Introduction

For decades, pundits have been trying to predict a tipping point for Peak Oil – when a sustained and unabated climb in oil prices sparks a near-collapse of the global economy. According to Peak Oil theory, the rate of petroleum extraction will crest and then begin an immutable decline, pushing oil prices ever higher as demand for this finite resource permanently exceeds supply.

However, an array of structural shifts in the Energy industry is conspiring to insulate the global economy from any such dramatic increase in the price of oil. After decades of indifference, pivotal U.S. consumers have radically altered their consumption of petroleum and related products, moderating demand for the world’s largest market. Concurrently, heightened investments and technological breakthroughs have spurred an explosion in resources, as source rock has expanded the definition of “finite resource.”

Although the Earth will not yield any more resources from decaying dinosaurs and vegetation any time soon, the planet already has more than it will ever need. Just at a time when consumers are finally thinking about consumption and exhibiting price-elastic behavior, horizontal drilling is accessing resources previously thought to be inaccessible. This has led to a dearth of global capital spending and allayed our concerns about demand outpacing supply.

In this paper, we will examine some of the popular, and more subtle, dynamics affecting the fragile balance of supply and demand for global oil markets. We will also explore some of the resulting implications and opportunities for investors in the Energy sector.
Why Supplies Are Rising

1. **The drought of capital has given way to a flood.**
   Throughout much of the 1980s and ’90s, the oil patch suffered from a prolonged period of underinvestment, as marginal economics did not provide enough incentive to deploy new capital for growth. At the same time, oilfields predictably continued to decline in production. Then, in the early to middle 2000s, investing began to pick up considerably, arresting production declines in aggregate. (See Exhibit 1.)

Exhibit 1: A Halt to Production Declines

![Graph showing US Production up 600 kbd (12%) since October 2010. PADD 2 (Bakken, ND) up 52%. PADD 3 (Eagle Ford & Permian, TX) up 12%.](source)

Source: Energy Information Administration

Typically, this cycle begins with a run-up in commodity prices. A rush of investment follows, which is then curtailed as cyclical demand often wanes just as new supply comes into the market. However, the most recent cycle brought about only a measured pullback in capital deployed instead of outright curtailment. This is because price weakness was very short lived, as shown in Exhibit 2.

Exhibit 2: Worldwide Upstream Capital Spending

![Graph showing Worldwide Upstream Capital Spend (Inflation Adjusted).](source)

Source: Barclays

After two decades of underinvestment, prices promptly surged as soon as demand hinted at a recovery in 2009. The result was to prolong investment in the global oil patch at five to six times the level it had been over the previous 20 years. With certainty, supply can grow globally. However, the two outstanding variables are the pace of that growth and the level of demand that needs to be met.

2. **Technological developments have unleashed the potential of source rock.**

Oil supplies are benefiting not only from the surge in capital investments but also from technological breakthroughs in horizontal drilling and fracturing (or fracking). These developments have enabled greater access to source rock, from which hydrocarbons can be generated. Source rock has fed the conventional petroleum and gas resources that have been exploited since 1859, when Edwin Drake drilled the first oil well in Titusville, Pa.

The theory is that source rock leaked into voids beneath the earth’s surface, leaving a significant amount trapped in rock formations. Some estimate that source rock has leaked roughly a third of its resources into reservoirs, suggesting that of all the oil discovered to date, twice as much may still be locked in complex geology beneath our feet.¹

3. **Deep-water offshore production is just getting under way.**

Aside from unconventional onshore production, another area with emerging supply is offshore. Although Gulf of Mexico production was abruptly shut down by the oil spill of 2010, it has quickly and quietly returned to pre-spill levels.

As you may remember from the extensive news coverage of the spill, the ruptured Macondo Well spewed more than 50,000 barrels of oil a day, while some of the country’s best shale wells are barely breaking above 1,000 barrels a day. The production impact of an offshore well can be tremendous, a fact that has not gone unnoticed by oil producers. As Exhibit 3 illustrates, the number of drilling rigs active in the Gulf of Mexico has been on an upward path since late 2010.

