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PIRINC has prepared the enclosed report, *Energy This Winter: Prospects and Risks for the Northeast*

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This report assesses the potential vulnerability of the Northeast to new price spikes this winter. The report finds grounds for concern in declining distillate stocks, low national crude stocks and the fall in natural gas production versus last year's levels. A war with Iraq would put temporary sharp, upward, pressure on crude prices and this prospect would be incorporated in a "war risk" premium that would wax and wane with market judgments regarding timing, supply loss, and what comes next. In recent weeks there has been a more important, calming influence on the market, namely the increasing supplies of oil being put on the market by the OPEC countries, including Iraq. Oil prices have already retreated from their September highs. While risks of price spikes remain, they have become less acute.

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Energy This Winter: Prospects and Risks for the Northeast

Summary

The winter heating season has started with both heating oil and natural gas residential customers paying more to heat their homes than they did at this time last year, although far less than in 2000. This is no surprise since crude oil costs despite recent declines are still significantly above the depressed, post-9/11 levels of last year while wellhead prices for natural gas have moved up sharply since the beginning of the year. However, in recent years, residential heating oil customers in the Northeast experienced the sharpest price spikes not from crude price surges but from the spillover of local gas supply problems into the distillate market. Residential gas customers were temporarily shielded from the problems by long-term contracts---and the shifting of supply shortfalls to interruptible and spot customers who in turn had to scramble for alternatives, in particular distillate. Of course, this year there are crude price risks as well associated with the prospect of another war with Iraq.

This report assesses the potential vulnerability of the Northeast to new price spikes this winter from local supply developments and from the evolving situation regarding Iraq. The report finds grounds for concern in declining distillate stocks, low national crude stocks and the fall in natural gas production versus last year's levels. A war with Iraq would put temporary sharp, upward, pressure on crude prices and this prospect could be incorporated in a "war risk" premium that would wax and wane with market judgments regarding timing, supply loss, and what comes next.¹ In recent weeks, however, there has been a more important, calming influence on the market, namely the increasing supplies of oil being put on the market by the OPEC countries. Although erratic, the supply improvement also extends to Iraq. Moreover, with the resumption of arms inspections under a new resolution approved by the UN and accepted by Iraq, the timing of any war, if war indeed occurs, looks more likely to come after seasonal peak requirements for oil have passed.²

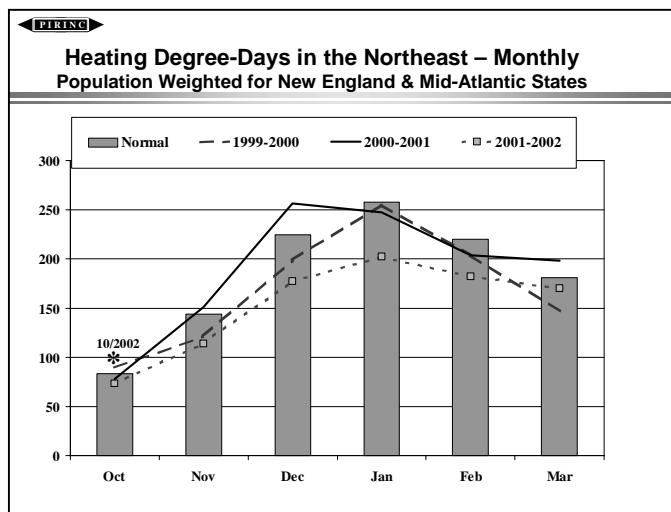
Oil prices have already retreated somewhat from their September highs in response to these supply and political developments. While some risks of price spikes remain, they have become less acute. The improvement in crude oil supply would carry over to higher stocks, including distillate stocks, the immediate safeguard against price shocks from local supply shortfalls.

¹ The Iraqi invasion in Kuwait came as a surprise and resulted not just in losses of crude supply but in losses of middle distillate production from the Kuwait refinery. Prices of middle distillates rose far more than crude, pushed up as well by military requirements. Should war again break out it will not come as a surprise. As such there is time for advance planning and action to meet military needs.

² Not all supply risks are associated with Iraq. Political unrest in Venezuela could worsen and spill over to the oil sector. Venezuela is a short-haul supplier of oil to the US and there is no guarantee that any supply disruption would wait until after peak oil requirements are met.

