

Natural Gas Market Prices

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NATURAL GAS MARKET PRICE SPIKE REVIEW

EXECUTIVE SUMMARY

This report addresses natural gas prices on the spot market which rose dramatically during late February and early March. Events began on Monday, February 24, 2003, when the national benchmark pricing for natural gas (Henry Hub Louisiana) rose from \$6.74 to \$12.26 per million British thermal units (MMBtu, the unit of measurement for natural gas quantities sold in the U.S.)--an 82 percent increase in one day. The following day, these market prices rose further to \$18.85 per MMBtu, another 54 percent. In all, national spot market prices rose 180 percent in two days. California market prices also rose during this period; however, the increase was less dramatic. For example, on the same day Henry Hub rose 82 percent, daily spot market prices for delivery of natural gas to the Southern California border at Topock rose from \$5.68 per MMBtu to \$8.71 per MMBtu, a 53 percent rise. The following day, these prices rose another 10 percent to \$9.54 per MMBtu. In all, California spot market prices rose 68 percent. Market prices slowly decreased over the next two weeks and have since returned to levels seen earlier in January 2003 (see Figure 1).

On March 13, 2003, Governor Davis asked the California Energy Commission (Energy Commission) and the California Public Utilities Commission (CPUC) to review the reasons for the unexpectedly fast rise in natural gas market prices.

Although market price fluctuations were significant, this joint review has not found any evidence of "manipulation". Instead, the level of, and volatility in, natural gas prices appear to be a direct result of actual and perceived natural gas demand and supply conditions. In particular, this review identified several weather-related factors (very cold temperatures, temperatures much colder than had been forecasted, and reduced regional natural gas production due to frozen natural gas wells and storms in the Gulf of Mexico) that had a significant effect on natural gas prices. In addition, we know that individual and institutional traders, who operate in the natural gas markets were reacting to information and perceptions about market conditions (concern about very low natural gas storage levels, the quality of data available to support technical analysis of natural gas markets, and the impact of a Middle East war on oil prices).

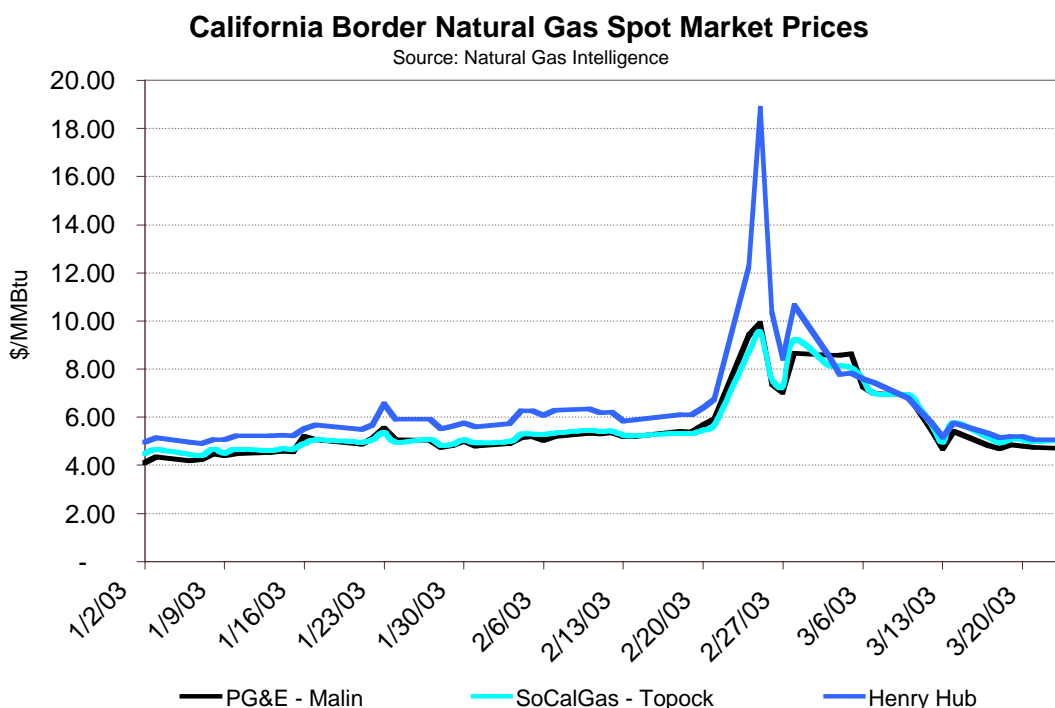
The rapid increase in daily spot market prices will hurt California natural gas and electricity ratepayers. The impact has been limited by the actions already taken by the state and its natural gas utilities, especially as compared to the artificially high spike in natural gas market prices that California experienced during the winter of 2000-01. Market price volatility impacts on ratepayers have been dampened by measures such as the use of in-state natural gas storage, further additions to the natural gas pipeline infrastructure, reliance on monthly and seasonal contracts (rather than on the daily spot market), financial hedging by the natural gas and electric utilities, and demand reduction efforts. In spite of these efforts, natural gas ratepayers will experience a modest increase in their rates during March 2003 and electric ratepayers may see a modest

increase in their future rates. To further mitigate the impacts of market price volatility, additional actions can be considered, including:

- increase demand side management and conservation programs for natural gas and electricity;
- encourage private developers to modernize or replace older, less efficient thermal power plants to improve statewide fuel efficiency;
- encourage development of additional supplies consistent with environmental protection goals, and
- reassess the need for additional natural gas storage capacity in California and make certain non core customers procure and use adequate gas storage.

Although an investigation by the Attorney General does not appear warranted at this time, the CPUC and the Energy Commission will continue to closely monitor State and national natural gas demand, supplies, prices, and markets.

Figure 1



BACKGROUND

The staffs of the Energy Commission and CPUC prepared this report cooperatively, with each agency focusing on issues relating to its core functions. Specifically, the Energy Commission analyzed the market issues at the national and regional levels. The CPUC analyzed the impact that increasing prices might have on ratepayers in California. Both agencies suggested actions that could be taken to improve California's natural gas demand, supply, infrastructure, and market conditions and to mitigate the potential

adverse impacts on natural gas ratepayers, consistent with California's other environmental protection and public health and safety goals.

The market prices reviewed in this report are effectively wholesale commodity prices. Changes in these prices do not necessarily flow through to natural gas customers' bills here in California. State agencies, including the Energy Commission and CPUC, and natural gas infrastructure developers have already taken steps to improve California's ability to withstand events like those of 2000 and 2001. The CPUC and California natural gas utilities have already taken steps to insulate most California consumers from the full effects of market price volatility. This report suggests additional actions that could be taken to further improve the short term and long term natural gas situation. The regulated gas utilities offered their views and suggestions for consideration in this analysis; their reports are available for review.

Given the amount of time available to prepare this report, an exhaustive investigation involving judicial discovery, subpoenaed witnesses, and comprehensive interviews with market participants was not conducted. While there is no information that suggests such an investigation is warranted, the possibility that a formal investigation would uncover unethical or illegal behavior does exist. Nonetheless, such a course of action is not recommended at this time, but the Energy Commission and CPUC will continue actively monitoring the market and report any evidence of such behavior.

Finally, the high prices that California experienced during the winter of 2000 and 2001 and again recently, demonstrated how vulnerable the state is to uncertainties and risks that affect the national and global markets. California, like other states in the U.S., is frequently swept along by events at the national level. California has already taken some steps to insulate itself from these events but remains exposed and vulnerable to future price spikes. We must now consider if California should chart a new course and take substantially stronger incremental steps to improve our long-term future natural gas situation. Some of these steps can be considered analogous to an insurance policy to protect our state from future negative uncertainties. Like most insurance policies, these steps can only be accomplished with an accompanying cost and must be consistent with the state's environmental protection and public health and safety goals.

CALIFORNIA NATURAL GAS MARKET RELATIONSHIP TO U.S. MARKETS

California consumers receive natural gas through a complex system involving a national physical infrastructure network, financial markets, and federal/state regulatory structures. While natural gas is an energy market, it is very different from the electricity market. These key differences highlight the factors that influence California's current natural gas situation and help shape the types of recommendations that might effectively improve our demand, supply, infrastructure, and market conditions.

- Natural gas is a national market, while electricity is primarily a regional market. California is closely linked to the rest of the U.S. As natural gas demand, supply, market prices, or any other market condition changes elsewhere in the nation, California experiences the effects of these changes. For example, if unexpectedly

high demand in Chicago and New York pushes prices up at times when California demand is low, prices still increase in California.

- The pipeline infrastructure that brings natural gas to California delivers natural gas to markets throughout the U.S., Canada, and parts of Mexico, while the electricity grid is regionalized. This means California competes for natural gas. Figure 2 illustrates this national network.
- California imports 85¹ percent of the natural gas it consumes, making it highly dependent upon other states and countries for supplies, as seen in Figure 3 and the accompanying chart. On the other hand, California generates most of the electricity it consumes, importing only 15 percent on an annual-average basis. While California cannot create an in-state supply of natural gas, it can build the infrastructure to bring natural gas to it.
- While California is the dominant natural gas market in the West, it is only a small part of the national market. The major demand centers are along the Gulf of Mexico (Texas' and Louisiana's petrochemical industries), in Chicago, and in the Northeast. The Gulf of Mexico so dominates natural gas markets that all national market pricing is referenced to a single point in Louisiana called Henry Hub. Conversely, California is the dominant electricity market and provides an effective benchmark for the rest of the West.
- Unlike electricity, natural gas can be stored for later use. Utilities and private companies have developed storage reservoirs in California and the western U.S. so that they can bring natural gas in during periods of lower demand or price and store it for use when demand or prices are high. Natural gas storage is an extremely valuable asset for California, given that the state is at the end of long interstate pipelines with many upstream users along the way.