Exhibit 3: Gulf of Mexico Rig Count

![Graph showing Gulf of Mexico Rig Count.](source)

Source: TBCAM, Bloomberg data
This drilling renaissance is not confined to the Gulf of Mexico. Activity has also recovered in the North Sea, where a recent discovery, the Johan Sverdrup field, boasts 3.3 billion recoverable barrels, making it the area’s largest discovery since 1980. In addition, new basins in Brazil and West Africa have contributed a significant amount of new resources. As a result, deepwater discoveries of oil over the past four years is roughly two times the average of the prior decade, as shown in Exhibit 4.

Exhibit 4: Offshore Discoveries

Supplementing domestic production is also being supplied by production from Canada. Although political drama surrounding the Keystone Pipeline continues to unfold, investment in Canadian energy production has been steaming ahead. The country’s current production of 3.5 million barrels per day (bpd) could rise by another 1.2 million bpd after more pipelines are added, with 900,000 barrels of that coming from oil-sands growth, according to the Canadian Association of Petroleum Producers.

How Demand Is Kept in Balance

In terms of demand, additional data points are further supporting our thesis of a more balanced dynamic, which is preventing oil-price spikes related to supply shortages.

1. **Demand is already at the point of elasticity.**

Despite forecasted increases in emerging-market demand, the U.S. is still the largest, most mature — and therefore most price-sensitive — consumer. That gives any change in U.S. demand a far more meaningful impact on global supply/demand. As such, the U.S. consumer is the main determinant of pricing power, and American oil consumption has become a price-conscious decision.

We believe the U.S. has already reached a point of elasticity. We base this assertion on historical patterns since World War II:

- When oil prices rise to 3% of gross domestic product, consumption becomes more cautionary.
- A spike to 6.5% reduces consumption, exhibiting sharp price elasticity. (Currently this 6.5% level would translate into $165-a-barrel crude prices and $5-a-gallon gasoline prices.)

To arrive at these conclusions, we used U.S. gross domestic product as a proxy for consumer income, and tabulated oil expenditures by multiplying the price of oil by the number of barrels consumed. Calculating the percentage of oil expenditures to GDP approximates the average share of the U.S. consumer’s wallet spent on gasoline. As seen in Exhibit 5, this ratio has remained north of our 3.5% point of elasticity since late 2009.

Exhibit 5: Oil Consumption

Price elasticity has been at play since 2005, albeit with a brief pause in 2008-2009 as U.S. oil prices came off their July 2008 peak of $145 a barrel.

2. **Passenger vehicles are becoming increasingly fuel-efficient.**

The memory of skyrocketing fuel prices may still feel fresh to many American consumers, who felt the impact at gasoline pumps and in their wallets. In fact, in a survey released by Consumer Reports in May 2012, fuel economy topped the list of consumers’ considerations for choosing a new car, beating out such stalwarts as quality, safety, value and performance. In the same survey, one-third of respondents reported driving fewer miles than they did 12 months ago, and 90% of those considering a more efficient vehicle cited lower fuel costs as their motivation.

For many years, however, automobile companies weren’t all that concerned with fuel efficiency. Back in October 1908, Ford Motor Co. introduced its Model T, widely regarded as the first affordable car. With a 20-horsepower, four-cylinder engine, the Model T averaged roughly 17 miles per gallon. Fast-forward more than a century later to the popular Ford Taurus. Its 2013 SE model comes with a standard V6 engine, averaging 19 mpg in the city and 29 mpg highway.

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However, Ford is not the only auto company to make somewhat limited progress in 100+ years when it comes to improving fuel efficiency. As evidenced in Exhibit 6, automakers did make some improvements to efficiency in the 1970s and 1980s, spurred by the oil embargoes and energy crises of those decades, but have not notably broken from the sideways trajectory since then.

