BLACKSUMMIT FINANCIAL GROUP, INC

A Registered Investment Advisor
132 Riverview Drive, Suite D Flowood, MS 39232
601.714.1034 Office 601.714.1038 Fax
www.blacksummitfg.com

REMEMBERING THE FUTURE
VOL. 3, Issue 8-9, January-February 2012

The Methane Age: The Upcoming Renaissance of Natural Gas

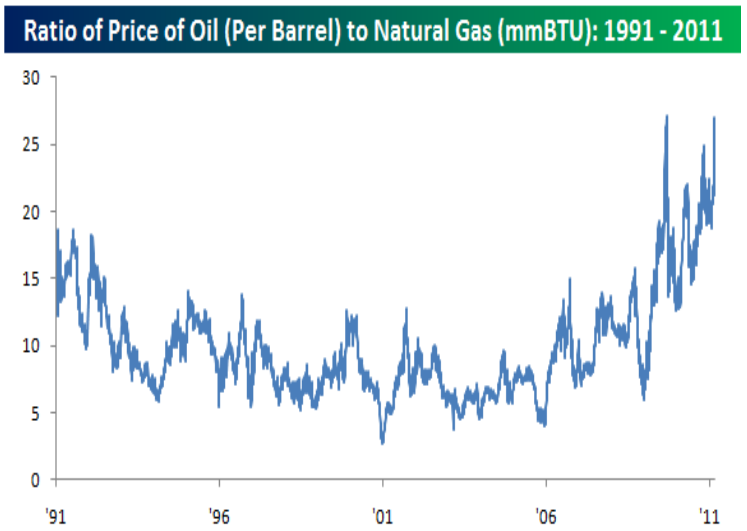
John E. Charalambakis Ph.D., Chief Economist

Introduction

The essence of our argument in this newsletter is that natural gas (natgas) will experience an awakening in the next few years and will become the substitute for coal and petroleum. In that sense, - and as Robert Hefner III and Daniel Yergin state in their respective books The Grand Energy Transition and The Quest – natgas will become the bridge fuel between the age of carbon fuels and the age of renewable energy. Our argument is based on four distinct facts: First, the geostrategic risks associated with oil imports and the corresponding trade deficits will force the next administration to draft an energy strategy revolving around the abundant (conventional and nonconventional) natgas reserves in the US. Second, the fact that natgas is much cleaner, reduces emissions, and makes regulatory environmental compliance much easier, will become an additional incentive for industries to switch from traditional sources (mainly coal and petro) to natgas. Third, the historic evolution of the economy signifies an era of change that produces in turn socioeconomic events that transform society. Such historical changes correspond to new energy sources, especially if those new sources can be found worldwide. Fourth, natgas is cheap relative to oil and this may be the main force that will initiate the transition.

The Price Consideration

Clients and friends may recall our early 2010 summer call for silver. One of our main arguments back then was the fact that the gold/silver ratio was outside its normal and historical confidence interval. Similarly, when we look at the oil/natgas ratio we observe the following graph:



The ratio is at an all time high, and has far exceeded historical norms and averages. We believe that while oil prices may have still some room to increase, the rate of increase for natgas will far exceed the one for oil in the next several years, especially when we take the other factors – explained in this newsletter - into account. We could even dare to say that we would not be surprised if we saw natgas prices more than doubling within the next three-four years.

The current low natgas prices seem to be stabilizing which is a necessary condition for the next phase characterized by higher prices, due to higher demand around the world, especially for electricity production. Moreover, if we start retrofitting cars and equipping

them for natgas consumption, consumers will save at least 500 billion in the next five years and trillions more in the years to come.

In addition, it is a given fact that the full-cycle costs a.k.a. externalities are not fully incorporated into the price of energy produced through coal and oil. Such incorporation would show that the true costs that society pays for these two traditional sources are much higher than the conventional costs, and hence relative to energy produced via natgas, suffer from a significant competitive disadvantage.
The following table shows that when we internalize in electricity production the external costs, then the cost-benefit ratio is prohibitive. Specifically, for petroleum the damages (GED=gross external damages) relative to the value added (VA=value added), has much higher GED/VA ratio than both coal and natgas. Any ratio above 1 signifies that the particular source of energy contributes more negative than positive value to the economy at large.