¹California produces approximately 1.0 bcf/d of natural gas and imports 5.7 bcf/d on average. Peak demand increases to about 11.3 bcf/d (2001).

Figure 2

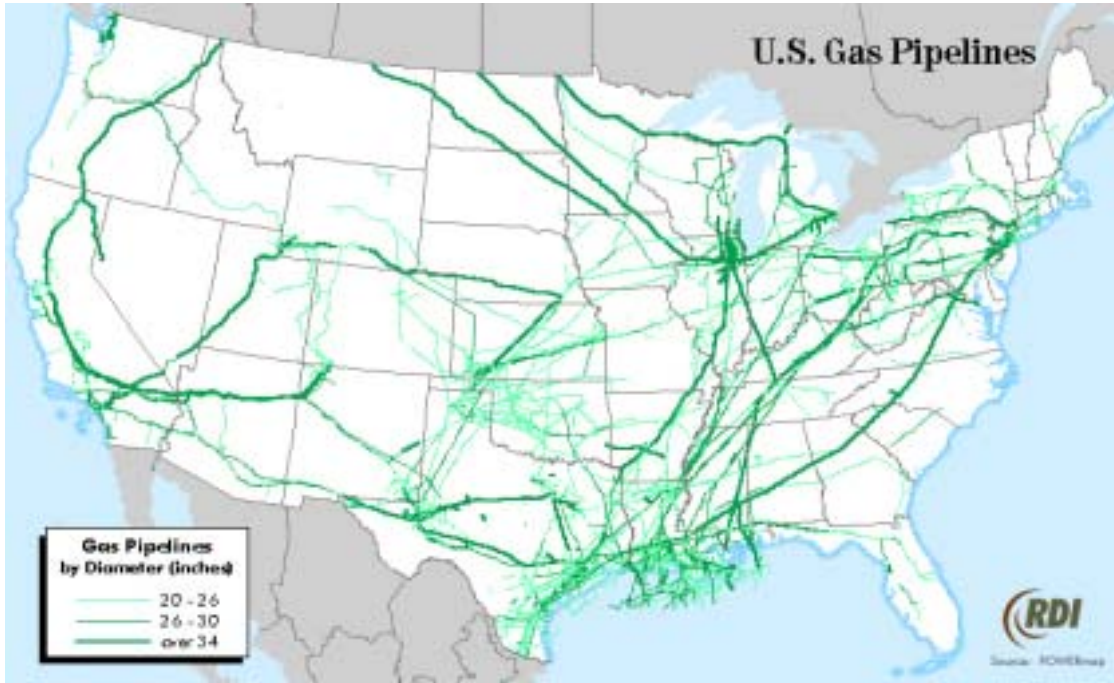
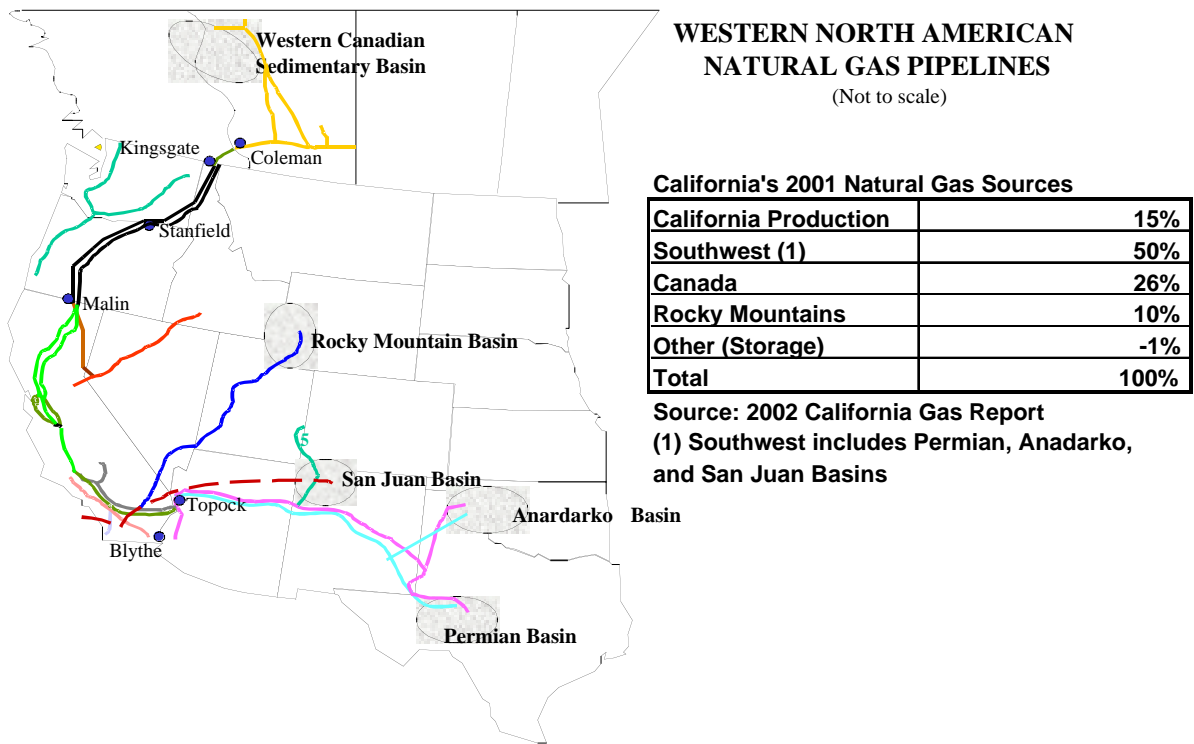


Figure 3



FACTORS AFFECTING NATURAL GAS MARKET PRICES

National natural gas market prices are influenced by a number of factors. These include:

- **Continental supply**—The amount of natural gas currently being produced in the U.S. and Canada and imported as liquefied natural gas (LNG) to the U.S. must be sufficient to meet current demand. The number of new wells developed through drilling must continue to increase at an ever-increasing pace in order to ensure that new sources of gas are available as the production rate of existing wells declines and new wells provide lower yields of natural gas.
- **Continental demand**—Weather is the single largest variable influencing the demand for natural gas to heat homes and businesses in the U.S., Canada, and Mexico. Industrial demand can also change as companies expand or contract operations, or close their facilities. Existing and new thermal electric power plants are burning more natural gas than before. New thermal power plants are more energy efficient than older ones, an issue that is particularly significant in California. Power plant demand for natural gas as a fuel is becoming a much larger proportion of overall natural gas demand. Additional energy efficiency measures (directed at both natural gas and electricity consumption) have helped slow the growth in demand for natural gas.
- **Natural gas infrastructure**—New pipelines and natural gas storage facilities can provide access to lower-cost, domestic supply sources and allow load centers to force price competition between major supply regions. Insufficient infrastructure can cause pipeline congestion, temporarily forcing prices higher.² New natural gas import facilities can help meet the potential gap between domestic supply and demand.
- **Regulatory guidance**—Numerous federal and state agencies adopt regulations that direct or restrict companies' behavior and affect prices. Chief among these are the Federal Energy Regulatory Commission and the California Public Utilities Commission.
- **Perceptions and current knowledge of these factors**—Inaccurate or poor quality data about natural gas supply, demand, and market trading/pricing distorts participants' understanding of natural gas market and technical issues. Uncertainties about the future generally increase market prices. Market traders' perceptions and interpretations of national and world events, or even rumors of such events, will drive prices higher or lower from what is technically supported.
- **Market traders' behavior**—The need to demonstrate a short-term profit will cause market traders to initiate actions when no other technical information suggests a trade is appropriate. Traders may engage in unethical behavior

² This report does not provide any findings that California's pipeline infrastructure is inadequate.

that creates the appearance of changes in demand or supply, thus forcing market prices to move, even when no underlying technical evidence supports such an action.

CONTRIBUTING FACTORS TO THE RECENT NATURAL GAS MARKET PRICE SPIKE

BACKGROUND

On Friday, February 21, 2003, natural gas daily spot market prices started rising rapidly. On Monday, February 24, 2003, spot market prices jumped very dramatically, along with other forward-market prices. Specifically, the national benchmark for spot market pricing at Henry Hub, Louisiana, rose 82 percent, or \$5.52, from \$6.74 to \$12.26 per million British thermal units (MMBtu, the unit of measurement for natural gas quantities sold in the U.S.). The following day, these market prices rose another 54 percent to \$18.85 per MMBtu. In all, national spot market prices rose 180 percent in two days. In comparison, price movements of +/- 10 percent in one day will attract considerable attention. In other trading, prices were reported even higher.

While market prices for California also increased, they did so at a pace much less than the rest of the nation. On this same day (February 24, 2003), daily spot prices for delivery to SoCalGas at Topock rose \$3.03 from \$5.68 per MMBtu to \$8.71 per MMBtu, a 53 percent rise. The following day, February 25, 2003, they rose another 14 percent to \$9.54 per MMBtu. In all, California spot market prices rose 68 percent.

