



NEWGATE CAPITAL MANAGEMENT LLC

• THE FUTURE OF NATURAL GAS •

Natural gas is perhaps America's greatest natural resource. It is abundant, relatively easy to extract, requires less post-extraction processing than oil, and is the cleanest of the fossil fuels (in both carbon and particulate emissions). Additionally, these processes employ a lot of people. Despite these apparent advantages, there has been no US policy explicitly designed to increase the use of natural gas. Newly found deposits of gas and advances in drilling technology have led to increased production of natural gas. Yet with no significant new sources of demand and overall economic weakness as a result of the US recession, prices for gas have collapsed. Gas effectively costs the same as it did at the end of 2002, albeit with several major price spikes (most notably due to the Gulf of Mexico hurricanes in 2005) and then subsequent declines.

It seems clear that the country should, and likely will, take affirmative action to increase the use of natural gas over the next decade. Substantial increases in demand are likely to take place only by a structural change in gas applications, rather than simply by an increase in current usage. The most likely scenario is to increase the use of natural gas as a source of electricity generation. Economic improvement will also boost demand, but without a structural change in energy policy, it is unlikely to shift the demand curve to the right.

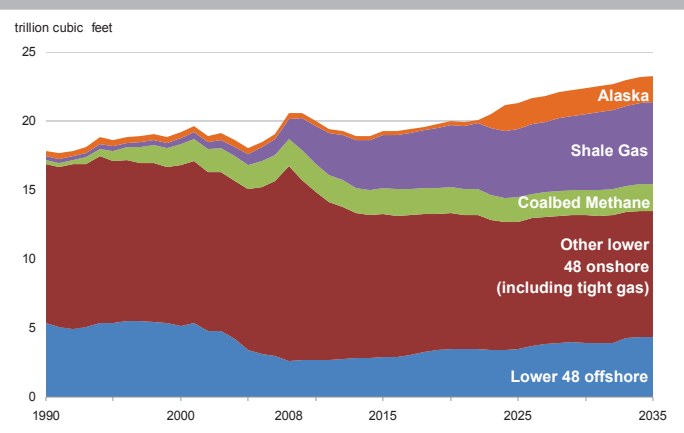
Investors are faced with difficult choices regarding how to best take advantage of opportunities related to natural gas. Given its abundant supply, it is not clear how great an impact increased demand will have on pricing. Furthermore, natural gas futures have proven difficult to navigate successfully. As an alternative, investments in natural gas companies should provide returns from the increased use of natural gas, while at the same time addressing the price risk of natural gas. Gas related companies, including servicers, drillers, pipeline operators and those that build gas storage and transportation facilities, are likely to see an increase in business (and profits) as the country shifts to natural gas power.

SUPPLY CONSIDERATIONS FOR NATURAL GAS. It is generally accepted that the US has vast amounts of natural gas. However, for several reasons the exact amount of gas is hard to determine. One issue is the classification standards mandated by federal rules. To qualify as a "reserve" the gas has to be in the ground *and* be viable for extraction both technologically and economically. The improvements in drilling technology have resulted in consistent upward revisions to the estimates of gas available for consumption. Fluctuations in the price of gas also result in changes in what is determined to be "economically viable." Consequently there is inconsistency in the different measures of reserves depending on the timing of the evaluation. This creates the counterintuitive situation where increases in the price of gas result in additions to reserves. Chart 1 below shows the nature of US natural gas reserves by type. Note how fluid the concept of a reserve can be, changing with price and drilling technology in addition to new discoveries.

The MIT Energy Initiative¹ has used an estimate of 2,100 trillion cubic feet as the US resource base. This represents 92 years of the natural gas supply at today's level of consumption. But this figure largely ignores gas reserves (including frozen gas called methane hydrates) that are commercially nonviable given today's technology. Even if sources differ as to the size of US reserves, it is clear that they

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CHART 1: US NATURAL GAS BY PRODUCTION SOURCE



Source: U.S. Energy Information Administration, Natural Gas Annual, 2007, DOE/EIA-0131(2007) (Washington, DC, January 2009) and Office of Integrated Analysis and Forecasting. Projections: AEO2010 National Energy Modeling System, run AEO2010R.D111809A

