

SPARK

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Even without the damage caused by an ugly hurricane season, natural gas infrastructure in the U.S. needs upgrading. But Katrina and Rita made that even more obvious. We are facing very high fuel rates in the U.S. this winter. So high in fact, that state commissions and federal agencies have been scrambling to implement added financial help for low-income consumers. But the nation must address the lack of gas infrastructure and what that means in the future for gas prices. With that in mind, FERC held a conference in October to examine the complex issues involving infrastructure and the related effect on prices. FERC is offering regulatory help, but more must be done.

Lori A. Burkhardt
Editor

NATURAL GAS INFRASTRUCTURE

Gulf Trauma & The Price Effect

By Lori A. Burkhardt

After a vicious hurricane season technically ending November 15, it is clear that natural gas infrastructure in the Gulf region took some nasty hits. Since 20% of our nation's natural gas supply comes from that area, and also due to the corresponding ripple effect from such losses, the Federal Energy Regulatory Commission (FERC) on October 12 held a conference to investigate. Specifically, it examined the status of natural gas infrastructure, as well as how that relates to expected higher natural gas prices this winter, and how to prevent prices from going even higher in a market it says now is primed for manipulation. [Re State of the Natural Gas Infrastructure Conference, Docket No. AD05-14-000, Oct. 12, 2005 (F.E.R.C.)]

The Energy Policy Act of 2005 (EPACT) gives FERC new authority to issue rules to prevent market manipulation and to ensure price transparency. It plans to use that authority to enact rules to strengthen its oversight. "Tight natural gas supplies could create temptations for improper behavior by some market participants," warns FERC chairman Joseph T. Kelliher. He adds FERC will be monitoring and if necessary, investigating and penalizing any market manipulation.

It is a fact that consumers will see higher natural gas prices this winter, as well as higher prices for electricity generated by natural gas. Kelliher hones in on two questions: "How much higher, and whether such price increases reflect only the »

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operation of supply and demand?" And while the hurricanes could not have come at a worse time, as tight supplies and increased demand already had raised natural gas prices throughout the summer, FERC says it stands ready to act quickly on emergency filings to authorize efficient use of existing gas infrastructure.

That authority to allow changes in movement of gas without in-depth regulatory oversight, is needed because after hurricanes Rita and Katrina struck, 26 gas-processing facilities were shut down with 20 still out of service at the time of the October conference. In combination with damage to other infrastructure, that creates long-term bottlenecks between production areas and interstate pipelines.

But there is help available. For example, FERC on October 19 received a request from Discovery Gas Transmission for an emergency exemption to transport gas around the damaged Venice processing plant at Discovery's non-jurisdictional Larousse, Louisiana processing plant. That request was granted by the end of the day.

Commissioner Suedeen Kelly points out the importance of informing the public about infrastructure repair in the Gulf of Mexico, because lack of knowledge can lead to speculation. That can drive up prices price unnecessarily, she says, or drive down demand response inappropriately. Commissioner Nora Brownell notes even without the hurricanes the problem had existed that customers need more gas infrastructure, increased supply and more storage. She also takes note of the world-wide competition for supplies due to the growing global gas market and says she worries when pundits turn to price



caps and windfall profits taxes, which are the very things she believes would halt investment and development.

Why Higher Gas Prices?

All the blame for increased natural gas prices cannot be placed on the hurricanes. They simply helped along an already perfect storm that was brewing in the gas industry. Specifically, what the hurricanes did was exacerbate already tight supply and demand conditions, which increased fuel prices in the U.S. further, after an already steady upward pressure on prices all summer. The price increases pre-hurricane are attributed to the combined effects of increased oil prices and increased electric generator use of natural gas, caused

by years of investment in gas-fired generation, plus a warmer than average summer.

A recent FERC staff report bears this out. It says that measured in national average cooling degree days, the three core summer months of June, July and August in 2005 were 26% hotter than in 2004, which had more of an average summer. The report notes that in early April 2005, next-day natural gas prices delivered at the Henry Hub in Louisiana averaged \$7.40 per MmBtu. After the hurricanes, in late September, prices at Henry Hub or the alternate location used to report prices when the hub was out of service due to hurricane damage, almost doubled to \$14 per MmBtu range, or about *(Cont. on p. 7)*

FORTNIGHTLY'S

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Public Utilities Reports, Inc.
8229 Boone Blvd., Suite 400
Vienna, VA 22182
Phone: 703-847-7720
800-368-5001
Fax: 703-847-0683
<http://www.pur.com>

Bruce Radford, Publisher
radford@pur.com
Lori A. Burkhart, Editor
lab@pur.com
Alex Stephen, Designer
astephen@pur.com

E-mailed to all
Fortnightly subscribers.
Call: 800-368-5001

For e-mail address changes
or other information, contact
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NATURAL GAS PRICING

Do Oil Prices Still Matter?

By Stephen P. A. Brown

For a number of years, natural gas and refined petroleum products have been used as close substitutes in U.S. industry and electric power generation. Industry and electric power generators have switched back and forth between natural gas and residual fuel oil, preferring to use whichever energy source was less expensive. Consequently, movements of natural gas prices in the United States have generally tracked those of crude oil. Most often, crude oil prices are shaped by world oil market conditions, and natural gas prices adjust to oil prices.

Over the past 10 years, however, the number of facilities able to switch between natural gas and residual fuel oil has declined. And in the most recent five years, natural gas prices seemed to move somewhat independently of oil prices. Natural gas prices rose above what was seen as their historical relationship with crude oil prices in 2000, 2002 and 2003. In the first half of 2005, natural gas prices seemed to fall below this historical relationship.

Consequently, many may wonder whether oil price movements still shape those of natural gas and whether the old rules of thumb for relating natural gas prices to those of crude are still useful. The analysis presented here shows oil prices do still matter for natural gas prices, but the old rules of thumb relating natural gas prices to those for oil are of limited usefulness.

Two Simple Rules of Thumb

One commonly used rule of thumb relating natural gas prices to crude oil is the 10-to-1 rule, in which the price of natural gas is one-tenth the crude oil price:

$$P_{NG} = .1 \times P_{WTI}$$

where PNG is the Henry Hub price of natural gas in dollars per million Btu and PWTI is the price of West Texas Intermediate (WTI) crude oil in dollars per barrel. Under this rule of thumb, a WTI price of \$20 per barrel would mean a natural gas price of \$2 per million Btu at Henry Hub, and \$50 oil would mean \$5 natural gas.

Some energy analysts have argued that natural gas really ought to trade at the same price per million Btu as crude oil. Because a barrel of WTI contains 5.825 million Btu, those analysts have used a 6-to-1 rule, in which the natural gas price ought to be roughly one-sixth the crude oil price:

$$P_{NG} = .1667 \times P_{WTI}$$

Under this rule of thumb, a WTI price of \$20 per barrel would mean a natural gas price of \$3.33 per million Btu at Henry Hub, and \$50 oil would

mean \$8.33 natural gas.