The California price on February 24, 2003 was \$3.61 per MMBtu below the Henry Hub price (called a negative basis). The negative basis was \$9.31 per MMBtu on February 25, 2003. This basis differential normally ranges from +\$0.50 (to account for natural gas transportation costs from the Texas area) to -\$0.50 when cheaper Canadian and Rocky Mountain natural gas can dominate prices in the West. Recently, the basis has approached -\$1.00, allowing California to purchase natural gas on the daily spot market at prices below what the rest of the nation is paying, although still at absolute prices higher than California normally sees.

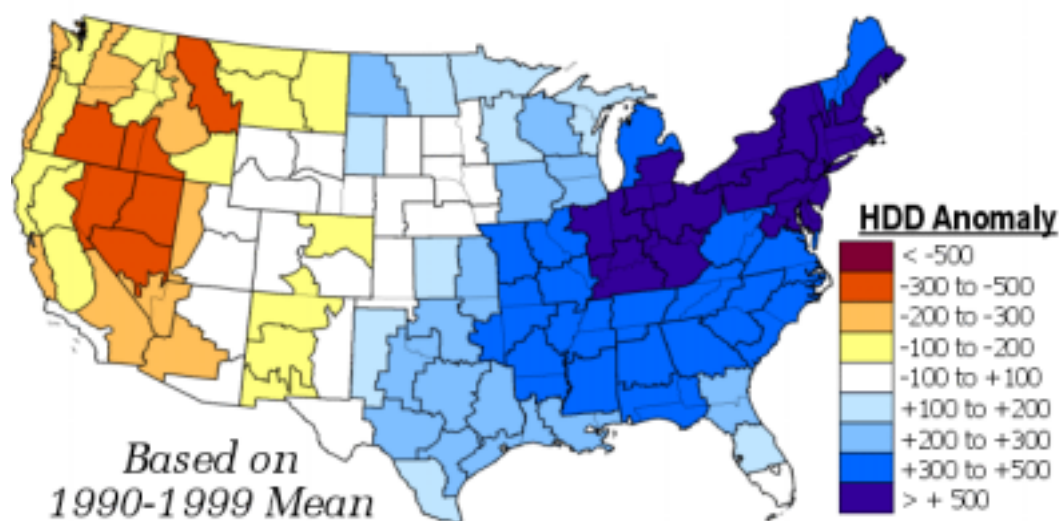
The following sections review the major factors contributing to this market price behavior.

NATURAL GAS DEMAND

Weather affects natural gas prices in both California and the nation. Cold temperatures increase space-heating needs above normal levels. In no place was this more apparent than the East Coast which experienced some of its coldest weather ever. As an example, New Jersey's largest utility set records on January 23, 2003 for energy delivery: 2,425 million cubic feet of natural gas and 6,877 megawatts of electricity. The very cold winter in the eastern half of the country increased natural gas demand and put upward pressure on national prices, which in turn drove up California prices.

Figure 4 illustrates how cold the 2002-2003 winter has been according to the National Climatic Data Center.³ Although the Western U.S. experienced moderate temperatures, the large swath of blue over most of the Midwest, the South and East Coast indicates how cold it has been this winter. The dark blue indicates a significantly greater need to heat homes as compared to the average need for heating. Consequently, natural gas demand for home heating throughout most of the nation has been strong and was a major driver of the recent price increases.

Figure 4
Departure From Normal – Heating Degree Days (HDD)



Source: The National Climatic Data Center

Another factor influencing natural gas prices was inaccurate weather forecasts. For instance, in mid-September 2002, the National Oceanic and Atmospheric Administration forecasted above-normal temperatures across the northern portion of the nation and indicated virtually no chance of below-normal temperatures anywhere in the country for winter 2002-2003. Participants in the natural gas market used such forecasts to determine how much gas to purchase at various pricing points and how much of their physical gas contracts should be hedged with financial contracts.

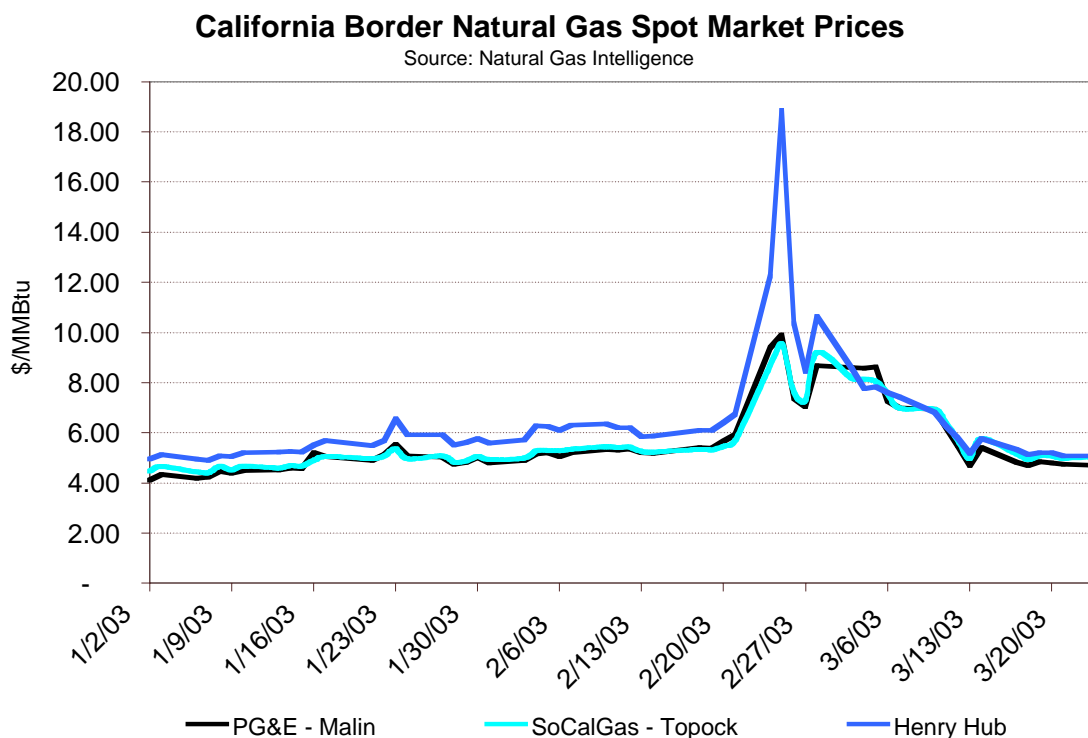
This expectation did not come true. Thus, what may have seemed prudent action by gas utilities in September, based on weather forecasts, may now appear inadequate. More recently, forecasts made in late December 2002 called for warmer temperatures in the eastern half of the nation, yet low temperatures and high snowfall have set records during this period in the Midwest and East Coast. As the natural gas market anticipated and planned for average to above-average temperatures, the unforeseen strength in weather-related natural gas demand put unexpected upward pressure on natural gas prices. If the reverse had happened, that is if gas utilities had purchased excess

³ The graphic shows temperature variation above and below normal, as measured in heating degree-days, for this winter. A heating degree-day is a standardized measurement used to quantify the amount of natural gas needed to heat homes and businesses.

supplies and the weather was in fact warmer than normal, these utilities would have incurred excess costs for unneeded reserves.

Finally, high crude oil and petroleum prices have reduced the desire of customers to switch to an alternative fuel when natural gas prices increase, since, in some instances, petroleum products and natural gas can be substituted. Some large users of natural gas, such as industrial complexes and electricity generators can switch between natural gas, heating oil, and other hydrocarbon products based on the price difference between the fuels. Competing heating oil prices have also been increasing. Consequently, the economic opportunity to switch from natural gas to heating oil has been limited and little natural gas demand is moving into heating oil. Figure 5 compares natural gas prices, heating oil, and petroleum during this time period.

Figure 5



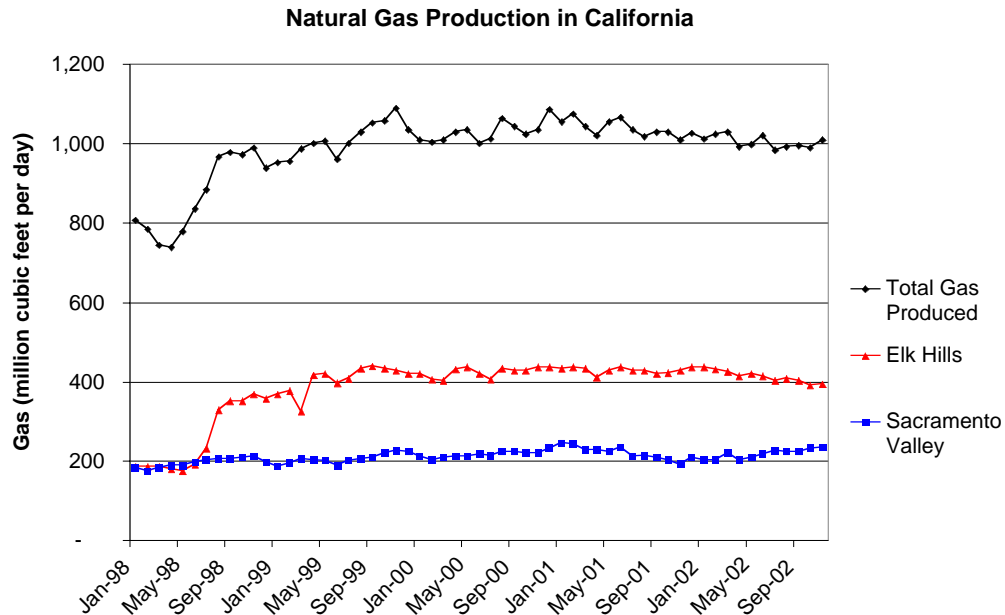
Source: Natural Gas Intelligence and U.S. DOE

A further uncertainty is the timeliness and quality of natural gas consumption data. U.S. natural gas consumption data comes primarily from the U.S. Energy Information Administration (EIA). EIA provides preliminary demand data with three months lag time. For example, the most recent data, published in February 2003, reported through November 2002. In addition, this data frequently changes as EIA receives additional information. As of February 2003, only data before 2001 are considered final. Therefore, the natural gas market has a difficult time using this data to make decisions. This uncertainty in consumption information puts upward pressure on natural gas prices since the market traders assume consumption is higher than reported.