Fuel type	GED/VA	GED	GED/kwh	GED*/VA	GED*	GED*/kwh
Coal	2.20	53.4	0.0280	2.83 (2.3, 3.7)	68.7 (56.8, 90.1)	0.0359 (0.0297, 0.0472)
Petroleum	5.13	1.8	0.0203	6.93 (5.5, 4.5)	2.5 (2.0, 3.4)	0.0274 (0.0219, 0.0374)
Natural gas	0.34	0.9	0.0085	1.30 (0.6, 2.7)	3.4 (1.4, 6.9)	0.0056 (0.0024, 0.0113)

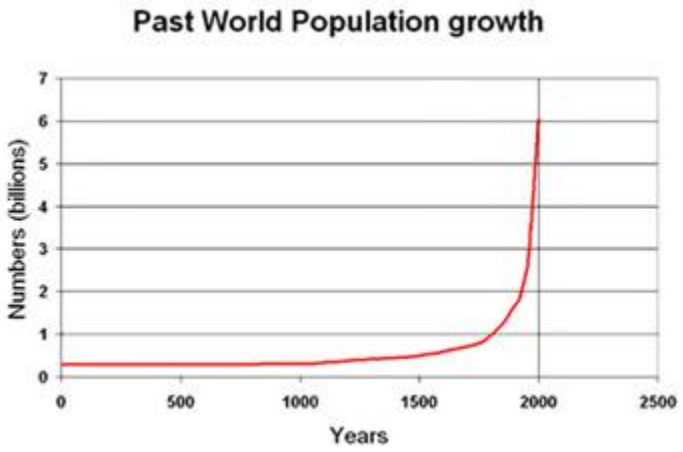
Notes: GED in $ billion per year, 2000 prices. GED* is GED plus damages from CO_2 emissions using a social cost of carbon of $27/tC. Numbers in parentheses use a lower ($6/tC) and upper ($65/tC) bound estimate for the social cost of carbon (Nordhaus 2008b). GED/kwh and GED*/kwh expressed in $/kwh.

As it is evident from the table above, natgas not only does it have the lowest GED/VA ratio, but most importantly the ratio is also below 1.

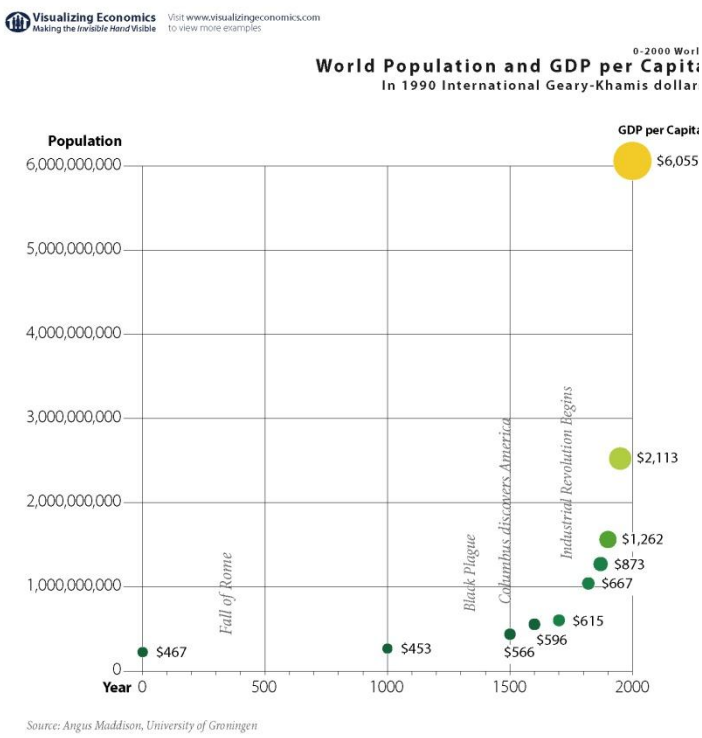
Given the superior environmental qualities of natgas (see section below), it should normally carry a premium over oil, especially when we take into account its value-added element in terms of national security. However, misconceptions about availability (always associated with oil exploration and production) and bad policies of the 1970s (thought to be in shortage and thus its use was prohibited in electric power generation and in other industrial uses) truncated the energy inputs and misallocated capital and resources. These misconceptions – along with subsidies for coal and oil - have not allowed market prices to prevail, which inhibits reserves of being explored and put into the production process, mispricing production and output. The vast quantities of nonconventional natgas i.e. natgas not associated with oil exploration, will assure low prices, efficient cost structures, and sustainable growth that will be offsetting other imbalances.