Weather Considerations

Weather plays a decisive factor in the heating fuel market. A cold winter pushes demand up, lending support to high prices and, if stocks are low, can leave the region vulnerable to price spikes. A warm winter on the other hand tends to hold prices down. This chart summarizes for the Northeast monthly, normal (30-year averages) population-weighted degree-days for the Northeast and the actual degree-day patterns for the past three heating seasons.



Note that the last 2001-2 heating season was warmer than normal right from the beginning, and much warmer than the two prior seasons. The 2000-01 season was the coldest of the three, with differences prominent in November through January. This season, degree-days are projected to be much closer to normal than last season. Although early in the season, October heating degree-days for this year were significantly above normal and higher than for any of the past three October months shown.

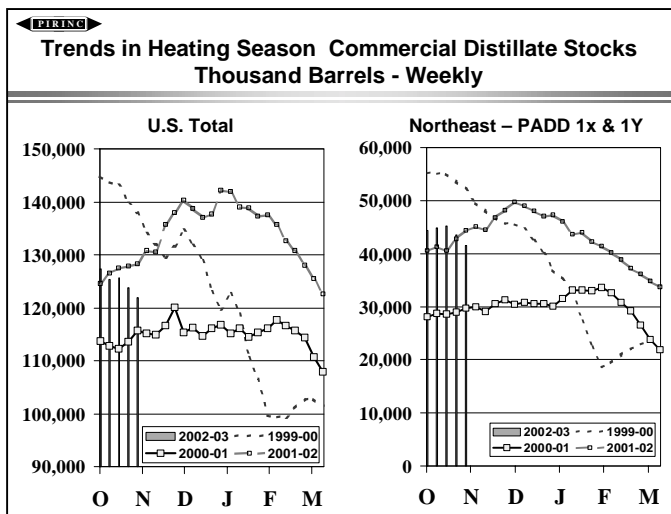
A return to more normal weather would push up demand. The latest US Department of Energy Short-Term Outlook, assuming a normal winter, has national distillate demand for the fourth quarter of this year up by about 4% this year versus last. For the first quarter of next year, distillate demand based on normal weather is up nearly 9%. The gains for distillate are greater than projected for the rest of the barrel, up about 3% for the both the fourth quarter of this year and the first quarter of next. versus last year. The differences reflect primarily the impact of an assumed return to more normal weather. The gains for distillate and the rest of the barrel include an allowance for improved economic activity since the immediate post 9/11 period.³

Distillate and Crude Stocks

Worries about possible price spikes, and support for high prices in general have been supported by trends in stocks. In the case of distillate, current stocks are not especially low but contrary to typical seasonal patterns they have been declining. The next chart summarizes on the left trends in US commercial distillate stocks for the current and the past three heating seasons and on the right, trends in the Northeast (PADDs 1Y and 1X) where heating oil use is concentrated.

³ The figures are taken from the US Department of Energy, Energy Information Agency, **2002 Short-Term Energy Outlook**, released early November 2002.

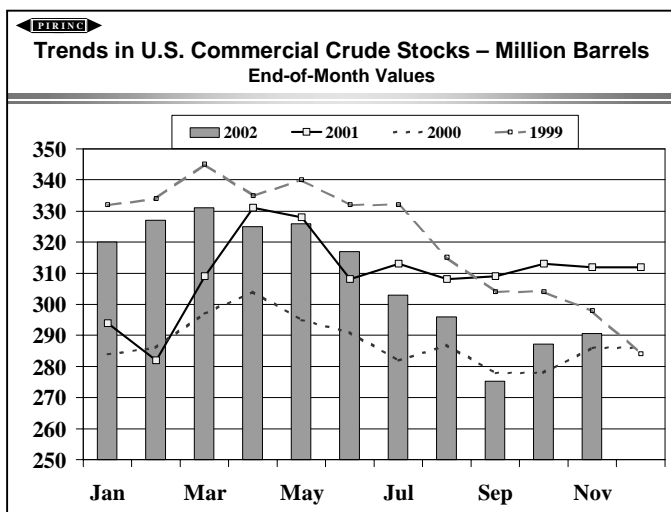
At the national level, distillate stocks in early November this year were above their level for the same period in 2000 although below last year's level and well below November 1999. However, inventories in October-November 2000 were at or near their lowest levels in recent memory and, as discussed later in the report, concerns about their adequacy were reflected in exceptionally high, beginning-of-season, heating oil prices. From the last week of September through early November of this year, distillate stocks fell by about 8 million barrels a very untypical seasonal pattern. Over the past 10 years, distillate stocks have risen on average by about 1 million barrels in October and 6 million in November.⁴ Stocks show a similar historic pattern in the Northeast. In early November of this year, stocks were down by about 3 million barrels from their end-September level, a 6% decline that was about in line with the current national trend.