NATURAL GAS SUPPLY

On the supply side, California production has been relatively flat or slightly declining recently, remaining near one billion cubic feet per day as seen in Figure 6.

Figure 6

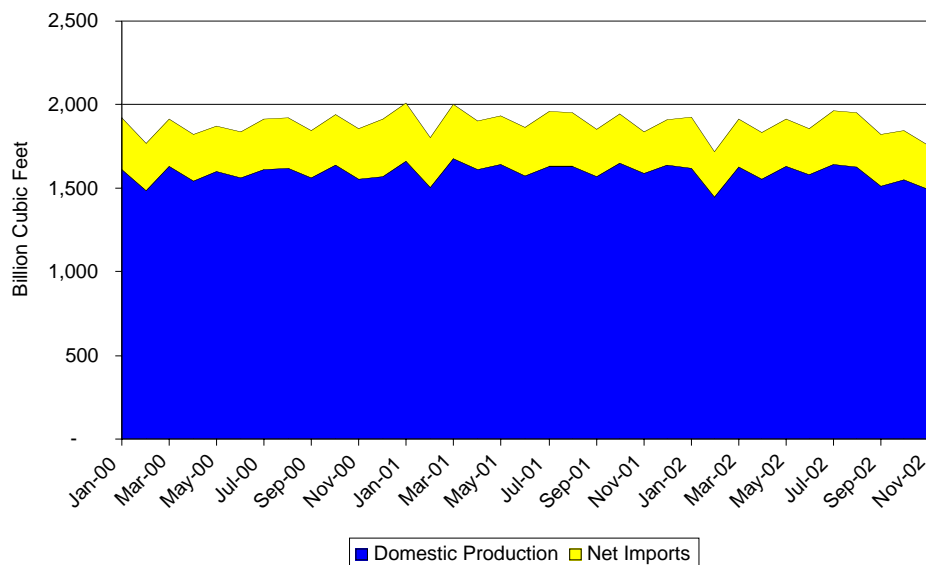


Source: California Department of conservation, Division of Oil, Gas, and Geothermal Resources

Supplies of natural gas to meet U.S. demand come from domestic production, imports in the form of liquefied natural gas (LNG), and imports from Canada, minus exports, primarily to Mexico. U.S. natural gas production has been relatively flat and even declining more recently; see Figure 7. With supply growth relatively flat, the additional weather-related natural gas demand caused spot market prices to rise.

Figure 7

Natural Gas Supplies Available To The U.S.

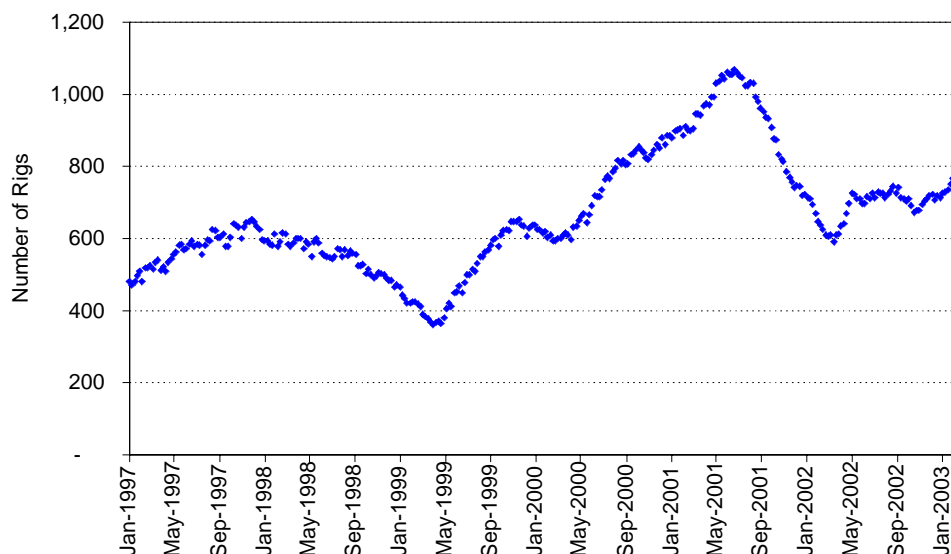


A couple of other factors have limited potential natural gas production during the past six months. During September and October 2002, hurricanes in the Gulf of Mexico production region (a major supply source for the U.S.) shut down some natural gas production. More recently in February 2003, cold temperatures gripping the nation froze wellheads in the Great Plains, significantly lowering the quantity of gas produced. With less natural gas available to meet demand, natural gas spot market prices increased nationwide.

Another factor influencing future natural gas production is the number of drilling rigs that actively find and produce gas in the U.S. The more drilling rigs seeking natural gas, the more supply that traders will expect to be available in the coming months. Over the past 10 months, the drilling rig count for the U.S. has remained relatively flat, about 700 as seen in Figure 8. These facts do not conform to expectations, in part due to the deteriorating financial condition of energy companies and capital markets needed to support additional drilling. Consequently, future supply has not markedly increased nor do market traders expect it to increase. This trend creates uncertainty in the natural gas market regarding the adequacy of current and future supply, further increasing natural gas market prices.

Figure 8
Weekly U.S. Active Gas Drilling Rigs

Source: Bakers Hughes

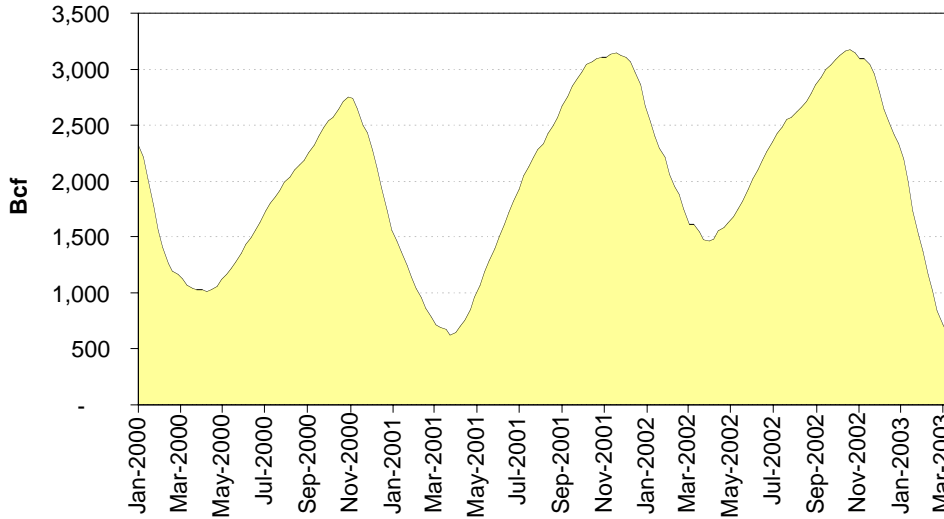


To help supplement currently available natural gas supplies during times of exceptionally strong demand, the utilities and customers withdraw natural gas from storage facilities. At the beginning of this winter, the U.S. as a whole and California specifically had plenty of stored natural gas. As the cold weather set in and natural gas market prices began to rise, more and more natural gas was withdrawn since most users expected weather-related demand to moderate later this winter. Natural gas providers also used stored gas to avoid paying the then-current high prices and control their annual costs. They expected to refill their storage facilities later in the year when demand, and prices, were lower. By February 2003, stored natural gas in the U.S. fell to very low levels. Currently, U.S. stored gas levels are about 50 percent below the five-year average. In total, U.S. stored gas levels are only 24 billion cubic feet (Bcf) higher than the record low of 697 Bcf set on April 12, 1996, according to EIA data. Figure 9 shows U.S. storage levels and Figure 10 displays California's storage levels. California's natural gas reserves in storage are well below last year's levels and near the levels of Spring 2001, when California experienced a previous natural gas market price crisis. Again, California faces a very deep storage deficit that it needs to refill, but this time market prices are much higher. The steep withdrawals over the winter of 2002-2003 can be attributed to a tight supply-demand balance and to those companies who used their own stored gas, withdrawing it to avoid some of the high prices seen in the past couple of months.

