

## Finding Growth in a Mature Industry

The oil and gas industry as we know it today dates to 1859 when Edwin (Colonel) Drake first began producing oil in Titusville, PA. Over the past 150 years, the oil & gas and energy industries have been largely tied to overall growth of the global economy, offset by the ever increasing efficiency with which we consume energy. Oil and energy consumption will go up overall but efficiency gains from technology and the increased investments in alternative energy and energy-efficient products will dilute overall growth rates. We expect what we have seen in the U.S. and other developed economies over the past 20 to 30 years will repeat itself in the emerging markets of China, India, Brazil, the Middle East and elsewhere in the next 20 years.

For example, in 1965 the U.S. consumed 4.2 billion barrels of oil or 1.17 barrels of oil per thousand dollars of Gross Domestic Product (GDP) in 2005 dollars. In 1980, while consumption rose to 6.2 billion barrels, the consumption per thousand dollars of GDP fell modestly to 1.07 barrels. In 2010 overall consumption rose to nearly 7 billion barrels, yet consumption per thousand dollars of GDP dropped to just 0.53 barrels.

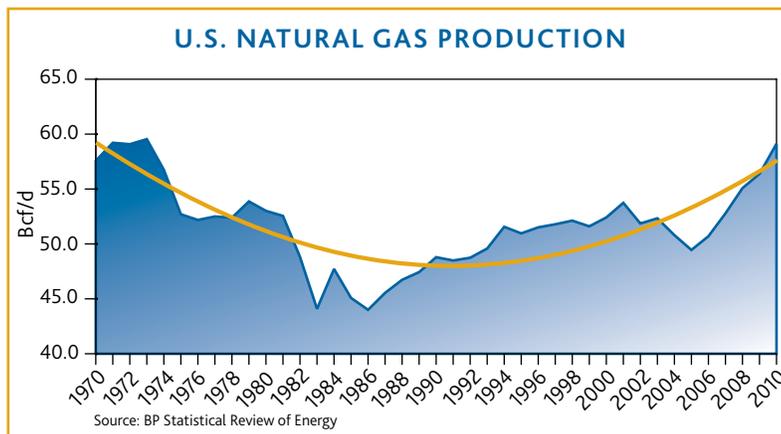
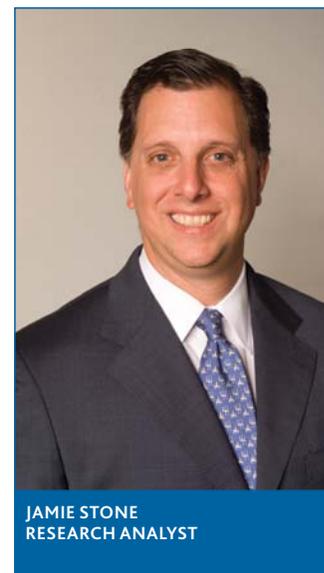
BP's long-term forecast for oil and energy consumption indicates total global energy consumption could rise 39% between 2010 and 2030, a 1.7% annual increase. BP forecasts that the developed world's consumption will grow only 6% in total or 0.3% per annum while the emerging markets will expand consumption by 68% or 2.6% per annum. So the question for an investor is where does one find growth within a mature or slow-growing industry?

At Baron, one source of investment ideas is megatrends, long-term demographic, societal or economic changes. Over the past decade, we have identified a number of megatrends that point to significant growth opportunities in the energy sector. These include the development of unconventional reservoirs; the increasing service intensity of finding, developing and producing oil & gas; the exploration and development of ultradeepwater and other frontier areas; and the monetization of stranded gas resources around the world. (Stranded gas reserves are those not naturally close to developed markets.)

Each of these trends is reshaping segments of the oil and gas industry and disrupting the status quo. As the following chart shows, U.S. natural gas production was on a downward trend for nearly 15 years prior to deregulation in the mid-1980s. Deregulation was a turning point and the catalyst for production growth from the independent Exploration & Production (E&P)

industry. However, that initial surge slowed shortly thereafter and it was not until the middle of the last decade that production really started to tilt upward with the development of natural gas shale. These included the Barnett in North Texas and more recently the Fayetteville in Arkansas, the Haynesville in Louisiana/East Texas and the Marcellus in Pennsylvania.

What is even more telling about this chart is that this rebound in overall production growth has occurred in the face of a massive decline in offshore gas production to 5.5 billion cubic feet/day (Bcf/d) last month from 14.1 Bcf/d in 2001. According to the Energy Information Administration (EIA), shale accounted for a negligible amount of U.S. gas supply in 2000 and 14% of supply in 2009. It is forecast by the EIA to grow to 45% of U.S. supply by 2035. During this time, U.S. gas production is also expected to rise to 26.3 trillion cubic feet (tcf) per year from 18 tcf in 2005.