Exhibit 6: Fuel Efficiency Has Flat-Lined

![Graph showing fuel efficiency from 1975 to 2011](image)

Source: Environmental Protection Agency

Whether economically or environmentally motivated, the U.S. government is also influencing the push for greater fuel efficiencies in vehicles. Back in 1975, Congress first enacted Corporate Average Fuel Economy (CAFE) standards to help lower the nation's energy consumption. Standards issued by the U.S. Department of Transportation and the U.S. Environmental Protection Agency raised average fuel efficiency to the equivalent of 35.5 mpg by 2016, and the next phase boosts fuel economy to 54.5 mpg by 2025. That would represent a roughly 6% annual increase. If one assumes that the number of miles driven remains generally flat, the increased efficiency would result in a decline in U.S. annual oil demand of roughly 500,000 bpd.

3. **The threat of substitution looms large in the oil market.**

One barrel of oil contains roughly 6 million British thermal units of natural gas, so one might expect their prices to reflect this 6-to-1 multiple. Allocating some premium to oil because of its greater ease of transport, the relationship between oil and gas prices has historically been near a multiple of 10. But as Exhibit 7 illustrates, that ratio has exploded, providing massive economic incentive to exploit the arbitrage. Although it remains unclear which applications or technologies have the greatest potential, many different angles are being explored, especially in transportation and home heating.

Exhibit 7: Price Ratio of Crude to Gas

![Graph showing price ratio of crude to gas from 1990 to 2011](image)

Source: Bloomberg

One key factor driving down consumption rates in transportation is the Clean Cities program. This initiative was established by the U.S. Department of Energy in 1993 and given the specific task of lowering petroleum use in transportation. According to the latest data available from the Department of Energy, Clean Cities saved 805 million gallons of petroleum in 2011, a 24.8% increase over the amount saved in 2010. Since its 1993 inception, the program is credited with saving more than 4.5 billion gallons of petroleum. Clean Cities’ National Clean Fleets Partnership counts several U.S. corporate heavyweights among its members, including AT&T, Coca-Cola, FedEx and General Electric.

Home heating is another area where consumer demand for natural gas has accelerated markedly. In New England, for example, NStar said that conversions have tripled over the past three years and National Grid reported a 34% increase in the same period, even though the cost of converting a home to natural gas heating can range from a few thousand dollars to more than $10,000. Undoubtedly, the conversion rate has been boosted in part by assorted incentives offered by utility companies, sometimes in conjunction with governments and public interest groups. For example, states in the Northeast, including Massachusetts and New Jersey, offer rebates and low-cost financing options to residential and commercial customers who upgrade to more energy-efficient heating systems, further enabling them to switch over to natural gas.

The appeal of expensive conversions becomes much clearer once heating prices are factored in. According to the U.S. Energy Information Administration, the average projected cost of heating a home in the U.S. during the 2012-2013 winter is $715 for natural gas, compared with $2,544 for heating oil.

**Potential Risk to Our Thesis**

Without question, the biggest delta in supply/demand variables has been unconventional supply growth in the U.S., aided by horizontal drilling techniques coupled with hydraulic fracturing, or fracking.
If the use of fracking were curtailed, a large portion of our thesis would unravel, and supply-shortage-induced price spikes would be back on the table.

The most publicized concerns about fracking are related to potential groundwater contamination. Water used in the fracking process contains relatively small amounts of chemicals and large amounts of sand. These are added to help keep open the cracks created in the shale, which is necessary to allow the natural gas or oil to escape. However, fracking requires a substantial amount of water, with a typical well needing several million gallons.

The worry is that the water containing chemicals is contaminating the water table from which drinking water is pumped. There are no proven cases specifically of fracking causing contamination of drinking water, and the typical distance from the gas well to the water table is more than 1 mile. However, in some cases, the vertical section of the well was improperly sealed, and this human error is believed to have allowed contamination of drinking water.