Figure 9

U.S. Natural Gas Storage Level

Source: EIA/AGA

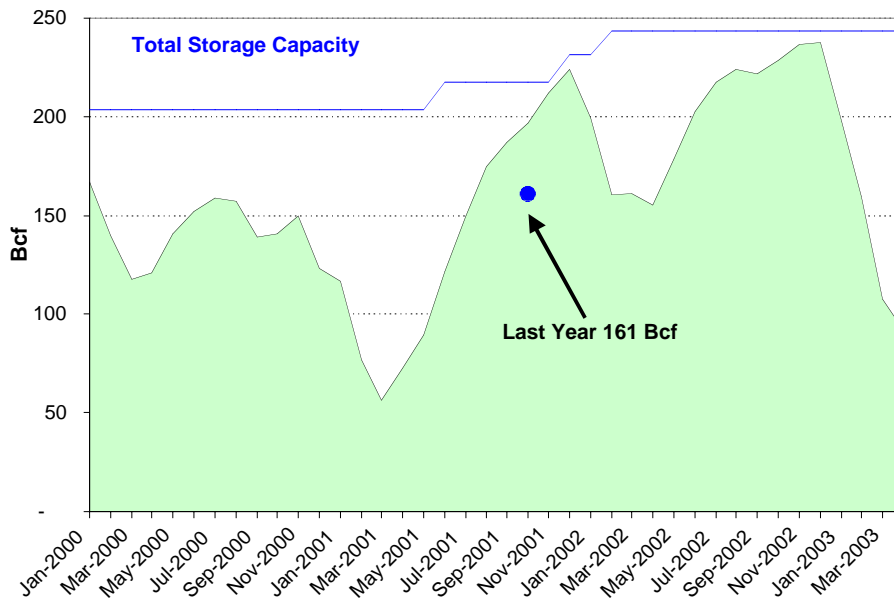


U.S Total Capacity 3,262 Bcf

Figure 10

California Natural Gas Utility Storage Level

Beginning of the month, Energy Commission estimate



The charts indicate that California is slightly better off than the rest of the nation from a storage perspective, although the state is approaching an alarmingly low level of stored natural gas.

National pipeline congestion during mid-February also contributed to price increases. The cold temperatures put significant demand on gas coming through pipelines and caused customers to scramble to get additional supplies to cover their needs. Consequently, some buyers got caught up in a bidding war to secure the supplies they needed in the face of scarce pipeline gas supplies. Pipeline congestion mainly occurred along the East Coast, and the price pressures there affected California too.

Fortunately, California has sufficient pipeline capacity to meet current needs. During this same period, California pipelines were running 50 percent to 70 percent full at various points. At all times, there was surplus pipeline capacity available to bring in more natural gas had it been needed, and California did not experience any pipeline congestion. California's infrastructure did not contribute to any upward pressure on market prices.

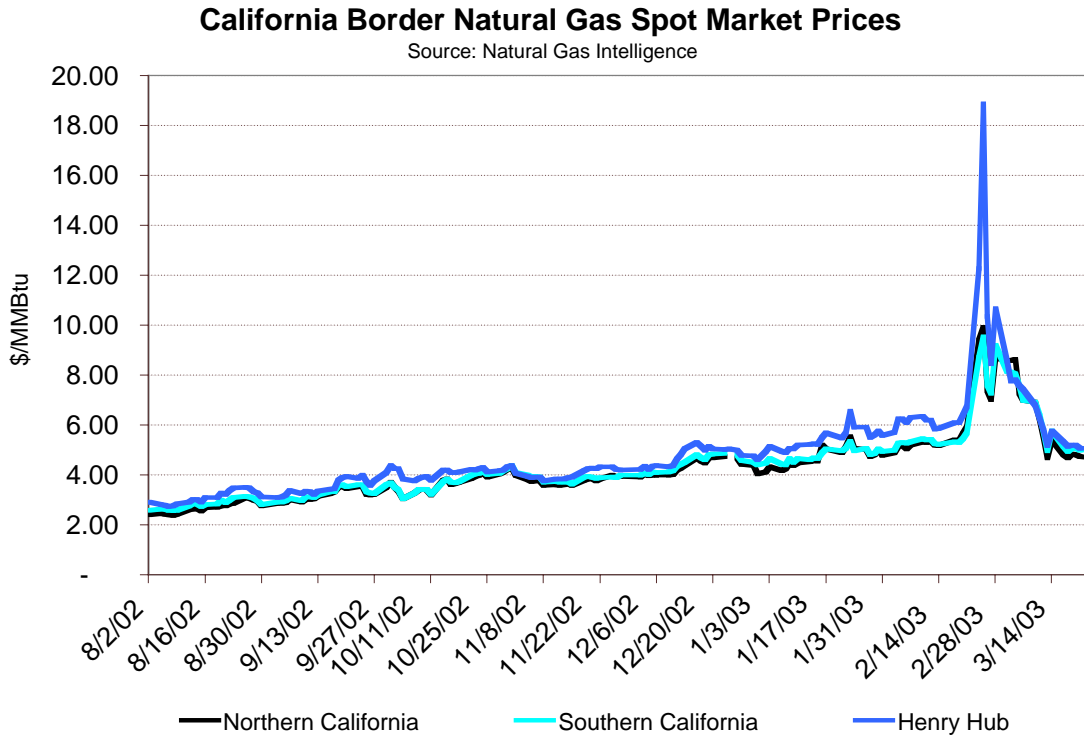
As with the consumption data-quality concerns described above, natural gas production data is questionable and can contribute to increasing natural gas prices. The supply numbers take time to publish and are often revised. These natural gas production and demand data quality issues do not provide a firm factual foundation for the market to use in understanding the past and how it will influence the future. The market's response is often to bid up prices more than is actually warranted to cover any risk of a natural gas shortfall since market traders do not know what is the real, current natural gas demand and supply.

PRICES

Since summer 2002, natural gas daily market prices have increased steadily, from about \$2.50 per million British thermal units (MMBtu, the most common unit of natural gas used in market trading) in August 2002 to higher than \$5.00 per MMBtu currently. In late February 2003, natural gas prices increased sharply. California prices peaked near \$10 per MMBtu and some national prices approached \$25 per MMBtu (prices in New York briefly reached almost \$30 per MMBtu). Figure 11 shows the path prices have taken over the past nine months. The Henry Hub price, the national benchmark, is listed along with the Northern and Southern California border prices, the most common indicators of market prices that affect California. The surprising fact in this chart is how much lower the California prices were than the Henry Hub market prices during this period (and especially below the New York prices identified above). Although market prices at the California border rose rapidly, they were substantially below what the rest of the country was paying. This was due in large part to California's ability to use stored natural gas.

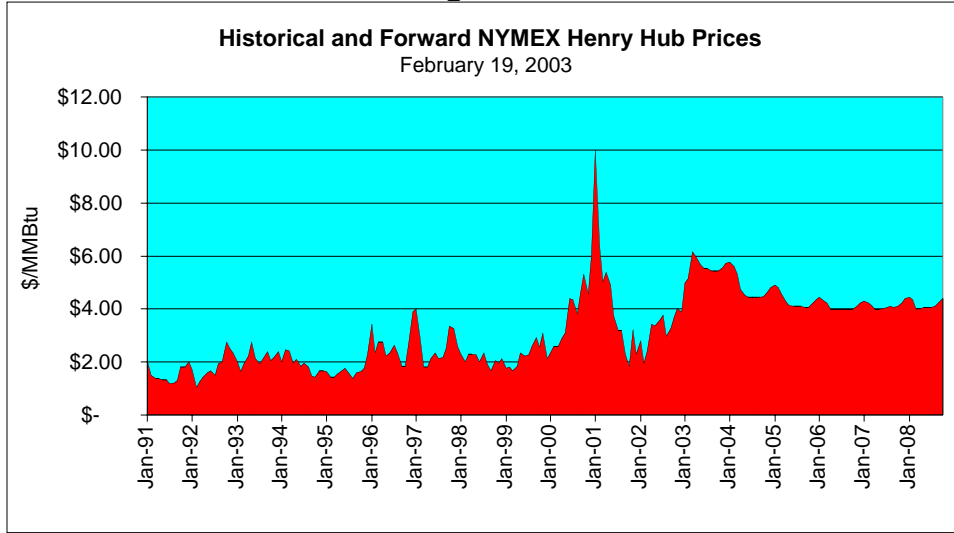
It is interesting to note that although many natural gas market observers predicted that market prices would rise, the traders in the natural gas markets did not fully believe that prices would rise to this extent. The two graphs below indicate the market traders' collective perceptions, as expressed in their bidding for natural gas.