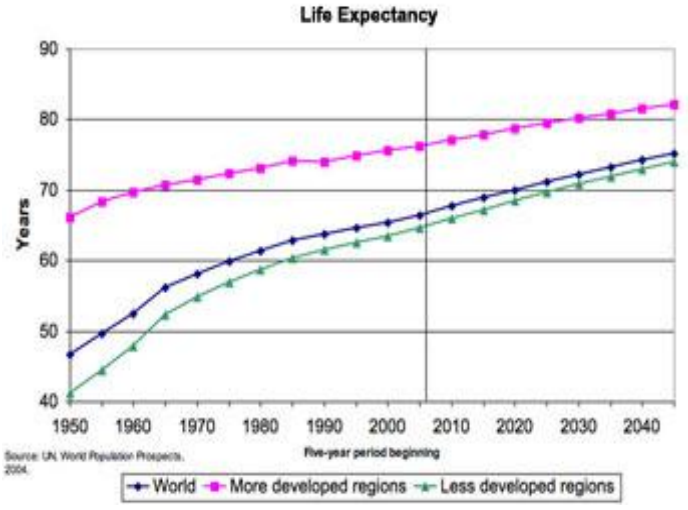
The Historical Element in Times of Change

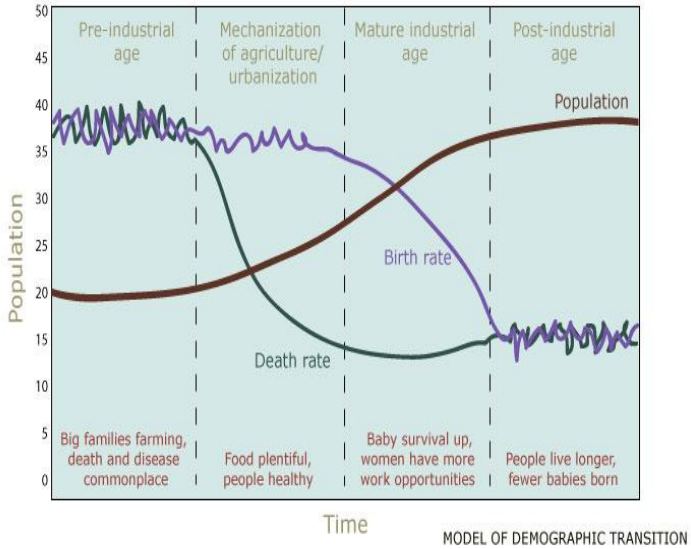
It is without a doubt that civilization cannot exist without energy. When civilizations pass from one historical period to the next, the energy source usually changes. Hence, we moved from firewood to coal and the Industrial Revolution took place in the 18th century. The following graph shows us clearly that the world population growth (a main source for higher productivity) was about the same until about 1800 when the Industrial Revolution took place. The latter as we all know would not have been feasible without the new form of energy called coal that powered the production process.



The exponential increase that took place in the second half of the twentieth century is related to the next bridge that the world energy markets crossed i.e. the extensive use of oil that brought with it a new era, higher levels of production, employment, and standards of living, in terms of life expectancy, death and birth rates, as well as income per capita (see also graphs that follow).



