on getting this matter resolved. Because if you don't open up the floodgates and the flexibility and take some of the bad stuff out of the system, you're not going to free up lending to the extent that you need it. So it may not be with everybody out in the oil field, but today's problems that they are all feeling, but if this thing were to go on for a couple more weeks where we're starting to dry up, I can see a big impact.

My thought: Most people would like to think that the oil and gas business is unaffected by today's credit problems. This is clearly not the case. If we cannot fix the US credit problems (and it is not clear to me that we can), these credit problems are likely to spill over into things we take for granted, like gasoline production and inventories.

Going Forward

It seems to me that there ought to be a more satisfactory way of determining gasoline inventories than depending on how much inventory each producer chooses to keep, based on his current credit situation and how tight profit margins are. At one point, we had integrated oil companies that owned the whole system from top to bottom. When this was the case, they had a strong incentive to keep all the pieces working together. Now, the process is divided among a number of players. The process depends heavily on price signals, but these haven't been working as one might hope. The credit situation is adding another dimension. We should theoretically have a government mandated minimum gasoline reserve, but I doubt this will happen.

I tried to do a little modeling of where we are now. It looks to me as though we should be able to get inventories back up over 180 million barrels by October 17, if refinery availability keeps coming back on line, and if we can increase our gasoline imports from Europe to 1.5 million barrels a day. At such a level, the problem with long lines and stations without gasoline should mostly disappear, I would think.

I wonder, though, whether this will happen on schedule. Our prices don't seem to be high enough to encourage large gasoline imports from Europe, and it is not clear our credit problems will go away. It is possible we may find ourselves struggling with the inventory issue long after it should have been resolved.

Links to recent articles related to gasoline shortages:

Implications of a Ten-Day Refinery Outage September 15

How Much Will Gustav and Ike Affect Gas Supplies - An Update September 22

Gas Shortages?: This Week in Petroleum - September 24 September 24