Figure 11



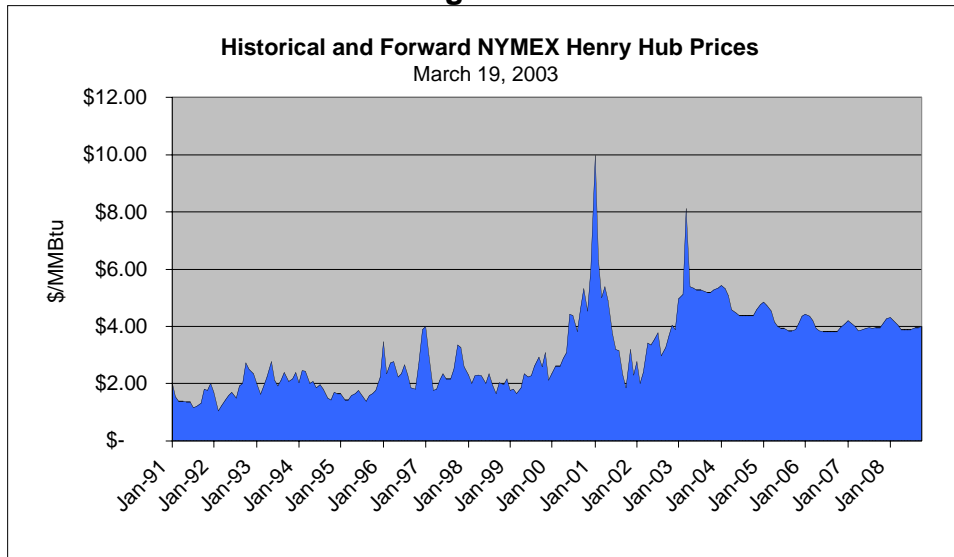
Prior to the \$10 to \$20 natural gas spot market price increases, the futures exchange did not expect the high prices, as shown in Figure 12. The New York Mercantile Exchange (NYMEX) is a market where buyers and sellers trade natural gas contracts for future delivery. On February 19, 2003, the NYMEX price settled at little more than \$5 per MMBtu. However, Figure 13 shows these same futures contract prices on March 19, 2003 with the price peak in late February 2003 and early March 2003. If, on February 19, 2003, these market traders had expected the spot market price spike that started on February 24, they would have bid the futures contracts in a manner consistent with the March 19, 2003 chart—but they did not.

Figure 12



Source: New York Mercantile Exchange

Figure 13



Source: New York Mercantile Exchange

Just like the data quality problems for production and consumption, data regarding natural gas market prices also has problems. Some industry participants have been charged (and pleaded guilty) with attempting to manipulate published natural gas prices by providing false or inaccurate information. Such market trading behavior places additional uncertainty on the prices quoted and this uncertainty typically puts upward pressure on prices.

Market traders price bids for natural gas are also affected by their perception of how world events might affect their markets. During this same period, market traders have bid the price of oil much higher than normal based on their concerns about the unrest in Venezuela and the potential war in Iraq. While these events affect oil, the natural gas market is closely linked and affected by large swings in oil prices.

ADDITIONAL MARKET CONCERNS OVER THE NEXT 12 MONTHS

Several concerns regarding future natural gas prices stem from this analysis. One is the low level of natural gas now in the in-state storage facilities and the need to refill both the California and national storage facilities over the next six months. Having enough gas in storage helps to balance supply and demand. In addition, it provides insurance against price increases allowing storage customers to use natural gas in storage and avoid paying higher prices in the future. However, a strong demand for storage refilling in the near term may put upward pressure on prices in the immediate future. Yet, without enough natural gas physically in storage for the 2003 summer peak electricity generation demand season and the 2003-2004 winter heating season, a reliable natural gas supply at reasonable prices may be at risk.

Another major concern involves the data quality of natural gas consumption, production, and price indexes. By not having good quality data, natural gas market participants typically settle on higher prices to insure against surprises and risks. The FERC and the Commodity Futures Trading Commission are currently investigating the issue on a national basis. California should assert that this investigation (and a companion future investigation by EIA) should continue with the goal of good quality, timely, and transparent data for all participants. Improved data about the natural gas market will give buyers and sellers information they can use to make sound decisions and avoid over-bidding strategies to ensure adequate gas supplies.

While this report focuses on natural gas market prices, increases in these prices will impact the cost to produce electricity, since natural gas fuels many of the state's power plants. Regional day-ahead electricity prices rose from near \$40 per megawatt-hour in early February 2003 to \$58 per megawatt-hour on February 24, 2003. They then spiked to \$145 per megawatt-hour on February 26, 2003. The significance of this fuel cost price increase is being further evaluated.

In California, thermal power plants fueled by natural gas are used when other less costly sources of electricity cannot meet the current electricity demand. Hydroelectric generation is normally fully used when it is available. The availability of hydroelectricity is determined by weather in the form of rainfall and snowfall. Earlier information on rainfall and snowpack in California and the Pacific Northwest (California buys substantial hydro-generated electricity from the Pacific Northwest when it is available) indicated well-below normal levels and therefore below-normal forecasts of electricity from this source. The Energy Commission staff conducted an update of the California and Pacific Northwest hydro situation on March 22, 2003, and found that the recent storms have boosted the total rainfall and snowpack. The forecast of total energy from California hydroelectric sources is now 80 percent of average. This will reduce pressure on natural gas demand for power generation this summer, compared to our earlier forecasts and conservative assumptions used to estimate our electricity supply/demand balance situation.

HIGH NATURAL GAS PRICES CAUSE HIGHER ENERGY COSTS FOR BOTH NATURAL GAS AND ELECTRIC CONSUMERS

CALIFORNIA'S NATURAL GAS MARKET INCLUDES A WIDE RANGE OF CONSUMERS

The California natural gas market consists of residential, commercial, industrial, and electric generation customers, including many large power plants in the state, and a few natural gas vehicles. Natural gas utilities deliver through their pipelines about 85 percent of the natural gas consumed, but only about a third of that gas is bought by the utilities on behalf of utility ratepayers. Southern California Gas Company (SoCalGas) and Pacific Gas and Electric Company (PG&E) are the two largest natural gas utilities in the state. Of the gas delivered by both, 92 percent is delivered to their own customers and the remaining 8 percent to wholesale customers such as San Diego Gas & Electric (SDG&E), Southwest Gas, and the cities of Long Beach and Palo Alto.

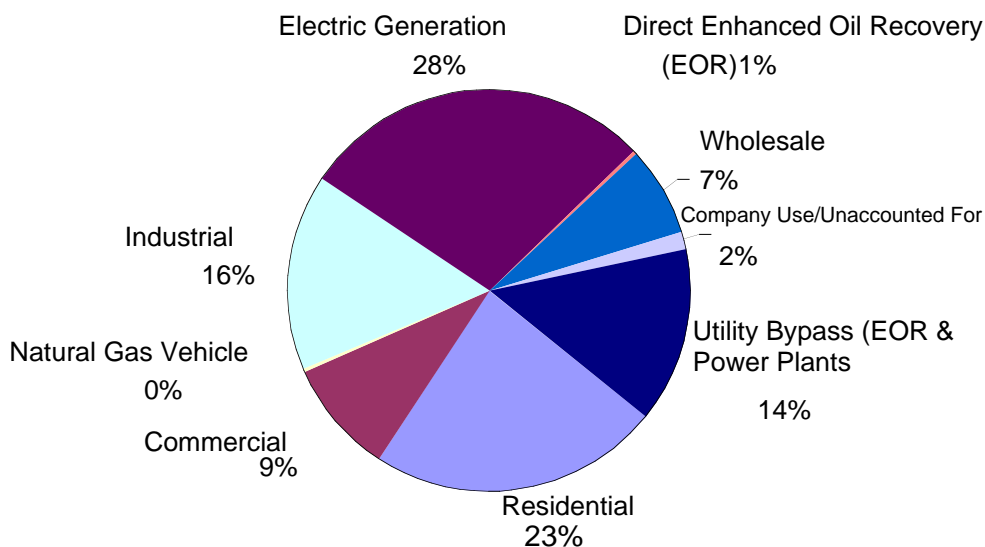
Smaller ratepayers (i.e. "core" ratepayers), such as residential and small commercial customers, are allowed to arrange for gas procurement from an alternative gas supplier, but overwhelmingly choose the utility to procure natural gas on their behalf.⁴ This procurement rate is "bundled" with the rate charged for the delivery of the natural gas. The total utility gas procurement rate changes every month for almost all California natural gas "core" ratepayers to reflect market changes in the costs of natural gas.

Larger utility customers (i.e. "noncore" ratepayers), such as industrial customers or electric generators, consume most of the utility-delivered gas. These large customers typically procure natural gas on their own, either by directly arranging for their own supplies and pipeline and storage capacity rights, or by simply buying gas from a non-utility natural gas marketer. Figure 14 shows the portions of overall end-use deliveries by customer class.

⁴ The utilities' costs associated with the purchase of natural gas are generically described as "procurement" costs. Procurement costs include both the costs of purchasing gas directly from producers or marketers, as well as the costs (or gains) associated with entering into financial instruments to hedge the price risk of natural gas purchases. The combination of costs incurred in the physical and financial markets, divided by the amount of natural gas delivered to customers, basically determines the retail natural gas procurement rate charged to ratepayers. The procurement rate may also include interstate pipeline capacity costs.