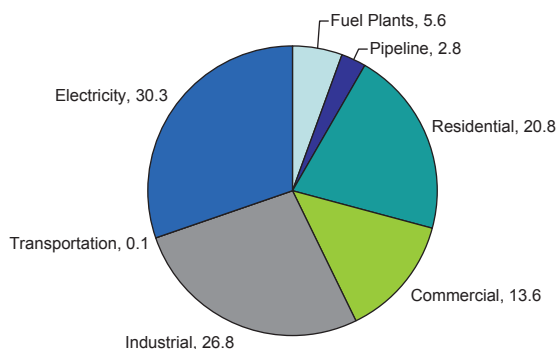
are sufficient to warrant not only further exploration but infrastructure development that increases US consumption of gas relative to other carbon based fuels.

DEMAND CONSIDERATIONS FOR NATURAL GAS.

Natural gas has many uses but can be divided approximately into thirds: 1) electricity generation, 2) direct use (home and commercial heating, hot water and cooking) and 3) industrial use (including the manufacture of chemicals, plastics, agricultural operations and similar uses). Chart 2 provides greater detail on gas usage.

Over the short term, weather is the primary determinant for natural gas demand. Historically, demand for gas was highest in the winter and lowest in summer, reflecting its use in home heating. The seasonal cyclical-ity has been muted recently due to the increased use of

CHART 2: 2009 US NATURAL GAS CONSUMPTION



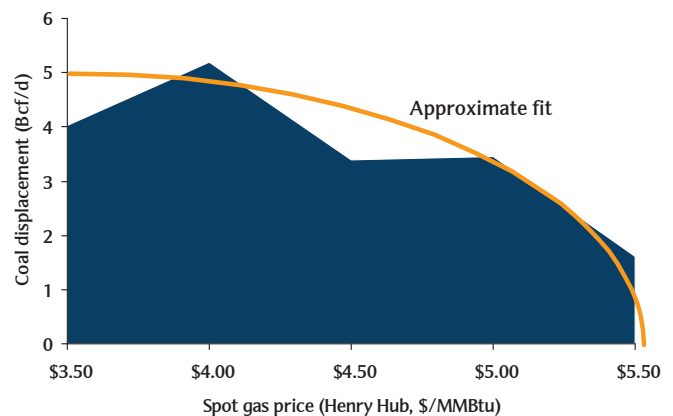
Source: U.S. Energy Information Administration

gas for electricity generation in the summer. Even though electricity is the dominant use for natural gas, only about 18% of all electricity is generated by gas, while almost 50% comes from coal.

Two factors impact demand for gas in electricity generation. The first is gas price relative to coal. Historically, coal has been a cheaper source of electricity generation than either gas or oil. However, given depressed prices for gas and increased demand for coal (largely from China), this historical relationship is being challenged. Chart 3 shows the levels at which gas displaces coal.

The second factor involves environmental regulations. Gas is by far the cleanest of any fossil fuel (see Table 1) Of major potential importance is any change in regulation on carbon dioxide (CO₂). If the US enacts a carbon tax, a “cap and trade” regime for CO₂, or any other concerted effort to reduce CO₂, natural gas use would likely increase significantly. Should other major coal

CHART 3: COAL DISPLACEMENT



Source: EIA, Platts, Barclays Capital

producers enact similar rules (especially China, which gets approximately 70% of its electricity from coal), coal prices in the US would likely fall, reducing the use of gas². The precise impact is unknown, especially since the political climate in Washington makes major environmental policy changes unlikely. However, the environment is still a long term consideration, as well as a transnational one.

POSSIBLE NEW USES FOR NATURAL GAS. Given that the US has so much gas, the question is how best to exploit it. In the absence of policy changes, demand for natural gas would appear range bound. Weather impacts create a great deal of volatility in demand, yet weather is exogenous and unpredictable. Industrial demand for gas is directly tied to the overall state of the economy, but the underlying factors are well known (and modeled) once the economy becomes more certain.

¹ The MIT Energy Initiative has made preliminary reports available on its website, web.mit.edu/mitei/research/studies/naturalgas. It was an invaluable resource in preparing this note.

² Midwestern states and Texas are the largest consumers of coal, while Northeastern states (including New York and New Jersey) use the least coal.