While a low seasonal starting point for stocks is a cause for concern, it doesn't follow that a high starting point guarantees no problems. The extremely high inventories of end-October 1999 were drawn down rapidly and the extreme low levels reached early in the New Year as a result of severe weather and the switch to oil from interruptible gas triggered exceptionally strong price spikes for consumers. At their early to mid-February 2000 low-points, national distillate stocks had fallen about 25% from their early November 1999 levels while stocks in the Northeast had fallen by about 60%. Over the same period, residential customers in the Northeast saw prices about double from a relatively low \$1/gallon to about \$2 before beginning to recede.⁵

Adding to concerns about distillate stocks has been the trend in commercial crude stocks, shown in the next chart.

US commercial crude stocks fell almost continuously from a high level in March through end-September of this year when



⁴ Over the past five years, distillate stocks have shown an average decline of 2 million barrels for October followed by an average 5 million barrel build in November.

⁵ A full discussion of price developments during the 1999-2000 heating season can be found in the PIRINC report, [What Happened to Heating Oil?](#), March, 2000

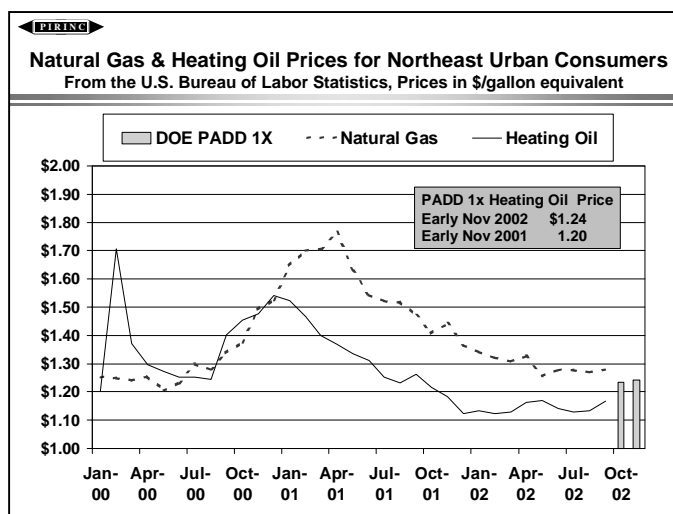
they reached an exceptionally low level, close to what prevailed in the very tight market of early fall 2000. Since then, stocks have moved up marginally although as of early November, they are running about 25 million barrels below year earlier levels.

There are certain rough similarities between the inventory trend so far this year and the pattern shown for 1999 when inventories at the beginning of the year were at high levels. In both years, OPEC implemented production cuts that led to a worldwide reduction in inventories and higher crude prices. The recent low levels of US crude stocks reflect local factors as well. Hurricane-related disruptions to Gulf of Mexico production led to a loss of about 17 million barrels of crude between late September and mid-October. The weather also disrupted crude oil import delivery schedules and adversely impacted refinery operations in the Gulf Coast. Lower refinery output meant greater draws on product stocks, including distillate stocks to meet demand. Both crude production and refinery operations have since returned to more normal levels.

Prices for Consumers

The past few years have treated heating oil and gas residential customers in the Northeast somewhat differently. Overall, gas customers have faced higher prices, as they do now, but oil customers have faced more volatile prices and one extremely painful price spike. The chart below summarizes monthly heating oil and natural gas prices as published by the Bureau of Labor Statistics for Northeast Urban Consumers. Both prices are shown in \$/gallon of heating oil equivalent.

Since January 2001, the price of heating oil as reported by the BLS has been significantly below the price of natural gas with the difference ranging from about 10 cents to 30 cents/gallon. In September of this year, the latest month available, the difference was about 11 cents/gallon. But there have been times when the price of heating oil was higher, especially in early 2000 and again in September-October of the same year. In 2000, the price increases clearly came fastest for oil customers, although they did dissipate. In the case of gas, price trends were much smoother--- both up and down. Both residential heating oil and natural gas prices are clearly influenced by trends in crude oil and wellhead gas prices, and for gas especially, transport and storage costs. But there are important price-setting differences. Residential gas prices are tied to firm gas supply contracts that delay the effects of changing market conditions. While dealer price-protection plans and an active futures market offer some cushion, residential heating oil prices are nonetheless sensitive to near-term shifts in national and local current market conditions.