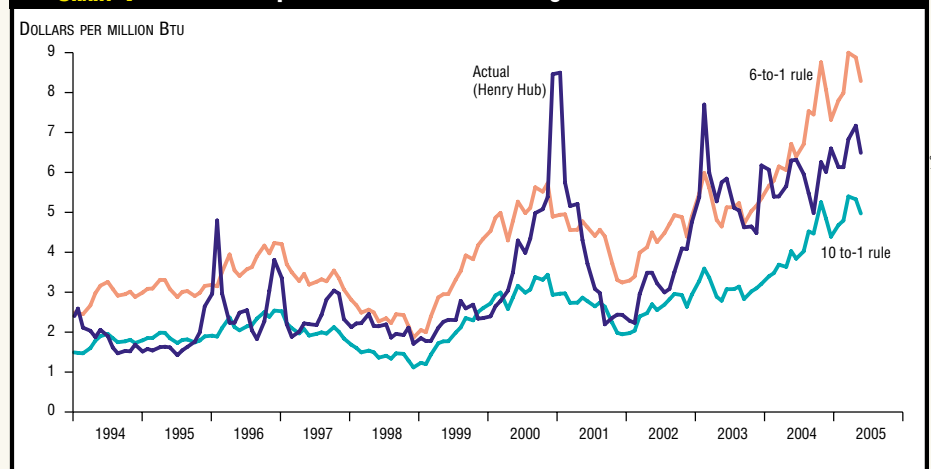
When used to assess the relationship between U.S. natural gas prices and WTI, neither the 10-to-1 nor the 6-to-1 rule of thumb seems to perform well (Chart 1). The 10-to-1 rule consistently underforecasts natural gas prices, and the 6-to-1 rule generally overforecasts them. Moreover, as oil and natural gas prices have risen, they seem to be making a transition from the 10-to-1 rule to the 6-to-1 rule.

Burner-Tip Parity

A few analysts have interpreted the apparent transition from the 10-to-1 rule to the 6-to-1 rule as indicative of improving market conditions for natural gas. In fact, the seeming transition in pricing may reflect a more complex relationship between natural gas and oil prices. The competition between residual fuel oil and natural gas occurs where they are used—at the burner tip. Therefore, natural gas pricing should yield parity at the burner tip, and prices at the trading hubs should adjust to whatever is necessary to achieve burner-tip parity. In fact, residual fuel oil sells for less than WTI, and natural gas costs more to move to end users than residual fuel oil.

If we explicitly consider the historical relationship between prices »

CHART 1 Actual and Implied Natural Gas Prices Using 10-to-1 and 6-to-1 Rules of Thumb



SOURCES: New York Mercantile Exchange; author's calculations

for residual fuel oil and WTI, convert to million Btu and subtract the higher costs of transporting natural gas to market, we obtain a rule of thumb based on burner-tip parity:

$$P_{NG} = -.5 + .1511 \times P_{WTI}$$

Under this rule, a \$20 per barrel price for WTI would mean a natural gas price of \$2.52 per million Btu at Henry Hub, and \$50 WTI would mean \$7.06 natural gas. For these prices, a 150 percent increase in the oil price would mean a 180 percent increase in the natural gas price.

Regression analysis using monthly data yields

$$P_{NG} = -.4744 + .1543 \times P_{WTI}$$

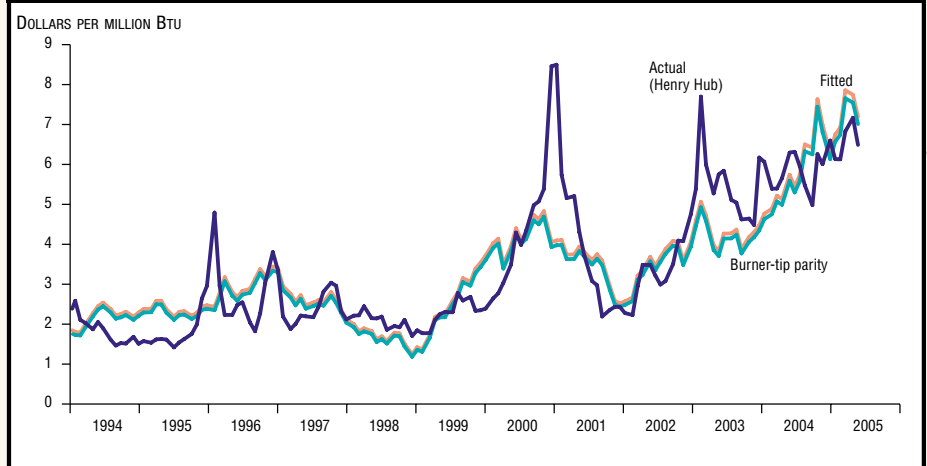
With the relationship obtained through regression analysis, a \$20 per barrel price for WTI would imply a natural gas price of \$2.61 per million Btu at Henry Hub, and \$50 WTI would mean \$7.24 natural gas. For these prices, a 150 percent increase in the oil price would mean a 177 percent increase in the natural gas price.

Fitted values from the regression analysis and those obtained through the burner-tip parity rule show that U.S. natural gas prices generally track those of WTI (Chart 2). Nonetheless, there appear to be a number of occasions when natural gas prices have decoupled from those of crude oil. In particular, natural gas prices seem to have pulled away from oil prices in 2000, 2002 and 2003 and then fallen behind in 2005.

Seasonality and Storage

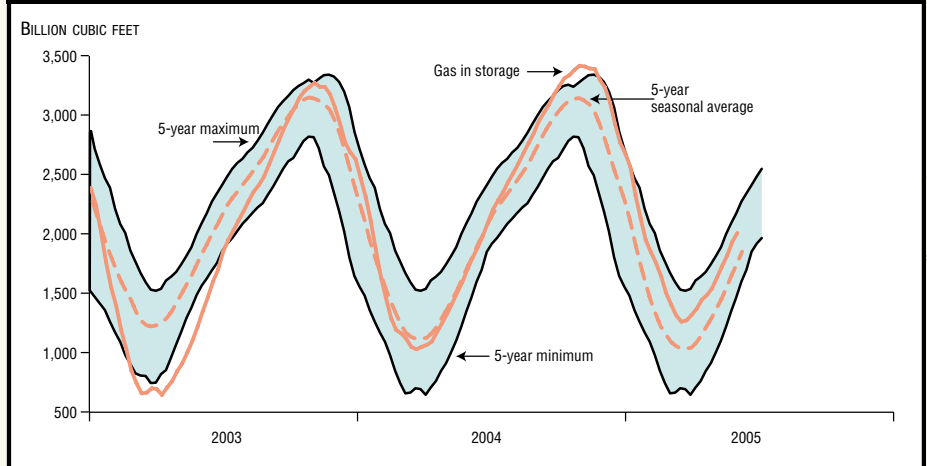
Seasonality and the natural gas in storage also play a prominent role in natural gas prices. Because natural gas consumption is seasonal but production is not, natural gas inventories are built during the summer for use in the winter (Chart 3). This seasonality leads to higher winter prices and lower summer

CHART 2 Actual and Implied Natural Gas Prices Using Burner-Tip Parity and Fitted Values



SOURCE: New York Mercantile Exchange; authors' calculations.

CHART 3 NATURAL GAS IN STORAGE ABOVE SEASONAL AVERAGE



SOURCE: U.S. Information Administration; Department of Energy.

prices. In addition, inventories above the seasonal average depress prices, and inventories below the seasonal average boost prices. Taking these additional factors into account in a regression analysis using weekly data yields

$$P_{NG} = -.3345 + WSF - .0265 \times ST + .1503 \times P_{WTI}$$

where WSF is a weekly seasonal addition to, or subtraction from, the price of natural gas, and ST is the percent deviation of natural gas in storage from the weekly seasonal average for the previous five years. Seasonal factors affect the price of natural gas considerably—

adding 94 cents per million Btu in the last week of the year and subtracting 55 cents per million Btu in the 38th week of the year (Table 1). Storage 10 percent below the weekly seasonal average adds 26 cents per million Btu.