Beyond the risk to drinking water, several other environmental issues have been raised, including:

- A scarcity of water available for fracking in some regions;
- Disposal of polluted water that comes back up from the well;
- Destruction of natural ground vegetation around well sites;
- Increased truck and heavy-equipment traffic on local roads, some of which were not designed for such loads;
- Noise pollution;
- Leaks of the petroleum products that are being produced;
- Construction of more pipelines and storage/processing facilities;
- Seismic activity generated from lubricating faults with wastewater injection wells.

While these are all legitimate concerns, most of them are workable and have a fairly minor impact. Even earthquakes that have been linked to waste wells have been small and actually somewhat predictable, as they occur at faults that are already stressed. As a result, seismic activity can be monitored and injection halted as activity grows.10

After all these risks have been evaluated, fracking regulation comes down to a state vs. federal issue, with states likelier to prevail. In regions where resource extraction is concentrated, the economic windfall is so large that they are likely to accept risk and do their best to manage it. The federal government would have a very difficult time ending the economic boom in parts of North Dakota and Pennsylvania, where it is sorely needed, and in Texas, where state independence is a cultural cornerstone.

Conclusion

We are not making a negative call on crude-oil prices. We are simply suggesting that recent advances in supply, multiple pressures curtailing demand and a flagging global economy provide us enough cover to maintain a reasonable supply-and-demand balance, thereby avoiding supply-shortage-related price spikes.

In North America alone, supply has grown annually by almost 500,000 bpd, while demand is shrinking by a similar amount. This has led to a 1 million bpd loosening of supply and demand, aside from the 1 million bpd of supply growth from the rest of the world (which includes deepwater, North Sea, Brazil, West Africa and the Middle East). If another 2 million bpd can be added to supply (including some giveback from weaker demand), Asia — the fastest-growing region in the world — would have to double its trend-line growth in consumption to achieve a balance.

That may be possible, and perhaps the U.S. and Europe could provide a cyclical recovery in a year’s time. However, the likelier scenario is a gradual increase in global demand with ample sources and time for supply growth. Thus, we bid farewell to the days of Peak Oil.
How to Invest in This Dynamic

While one might speculate that a flat commodity price would obviate any investment thesis in the Energy sector, the large amount of capital being deployed as a part of North America’s energy revolution provides a multitude of investment opportunities.

Among the types of investments that will likely benefit are:

- Select exploration and production (E&P) companies
- Energy service companies
- Pipeline and transportation companies
- Companies that benefit from the low cost of gas and associated liquids
- Companies that sell products to firms that are directly involved in natural gas and oil production

Our estimates suggest that shale natural gas can be extracted at a cost of $4 to $5 per million cubic feet and shale oil at a cost of $70 to $80 a barrel. Relative to structurally higher global prices, these cost estimates make extracting shale-based hydrocarbons in North America an attractive long-term prospect. Even with an overall less bullish outlook on commodity prices, volatility will remain, so we are identifying trends and investments that aren’t entirely predicated on substantial commodity-price moves.

As we have noted, the proliferation of unconventional oil and gas has been the driver of accelerated investments in the energy space. This revolution of sorts was enabled by technological breakthroughs in horizontal drilling and fracking. Previously, to extract gas or oil, a well was drilled into the porous sandstone, letting oil and gas flow freely to the surface. However, if a well was drilled into the dense shale, very little oil or gas is released. Horizontal drilling and fracking allow us to now access those trapped hydrocarbons.

- Horizontal drilling:
  Previously, most drilling was vertical, straight down into a reservoir. Shale deposits required drilling that could be performed both vertically and horizontally, thereby increasing the amount of contact a wellbore has with the “reservoir.”