Since the BLS data end in September, as a more current guide to heating oil prices, the bars at the right show the October and early November average prices from the Department of Energy Heating Season Survey for New England (PADD 1X) residential customers. In early November, the price averaged about \$1.24/gallon, about 4 cents/gallon above the price at the same time last year.

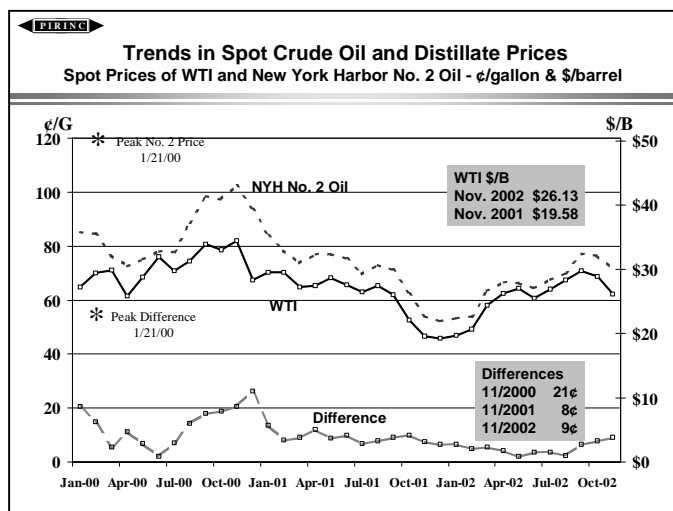
Prices to both residential heating oil and gas customers ultimately reflect market developments further upstream, although with a greater delay for residential gas customers. The next section focuses on these markets.

Spot Market Trends for Oil and Gas

After reaching their post-9/11 low-points late last year, both crude oil and distillate moved up steadily over the first nine months of this year, with average spot prices in September averaging about 50% above December 2001 levels. Trends in spot prices for WTI crude and New York Harbor No. 2 oil are shown in the chart below.

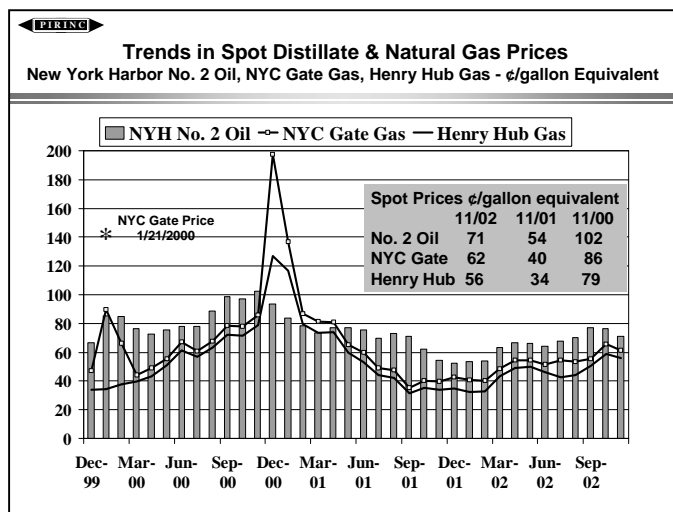
As of early November, the average spot price of crude is down by about \$3.50/barrel or 8.5 cents/gallon from its September level. The average spot distillate price is down about 6 cents/gallon. This change in price direction should bring some modest price relief to residential consumers who are currently paying an average of about 4 cents/gallon more for heating oil than they were in November 2001.

The somewhat faster decline in crude oil prices since September has led to a widening of refinery margins versus distillate (and other products) from what have been extremely depressed levels. So far this year, the price differential between spot crude and distillate has averaged about 5 cents/gallon, well below last year's average of about 9 cents. So far in November, the price differential has recovered to 9 cents, slightly above last November's 8 cents. Absolute price levels and price differentials have at times been substantially higher. In October through December of 2000, spot distillate price differentials ranged from 19 to 26 cents/gallon as supply concerns for natural gas as well distillate pushed No. 2 oil prices well above what were already high crude prices. An even larger, but more short-lived, differential developed in late January 2000, as shown by the asterisks on the chart, when an unanticipated cold snap in the Northeast put immediate strains on local natural gas and distillate supplies. On January 21, 2002, the price of New York Harbor No. 2 oil reached \$1.24/gallon while the differential versus crude reached 52 cents.