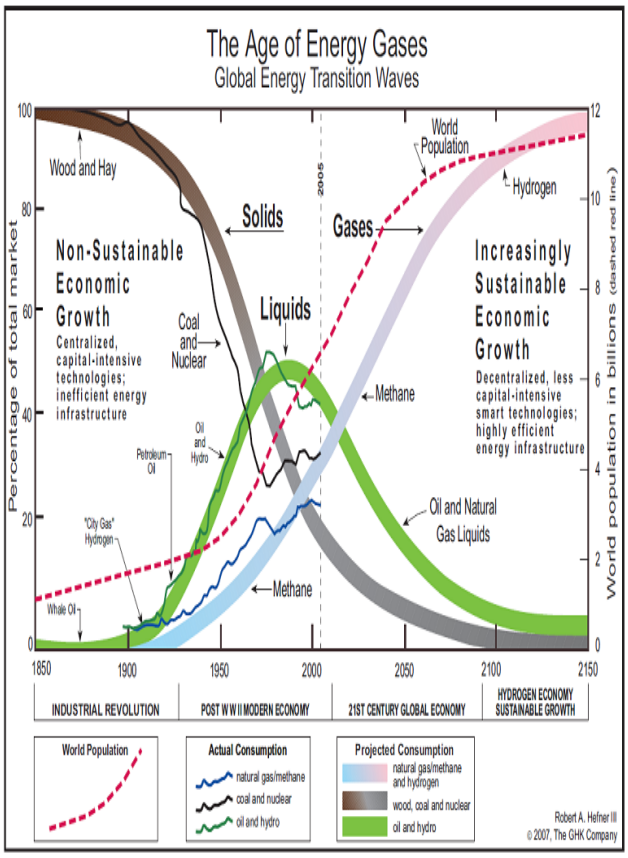




MODEL OF DEMOGRAPHIC TRANSITION

We are of the opinion that we are getting ready to cross another important energy bridge that will be accompanied by significant historical changes. The bridge of natgas will change production modes and habits, will give rise to new technologies, will unleash production efficiencies, will expand innovations and new inventions, and could be as significant as the bridge that the world crossed when moved from coal to oil. Natgas has the capability of becoming the steam engine for the next twenty year, and any inability to adapt and change towards that direction may have significant negative consequences, similar to the ones that the British suffered when stubbornly they remained "faithful" to coal in the era of oil. The vested political interests of the coal industry slowed down Britain and made her an awkward nation in terms of production and economic standards in the 1960s and 70s. British economic spring came again when they started moving the electricity production method from coal to natgas.

As the following graph demonstrates, we may well be at that critical historical juncture when we cross from one energy era (oil) to the next (natgas) which may lead us to an epoch of sustainable development through the use of renewable energy resources.

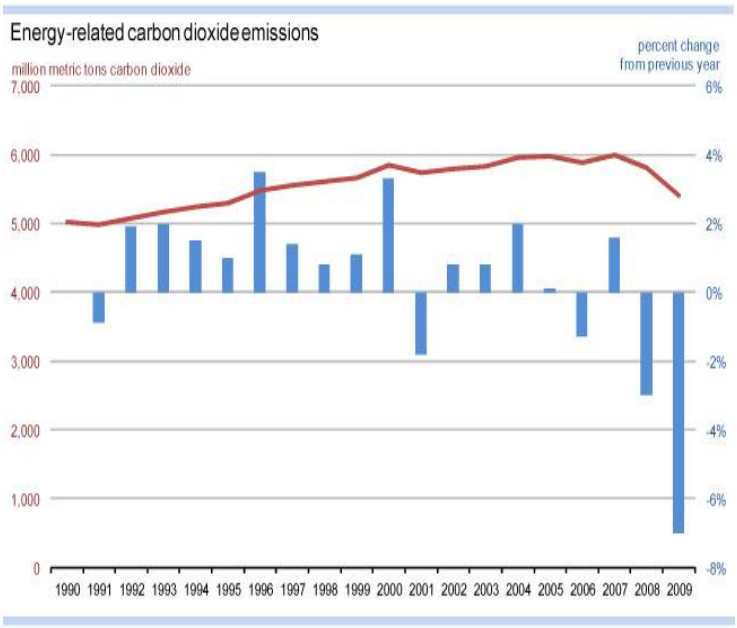


The Environmental Dimension

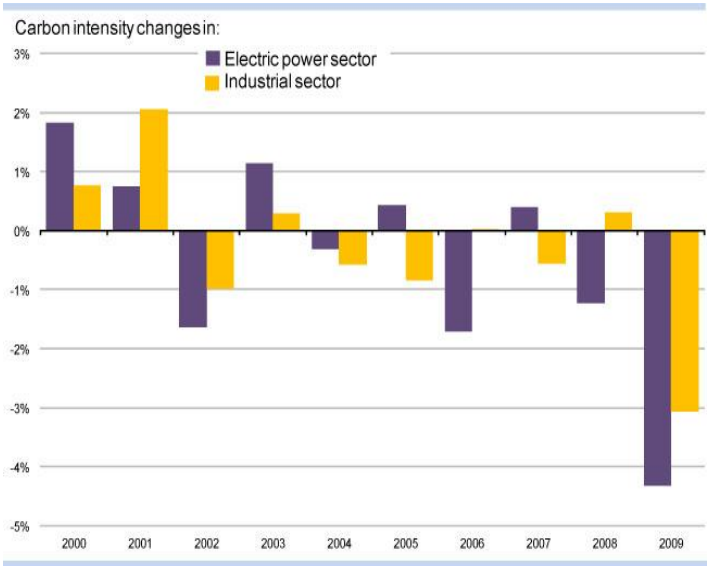
To some extent we could consider natgas a form of "green" fuel. It is "carbon light" in the sense that there is only one carbon atom and four hydrogen atoms. Its use reduces carbon dioxide emissions, while it eliminates most for the toxic emissions. Electric generation using coal and transportation based on petro-fuels produce half of the world's pollution and carbon dioxide emissions. If natgas is used for electricity production – especially with CCS a.k.a. carbon capture & sequestration technology – it will be virtually pollution-free. Such plants are easier to plan, build, finance and operate and produce a series of jobs with multiplicative effects in the surrounding economies.