These weekly seasonal factors and storage conditions allow for considerable variation in the price of natural gas for any given oil price. With natural gas 10 percent above the normal seasonal average, a \$20 per barrel price for WTI would imply a natural gas price of \$1.86 per million Btu at Henry Hub in the 38th week of the year. With natural gas 10 percent below the normal seasonal average, a \$20 per barrel price >>

TABLE 1 ESTIMATED WEEKLY SEASONAL FACTORS

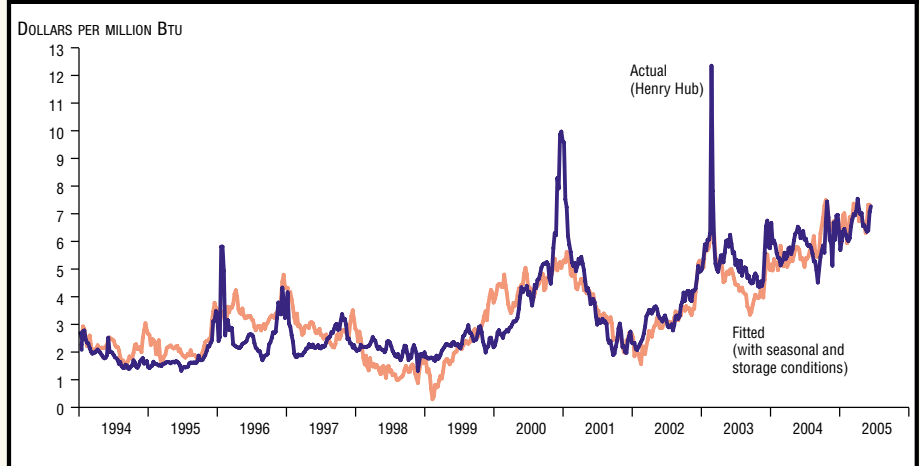
Week	Factor	Week	Factor
1	.7755	27	-.0192
2	.6901	28	-.1600
3	.6833	29	-.1948
4	.3790	30	-.2917
5	.6603	31	-.3226
6	.6289	32	-.2775
7	.4511	33	-.3579
8	.0766	34	-.4062
9	.0660	35	-.4215
10	.4768	36	-.5056
11	.0605	37	-.5435
12	-.1538	38	-.5510
13	-.0649	39	-.5060
14	-.0977	40	-.4112
15	-.0431	41	-.3920
16	.0545	42	-.3888
17	.0118	43	-.2843
18	-.0269	44	-.1322
19	-.0579	45	-.0257
20	-.1216	46	-.0460
21	-.0935	47	-.0475
22	-.0356	48	-.0252
23	-.0233	49	-.0833
24	.0060	50	.4254
25	-.0223	51	.7122
26	.0335	52	.9427

NOTE: By construction, the weekly seasonal factors have a zero mean.

for WTI would imply a natural gas price of \$3.88 per million Btu at Henry Hub in the last week of the year. Comparable figures for \$50 WTI are \$6.36 and \$8.39 per million Btu, respectively.

With variations in natural gas storage of ± 10 percent, a 150 percent gain in the crude oil price could result in the

CHART 4 ACTUAL AND IMPLIED NATURAL GAS PRICES INCORPORATING SEASONAL FACTORS AND STORAGE CONDITIONS



SOURCES: New York Mercantile Exchange; author's calculations.

natural gas price rising by less than 65 percent or more than 350 percent. It's no wonder that analysis using rules of thumb to price natural gas suggests that the relationship between natural gas and crude oil prices has changed. In contrast, fitted values from the regression analysis with weekly seasonal factors and storage conditions taken into account show that U.S. natural gas prices track those of WTI quite well (Chart 4).

A Relatively Stable and Complex Relationship

A number of common rules of thumb imply that the relationship between U.S. natural gas and crude oil prices has changed or that oil prices no longer affect natural gas prices. This view has been bolstered by the observation that

industrial and electric power-generation facilities are less able to switch between natural gas and residual fuel oil than they were in the past. When we take into account the normal seasonal variation in natural gas prices and the amount of natural gas in storage, however, we find compelling evidence that U.S. natural gas prices continue to be related to those for crude oil. The relationship is relatively stable and complex. ■

Stephen P. A. Brown is director of energy economics and microeconomic policy analysis in the Research Department of the Federal Reserve Bank of Dallas.

Note: The author thanks Mike Cox for helpful conversations and Raghav Virmani for able assistance.



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LETTER TO THE EDITOR

To the Editor:

I read your article "Reactors are Back" in the #22 October, 2005 Spark.

Please allow me to make two comments on your article and the related article on carbon emissions.

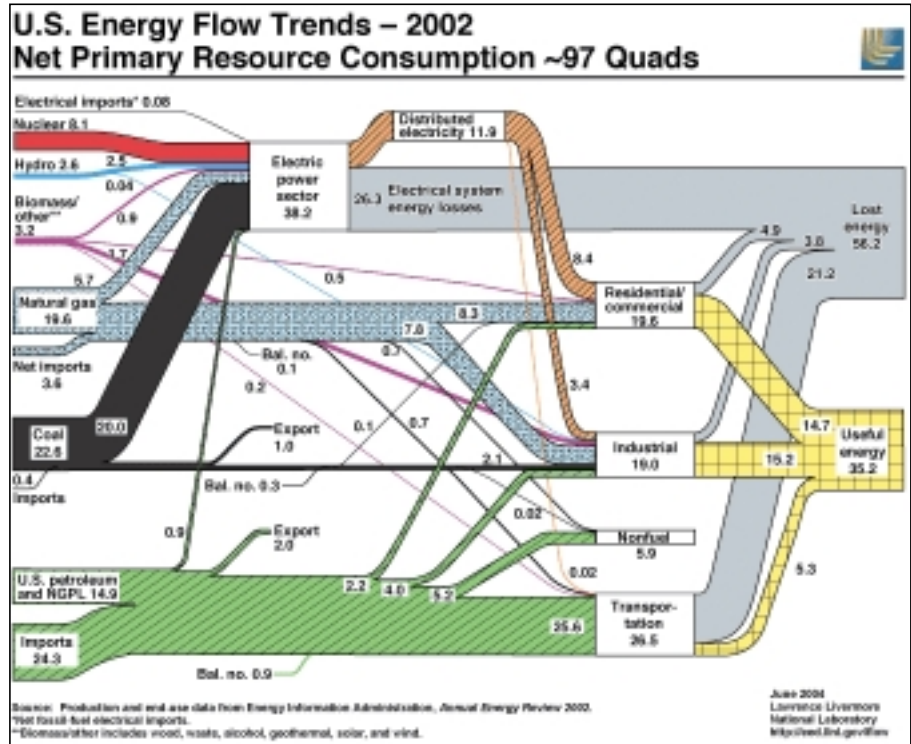
1. To prepare for an interview at a local radio station (KYGT) in Clear Creek County Colorado, I analyzed the U.S. Energy Flow Trends for 2002-Quads, Net Primary Resource Consumption, a Flow Chart prepared by Lawrence Livermore National Laboratory, June, 2004. LLNL used data reported in the Energy Information Administration, Annual Energy Review 2002.