The relationships between gas and distillate market conditions are illustrated in the next chart which shows two sets of spot prices for natural gas, Henry Hub and New York City Gate, and, as before, New York Harbor No. 2 oil. Prices are in terms of gallon of heating oil equivalent.

In general, New York City Gate and Henry Hub prices show similar movements with the New York prices modestly higher. So far this year, differences between the two have averaged just under 7 cents/gallon equivalent (or about 47 cents/thousand cubic feet). There are times when the differentials have been much larger. In January 2000, the differential between the two gas prices reached 55 cents/gallon equivalent (nearly \$4/MCF) as the average price of gas at the New York City Gate in January 2000 rose to the equivalent of 90 cents/gallon (\$6.30/MCF). On the same day highlighted as the New York Harbor spot distillate price peak in the previous chart, January 21, the New York City Gate price was also at an extreme \$1.40/gallon equivalent level (nearly \$10/MCF) while the Henry Hub price was more or less stable.⁶ This surge in local spot gas prices pulled up local distillate prices as interruptible gas customers searched for available alternative supplies. At the beginning of the 2000-2001 heating season, Henry Hub prices moved up while New York City Gate prices moved up even more, reaching a peak of \$2/gallon equivalent (nearly \$14/MCF). As was the case earlier in 2000, sharply rising local spot gas prices pulled up local spot distillate prices.



As shown in the inset table, spot natural gas prices so far in November are running well ahead of year-earlier levels with differences amounting to 22 cents/gallon equivalent. The increases are larger than the 17 cents/gallon increase for No. 2 oil. The overall upward movement in spot gas prices over the past year, and the adjustment lags built into firm contract prices virtually assure that residential gas customers will face further price increases over the coming months---unlike the case of heating oil customers who experience more rapid pass-throughs of spot-market developments.

Gas Market Issues

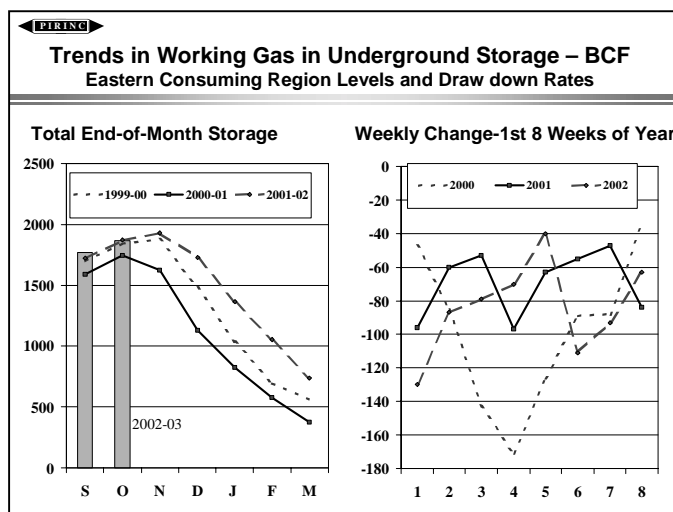
The signals are mixed as to the potential for new gas market stresses that could provoke a new sharp escalation in spot gas prices, especially in the Northeast, and in turn push interruptible customers into the local distillate market. One particular concern is the state of US natural gas

⁶ A few days later, on January 26th the NYC price moved even higher, above \$11/MCF while the Henry Hub price remained well below \$3.

production. In the first half of the year, production was about 0.5% below its level in the first half of 2001. The decline has since become more pronounced with the Department of Energy projecting a second-half 2002 decline of 2.2% versus the same period last year, a projection that may be conservative.⁷ The fall-off in domestic production makes the current favorable gas storage position look less positive since, other things equal, draw-downs would have to be greater to compensate. The left panel of the chart below summarizes end-of-month trends in Eastern Consuming Region underground working gas in storage over the past three September-March periods and for September to date of this year.

As of end-October working gas in storage in the East this season is comparable to levels at end-October 1999 and last year--- and above the top of the end-October range for the past five years. The amount in storage is about 6% above the amount in storage in end-October 2000 when worries about gas supplies for the winter were particularly acute. The end-October 2000 level of East Consuming Region working gas storage was the lowest of any of the preceding five years.