While natural gas is widely used for electricity, it may be surprising that despite its apparent advantages as a fuel source, the US does not generate *more* electricity from natural gas. The reason is shocking given today's acknowledgement of the vast quantity of gas in the US. In the late 1970s, geologists believed that the country was running out of natural gas. In 1978, Congress passed the Power Plant and Industrial Fuel Use Act. Though repealed in 1987, for nine years the construction of additional oil or natural gas burning power plants was illegal. Combined with negative reactions to nuclear power post-Three Mile Island and pressure from coal states' political leaders, coal became entrenched as the country's primary source of electricity.

Table 1: Fossil Fuel Emission Levels*

Pollutant	Natural Gas	Oil	Coal
Carbon Dioxide	117,000	164,000	208,000
Carbon Monoxide	40	33	208
Nitrogen Oxides	92	448	457
Sulfur Dioxide	1	1,122	2,591
Particulates	7	84	2,744
Mercury	0.000	0.007	0.016

*Pounds per billion Btu of energy input
Source: EIA - Natural Gas Issues and Trends 1998

Second to electricity, transportation requires the greatest amount of energy. This need is met almost exclusively by oil. Natural gas as a transportation fuel currently has limited applications, mostly for some buses in select cities and in airports and other closed loop systems. Natural gas is also used in the production of ethanol, a small but growing source of transportation fuel. Over 70% of the petroleum consumed in the US is used as a transportation fuel. Industrial applications represent the balance. Home heating is a distant third for oil uses.

Although the concept of "energy" is widely discussed, energy is not fungible. Quite to the contrary, energy is highly segmented by both source and use. As a result, we believe that only a conscious and likely publicly led initiative will promote the increased use of natural gas.

The most likely catalyst for using natural gas as a transportation fuel is not direct application but by the increased use of electricity as a transportation fuel in electric cars. Modifications to the electricity grid will have to be made to accommodate electric cars. Adding gas power into the grid may become part of a coming national infrastructure upgrade.

THE EFFECT OF CONTANGO. The natural gas market has unique features compared to other commodities. It is highly seasonal, with an undulating futures curve that peaks in mid-winter reflecting use for heating. In contrast,

the futures curve tends to be in one continuous arc.

The natural gas market also has had a recent tendency to be steeply in contango, meaning contracts for future delivery have higher prices than the current spot price. This makes passive investing in natural gas futures (or the ETFs that follow this strategy) poor investments. Passive managers must settle contracts at expiration at their current prices, but reinvest at higher prices due to the shape of the curve. At times, this can cost 20% in a year (in other words, the price of gas would have to increase by 20% just for the investor to break even).

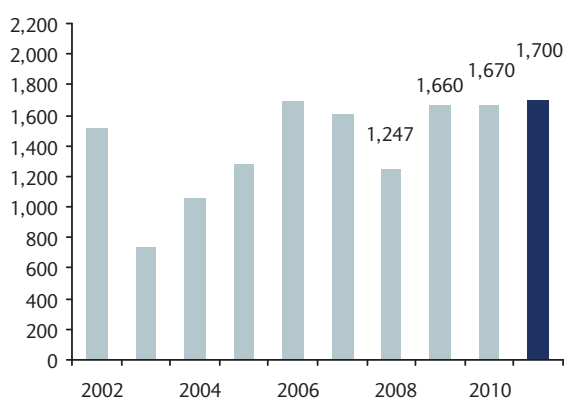
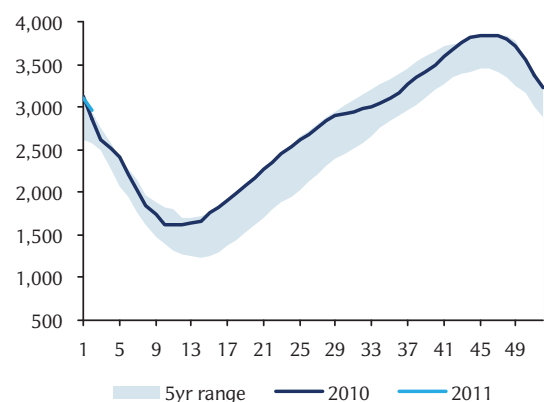
The recent steep and persistent contango in the natural gas market has another, more subtle effect. The steep contango encourages natural gas producers to maintain an aggressive drilling schedule, far more aggressive than one would expect simply by looking at current spot prices. Why? Because natural gas producers often hedge, selling most of their production for the coming year at the (higher) forward prices. Producers often hedge several years out. The amount of hedging varies by producer, based on both the shape of the curve (steeper contango encouraging more hedging) as well as their predictions for prices in the future.

