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# INVESTMENT STRATEGY UPDATE

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## NATURAL GAS – A STRATEGIC AMERICAN RESOURCE

Imagine that you are a senior government official in a country that has one of the highest per-capita levels of energy consumption in the world and is heavily dependent on imported sources of that energy. Suppose further that you were recently informed that huge domestic deposits exist of a fuel that is much cleaner and more versatile than coal, cleaner and cheaper than oil, and readily accessible, to boot. Presumably, you would jump at the chance to promote such a resource as a path to energy independence.

This is, in fact, the situation in which the U.S. government currently finds itself, and the fuel source in question is none other than natural gas. Natural gas is already used to heat and cool homes and businesses, generate electricity, and even to power buses, trucks, and other commercial vehicles. Advances in drilling methods have made it increasingly abundant in supply. So why don't we use more of it?

### Huge Reserves

It wasn't very long ago that natural gas production was declining in the U.S., despite an increasing number of active drilling rigs. By the mid-2000s, it appeared that any shortfall would have to be offset by importing liquefied natural gas (LNG). Consequently, there was a surge in construction of LNG export facilities around the world and of import facilities here. However, in the space of just a few years and without the expected massive imports, the dearth of natural gas has become a glut and, as a result, the price has plunged. Since the early 2000s, the comparative cost of natural gas to oil (on a BTU-equivalent basis) has dropped by more than half, and currently sells at the equivalent of less than $30 per barrel of oil, whereas oil itself hovers near $80.

What changed in such a short time frame was the development of a better way to tap an enormous but hitherto inaccessible set of domestic reserves: the massive shale formations underlying large sections of the country. The amounts in question are staggering. While the U.S. economy consumes 24 trillion cubic feet (TCF) of natural gas per year, the shales are believed to contain more than 2,000 TCF of economically recoverable reserves. Along with conventional deposits, total U.S. natural gas reserves easily exceed 100 years at current levels of consumption.

Shale formations have long been known to contain significant amounts of natural gas, but because shale is a non-porous rock, the ability to exploit this resource was historically limited. In recent years, however, industry scientists and engineers developed the technology that allows drillers to access this "stranded" gas. By utilizing rigs that can drill horizontally and then pressure-pumping large amounts of water down the bores, the shale is broken up, thereby allowing the gas to flow. The process known as hydraulic fracturing has been used for decades on conventional reservoirs, but only recently has it been employed economically on such a large scale. The majority of gas wells are now drilled horizontally, compared to less than a quarter at the beginning of 2007. Over that short time frame, shale production has jumped from 5% of the U.S. gas total to 12%, and since 2000, offshore gas production has dropped from 24% of annual output to approximately 11%. Hurricanes in the Gulf of Mexico no longer represent as much of a threat to our energy supply.

## The Advantages of Natural Gas

While it is common knowledge that the U.S. is blessed with abundant coal deposits and a modest amount of oil, it is fortuitous that we should also have such a wealth of natural gas because it is a much cleaner fuel than either of those hydrocarbon alternatives. At a time when there is a heavy focus on the global-warming impact of carbon dioxide emissions, natural gas is a clearly superior option, emitting almost 30% less carbon dioxide than oil when burned, and 45-70% less than coal. On top of that, nitrogen oxide emissions are about a fifth of those from oil and coal, while emissions of sulfur dioxide, mercury, and particulates are almost nil.

While natural gas currently supplies 24% of U.S. energy needs, it only fuels a small portion of our transportation fleet. Petroleum and its derivatives, on the other hand, supply 37% of our energy consumption, most of which is used for transportation. Yet, since any internal combustion engine can be converted to run on natural gas, there is no technological limitation to its broader use as a transportation fuel. No other non-petroleum fuel source has that characteristic, and cars that run on solar, wind, or nuclear power are still very much in the realm of science fiction.

With the right infrastructure and increased conservation, natural gas – coupled with nuclear power, cleaner coal-fired plants, and various renewable resources – could supply over 90% of the energy consumed by our economy. Given that we produce domestically nearly a third of the oil we consume, a focus on natural gas could actually eliminate the need for any foreign oil, thereby leading to U.S. energy independence. If we have the gas, it makes no sense to continue sending vast amounts of our nation's wealth to foreign countries that, in some cases, are openly hostile to our way of life.