These stocks of working gas are drawn down over the course of the heating season. From end-October to end-March the decline over the past 3 seasons ranged from 60% in the warm 2001-2002 winter to nearly 80%, and from a lower starting point, in the much colder 2000-2001 season. While the monthly starting point and draw down profile for 200-2001 help explain the high natural gas and distillate prices prevailing in the early months of that season, there is no obvious explanation in the monthly trends for the price spikes in local spot gas and distillate prices that occurred in early 2000. At end-December 1999 and end-January 2000, indeed for all the winter 1999-2000 months, gas in storage was well above the levels of 2000-2001. For insight into the early 2000 price developments, it is necessary to look at the draw down patterns in greater detail. The panel on the right shows draw downs on a weekly basis for the first 8 weeks of 2000, 2001, and 2002. In the third through fifth weeks of 2000, draw downs reached exceptionally high levels. In the fourth, peak draw down week of 2000, the amount, 171 BCF, was about 75% higher than in 2001 and nearly 1½ times the amount during the same week this year. The exceptional stresses to the local gas supply system, as indicated by these draw down rates provoked the price spikes and supply-cutoffs to interruptible gas customers, and spilled over to the local distillate market as these customers suddenly bid for immediately available supply.

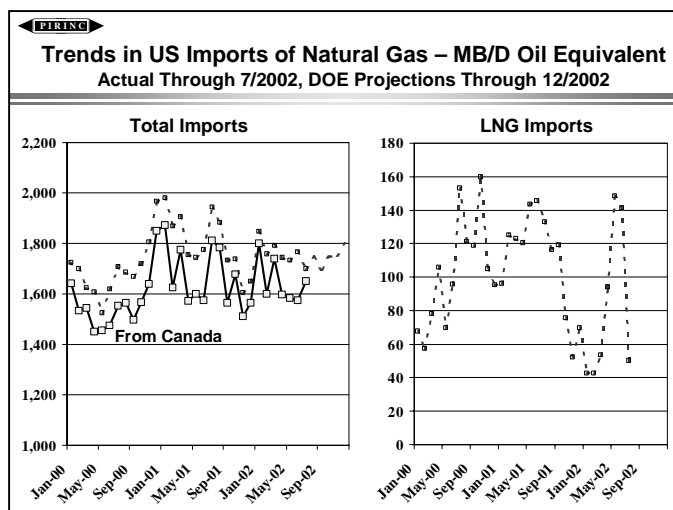


⁷ Based on projections in the US Department of Energy, Energy Information Administration, **Winter Fuels Outlook: 2002-2003**.

The Role of Imports

Apart from inventories and local supplies, imports play significant but differing roles in meeting demands for both gas and oil, including the focus of this report, winter distillate. Overall, gas imports amount to about 15% of US demand, a far lower proportion than the 55% share of total US oil demand met by (net) imports.

The chart below summarizes trends in imports of natural gas, measured in terms of MB/D of oil equivalent. The right panel shows total imports by month and imports from Canada. Through July of this year, the latest month for estimated actual data, imports were about 5% below year-earlier levels. For the balance of this year, the Department of Energy Winter Fuels Outlook projects imports to be up about 1.5% versus the same period last year---but the projected decline in domestic production versus last year for the same period is over 5 times larger than the anticipated gain in imports. Canada is by far the largest source of gas imports, accounting for 94% of the total in 2001. In the first seven months of this year, imports from Canada, all delivered by pipeline, have been down by about 2.5% versus the first seven months of 2001. As the panel indicates, there have been surges in imports, notably in late 2000 and early 2001 when US gas prices were at record levels, and the question arises whether in the case of new gas price spikes additional imports beyond those currently forecast would again be available. In the case of Canada, some doubts are in order, given recent production trends in that country. Actual production for the first seven months of the year is in total about in line with year-earlier levels but the most recent months show declines. Lower production means greater difficulties in attracting additional imports from Canada during their own seasonal demand peak.



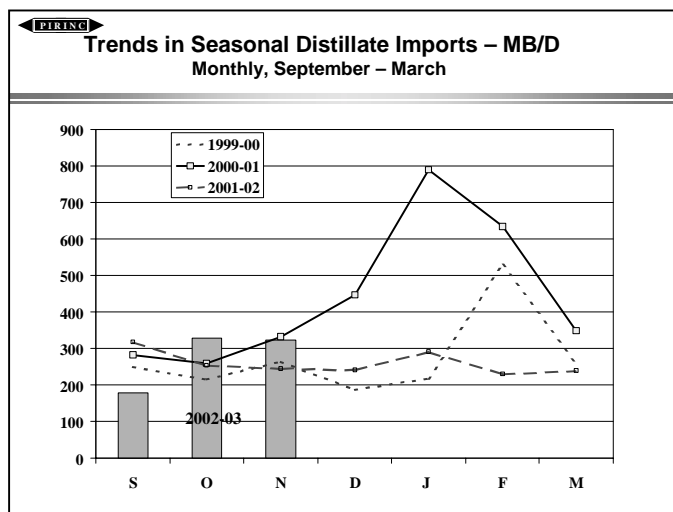
The right panel shows the trend for LNG imports, which currently amount to less than 5% of total gas imports and less than 1% of total demand. However the Northeast has, at Everett, Massachusetts one of the country's three operating LNG import terminals and an additional terminal at Cove Point, Maryland in the process of being activated and currently providing some storage services.⁸ While making only a modest addition to total national supply, LNG is more important as a source of local supply, deliverable by truckload, for peak-shaving. Not surprisingly, Massachusetts alone accounts for about 40% of all so-called "satellite" storage