If natgas is used for half the automobiles in the US, it will reduce carbon dioxide emissions by at least 25 percent while it will eliminate over 75% of most transportation's pollutants.

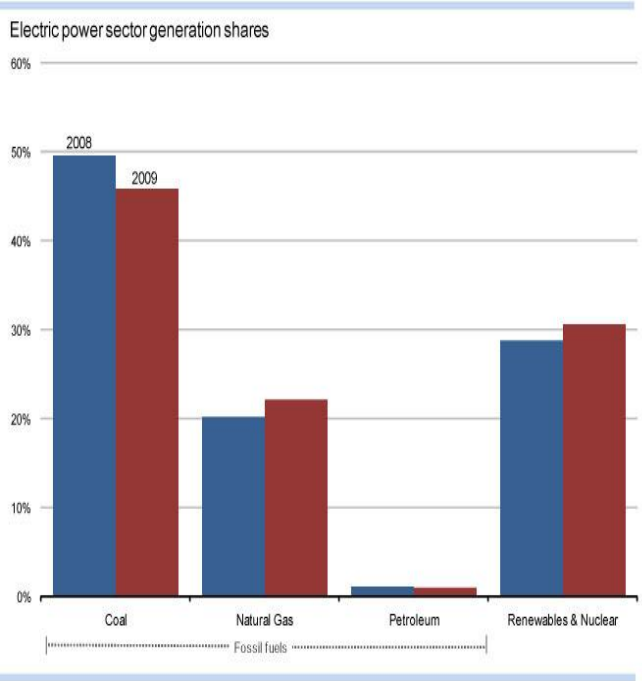
Now, allow us to share with you some basic graphs that show the positive environmental effects when an economy switches its production techniques from coal and petroleum to natgas.



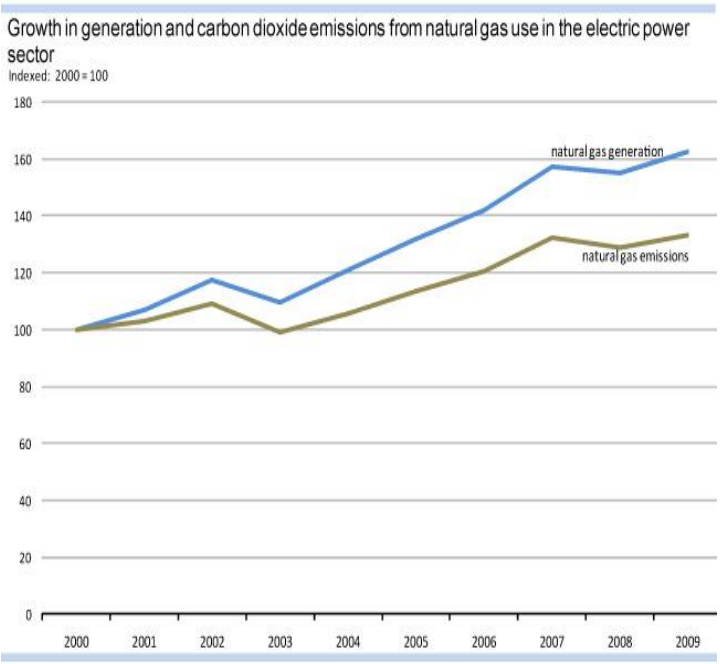
The graph above, demonstrates the significant drop in carbon dioxide emissions observed starting in 2008. One factor that contributed to that drop was without any doubt, the reduced economic activity due to the global economic recession. However, the other major factor, as the following graphs show was the increased use of natgas in production techniques.



The graph above shows us that the most significant drop in carbon emissions was observed in the electric power generation.