- Fracking:
  Previously, naturally occurring faults allowed hydrocarbons to flow into the wellbore. Fracking, or hydraulic fracturing, creates new faults by pulverizing the rock sub-surface, and contingent with a horizontal wellbore, creates a sort of artificial reservoir that allows hydrocarbons to flow to the surface.

This technology is clearly more service-intense, as multiple steps are involved in producing oil and gas in addition to optimizing wellbore contact and targeting zones for fracturing. This translates into a rapidly increasing market opportunity for energy service companies.

Why U.S. Shale Is a Winner

With its long history of conventional oil and gas production, the U.S. has become the epicenter of unconventional development, as source rock is present in areas that are already producing conventional resources. This has provided a map of where one might find productive unconventional resources and has significantly reduced exploration risks. In fact, while companies may not drill the wells they hope for, they rarely drill dry wells onshore anymore.

Another key advantage is that much of the needed energy infrastructure is already in place. The U.S. has some of the world’s best energy infrastructure, including detailed databases on underground geology from prior drilling, a large fleet of drilling rigs, collection and storage facilities, pipelines, and a substantial pool of experienced labor. Plus, under its legal system, ownership rights for minerals existing under a parcel of land can be traded by individuals or corporations. This “free market” approach to minerals allows resources to be developed more quickly and efficiently when industry dynamics shift.

The rest of the world, including Europe and Asia, is using technologies that have been developed in North America, and they have had varying degrees of success. We continue to monitor conditions to identify the next winners and losers as shale gas goes global.

Investment Opportunities

As investors, we maintain a critical eye on industry trends to determine potential winners and losers. Interestingly, the shale revolution can create a winning company that can later become a loser. E&P companies have become victims of their own success as natural gas discoveries have led to a glut of new supply and depressed prices. As a result, we anticipate the North American economy will be reshaped by the economics of low-priced gas as companies compete to maximize that benefit from a variety of angles, direct and indirect.

Direct Beneficiaries

In our view, three groups of companies are poised to benefit directly from lower gas prices: E&P companies, energy service companies, and pipelines.

- Exploration & Production:
  E&P companies own or lease the mineral rights and land on which they drill for oil and gas. When a company is exploring for energy resources, it may drill in unknown areas, and these wells have a high risk of being a “dry hole,” meaning no oil or gas is found — or not enough to justify the costs. Other production wells are drilled where the underground geology is better known, and those wells have a high probability of producing as expected.
As a well produces oil or gas, its reserves (what is left underground and will be produced in the future) are being depleted, and the rate that the oil or gas is coming out of the ground is slowing. These companies must keep finding new resources to drill, or they will go out of business when their current wells run dry.

As a group, independent E&Ps have been very entrepreneurial in searching for new shales and are most responsible for the growth of North American shale production. However, their success has been a double-edged sword. On the positive side, shale technologies allow for more production at lower costs and an increase in reserves if companies can exploit the right shale play and buy acreage at an attractive price. However, as a lot of capital is being deployed and production ramps, companies face the risk of supply outweighing demand at various points in time. This was clearly the case with natural gas in 2011, when prices sank to unprofitable levels. Longer term, we believe demand will continue to grow both domestically and for exports. However, until the infrastructure is built to take advantage of the low-cost gas and liquids, we will likely see continued price volatility. As such, exposure to the E&P group needs to be managed and the most profitable and prospective shale plays identified.

- **Energy Service Companies:**

  Although some E&P companies have their own drill rigs and fracking equipment, most buy these services from specialized companies. These companies are paid by E&Ps for a variety of services, including drilling wells, completing wells, and monitoring the flow of oil and gas. As an example of the strong (and volatile) growth of energy services, Exhibit 8 shows the number of drilling rigs in use.