Another consideration encouraging production of natural gas despite relatively low prices is the prevalence of Held to Production (HTP) contracts. These require developers who lease land for drilling to actually attempt to produce gas, or the lease will terminate. These contracts also serve to encourage drilling that otherwise might be postponed until spot prices rise.

So natural gas producers are encouraged to "buy low" (by extracting gas today) and "sell high" by selling gas for delivery in the future. As long as this trade is profitable, there will be downward pressure on prices as supply swells awaiting future delivery. What happens to all this gas? It ends up in storage. We see the impact of this in the amount of gas in storage in both the US and Canada (Chart 4). While down from record highs, gas in storage is still near the theoretical capacity in the system of approximately 4.3 trillion cubic feet.

IMPACT ON PRICING. Combined, these factors explain the long term behavior of the natural gas market. Even though demand is increasing, and there is some reasonable indication that this trend will continue, the price of natural gas (in the absence of some severe weather events) has been effectively stagnant. The key factor is the same thing that makes it so attractive, its abundance. Not only is natural gas plentiful, but relative to oil it is easy to extract. The explosion of the *Deepwater Horizon* drill rig and subsequent difficulty in capping the damaged wellhead demonstrated the difficulties and expense of drilling wells not only deep, but often miles under the ocean floor. In contrast, there are significant unexploited natural gas reservoirs available either onshore or in relatively shallow water off the coast.

CHART 4: NATURAL GAS STORAGE



Source: Barclays Capital Natural Gas Weekly Kaleidoscope 01/2011

WHAT TO DO. How can one invest in a more natural gas powered future without taking on explicit price risk on gas itself and subjecting the portfolio to a continued contango in the natural gas market? There are several options.

- **Natural Gas Companies** – Natural gas companies often hedge themselves. Some hedge more, either by selling more production or extending the time over which production is sold. Companies with more robust hedge books, as well as those that have demonstrated some success in hedging, should have less sensitivity to current prices. In addition, companies with large reserves relative to current production also have reduced sensitivity to short term price fluctuations, since the market pays more attention to the value of reserves and less on earnings generated by current production.
- **Gas Focused Servicers and Drillers** – Regardless of the short term volatility of natural gas prices and the technical nature of futures trading, companies that extract gas from the ground need drilling, pressure pumping, wellhead equipment and related services. The revenue for companies in this sector is not dependent on the price of natural gas. Short term, these companies are correlated to gas prices. But if the long term outlook is correct and natural gas becomes more widely used, the future for servicing and drilling companies becomes very positive.
- **Pipeline Companies and MLPs** – Unlike oil, which is easily shipped between ports and between countries, gas is much more difficult and expensive to transport. Transportation costs are significant relative to the underlying price of gas. This is

evidenced by the substantial basis, or cost differential, between gas at different locations, even within the US. Gas pipeline companies, often structured as Master Limited Partnerships, make money on the movement of gas, not its price. As a result, these companies should participate in the growth of gas as a fuel even if prices remain low. In some ways, these companies actually benefit from lower prices, as they make gas more competitive than other fuel sources, notably coal.

- **Engineering and Construction Companies** – A more natural gas fired future requires significantly more infrastructure for gas transportation, storage and conversion to electricity. This is especially true for those regions that currently have little gas production, such as those above the Marcellus Shale in eastern Pennsylvania and New York.
- **Utilities** – The ability of utility companies to benefit from increased use of natural gas will be dependent on regulatory bodies at both the national level regarding carbon generation and local level regarding rate setting.

CONCLUSION. From a public policy and macroeconomic perspective, it appears logical that the US energy “portfolio” is likely to become more gas intensive in the years and decades to come. Investors will reallocate their portfolios to accommodate this change. However, the primary beneficiary of increased gas demand may not be gas exploration companies, but those companies involved in the build-out of a natural gas powered infrastructure. We present these ideas not as short term opportunities, but as long term themes likely to influence investor behavior for years, if not decades. ♦

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