Figure 14

2002 Estimated Calif. IOU Natural Gas Deliveries by Customer Class



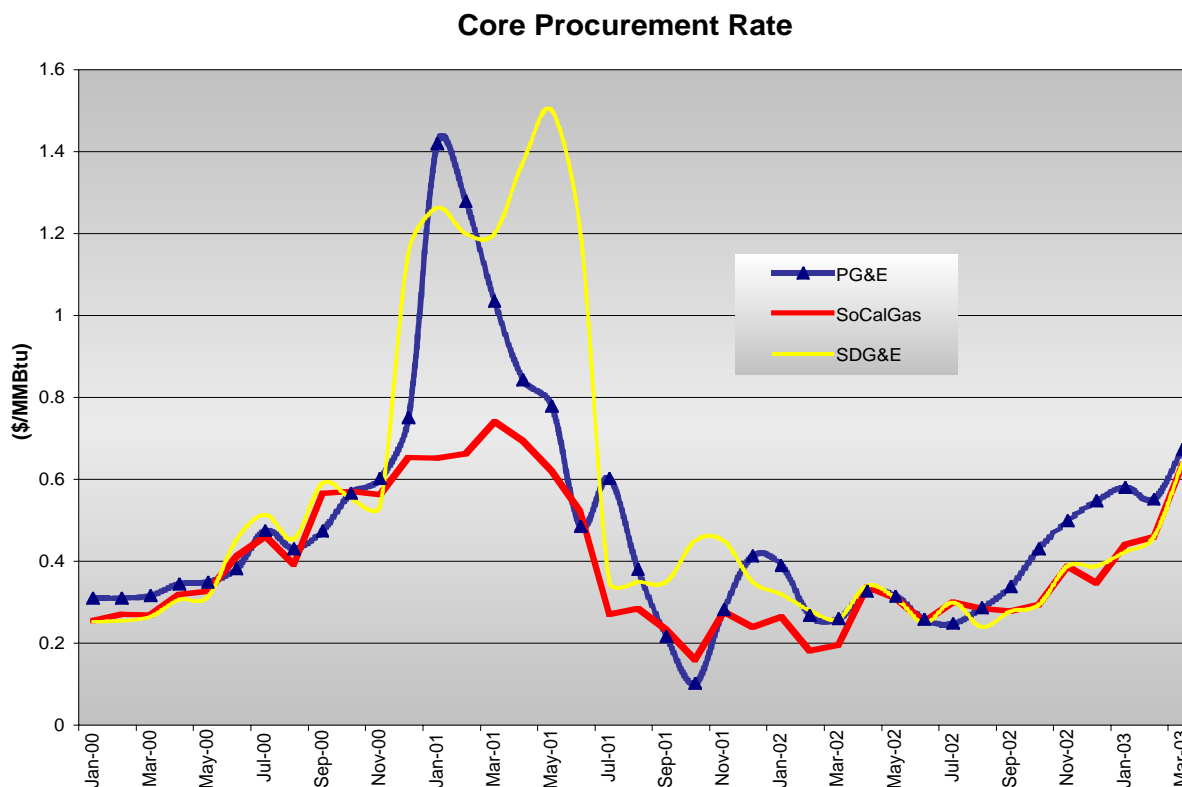
About 15 percent of California's natural gas is delivered directly to consumers over non-utility pipeline systems. Such deliveries are referred to as "bypass" deliveries. Of the bypass deliveries, about half is delivered from California natural gas sources, and half is delivered over the Kern/Mojave Interstate Pipeline. Customers accessing these sources are primarily electric power plants and "enhanced oil recovery" customers in Kern County.

RETAIL PRICES TO NATURAL GAS CONSUMERS SHARPLY HIGHER

All of these consumers of natural gas have been significantly hurt by the recent increase in natural gas market prices. Figure 15 shows the procurement rates charged to residential customers by PG&E, SoCalGas, and SDG&E from January 2000 through March 2003. The procurement rate charged in March 2003 by SoCalGas is more than three times higher than the procurement rate charged in March 2002 - PG&E's rate is more than two-and-a-half times higher.⁵

⁵ SoCalGas' natural gas procurement rates have typically been lower than PG&E's and SDG&E's in recent years for a variety of reasons. These reasons include slightly different methods of calculating the rates, SoCalGas's greater access to natural gas storage for core customers, and SoCalGas' lower reliance on border purchases during the 2000-2001 energy crisis.

Figure 15
Monthly Natural Gas Procurement Rates for PG&E, SoCalGas, and SDG&E



The California natural gas utilities purchase the majority of their natural gas through monthly, seasonal, or annual contracts with producers and marketers, and much less on the daily spot market. Consequently, they have limited the exposure of daily spot market price spikes to their customers.

The CPUC estimates that California utility core ratepayers will pay over \$325 million more for natural gas costs in March 2003 than in March 2002 due to the procurement rate increase. Still, procurement costs over the past winter were considerably less than during the winter of 2000-01.

The CPUC does not have access to the actual supply arrangements and costs of large consumers who buy their natural gas from marketers or who make their own gas supply arrangements. Some of these customers may have arranged long-term supply contracts or may have hedged their natural gas price risk using some combination of storage and financial instruments. Assuming that these consumers are paying a price for natural gas that is close to the "California border price," and failed to hedge their price risk, they also would have been faced with increased gas costs of hundreds of millions of dollars in March 2003 compared to March 2002.

HIGHER NATURAL GAS PRICES ALSO INCREASE ELECTRICITY COSTS

California is heavily dependent on natural gas as a fuel for electric power. About 35-40 percent of the electric power required in California to meet peak electric demand is fueled by natural gas. About a third of the natural gas consumed in California is delivered to electric generators.

Some of the electric supply contracts in the portfolio of the electric utilities (i.e. some Qualifying Facility (QF) and Department of Water Resources (DWR) electric contracts) are directly indexed to natural gas prices, while others are at fixed electric prices. For the electricity supply that is indexed to natural gas prices, the price of that electricity is obviously going to increase with higher natural gas prices.

The electric rates of the three major electric utilities in the state have not yet increased to reflect the recent increase in natural gas prices. Unlike natural gas rates, electric procurement rates do not routinely change every month to reflect changes in market conditions. Electric procurement rates can be changed by the CPUC based on evidence that a rate change is needed. With regard to non-DWR electricity costs, the CPUC is required to increase electric procurement rates if utilities' unrecovered non-DWR electricity costs are more than 5 percent greater than the previous 12 months non-DWR electricity costs. With regard to DWR-related electricity costs, the CPUC is required to pass along to electric utility ratepayers increased costs that DWR determines that it incurs.

Customers who do not buy electricity from utilities are hurt by natural gas price increases to the extent they have not entered into fixed price contracts or otherwise hedged the price risk of natural gas.

CALIFORNIA UTILITIES HAVE TAKEN STEPS TO MITIGATE THE IMPACT OF NATURAL GAS PRICE INCREASES

California gas utilities do not own any gas wells. They must purchase all of the natural gas they obtain for core customers or for power plants from natural gas basins, from marketers at the California border, or from California producers.

California receives natural gas supplies from Canada, the Rocky Mountains, the southwestern U.S., and California sources. California natural gas utilities procure gas from all of these regions, but primarily from Canada and southwest basins. California gas utilities buy natural gas primarily on a monthly basis, but also buy about 10-20 percent of their supply on the daily spot market, and occasionally enter into supply contracts of longer than one month (typically for a season, such as the winter).

Both natural gas and electric utilities in California have taken a variety of measures in recent years and months to reduce the impact of higher natural gas prices, and

California utilities were already well-positioned to keep natural gas costs in check during the most recent run-up in natural gas prices because of the following factors:

- **Interstate Pipeline Capacity Rights:** These capacity rights help to protect core ratepayers from an increase in the border price beyond the increases seen in the basins. (These capacity rights fix the cost of transportation from the basin to the California border, thus isolating any price increases to those occurring in the basin.) In addition, these capacity rights provide utilities with a diverse mix of supplies from various supply regions, fostering basin-on-basin competition.
- **Natural Gas Storage:** PG&E, SoCalGas, SDG&E, and Southwest Gas own or have access to natural gas storage. Storage not only improves the reliability of supply, it also helps to reduce the impact of short-term or seasonal increases in natural gas prices, particularly during the winter.
- **Incentives to Lower Gas Costs:** PG&E, SoCalGas, and SDG&E all operate under gas cost incentive mechanisms. These ratemaking mechanisms provide a financial incentive to procure natural gas at low cost for their core ratepayers. The utilities are given flexibility to procure natural gas in a manner that helps keep overall gas costs low. For example, they may use financial instruments to hedge the price of natural gas. During the past winter, some natural gas utilities used financial instruments to keep prices in check.⁶
- **Portfolio of Supplies:** The incentive mechanisms also allow the utilities the flexibility to purchase natural gas supplies under different contract lengths and pricing terms, and from a variety of supply sources. The utilities operating under incentive mechanisms typically purchase only 10-20 percent of their supplies on under daily “spot” price terms. The bulk of their supplies are purchased under monthly, seasonal, or one-year terms. Thus, ratepayers are largely protected from the wild fluctuations of the daily spot market.
- **Hedging of Gas Price Risk for Electric Contracts:** In late 2001, the electric utility Southern California Edison (Edison) entered into financial instruments to hedge the price risk of their gas-indexed QFs for 2002 and 2003. These arrangements are now helping to keep Edison’s electric costs in check. In early 2003, SDG&E and PG&E also hedged the price risk of natural gas associated with some of their electric purchases.
- **Additional Interstate Pipeline Capacity Rights:** The “big three” natural gas utilities, Edison, and Southwest Gas obtained additional interstate pipeline capacity rights on El Paso Interstate Pipeline in the fall of 2002, as ordered by the CPUC in Order Instituting Rulemaking 02-06-041(D.02-07-037).
- **Increased Natural Gas Infrastructure:** Working with the CPUC, the regulated natural gas utilities significantly increased natural gas infrastructure in the state in 2001-2002. SoCalGas increased its transmission capacity by 375 million cubic feet per day (MMcfd) in 2001 and 2002 (an 11 percent increase), and its storage capacity by 11 billion cubic feet per day. PG&E increased its transmission capacity by 180 MMcfd. Natural gas transmission capacity to the SDG&E area was increased by 70 MMcfd. Wild Goose Storage began operation in 1999 with capacity of 14 Bcf, and

⁶ PG&E has indicated that it believes it is somewhat limited in its ability to enter into financial instruments and long-term fixed-price contracts due to its financial situation.

an expansion of 15 Bcf is expected to be ready in 2004. Lodi Gas Storage began operation in 2002 with 12 Bcf of capacity.