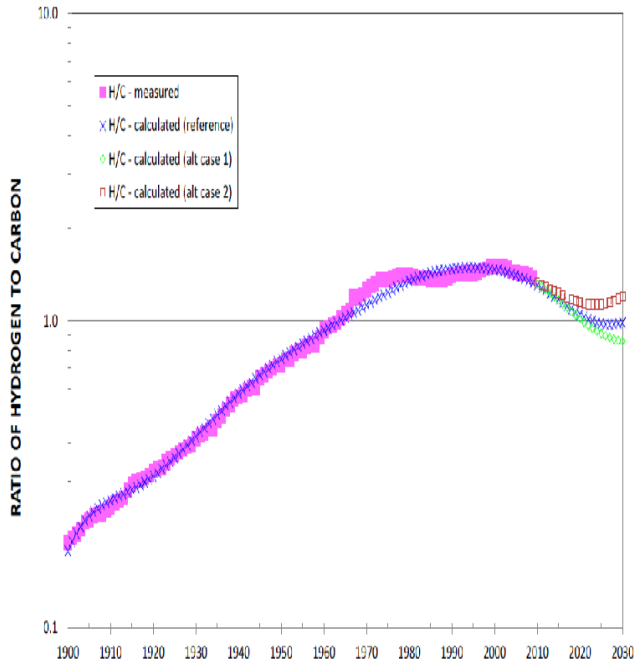
The change in fuel mix as shown in the graph above (from coal to natgas) in the electric power sector, contributed significantly in the carbon intensity emissions' drop. Now, if we look at the following graph we will see that as natgas usage increases its emissions are significantly lower than coal or petroleum.



Quoting from the U.S. Energy Information Administration:

"In 2000, electric power sector generation from natural gas was 518 billion kWh, leading to emissions of 281 million metric tons carbon dioxide. By 2009, generation had risen to 841 billion kWh and emissions were 374 million metric tons. Therefore the emissions intensity fell from 0.542 to 0.445 metric tons per thousand kWh, or by 18 percent. If the emissions intensity had not changed and emissions had risen at the same rate as generation, they would have reached 456 million metric tons in 2009. Therefore, the increased efficiency of new generation capacity resulted in avoided emissions of 82 million metric tons of carbon dioxide."

Overall environmental quality improves, as the graph below shows.



The ratio of hydrogen to carbon is used as a proxy for environmental quality. As the figure below shows the ratio has been rising as we move along the energy waves, since each wave represents a cleaner carbon to hydrogen ratio and hence naturally we move to greater energy efficiencies while reducing the true costs of energy production(wood contains about 10 carbon atoms for each hydrogen atom; coal has two carbon atoms for each hydrogen atom; oil has two hydrogen atoms for each carbon atom; while natgas improves the picture much more since it has four hydrogen atoms for each carbon atom).

The Geostrategic Dimension

The oil dependence has created significant trade deficits in the US. It is estimated that more than 50 percent of the trade deficit is due to oil imports, as the following graph shows. Such oil dependency creates geopolitical and geoeconomic risks for the US that simply cannot be ignored.

In addition, the price volatility of oil creates significant uncertainties to US energy policy as the following graph shows.

As the graph above demonstrates, the quantity imported is almost the same, however, due to higher price volatility and risk, the imported value has almost tripled in the last eight years, exacerbating trade imbalances, while exposing the US to geopolitical risks when such exposure is absolutely not necessary,

given the abundant quantities of natgas that the US is blessed with. Moreover, higher imported oil prices reduce incomes, increase the risks of stagnation, deprive the economy of precious resources, and do not allow the natural economic evolution to take place that will be a force of creative destruction in terms of new technologies, jobs, and opportunities.
Oil-imports contribute to geostrategic tensions, diminish the value of the dollar, while enrich particular regions that may not be that friendly to US interests.

Given that natgas can be found in abundance in the US, Russia, the Mediterranean (recent explorations in Israel, Cyprus, besides the known quantities in Algeria), in the Middle East (Qatar has been transformed through its LNG operations), the South China Sea, and also given the recent technological innovations that advance exploration (fracking) and recoverable reserves, the advance use of natgas as the primary source of energy will rebalance energy politics, and reduce global tensions, while it will reduce US vulnerability to wild oil prices that in turn become the source of political and economic instability.

Concluding Remarks

We hope that the administration will avoid the mistakes of past administrations (where energy policies favored coal and oil), given that natgas exists in abundance worldwide (in the US most recent estimates are in the range of 2500 trillion cubic feet). Recently discovered giant fields in the US and abroad will set in motion the historical change to the new wave of energy generation based on natgas. Moreover, the potential of natgas hydrates offer the opportunity of many times more Btus of energy than the entire globe's supply of coal and oil reserves combined.

We believe that such a strategic asset needs to be in portfolios and actually its recent low price is a welcoming sign of accumulation, especially for those who invest with a medium to long-term focus.