Based on my analysis, in 2002, nuclear supplied 21.22% of the energy inputs used to generate electricity, but only 8.15% of the total energy used in the U.S. in 2002.

I have attached my work and the LLNL 2002 Energy Flow Chart.

2. Under the Kyoto Protocol each signatory country that must control emissions in the first period can set its own emissions architecture (*i.e.* cap-and-trade; cap and command, a carbon tax). Under the protocol, the EU has set itself up as an emissions bubble with the cap-and-trade system used. Under the EU ETS, each emitting plant is given a cap for carbon emissions. Nuclear plants (like wind and solar) do not emit carbon and are not given any emission units. I predict that in the EU and, especially in the U.S., nuclear plants would do much better under a carbon tax emissions architecture.

Best regards,
 Michael Stavy
 Consulting Energy Economist
 michael@michaelstavy.com



Sources and Uses of Energy-2002			
10/28/05			
US Primary energy sources			
	input		electric power sector
			input
Net imports-electricity	0.08	0.08%	0.08
nuclear	8.1	8.15%	8.1
hydro	2.6	2.62%	2.5
biomass, wind solar	3.2	3.22%	0.9
natural gas	19.6	19.72%	0.00%
net imports-NG	3.6	3.62%	0.00%
Total NG supplied to US		23.2	100.00%
			5.7
coal	22.6	22.74%	0.00%
coal imports	0.4	0.40%	0.00%
Total coal supplied to US		23	99.14%
			20
us petroleum	14.9	14.99%	0.00%
petroleum imports	24.3	24.45%	0.00%
Total petro supplied to US		39.2	100.00%
			0.9
	99.38	100.00%	38.2
			100.00%

My Primary Sources: US Energy Flow Trends-2002 Net Primary Resource Consumption ~97 Quads 6/04			
Lawrence Livermore National Laboratory			
Lawrence Livermore National Laboratory's Primary Source EIA, Annual Energy Review, 2002			
			electric power sector
			output
			output%
			11.9
			31.15%
			26.3
			68.85%
			38.2
			100.00%

Michael Stavy Consulting Energy Economist 432 N Clark St., Suite 204 Chicago, IL 60610 312.832.1631 303-568.2501 michael@michaelstavy.com www.michaelstavy.com

Natural Gas Infrastructure

(Continued from p. 2)

a 44% increase. But it is important to note that prices already had increased by one third from that \$7.40 level in early April to almost \$10 per MmBtu before any hurricane hit. *Gulf Coast Storms Exacerbate Tight Natural Gas Supplies: Already Higher Prices Driven Higher, Staff Report, Oct. 12, 2005 (F.E.R.C.).*

That price increase to \$10/MmBtu prior to any hurricane damage, resulted in part from an overall 6% electric generation increase for June and July from 2004. And while generation using almost all fuel types increased, generation using natural gas increased the most, by 21% for those two months over 2004 levels. It also is important to note that domestic natural gas production had fallen by one percent between the summer of 2003 and summer of 2005. The U.S. further imported 13% less liquefied natural gas (LNG) during the period from April 2005 through September 2005 than it did in 2004. During the August prior to Katrina, U.S. LNG imports were almost 600 MMcfd lower than for the comparable period in 2004. That is because the U.S. competes with other nations for spot LNG shipments, and quite often the higher LNG prices paid in other countries draws away spot supplies. The U.S. does in fact, compete heavily with South Korea, England and Spain for that LNG spot capacity.

Hotter summer weather, gas-fired generation overbuild, falling domestic gas production, and lower LNG imports results in increased demand for limited supply. The FERC staff report says the closest to real-time measure of the active balance of supply and demand is natural gas inventories in storage. But while surplus natural gas storage inventories fell throughout the summer of 2005, the good news is that current storage inventories remain

above five-year averages.

"While not resulting in immediate scarcity, it appears clear that the strain on the system of a hot summer did have an effect on natural gas prices as buyers and sellers took into account tighter conditions for entering the winter than in the past couple of years," says Stephen Harvey, of FERC's Office of Market Oversight and Investigations (OMOI) at the Oct. 12 conference. He explains that mere anticipation of tightness of supply affected prices even before the hurricanes struck. That anticipation began August 2, when the National Oceanic and Atmospheric Administration (NOAA) increased its already above-normal forecast for the hurricane season.

Hurricane Katrina caused an immediate loss of 8.3 Bcfd of gas production, but about 66% of Gulf of Mexico production was back on line before Rita struck. Rita increased production outages greatly and recovery has been slower. Both hurricanes cut natural gas production while damaging pipelines, gas processing infrastructure and electric power facilities along with oil production and refineries.

It is important to keep in mind the relationship between oil and natural gas production, as much natural gas production is captured in association with oil. Also, there exists a so-called crude sympathy effect, whereby increases in crude oil prices exacerbate natural gas price increases. (See *Natural Gas Pricing: Do Oil Prices Still Matter?*, p. 3) The effects on oil and natural gas markets are to both increase prices and price volatility while reducing market activity.

Now, the nation is at the start of a winter-heating season where heating-season demand and anticipation of that demand are likely to drive natural gas prices higher. Production prices now sit

above \$13.50 per MmBtu, which is about two and one-half times higher than the same time last year. Rising fuel prices, especially for natural gas have contributed also to higher electricity prices.

The Hunt For Manipulation

While it can be understood to a certain extent that those most affected by high natural gas prices want to cry "foul" and blame the industry actors for bad behavior in driving prices up, a degree of caution is needed.

Disruptions in supplies due to infrastructure damage caused by the hurricanes are important to understand in terms of looking for marketplace manipulation. That involves in part, now looking at price relationships in the Gulf of Mexico through a different lens, as the relationships that were valid in the past and were used to find evidence of manipulation, are not necessarily in existence any more. The infrastructure and related histories simply were blown away.

The concept is explained in an exchange at the conference between commissioner Nora Brownell and OMOI's Harvey.

Harvey: The more we can understand about the way the facilities work, the better we can kind of keep up with that, but a lot of what we've understood in that past about those relationships, doesn't really relate now, because the facilities have reconfigured themselves, effectively.

Brownell: So, conceivably, under other sets of circumstances, what might look like potential manipulation of the marketplace or price misreporting, is simply that we're in a new area that we really don't have much history with; is that right?

Harvey: I would absolutely agree, we have to be very, very careful in thinking about manipulation, that we're not just »

making analogies to times that don't really relate.

Commissioner Suedeen Kelly further asks Harvey whether the staff report concludes that to date there has been no evidence of market manipulation, but instead that the rising prices simply reflect market fundamentals. But Harvey could not agree "exactly" on that point. He says while the report does show that the prices are not unreasonable in respect to the combination of fundamentals stemming from extraordinary circumstances, that the report does not say no manipulation is occurring.

"These are conditions where people can do manipulative things," Harvey warns, but at the same time pointing out that OMOI will be looking for it. He explains that FERC staff and the Commodity Futures Trading Commission (CFTC) staff will be analyzing the market every day and if there is found a dysfunction not explainable by fundamentals, the result could be an investigation. But he again emphasizes the difficulties in reaching that point, as some historical relationships that illuminate misdeeds are unavailable for comparison due to infrastructure damage.