This revolution in unconventional energy sources encompasses more than a U.S. gas phenomenon. It is also having an impact on the domestic oil market as the technologies used to extract gas from shales (horizontal drilling and hydraulic fracturing) are now being used to extract oil from shale and tight rocks as well. As a result, U.S. oil production is also tilting upward for the first time in three decades and looks set to grow further as the shale

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oil revolution is just kicking off in places like North Dakota, South Texas and even in California.

The production potential from unconventional sources is creating significant growth opportunities for the producers and for the service companies that provide critical production components. For example, the Bakken shale in North Dakota is estimated to contain as much as 4 billion barrels of recoverable reserves and production could exceed 1 million barrels per day within the next five years from the current level of about 400,000 barrels per day.

Among oil and gas producers, companies such as Brigham Exploration, Oasis Petroleum and SM Energy stand out, in our view, as companies with substantial growth potential from the development of the Bakken Shale and related formations in North Dakota and Montana and the Eagle Ford Shale in South Texas. Brigham has been a leader in the application of multistage fracturing and long lateral horizontal drilling to unlock the potential on several hundred thousand acres in North Dakota and, we think the company could post a nearly six-fold increase in oil and gas production between 2010 and 2015. Oasis is similarly situated to Brigham and has been experiencing rapid growth from the Bakken. SM has one of the largest acreage positions relative to its size in Eagle Ford and we think is positioned for significant production growth as a result of the development of its assets in the area.

A second key growth driver is the increasing service intensity required to develop supplies of oil and gas around the world. Some of this is due to development of unconventional reservoirs, which require more complex well trajectories and well completion services. In part, it also results from the aging of the world's biggest and most prolific oil and gas fields. Over time, these fields tend to decline at faster rates, requiring more remedial services, which in turn pushes the industry to find new fields, adding to the demand for services.

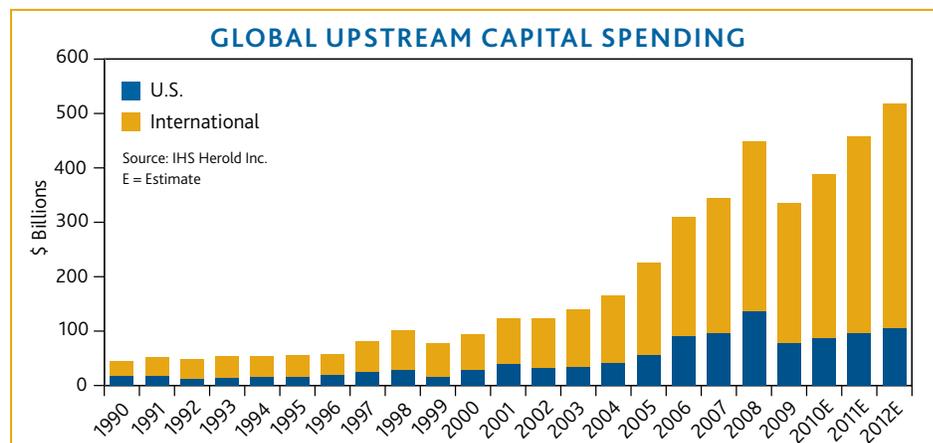
However, the largest part of service industry growth began in the 1990s as worldwide spare production capacity and other sources of "easy" or "low cost" oil started to disappear. As a result,

the exploration and production industry had to face the challenge of significantly increasing capital spending for minimal increases in overall production. As the following chart shows, from 1990 to 2000, global capital spending grew at an annual rate of 8%. In the following decade, from 2000 to 2010, that rate accelerated to 15%. Before the global recession began in 2008, the growth rate was closer to 22%.

While capital spending was rising, production was falling. From 1990 to 2000 the companies in this survey grew production 7% annually. From 2000 to 2010 the growth rate fell to 3%. The industry was spending more to accomplish less, benefiting the oil service and equipment industry.

ultradeepwater and frontier exploration areas. The offshore business has been around for over 60 years and has moved into deeper and deeper waters over time. In the mid-90s deepwater was considered to be anything greater than 1,000 feet with a practical limit of about 5,000 feet. That began to change in the early 2000s with the initial construction of a handful of drilling rigs capable of working in up to 10,000 feet of water.

As the industry has become more comfortable with the risks and challenges of working in deeper water, it has substantially added to its infrastructure. This includes drilling rigs, subsea construction equipment, remote operated vehicles, subsea production hardware and



On the service and supply side, one of our largest positions is CARBO Ceramics. CARBO is the world leader in the supply of ceramic proppants, small beads that are pumped into a well along with the fracturing fluid to "prop" open the fractures that are created. This enhances the conductivity or the ability of oil and gas to flow more freely from the rocks into the wellbore. As such, the company benefits from the first two powerful trends that we have outlined: unconventional resources and rising service intensity. CARBO has and should continue to benefit from a sharp increase in the number of wells that are fractured or stimulated and the amount of proppant that is placed down-hole per well. Proppant per well has increased more than tenfold in many areas due to the use of multistage fracturing and longer fracture intervals.