Significant interstate pipeline expansion authorized by FERC also occurred during this period, and additional expansion is underway.

THE CPUC AND ENERGY COMMISSION HAVE BEEN TAKING ACTIONS TO PROTECT CONSUMERS AGAINST NATURAL GAS PRICE INCREASES

The CPUC and Energy Commission have also taken a number of measures in recent years to protect utility ratepayers against natural gas price increases and costs.

The CPUC has:

1. fought the excess 2000-2001 natural gas costs that were caused by El Paso Natural Gas Company and its affiliate,
2. taken measures to reduce California's demand for and dependence on natural gas,
3. assured that adequate infrastructure is in place to provide reliability of supply, diverse access to supplies, and the ability to manage gas costs, and
4. provided utilities with the flexibility and the tools to manage gas costs.

The Energy Commission has:

1. adopted building and appliance standards that are saving natural gas at a rate of approximately 2.5 billion therms per year,
2. provided funding for development of renewables projects in the amount of \$135 million per year.
3. conducted policy development proceedings to examine natural gas demand, supply, price, and infrastructure needs, including numerous public workshops soliciting viewpoints of all market participants, and
4. along with the CPUC, taken steps to work more closely and constructively with the FERC.

For example:

- **Actions at the FERC:** The CPUC has had a vital presence representing the State at FERC. For nearly three years, the CPUC and others have been arguing at the FERC that the El Paso Natural Gas Company (El Paso) and one of its affiliates engaged in anti-competitive activities, costing California billions of dollars. On March 17, 2003, the CPUC and other parties announced a settlement of this case with El Paso. The settlement will provide over \$1.5 billion to Californians, help solidify the state's natural gas supply, and will help prevent future manipulation of El Paso pipeline capacity. In another FERC proceeding, the Commission also won a \$4.2 million refund from Transwestern pipeline at the FERC for California utility ratepayers, and an additional \$5.8 million for other California shippers. In addition, the CPUC has been involved in fighting at the FERC to assure that California

receive a fair allocation of interstate pipeline capacity on El Paso. Finally, the CPUC is fighting to prevent breakup of PG&E's natural gas system in PG&E's bankruptcy proceeding.

- **Increased Renewables:** In 2002, the Governor signed the Renewable Portfolio Standard (RPS), SB 1078. According to the RPS, 20 percent of California's electricity needs should be generated by renewable sources by 2017. (Increasing California's renewable supplies will diminish the state's heavy dependence on natural gas as a fuel for electric power generation.) As a result, the CPUC and the Energy Commission have jointly charted an aggressive course in a collaborative effort to further expand the State's renewable energy infrastructure. As part of its direction to the investor-owned utilities in the formulation of their short-term energy procurement plans, the CPUC has ordered that the electric utilities increase their procurement of renewable generation by at least 1 percent in 2003.
- **Energy Efficiency:** Due in part to the success of CPUC efforts to promote energy efficiency, California is widely recognized as a leader in energy efficiency programs in the nation. In 2002, the CPUC estimates that its energy efficiency programs saved about 1,619,421 electric megawatt-hours, by shaving 508 peak demand megawatts. This saved about 21 MMcfd in incremental natural gas supplies, which are typically the most expensive supplies.
- **Natural Gas Infrastructure:** In 2001, the CPUC issued a report that examined the adequacy of the state's natural gas infrastructure. The CPUC found that the infrastructure would be adequate through 2006 to provide seasonally reliable amounts of competitively priced natural gas to residential, commercial, industrial, and electric generation customers. In that report, the CPUC also made the following conclusions:
 - Conservation and more efficient electricity production would reduce demand on California's natural gas infrastructure
 - Renewable electricity production reduces gas demand and improves environmental quality
 - Energy efficiency programs help reduce demand
 - Improved coordination between electric and gas operations can enhance reliability

The CPUC is aggressively pursuing many of its recommendations in its infrastructure report by putting more emphasis on renewables, energy efficiency, and conservation.

The Energy Commission examined natural gas infrastructure risk assessment in its "Natural Gas Infrastructure Issues," issued in October 2001.

- **Investigation of Utility Actions:** The CPUC began an investigation (I.02-11-040) into whether utilities were in any way responsible for the gas price increases during the 2000-2001 energy crises.
- **Investigation of Utility Affiliate Relations:** The CPUC began an investigation (I.03-02-033) into the activities of Sempra Energy and its subsidiaries and affiliates.

- **Additional Interstate Pipeline Capacity Rights:** As noted above, in 2002 the CPUC ordered PG&E, SoCalGas, SDG&E, Edison, and Southwest Gas to obtain additional interstate pipeline capacity rights as a hedge against rising natural border gas prices and to improve the reliability of natural gas deliveries to the State.
- **State Government Coordination:** The CPUC and Energy Commission are actively involved in a Natural Gas Working Group (NGWG), led by Resources Secretary Mary Nichols, to review developments in the natural gas market, share information, and coordinate state agencies' actions.
- **Low-Income Programs:** CPUC programs, such as California Alternate Rates for Energy (CARE) and Low-Income Energy Efficiency (LIEE), help low-income customers to cope with high energy bills.
- **“Level-pay” Programs:** CPUC-approved utility tariffs allow customers to spread out the cost of their utility bills.

RECOMMENDATION: CALIFORNIA SHOULD TAKE FURTHER ACTION TO MITIGATE THE IMPACT OF HIGH AND VOLATILE NATURAL GAS PRICES AND ASSURE A LONG-TERM RELIABLE SUPPLY

California government and its regulated utilities have the responsibility to provide a reliable supply of natural gas at reasonable prices and acceptable market risk consistent with environmental protection and public health and safety goals. Although significant improvements have already been made to improve the state's situation since the price increases of 2000-2001, additional actions should be taken. These actions can address:

- short-term needs to protect California consumers from market price volatility,
- mid-term needs to help reduce average market prices,
- long-term needs to secure adequate supplies to meet our demand, and
- overall needs to manage market price and supply risk.

The nature of the natural gas market has changed significantly in the past decade, since deregulation of both this and the electricity market. To better prepare California to handle a more price-volatile future, state government needs more detailed and timely information on natural gas production, usage, and pricing. The Energy Commission and the CPUC should work with the natural gas utilities, natural gas industry, other state agencies, and the federal government to better meet our state's needs in this area. In the meantime, the CPUC and Energy Commission will continue actively monitoring the natural gas market and analyzing the data they already have.

The Commissions will issue additional energy policy and infrastructure reports by the end of 2003. These reports should be consistent with the basic policy priorities identified in the Draft Energy Action Plan recently issued jointly by the Energy Commission, CPUC, and the California Power Authority (CPA). This Plan identifies the need to maximize all energy efficiency actions before the energy supply actions. State agencies should take coordinated, aggressive measures to protect Californians in light

of current high natural gas prices and high volatility in natural gas market, in both the short and long term. Therefore, the Energy Commission, CPUC, and CPA, working with the Governor's Natural Gas Working Group, should develop a natural gas plan consistent with the principles of the Energy Plan. The Energy Commission also needs to reflect on this plan in its Integrated Energy Policy Report. This natural gas plan should help California chart a new course that ensures a reliable supply of natural gas to meet our needs, helps insulate it from the volatility of market prices, and achieves reasonable prices, all consistent with the state's environmental protection goals.

California should take the following measures into consideration:

- increase demand side management and conservation programs for natural gas and electricity,
- encourage private developers to continue to modernizing and replacing older, less efficient thermal power plants to improve statewide fuel efficiency,
- continue to monitor and enhance CPUC low-income energy programs, CARE and LIEE,
- review and approve natural gas supply plans of electric utilities who assumed operational and administrative control of DWR contracts,
- reexamine the adequacy of natural gas infrastructure to ensure future reliable deliveries with a prudent surplus delivery capacity, and encourage ample access to the lowest-cost supplies, focusing on the Rocky Mountains, San Juan, and Canadian supply basins,
- assess the need for additional natural gas storage capacity in California,
- develop appropriate mechanisms to make certain that noncore customers employ adequate storage of natural gas, or that utilities provide adequate storage of natural gas on noncore customers' behalf,
- develop a coordinated operational plan for electric and natural gas utilities to enhance efficiency and reliability,
- ensure that natural gas utilities have appropriate incentives to buy gas in lowest-cost producing basins, and employ a prudent mix of short and long-term commitments, and a mix of physical and financial options,
- establish government-to-government relationships with key natural gas supply states,
- encourage additional California natural gas production, consistent with environmental protection objectives, and
- consider a statewide policy on importing LNG and possible construction of LNG receiving terminals in California.

Since most of the natural gas market price issues are the result of national events, actions to improve the state's and the nation's situation also must be taken at the national level. California must encourage the federal agencies to thoroughly oversee these issues and to aggressively seek solutions to current and future problems. For example, California must strongly support the Federal Energy Regulatory Commission (FERC) in its investigation of natural gas market price reporting. An effective resolution to this issue will benefit all parties, including California.

Natural gas is a critical component of our short-term and long-term energy future. We cannot afford to allow California's future to be determined solely by national market forces. Our citizens, the natural gas consumers, our economy, and our environment all depend upon a reliable supply of this key fuel at reasonable, stable prices. We must act aggressively in order to fully meet that goal.