Meanwhile, damage assessment of oil and gas infrastructure in the Gulf continues. David Halphen, v.p. of regulatory affairs and administration for Enbridge Offshore Gas Transmission, which transports roughly half of the natural gas produced from the deep-water Gulf, explains why recovery efforts are taking so long. "Floating drill rigs that were anchored to ride out the storm, are shoved and pushed along like toys in a bathtub," he describes. "Anchors similar in size and weight to an M-2 tank are drug along the sea floor, sometimes snagging on the oil and gas pipelines."

With that kind of damage, the speed with which the shut-in production in the Gulf comes on line will have a significant impact on the upcoming winter deliveries and prices of natural gas. The

U.S. Mineral Management Service (MMS) estimates that over 3,500 of the 4,000 offshore drilling platforms were in the paths of the hurricanes. Almost all gas pipelines and processing facilities in south Louisiana were impacted, shutting in some 64% of Gulf production.

Saving The Day

The natural gas industry is asking FERC for regulatory help. FERC already made it easier to re-route gas supplies on an emergency basis in order to get gas to customers, and it already has waived some electronic bulletin board (EBB) posting requirements. Other help requested includes a myriad list: market-based rate authority, enlarged eminent domain authority, gas-storage flexibility, waiver of shipper-must-have-title rules, and more. Some requests, such as for use of long-term gas contracts to reduce price volatility, are aimed more at state regulatory commissions.

Martha Wyrsh, president and CEO of Duke Energy Gas Transmission, points out at the conference that with gas prices near \$14, that the market already had quantified the anxiety felt over ability to meet demand to the extent the supply chain was impacted by hurricanes. But she explains one way her company plans to deal with it.

Duke's Texas Eastern pipeline wants to be very proactive in monitoring and managing its system imbalances throughout the winter to prevent the loss of line pack in order to ensure the company can make market deliveries. To maintain that balance, Wyrsh says Texas Eastern will issue operational flow orders (OFOs) as needed, but points out the current OFO penalty is capped at \$25. That penalty is not high enough, she believes, in this period of high prices and tight demand to act as a deterrent. As a result, the company will ask FERC for a change in its penalty tariff provisions.

Some panelists want FERC to hasten its move to consider reforms to its gas-

pricing and storage policies, which has the ultimate goal of reducing gas-price volatility. Patrick DeVille, v.p. of marketing for ENSTOR, an independent gas storage company, says the current situation underscores the need for added flexible storage services across the U.S. He suggests that could be accomplished via greenfield development, and done faster if FERC would adopt, "certain supportive regulatory policies to ease their introduction."

DeVilleville believes independent storage developers and operators can be the driving forces to building added storage facilities in the U.S., but points out they cannot compete with pipelines or marketers due to restrictions from the shipper-must-have-title rule. ENSTOR proposes FERC waive the shipper-must-have-title rule for all independent storage operators for the purpose of extending the independent-owned storage capability downstream to the market utilizing firm transportation held by that independent. Then the customer who originally injects that inventory would retain title to the storage inventory transported. Therefore, DeVilleville says a waiver of that rule is needed for independents to offer a delivered-storage service under the present regulatory structure. ENSTOR believes such services would allow consumers greater flexibility in managing volatility.

ENSTOR also wants FERC to continue granting market-based rates to new storage facilities that are brought on-line. "We'd further encourage the commission to utilize its recent Energy Policy Act authorization to grant market-based rates to facilities that would not meet the current test for market power in precisely those areas where storage services are needed most," he argues. That move is intended to provide necessary incentives to independents to take the risk of developing such facilities.

Another remedy called on is use of long-term gas contracts. »

The dilemma presents itself that in the past, the state regulator worried that long-term gas contracts unduly would burden the retail consumer, and gas local distribution companies feared the wrath of the state regulator if prices dropped while the company was locked into a long-term supply contract. Something needs to be done, since according to Scott Parker, the president of Kinder Morgan's gas pipeline group, and others along the chain of the natural gas supply route, "We believe the existing pipeline grid is not sufficient to effectively move that supply to market." And it proves hard to ignore his plea that, "Pipeline developers need long-term contracts to support an investment of \$500 million to \$3 billion. (See Box, *Long-Term Gas Contracts*)

But some change may be in the air, as state commissioners appear to be becoming more tolerant of the idea of use of such long-term contracts as an incentive to build gas infrastructure. David Manning, senior v.p. of corporate affairs at Keyspan Energy, speaks on behalf of the American Gas Association (AGA), and emphasizes the need to work with state utility commissioners to facilitate and encourage long-term contracts for new infrastructure. He notes an over-dependence in the U.S. on natural gas from the Gulf, and blames it mostly on the "lack of enthusiasm in the U.S. south for new infrastructure to the Northeast." He says getting infrastructure built in the Northeast is very difficult, especially across the Hudson River.

But Manning see some "informal indications from the regulators that they're prepared to have that discussion at least for some portion of the portfolio coming in and that they are starting to recognize that and they're starting to balance the need for infrastructure with the longer-term concern about protecting the consumer."

Commissioner Donald Mason, with the Ohio PUC, who also chairs the

LONG-TERM GAS CONTRACTS

The joint task force of the National Association of Regulatory Utility Commissioners (NARUC) and the Interstate Oil and Gas Compact Commission (IOGCC) released a report, *Policy Recommendations on Long-Term Contracting for Natural Gas Transportation, Storage Services and Liquefied Natural Gas Delivery*, which makes a series recommendations on the controversy surrounding long-term contracts. It encourages state regulators to take a more active role in encouraging long-term gas supply, transportation and storage plans, while urging them to minimize "second guessing" by talking a short-term perspective when evaluating long-term contracts. The report asks state regulators to recognize the urgent need for added natural gas delivery infrastructure in order to help moderate the level and volatility of natural gas prices. It wants them to consider long-term contracting as an appropriate mechanism to manage long-term price and volume risk within the confines of a gas utility's portfolio strategy. It asks them to recognize that certain projects will require substantial revenue guarantees, especially for projects such as the Alaskan gas pipeline and multiple liquefied natural gas projects. States further should consider requiring gas utilities to develop long-term strategies for pipeline capacity, gas storage and supply acquisitions, at least in the ten-year plus timeframe.—LB

National Association of Regulatory Utility Commissioners (NARUC) Gas Committee, says a NARUC policy recommendation is soon coming concluding that state regulators should take a more active role in encouraging long-term supply, transportation and storage contracts. Also, in some circumstances, NARUC believes regulators and utilities should consider pre-approval of long-term contracts. Finally, he called for state regulators "to consider requiring utilities to develop long-term strategies for pipeline capacity, gas storage and gas supply acquisitions, even in the ten-year-plus range."

Eminent domain proceedings also were discussed at the FERC conference. James Cleary, president of Western Pipelines of the El Paso Corp., drew FERC's attention to what he calls a "significant threat on our ability to operate existing infrastructure and to build new infrastructure." He says Native American tribes are asking for

"hugely inflated cash demands" in return for "their so-called consent to right-of-way agreements for new and existing infrastructure."