⁸ The other two operating terminals are at Lake Charles, Louisiana, and Elba Island, Georgia.

facilities in the country.⁹ Expansion of LNG import capability and local storage would enhance ability to meet peak demands. There are however, two important qualifications. First, receipts and send-outs of gas from LNG terminals are typically scheduled well in advance. Although spot sales are growing, there is still far less flexibility to shop the market to meet sudden local needs than in the case of oil. Second, the events of 9/11 have intensified pre-existing public concerns about the safety of LNG operations. Indeed, operations at the Everett facility, located off of Boston's inner harbor, were suspended for seven weeks after 9/11 because of worries about a potential terrorist attack, particularly on LNG tankers that pass through the harbor. These intensified concerns are likely to complicate and delay the expansion of LNG import capability across the country.

Distillate imports are different. Overall, imports last year averaged about 350 MB/D, only about 9% of US distillate consumption. Most of the imports, nearly 90%, came to the East Coast (PADD 1). Imports, however, play a critical role in responding to, and correcting, unanticipated winter price spikes after they occur---and in heading off anticipated price spikes before they occur. The chart below shows imports by month for September through March for the past three heating seasons and so far this season.

At the beginning of the heating season, imports tend to be relatively low. In September, the month preceding the official start of the season, and its first month, October, imports for the four years shown were at or below about 300 MB/D. In late 2000 and early 2001, in response to early high prices and gas supply concerns, imports moved up sharply, reaching a peak of nearly 800 MB/D in January (and within the month, a peak of nearly 1 MMB/D in the first week). The rise in imports brought spot distillate prices, and in particular price differentials versus crude, down from their fall peaks. In the 1999-2000 season, imports remained relatively flat into January, when the mid-month unanticipated cold snap and spot price surges led to a dramatic increase in imports. Between January and February, imports more than doubled---from about 220 MB/D to 530.¹⁰ So far this season, imports have moved up from a September level below 200 MB/D to October and



⁹ A satellite facility is an LNG storage facility without its own liquifaction capability that receives LNG by truck. For the most recent discussion of the US LNG industry, see the report by the US Department of Energy, Energy Information Administration, **U.S. LNG Markets and Uses**, November 2002.

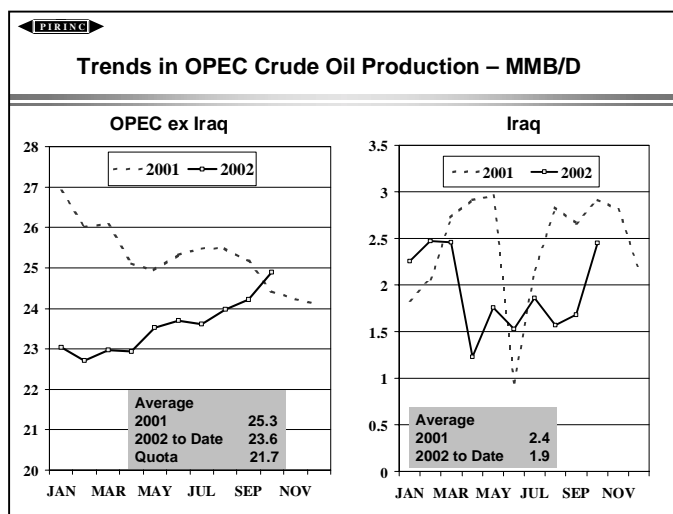
¹⁰ At their peak in the week ending February 25th, imports reached nearly 720 MB/D.