  **Exhibit 8: Working Rig Counts**

  ![Graph showing Working Rig Counts](image)

  Source: Baker Hughes, as of June 2012

  The top line in Exhibit 8 represents the total number of drilling rigs working in North America. At the end of 2011, the rig count was back to its high of slightly more than 2,000. But the important line is the red one, representing horizontal rigs, which are technically sophisticated and powerful enough to drill several thousand feet down vertically and then turn 90 degrees at the bottom of the hole and drill horizontally for up to two miles along the middle of a layer of shale. The ability to do this accurately is a genuine technological revolution of the past decade. The number of horizontal rigs has grown from fewer than 100 in 2004 to almost 1,200 in 2012. The operators of these rigs stand to benefit from the shale revolution.

  Another type of service critical to shale production is fracking, a complicated process that requires high technical competency and strong logistical management skills. The benefit of shale production to companies that provide fracking services is twofold:

  - More wells are completed, requiring more service.
  - As wells get longer and deeper, they require more and more pressurized fracking services.

  Because the large service companies work for many different E&Ps and conduct international and offshore operations, they generally have less cyclical risk than the E&Ps themselves.

  - **Pipelines (Midstream):**

    While North America has a relatively good infrastructure for moving energy liquids and gases around the continent, it is not sufficient to meet the onslaught of new shale projects. Pipeline, or midstream, companies own the pipelines that transmit oil and gas. Typically, these companies make large upfront investments and then sell capacity in the pipeline and charge on a tolling mechanism.

    The current pipeline infrastructure in North America is generally considered the most expansive in the world, but it also has many new bottlenecks due to the rapid growth of shale-sourced production. New pipelines, separation and storage facilities are needed for midstream operations, which move crude oil and gas from the well to refineries and other users. Pipeline companies have grown their systems for the past few years, and the trend should continue for several more years, as more shale oil and gas are produced and require transport throughout North America. With the relatively strong predictability of future revenue, pipeline companies can then pay higher dividends to shareholders.

    One way that we, as investment professionals, monitor the balance between pipeline demand and pipeline supply is by noting oil-price differentials between various points in the country. For instance, when oil is relatively cheap (as it is now) in the middle of the U.S., but relatively expensive on the coasts, it indicates that the supply of oil is too great relative to pipeline supply, and that more pipeline is needed and will likely be added. It is important to monitor this because when sufficient pipeline supply is added, the spreads will collapse and the former beneficiaries of cheap oil in the middle of the U.S. will lose their advantage.

*No investment strategy or risk management technique can guarantee returns or eliminate risk in any market environment.*

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Indirect Beneficiaries

We have also identified several industries that benefit from the decrease in natural gas prices.

Utilities:
Lower natural gas prices can benefit several utilities in two ways: by reducing direct fuel costs for existing generation and by improving the economics of idle natural-gas-fired power plants by reshaping the supply stack. This is a big deal because for decades, using coal as a feedstock to generate power was much cheaper than using natural gas. However, as a result of lower natural gas prices, coal generation has become relatively expensive compared to gas-fired generation, incentivizing an increase in natural-gas-fired production from underutilized plants. (See Exhibit 9.)

Exhibit 9: The Rising Popularity of Natural Gas

Another indirect benefit to utilities is that as natural gas prices have fallen, they have pulled down power prices, reducing costs to the end consumer. That, in turn, puts less pressure on regulated utility businesses and gives utilities more flexibility to increase their asset base. Because transmission utilities are compensated based on the size of their asset base, having more assets will increase future profits, so higher capital expenditures will generally translate into higher earnings in future periods.

Chemicals:
Low natural gas prices can greatly improve the competitive position for many U.S.-based chemical companies. Chemical companies use ethane (a byproduct from most natural gas wells) as a primary feedstock that is processed into ethylene and other chemicals and plastics that are then sold worldwide. With the dramatic decrease in the price of natural gas, margins are widening as U.S. ethylene producers transition from being among the least competitive globally to having one of the most competitive cost structures in the world. We believe this margin expansion should be accompanied by an increased earnings multiple as the earnings cyclicality has been reduced (margins will be more stable through the cycle) and companies are returning cash to shareholders through higher dividends. Multiples may also rise as investors begin to price in incrementally higher returns on invested capital.