Cleary points out that under the Natural Gas Act, the use of eminent domain and the related infrastructure certification process normally are easily carried out because there is a body of law and standards that develop fair market value. The result is that 90% of the time the companies successfully negotiate with landowners at, near or slightly above fair market value.

But in the west on tribal lands, "we're seeing tribal demands grow exponentially and consent payments are increasing for right-of-way on tribal lands by 50 or 100 times fair market value on non-tribal lands." However, EPACT provides hope for clarifying the issue, as EPACT section 1813 requires a study be made, with recommendations then given to Congress on how to remedy the situation. Meanwhile, Cleary asks FERC to take an active part in that >>

study and recommend to Congress to clarify that Section 7(h) eminent domain authority of the Natural Gas Act applies to Indian reservations upon payment of just compensation. That would be measured by fair market value as established by right-of-way payments paid to non-Indian landowners.

As seen by the Oct. 12 conference, FERC does intend to be very active in helping needed gas infrastructure get built. According to Sam Brothwell, head of the Equity Research Effort at

Wachovia Securities, "FERC can't do much about commodity process, but it can do a lot to facilitate the freer flow of gas from where it's produced to where it's needed." He believes that in the pipeline and storage arenas, "it's not high rates that's hurting consumers, it's a lack of capacity." ■

Lori A. Burkhart is a legal editor at Public Utilities Fortnightly magazine and can be reached at 703-847-7720 or lab@pur.com.

U.S. WATER COSTS

Survey Finds Prices Rising (Again)

The annual water survey released October 17 and conducted by the NUS Consulting Group found the average price of water in the United States climbed by 3.5 percent for the period of July 1, 2004 to July 1, 2005. The survey includes 51 water systems located throughout the nation and revealed the highest price paid was in Huntington, West Virginia at \$5.49 per one thousand gallons (MGal), while residents in Greenville, Mississippi enjoyed the lowest price for water at \$0.80 per MGal. (*See Survey, p. 11*) Overall, the average cost of water in the U.S. was \$2.34 per MGal. Including related sewer costs, the survey also found that the national average rose to \$5.78 per Mgal, an increase of 5.3 percent from July 2004.

The water survey finds that some of the more notable increases in water prices were observed in San Francisco (+14.8%), Denver, Colorado (+13.7%), Hartford, Conn. (+12.7%), Greensboro, N.C. (+12.7%), and Newport,

N.H. (+10.0%). Most of the increases were attributable to maintenance and construction costs, as these cities struggle to upgrade and maintain aging water and sewer infrastructures.

"While the increase in water prices may seem insignificant in comparison to the recent rise in other energy costs, it should be pointed out that increased water and related sewer costs occur, without fail, year after year," remarked Richard Soutanian, co-president of NUS Consulting Group. "Businesses need to pay careful attention to their water costs as this commodity has the potential for significant increases in the future. Aging water systems coupled with ever stricter government regulations will have consumers paying more which in turn could have a negative impact on many business operations."

More information can be accessed at www.nusconsulting.com

Next Month's FORTNIGHTLY

Fortnightly's December issue packs a punch as our editor at large, Michael T. Burr, takes an in-depth look at the fight over coal technologies and where the outcome leads the industry. Our series of articles on the impacts of the Energy Policy Act of 2005 continues, as Congress draws criticism for what it failed to do.

Here is more of what you will find:

▶ Battle Royal Over Coal

Does the future belong to pulverized coal, or integrated gasification combined-cycle technologies? The answer will determine how the industry manages load growth and regulatory risks, while protecting shareholders and ratepayers.

▶ The Capacity Market Enigma

Capacity and energy, although related, are not identical products. If we are to continue to rely on competitive market forces to provide new generation supplies, we need separate, long-term, installed capacity markets.

▶ A Continuing Reign of Incoherence

The Energy Policy Act of 2005 ducks three crucial issues: volatile prices and fuel supplies; insufficient, erratic capital investment in generation and transmission; and energy commodity pricing. What should policy-makers do now?

▶ Regulated Utilities: Reinventing The Classic Business Strategy

How can regulated utilities create value? Each of five key options presents their own regulatory risks. Which way should management go?

▶ Day of Decision for FERC

How will the Federal Energy Regulatory Commission answer Congress' call for energy market transparency? Will it rest on its laurels, or move forward to restore confidence in wholesale energy markets?