## But, Not So Fast

So, what's holding us back? First, there are environmental concerns. While natural gas is a significantly cleaner-burning fuel than oil or coal, drilling for it is still not an entirely

benign process. Fracturing a horizontal shale well might require 100 times the water that a traditional well does. In addition, well-fracturing technology relies on a small proportion of chemicals (to reduce friction, etc.) that are pumped in with the water. To date, hundreds of thousands of hydro-fractured wells have been drilled on this continent, with no documented cases of ground-water contamination. Yet the potential consequences of such an event are too serious to ignore, so the EPA recently announced the commencement of a study of the risks from hydraulic fracturing.

Second, increasing the usage of natural gas will take time. Remember that until just a few years ago this country was expecting a supply shortage. The process of converting high-impact fleets, such as taxis and garbage trucks, that can be refueled at a central depot is well-established and ongoing. However, at $12,000 per vehicle, converting the remainder of the 250 million U.S. cars and light trucks just isn't feasible, and would also imply the need to convert or upgrade tens of thousands of service stations. Even with government financial incentives to increase demand for new natural-gas powered passenger cars, the refueling infrastructure would still be an issue, so it would take years for such a changeover to be meaningful. A more likely way to move ahead will be to deploy millions of battery-powered or plug-in hybrid vehicles that are recharged with electricity provided by a more natural-gas oriented fleet of power plants. This is coming, but the ramp up will be gradual here, as well. Increased availability of ever-improving batteries would overcome the most important gating factor.

Regarding our power infrastructure, what could realistically be done to convert more of our electrical generating capacity from coal to natural gas, and over what time frame? First, coal represents 23% of our total energy consumption, and to scrap 1,500 coal-fired power plants would entail overcoming the strenuous objections of utility companies that have invested billions in these assets, and of course of the many thousands of coal workers who would be displaced. Furthermore, since coal is currently cheaper than natural gas, we would be raising our overall energy costs. So, rapidly replacing the entire coal fleet is not practical, either politically or financially. Many of the older, dirtier, and less-efficient coal-fired power plants are being, and will continue to be, decommissioned. Some of the replacement plants will run on natural gas, some on wind power, and some will even be nuclear, but others will also be built to burn coal more cleanly and efficiently. Thus, coal will continue to fuel a significant percentage of U.S. electricity generation for the foreseeable future.

## Conclusion

The bottom line is that while there are few, if any, technological hurdles to replacing imported oil and dirty coal, the necessary developments can't and won't come overnight. But the new abundance of domestic natural gas is truly a game changer, and while the incremental steps towards energy independence may seem small, we believe they will have a material impact over the coming decade. In the meantime, however, wells continue to be drilled and LNG capacity continues to come online around the world, so our natural gas

supply continues to grow. These developments will almost certainly put a cap on natural gas prices.

So what are the investment implications? Simply put, over a two to three year time horizon, we are more comfortable investing in companies that benefit from low and falling natural gas prices, rather than in the gas producers themselves. Such beneficiaries include chemical and fertilizer companies, metal smelters, food processors, and other industrial companies with significant energy costs. The gradual but steadily increasing usage of natural gas should also benefit the companies that design, build, and operate gas pipelines. In addition, families with gas furnaces should have lower heating bills, which would have a positive effect on overall consumer spending.

Finally, we should mention that the fundamental dynamics in the petroleum industry are quite different from those of natural gas. The global demand for oil will continue to expand, in our opinion, due to continuing rapid growth in emerging markets. With new crude supplies proving ever harder to come by, we are maintaining our long-term bullish posture toward oil-specific exploration, drilling, and service companies.

## A Market Comment

March 9 marked the one year anniversary of the current bull market. While we believe the "easy" money has already been made (no, it wasn't really easy), we expect that stocks have still further to rise. Indeed, as we are being constantly reminded by clients, there are significant problems down the road – primarily related to this nation's rising fiscal imbalances. For now, however, the global economy is improving nicely, the U.S. economy continues to surprise on the upside, and U.S. corporations are in an excellent position to grow earnings. At the same time, investor pessimism is such that there remains a huge amount of cash (potential buying power) on the sidelines, earning virtually nothing. Positive earnings reports and rising stock prices seem likely to continue drawing those funds into the market.

So we are bullish on the intermediate-term stock market outlook. Longer term, however, we remain highly attuned to and very cognizant of the growing risks, and will respond and adjust our outlook as the situation evolves. We expect that the canary in the coal mine will be the U.S. bond market. Interest rates are likely to rise over the next 12-18 months, at least in part reflecting those risks. As such, we remain quite negative on U.S. Treasury notes and long term fixed-income investments in general.