The next megatrend has been the move into

floating production systems. The number of rigs capable of drilling in 10,000 feet of water or greater has grown from 14 in 2000 to 57 at the end of 2010. By the end of this year, that number is expected to reach 82.

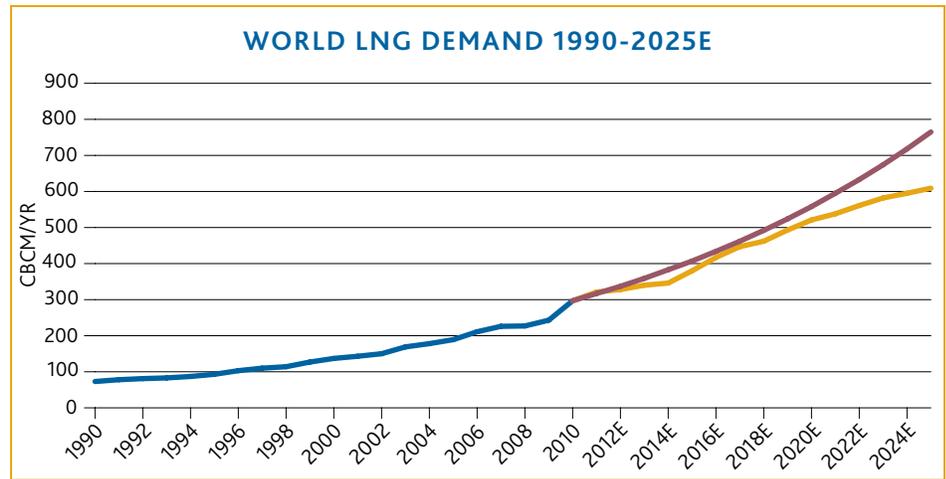
There is even more growth in ultra deepwater rigs ahead. In the past 12 months, the industry placed another 30 rig orders with options for 11 more. Our current investment exposure to this deepwater trend is through Core Labs, a provider of reservoir production, enhancement and management services, and Halliburton, a provider of oilfield services and equipment. We have also invested in small exploration & production companies such as Borders & Southern Petroleum PLC. We continue to look for additional ways to increase our exposure to companies that can capitalize on this growth theme over the next several years.

# “We invest in people, not just buildings.”

We have already discussed how shale gas has been a game changer for U.S. gas production and how the shale revolution could spread around the world. This growth, along with the demand it creates for additional infrastructure to process and transport the gas, is part of the fourth megatrend: monetization of stranded gas and the overall growth of natural gas supply, demand and infrastructure.

In the U.S. we have made several investments in companies that are growing their gas storage, transport and processing capabilities such as Targa Resources and PAA Natural Gas Storage. Both of these companies are positioned to take advantage of the increased availability of gas in the U.S. Another part of this gas megatrend is that in the last ten years, global natural gas demand has grown at twice the rate of oil demand. According to various sources it is expected that natural gas will continue to be the fastest growing part of the conventional energy sector over the next 20 years. We see Shale gas as a bright spot, in addition to the continued conversion of stranded gas into liquefied natural gas (LNG), which can be shipped all over the world.

While gas consumption has been growing at 2% to 3% annually, LNG consumption has been growing 7% to 8%. Even though the



— 1990-2010 — Wood Mackenzie — BP E= Estimate Source: BP; Wood Mackenzie; Pareto

growth rate may slow in the near term due to a lack of new supply hitting the market in the next couple of years, it should reaccelerate when another tranche of new liquefaction projects start up beyond 2015.

In addition, we see significant opportunity in the business of transporting and receiving gas. We have looked at companies that supply critical components to the gas liquefaction and gasification processes as well as LNG tanker companies. We recently invested in LNG shipping and regasification companies Golar Energy Partners and Golar LNG Ltd. Golar is the

MLP (master limited partnership) subsidiary of Golar LNG, which owns and operates a growing fleet of LNG ships and has been a pioneer in the floater regasification segment of the market.

At Baron, we are long-term investors in search of businesses that can capitalize on great growth opportunities, and we seek to buy these businesses at attractive valuations. While the energy sector is not typically viewed as a growth sector, we believe that view is incorrect. We believe there are a number of interesting growth pockets within this mature industry—one just has to dig a little deeper to find them. ♦

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\* Mutual funds and sub-advisory services are managed by BAMCO, Inc., investment advisory affiliate of Baron Capital Management, Inc.

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