PLUS Interest Rates and Armageddon

Whither Reliability Markets

EPACT -Passing the Baton

SPARK

TABLE 1 2005 WATER SURVEY DOMESTIC 2005

STATE	CITY	MONTHLY COST - 2004	MONTHLY COST - 2005	MONTHLY MGal - 2004	MONTHLY MGal - 2005	PERCENT CHANGE
WV	HUNTINGTON	\$ 1,111.49	\$ 1,208.86	\$ 5.05	\$ 5.49	8.8%
PA	PITTSBURGH	\$ 968.40	\$ 1,047.55	\$ 4.40	\$ 4.76	8.2%
NH	NEWPORT	\$ 884.10	\$ 972.51	\$ 4.02	\$ 4.42	10.0%
MA	BOSTON	\$ 915.49	\$ 915.49	\$ 4.16	\$ 4.16	0.0%
VT	BURLINGTON	\$ 788.72	\$ 788.72	\$ 3.58	\$ 3.58	0.0%
NJ	HACKENSACK*	\$ 743.94	\$ 743.94	\$ 3.38	\$ 3.38	0.0%
WA	SEATTLE	\$ 743.04	\$ 743.04	\$ 3.37	\$ 3.37	0.0%
WY	CHEYENNE	\$ 626.56	\$ 672.95	\$ 2.85	\$ 3.06	7.4%
OR	PORTLAND	\$ 663.97	\$ 663.97	\$ 3.02	\$ 3.02	0.0%
FL	MIAMI	\$ 635.42	\$ 635.42	\$ 2.89	\$ 2.89	0.0%
CA	LOS ANGELES	\$ 559.36	\$ 606.87	\$ 2.54	\$ 2.76	8.5%
TX	HOUSTON	\$ 565.80	\$ 584.07	\$ 2.57	\$ 2.65	3.2%
ND	GRAND FORKS	\$ 551.47	\$ 579.59	\$ 2.50	\$ 2.63	5.1%
NC	GREENSBORO	\$ 509.60	\$ 574.46	\$ 2.31	\$ 2.61	12.7%
TN	NASHVILLE	\$ 568.95	\$ 568.95	\$ 2.58	\$ 2.58	0.0%
GA	ATLANTA	\$ 568.00	\$ 568.00	\$ 2.58	\$ 2.58	0.0%
VA	ROANOKE	\$ 549.66	\$ 567.86	\$ 2.50	\$ 2.58	3.3%
DC	PUB.WORKS	\$ 516.00	\$ 542.49	\$ 2.34	\$ 2.46	5.1%
OH	CLEVELAND	\$ 519.87	\$ 538.08	\$ 2.36	\$ 2.44	3.5%
CA	SAN FRANCISCO	\$ 468.31	\$ 537.55	\$ 2.13	\$ 2.44	14.8%
CT	HARTFORD	\$ 476.43	\$ 537.16	\$ 2.16	\$ 2.44	12.7%
RI	PROVIDENCE	\$ 530.57	\$ 530.57	\$ 2.41	\$ 2.41	0.0%
DE	DOVER	\$ 514.44	\$ 517.47	\$ 2.34	\$ 2.35	0.6%
NY	ALBANY	\$ 503.25	\$ 503.25	\$ 2.29	\$ 2.29	0.0%
CO	DENVER	\$ 442.53	\$ 503.10	\$ 2.01	\$ 2.28	13.7%
AR	FT. SMITH	\$ 498.63	\$ 498.63	\$ 2.26	\$ 2.26	0.0%
NY	BINGHAMTON	\$ 489.10	\$ 489.10	\$ 2.22	\$ 2.22	0.0%
LA	NEW ORLEANS	\$ 472.61	\$ 472.61	\$ 2.15	\$ 2.15	0.0%
NY	NEW YORK CITY	\$ 470.88	\$ 470.88	\$ 2.14	\$ 2.14	0.0%
IA	DES MOINES	\$ 439.69	\$ 451.50	\$ 2.00	\$ 2.05	2.7%
MO	KANSAS CITY	\$ 434.96	\$ 443.31	\$ 1.98	\$ 2.01	1.9%
NM	ALBUQUERQUE	\$ 423.34	\$ 430.91	\$ 1.92	\$ 1.96	1.8%
WI	GREEN BAY	\$ 402.35	\$ 422.62	\$ 1.83	\$ 1.92	5.0%
OK	OKLAHOMA CITY	\$ 401.24	\$ 411.98	\$ 1.82	\$ 1.87	2.7%
TX	EL PASO	\$ 398.90	\$ 398.90	\$ 1.81	\$ 1.81	0.0%
MN	DULUTH	\$ 378.92	\$ 397.78	\$ 1.72	\$ 1.81	5.0%
IN	INDIANAPOLIS	\$ 391.61	\$ 391.61	\$ 1.78	\$ 1.78	0.0%
OH	CINCINNATI	\$ 350.85	\$ 373.25	\$ 1.59	\$ 1.70	6.4%
NJ	TRENTON	\$ 371.91	\$ 371.91	\$ 1.69	\$ 1.69	0.0%
MI	DETROIT	\$ 336.17	\$ 362.86	\$ 1.53	\$ 1.65	7.9%
NE	LINCOLN	\$ 341.50	\$ 360.50	\$ 1.55	\$ 1.64	5.6%
NJ	NEWARK	\$ 359.43	\$ 359.43	\$ 1.63	\$ 1.63	0.0%
SD	SIoux FALLS	\$ 359.20	\$ 359.20	\$ 1.63	\$ 1.63	0.0%
ME	PORTLAND	\$ 345.52	\$ 345.52	\$ 1.57	\$ 1.57	0.0%
MO	ST.LOUIS	\$ 312.04	\$ 312.04	\$ 1.42	\$ 1.42	0.0%
TN	MEMPHIS	\$ 298.44	\$ 298.44	\$ 1.36	\$ 1.36	0.0%
SC	CHARLESTON	\$ 291.75	\$ 293.13	\$ 1.32	\$ 1.33	0.5%
IL	CHICAGO	\$ 276.05	\$ 284.29	\$ 1.25	\$ 1.29	3.0%
MS	BILOXI	\$ 267.25	\$ 278.26	\$ 1.21	\$ 1.26	4.1%
GA	SAVANNAH	\$ 192.53	\$ 192.53	\$ 0.87	\$ 0.87	0.0%
MS	GREENVILLE	\$ 175.31	\$ 175.31	\$ 0.80	\$ 0.80	0.0%
	51 City Total	\$ 25,405.52	\$ 26,298.42			3.5%
	51 City Avg	\$ 498.15	\$ 515.66			
	CCF Avg	\$ 1.693	\$ 1.752			
	Mgal Avg	\$ 2.262	\$ 2.342			
	M³ Avg	\$ 0.598	\$ 0.619			

CALCULATIONS: BASED ON 220.2 M.GAL OR 294.3 CCF OR 833.33
CUBIC METERS PER MONTH + 2" METER INSIDE CITY AND/OR
DOWNTOWN BUSINESS DISTRICT/INDUSTRIAL USER