The secondary impact for chemical producers will be an increase in capacity as new equipment comes on line in 2017, replacing high-cost capacity in Asia and Europe. We do not believe that this additional upside potential is currently priced into shares, and we see this as a long-term benefit from low natural gas prices.

Refiners:
North American refiners stand to benefit greatly from inexpensive gas and the application of shale gas production techniques on shale oil. Refiners use oil as their primary raw material and use electricity to run giant refineries that process the oil into gasoline, diesel and other petroleum products. Power is one of a refiner’s biggest costs, so using cheap natural gas as a power source can create a substantial advantage over refiners in other regions.

Additionally, using shale oil techniques to boost oil production has created an oil glut in the middle of the U.S., thereby depressing prices. This gives U.S. refiners another edge as they can buy oil for less than their European counterparts, and their operating costs are lower. As a result, U.S. refining capacity is better utilized, and refined product exports have increased to their highest level in 75 years. (See Exhibit 10.)

Exhibit 10: A Surge in Gasoline Exports

Source: EIA, The Boston Company Asset Management, as of April 2012

Source: EIA, TBCAM as of Dec. 31, 2011

These crude-oil pricing differentials, which benefit North American refiners, will not be permanent, but we believe they will persist for another five to 10 years, at least until a pipeline infrastructure is built to reduce this anomaly.
End of an Era: The Death of Peak Oil
An Energy Revolution, American-Style

- General Manufacturing:
  Many other industries will also benefit from lower energy prices. For example, steel companies are reducing expensive coking-coal usage by using more natural gas to manufacture steel. The relatively favorable economics of this switch are compelling, but it has been overwhelmed by overcapacity in the global steel markets. We believe this will provide steel companies with only a temporary advantage, as their peers face few barriers in reproducing this plan. This is another example of why the benefits of shale gas are not uniform: Some industries such as chemicals benefit much more than other industries such as steel. We continue to watch for other industries that can seize the opportunity to reduce costs and share the rewards with shareholders.

Tertiary Beneficiaries
Other companies may not benefit directly from an increase in natural gas and oil exploration in the U.S., but they can profit from the subsequent build-out of services and infrastructure to support this trend.

- Engineering and Construction:
  We believe low natural gas prices will be a long-term theme for engineering and construction, as the construction cycle for many of these projects totals five to seven years. Here are some types of E&C work that are impacted:
  - **Gas processing:** Facilities will be built to remove natural gas liquids (NGLs), water and contaminants from raw natural gas, purifying it for consumption.
  - **Fractionation:** Processing facilities will be built to separate NGLs into distinct products.
  - **Petrochemical:** Globally competitive feedstock prices will lead to high returns on new petrochemical plants.
  - **Liquefaction:** At least 12 LNG export terminals are being proposed to export gas from North America. Although the level of political involvement will be high, at least some of these projects are likely to proceed.
  - **Gas power plants:** Cheap natural gas and lower carbon footprints will incentivize the building of more gas power plants.

- Industrial Companies:
  A variety of industrial companies stand to benefit from the shale revolution because they manufacture products used in shale gas and oil production. One example is a large North American-based industrial company, which sells some equipment directly to E&P and energy service companies, but also has a large division that makes gas-fired turbines needed by utility companies as they shift from coal to gas for electricity generation.

Summary
The shale revolution has created an opportunity that we view as one of the dominant investment themes of the next decade, and we have highlighted some potential beneficiaries. However, at different points in this secular story, today’s winners will be tomorrow’s losers. It is by having this longer-term perspective on how North American hydrocarbon pricing will evolve and which companies are exposed to this trend that we can seek to capture the excess returns and dividends provided by this theme.
No investment strategy or risk management technique can guarantee returns or eliminate risk in any market environment.

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An Energy Revolution, American-Style

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Disclosure

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