November (1st half) levels slightly above 300 MB/D. The November level is in line with the elevated volumes for November 2000.¹¹

World Oil Markets and the Iraqi Wild Card

Over the past year the world oil market has undergone dramatic shifts in perception and reality. From weakness in the aftermath of 9/11, the market tightened over most of this year. In the past few weeks however, the market has once again weakened. The dominant influences on the market have been the production decisions by individual OPEC countries and perceptions about the prospects and consequences of war with Iraq. The chart below shows recent trends in OPEC crude production, split between OPEC apart from Iraq, and production by that country.

In January 2001, the OPEC countries apart from Iraq implemented the first of a series of reductions in their official quotas that by September, when the last reduction for the year went into effect amounted to 3.5 MMB/D versus the official quota in effect at the end of 2000. As the left panel shows, actual production by the group fell substantially over the course of the year with December 2001 production nearly 3 MMB/D below its January level--- although above the official 23.2 MMB/D quota in effect that month by about 1 MMB/D. In January 2001, another 1.5 MMB/D reduction in the quota officially came into effect. But this year, actual production has been moving up. Latest estimates for October show production up nearly 2 MMB/D versus January and for the first time this year matching, indeed slightly ahead of year-earlier levels. October production is also more than 3 MMB/D above the official quota.



The left panel shows, on smaller scale, the far more erratic production profile for Iraq. Production continues to be heavily influenced by internal and external political decisions. In 2001, UN-monitored (but not the illegal) exports were suspended by Iraq for four weeks beginning in mid-June in a dispute over the renewal of the sanctions regime. From April 8th

¹¹ This report has not discussed the 2 million barrel Northeast Home Heating Oil Reserve established in 2000. It should be kept in mind that the Reserve is small relative to peak winter import levels, 2-3 days of weekly import peaks reached in February 2000 or January 2001. The US Strategic Petroleum Reserve on the other hand holds nearly 600 million barrels of crude, or nearly 55 days of US imports. There is an issue as to whether on balance the Heating Oil Reserve at its present level actually reduces price spike risks or could conceivably aggravate them by interfering with incentives to “shop the market” to meet sudden surges in demand. For a discussion of this issue, see the PIRINC note, **A Regional Heating Oil Reserve: A “Solution” With Its Own Problems**, released in March 2000. This note, as well as other reports regarding the Reserve issued in December 2000 can be accessed at the PIRINC website: www.pirinc.org.

until May 9th of this year, Iraq suspended its monitored exports as a gesture of support for the Palestinians. Setting aside the temporary export suspensions, for much of this year, production, has been significantly below year earlier levels, with differences reflected almost entirely in lower levels of monitored exports. Late last year, in an attempt to clamp down on illegal surcharges over and above UN-approved prices received by Iraq, the UN-determined pricing formula was modified. Prices were to be determined retroactively, with the intention of setting them high enough relative to market value to minimize any scope for surcharges. The uncertainties for buyers introduced by retroactive pricing as it has been implemented---and the continuing insistence on surcharges by Iraq---have been blamed for the fall-off in Iraqi production and exports.

On September 12th President Bush delivered a speech to the UN General Assembly that made it clear that action would be taken, by force if necessary, to bring Iraq into compliance with past UN resolutions, especially those related to weapons of mass destruction. While the speech added further to growing market concerns about a potential war with Iraq, within a week after the speech, the Iraqi government took the first steps to attempt to deflect or at least postpone the threat. The first was an announcement inviting arms inspectors to return---and along the same lines, acceptance of the recently passed UN Security Council Resolution incorporating the terms for their return. At the same time, the Iraqi government also announced the ending of surcharges, thereby removing a major obstacle to sales. Although retroactive pricing is continuing, elimination of the surcharges contributed to an increase in production and exports in October.

The continuing growth in production by OPEC ex Iraq and the latest gains in Iraq come at a time when oil supplies in the rest of the world are growing and estimates of near-term economic prospects are becoming more subdued.¹² These developments all support lower prices. Concern over the risks of imminent war with Iraq had been providing some modest offsetting upward pressure. But with Iraq acting to avoid any immediate grounds for military confrontation, near-term risks have receded and this prop to prices has weakened. The risk of military conflict remains although even a postponement reduces the potential upside possibilities for prices---particularly if it extends beyond the world's peak winter oil requirements. In this regard, it should be kept in mind that nearly all the oil needed from the Persian Gulf for the winter would be on the water by early February.

¹² The latest International Energy Agency **Monthly Oil Market Report**, released November 12th estimates October non-OPEC oil production up by about 1 MMB/D versus October 2001.