Source: The NUS Consulting Group - July 2005

TABLE 2 2005 US WATER SEWER SURVEY

ST	CITY	MONTHLY COST — 2004			MONTHLY COST — 2005			YR on YR CHANGE
		WATER	SEWER	TOTAL	WATER	SEWER	TOTAL	
		\$	\$	\$	\$	\$	\$	%
WA	SEATTLE	\$ 743.04	\$ 1,736.37	\$ 2,479.41	\$ 743.04	\$ 1,936.49	\$ 2,679.53	8.1%
CA	SAN FRANCISCO	\$ 468.31	\$ 1,730.48	\$ 2,198.79	\$ 537.55	\$ 1,961.74	\$ 2,499.30	13.7%
NH	NEWPORT	\$ 884.10	\$ 1,230.48	\$ 2,114.58	\$ 972.51	\$ 1,353.57	\$ 2,326.08	10.0%
OR	PORTLAND	\$ 663.97	\$ 1,442.93	\$ 2,106.90	\$ 663.97	\$ 1,608.34	\$ 2,272.31	7.9%
MA	BOSTON	\$ 915.49	\$ 1,271.55	\$ 2,187.03	\$ 915.49	\$ 1,271.55	\$ 2,187.03	0.0%
GA	ATLANTA	\$ 568.00	\$ 1,442.07	\$ 2,010.07	\$ 568.00	\$ 1,442.07	\$ 2,010.07	0.0%
ME	PORTLAND	\$ 345.52	\$ 1,492.10	\$ 1,837.62	\$ 345.52	\$ 1,589.22	\$ 1,934.74	5.3%
WV	HUNTINGTON	\$ 1,111.49	\$ 543.09	\$ 1,654.58	\$ 1,208.86	\$ 689.36	\$ 1,898.23	14.7%
MIN	DULUTH	\$ 378.92	\$ 1,380.27	\$ 1,759.19	\$ 397.78	\$ 1,497.99	\$ 1,895.77	7.8%
VT	BURLINGTON	\$ 788.72	\$ 953.53	\$ 1,742.26	\$ 788.72	\$ 953.53	\$ 1,742.26	0.0%
TN	NASHVILLE	\$ 568.95	\$ 1,054.77	\$ 1,623.71	\$ 568.95	\$ 1,054.77	\$ 1,623.71	0.0%
PA	PITTSBURGH	\$ 968.40	\$ 556.46	\$ 1,524.86	\$ 1,047.55	\$ 555.50	\$ 1,603.05	5.1%
SC	CHARLESTON	\$ 291.75	\$ 1,272.81	\$ 1,564.57	\$ 293.13	\$ 1,284.23	\$ 1,577.37	0.8%
TX	HOUSTON	\$ 565.80	\$ 951.76	\$ 1,517.56	\$ 584.07	\$ 984.88	\$ 1,568.95	3.4%
OH	CLEVELAND	\$ 519.87	\$ 950.29	\$ 1,470.16	\$ 538.08	\$ 1,014.75	\$ 1,552.82	5.6%
FL	MIAMI	\$ 635.42	\$ 754.61	\$ 1,390.03	\$ 635.42	\$ 754.61	\$ 1,390.03	0.0%
DC	PUB.WORKS	\$ 516.00	\$ 774.01	\$ 1,290.01	\$ 542.49	\$ 812.27	\$ 1,354.76	5.0%
DE	DOVER	\$ 514.44	\$ 770.70	\$ 1,285.14	\$ 517.47	\$ 825.75	\$ 1,343.22	6.10
NC	GREENSBORO	\$ 509.60	\$ 612.60	\$ 1,122.20	\$ 574.46	\$ 706.89	\$ 1,281.35	14.2%
NJ	TRENTON	\$ 371.91	\$ 669.45	\$ 1,041.36	\$ 371.91	\$ 901.48	\$ 1,273.39	22.3%
CA	LOS ANGELES	\$ 559.36	\$ 598.61	\$ 1,157.97	\$ 606.87	\$ 659.53	\$ 1,266.39	9.4%
LA	NEW ORLEANS	\$ 472.61	\$ 636.04	\$ 1,108.65	\$ 472.61	\$ 731.62	\$ 1,204.23	5.47
RI	PROVIDENCE	\$ 530.57	\$ 563.78	\$ 1,094.35	\$ 530.57	\$ 671.59	\$ 1,202.15	5.46
NY	BINGHAMTON	\$ 489.10	\$ 538.74	\$ 1,027.84	\$ 489.10	\$ 688.39	\$ 1,177.49	5.35
WY	CHEYENNE	\$ 626.56	\$ 447.40	\$ 1,073.96	\$ 672.95	\$ 502.45	\$ 1,175.40	5.34
NY	NEW YORK CITY	\$ 470.88	\$ 673.95	\$ 1,144.83	\$ 470.88	\$ 673.95	\$ 1,144.83	0.0%
VA	ROANOKE	\$ 549.66	\$ 656.29	\$ 1,205.95	\$ 567.86	\$ 570.32	\$ 1,138.17	5.17
AR	FT. SMITH	\$ 498.63	\$ 631.23	\$ 1,129.86	\$ 498.63	\$ 631.23	\$ 1,129.86	5.13
IA	DES MOINES	\$ 439.69	\$ 658.33	\$ 1,098.03	\$ 451.50	\$ 658.33	\$ 1,109.84	5.04
OH	CINCINNATI	\$ 350.85	\$ 651.50	\$ 1,002.35	\$ 373.25	\$ 728.99	\$ 1,102.24	5.01
ND	GRAND FORKS	\$ 551.47	\$ 482.63	\$ 1,034.10	\$ 579.59	\$ 520.80	\$ 1,100.40	5.00
CT	HARTFORD	\$ 476.43	\$ 500.31	\$ 976.74	\$ 537.16	\$ 500.31	\$ 1,037.47	4.71
MI	DETROIT	\$ 336.17	\$ 518.60	\$ 854.77	\$ 362.86	\$ 649.27	\$ 1,012.13	4.60
NY	ALBANY	\$ 503.25	\$ 503.25	\$ 1,006.51	\$ 503.25	\$ 503.25	\$ 1,006.51	4.57
OK	OKLAHOMA CITY	\$ 401.24	\$ 565.91	\$ 967.15	\$ 411.98	\$ 583.53	\$ 995.51	4.52
NJ	NEWARK	\$ 359.43	\$ 626.41	\$ 985.84	\$ 359.43	\$ 626.41	\$ 985.84	4.48
CO	DENVER	\$ 442.53	\$ 429.39	\$ 871.92	\$ 503.10	\$ 429.39	\$ 932.49	4.23
MO	KANSAS CITY	\$ 434.96	\$ 421.10	\$ 856.06	\$ 443.31	\$ 445.02	\$ 888.32	4.03
WI	GREEN BAY	\$ 402.35	\$ 441.28	\$ 843.63	\$ 422.62	\$ 461.48	\$ 884.10	4.01
MS	BILOXI	\$ 267.25	\$ 586.54	\$ 853.79	\$ 278.26	\$ 598.95	\$ 877.21	3.98
NM	ALBUQUERQUE	\$ 423.34	\$ 396.98	\$ 820.31	\$ 430.91	\$ 432.47	\$ 863.38	3.92
MO	ST.LOUIS	\$ 312.04	\$ 508.23	\$ 820.27	\$ 312.04	\$ 508.23	\$ 820.27	3.73
IN	INDIANAPOLIS	\$ 391.61	\$ 414.17	\$ 805.78	\$ 391.61	\$ 414.17	\$ 805.78	3.66
TX	EL PASO	\$ 398.90	\$ 353.36	\$ 752.26	\$ 398.90	\$ 353.36	\$ 752.26	3.42

(Cont. on p. 13)

(Cont. from p. 13)

TABLE 2 2005 US WATER SEWER SURVEY

ST	CITY	MONTHLY COST — 2004				MONTHLY COST — 2005				YR on YR CHANGE
		WATER	SEWER	TOTAL	\$ Per Mgal	WATER	SEWER	TOTAL	\$ Per Mgal	
NJ	HACKENSACK*	\$ 743.94	\$ N/A	\$ 743.94	\$ N/A	\$ 743.94	N/A	743.94	N/A	0.0%
SD	SIoux FALLS	\$ 359.20	\$ 378.66	\$ 737.87	\$ 3.35	\$ 359.20	\$ 378.66	\$ 737.87	\$ 3.35	0.0%
NE	LINCOLN	\$ 341.50	\$ 334.86	\$ 676.36	\$ 3.07	\$ 360.50	\$ 359.87	\$ 720.38	\$ 3.27	6.5%
GA	SAVANNAH	\$ 192.53	\$ 475.15	\$ 667.68	\$ 3.03	\$ 192.53	\$ 475.15	\$ 667.68	\$ 3.03	0.0%
IL	CHICAGO	\$ 276.05	\$ 229.12	\$ 505.18	\$ 2.29	\$ 284.29	\$ 235.96	\$ 520.26	\$ 2.36	3.0%
TN	MEMPHIS	\$ 298.44	\$ 192.49	\$ 490.93	\$ 2.23	\$ 298.44	\$ 192.49	\$ 490.93	\$ 2.23	0.0%
MS	GREENVILLE	\$ 175.31	\$ 212.08	\$ 387.39	\$ 1.76	\$ 175.31	\$ 212.08	\$ 387.39	\$ 1.76	0.0%
TOTAL FOR 51 CITIES		\$ 25,405.52	\$ 36,216.74	\$ 61,622.26		\$ 26,298.42	\$ 38,596.26	\$ 64,894.68		5.3%
51 CITY AVG		\$ 498.15	\$ 724.33	\$ 1,208.28		\$ 515.66	\$ 771.93	\$ 1,272.44		
AVG. COST PER CCF		\$ 1.69	\$ 2.46	\$ 4.11		\$ 1.75	\$ 2.62	\$ 4.32		
AVG. COST PER M.GAL.		\$ 2.26	\$ 3.29	\$ 5.49		\$ 2.34	\$ 3.51	\$ 5.78		
AVG. COST PER CUBIC MT.		\$ 0.60	\$ 0.87	\$ 1.45		\$ 0.62	\$ 0.93	\$ 1.53		

CALCULATIONS: BASED ON 220.2 M.GAL OR 294.3 CCF OR 833.33 CUBIC METERS PER MONTH + 2" METER INSIDE CITY AND/OR DOWNTOWN BUSINESS DISTRICT COMMERCIAL/INDUSTRIAL USER
 * Sewer Charges incorporated within local Property Taxes.

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