CLIFFWATER LLC

# Investments in Private Energy Partnerships

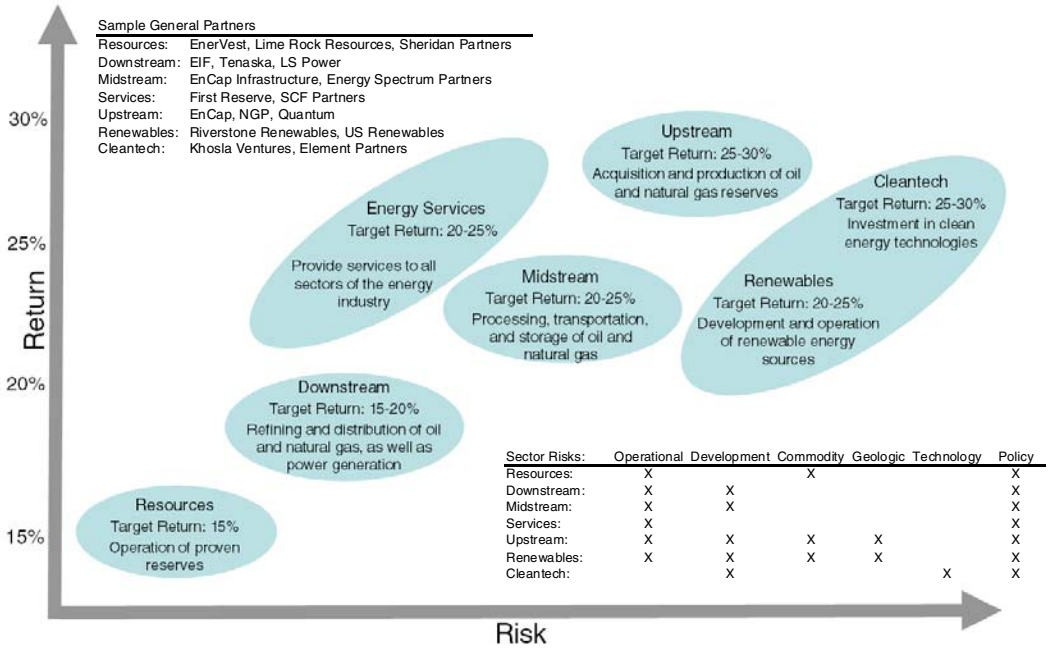
August 2010

*Private energy partnership investments offer a meaningful addition to a diversified private equity or real asset portfolio. Over the past 20 years, private energy investments have both enhanced portfolio returns and provided diversification against other asset classes. The lack of an appropriate benchmark for private energy partnerships has led us to create the Cliffwater Private Energy Index. The Index is based on actual private energy funds and is an appropriate comparison for private energy partnership performance and real asset portfolios.*

## *Private Energy Partnerships*

The energy industry is divided into three broad categories: upstream, midstream, and downstream. Additional sectors include resources, services, cleantech, and renewables. Each of these categories has unique return and risk characteristics as described in Exhibit 1.

Exhibit 1
Energy Market Sectors




## *Upstream*

Upstream refers to the exploration and production ("E&P") of crude oil, natural gas, coal, and other natural resource reserves. Most private upstream partnerships focus on oil and natural gas. Upstream companies incur the risk of acquiring and proving unknown reserves. Once a reserve

has been proven, the upstream company commences production depending on the cost to recover the resource and the prevailing commodity pricing in the market. The upstream energy category is the most risky and provides the potential for the greatest return of the three major sectors. Private energy managers target returns ranging from 25% to 30%.

In many cases after successful recovery, upstream companies will sell the "de-risked" proven reserves to a resource company that specializes in their efficient operation. These lower risk resource investors target a 15% to 20% return.

Over the past ten years, upstream companies have turned their focus to shale formations that contain significant oil and gas reserves. Until recently, high extraction costs had prevented the exploitation of these resources. New drilling technology has enabled upstream companies to extract the reserves on better economic terms. The major oil and gas producers, including Chinese companies, have begun to focus on these areas in order to grow their reserve bases.

*Midstream*

Midstream refers to the processing, transportation, and storage of oil and natural gas. In terms of risk and return, midstream investments lie between the upstream and downstream categories. Privately managed midstream investments target returns in the 20% to 25% range. Midstream investments typically do not take exploration or commodity price risk. The typical business model for a midstream company is to optimize the use of pipelines, processing plants, and storage facilities. Today, midstream assets are experiencing a building boom due to new systems required to deliver oil and gas from shale.

*Downstream*

Downstream refers to the refining and distribution of oil and natural gas, as well as power generation. Downstream assets have the lowest level of operating risk because a base level of demand by end users of energy is all but guaranteed and results in a well-defined cash flow. Leverage will typically be applied to downstream assets given the stable cash flow. Managers of power plants will seek to guarantee some, if not all, of the potential output of the plant through power purchase agreements ("PPAs"). The counter-parties to the PPAs are utilities, municipalities, co-ops, and industrial users. The more output that is accounted for in a PPA, the lower the risk and return. Private downstream investments target a range of return between 15% and 20%.

*Renewables and Cleantech*

Renewables and cleantech are growing sectors in the energy industry. Cleantech refers to investments in technology that assist in the production of clean energy (energy produced with zero or reduced carbon emissions). Renewables refer to energy production using renewable sources such as solar and wind. Both renewables and cleantech have the potential to offer high returns but also come with a high level of risk. Cleantech investments suffer from the risk that a new technology fails to deliver the desired result. Renewable investments do not have technology risk, but are generally supported by government tax incentives and state and municipal mandates requiring a minimum portion of the power utilities deliver to come from renewable sources. Should the renewable energy mandates and tax incentives be removed, many of the renewable resource investment would not be economical. Renewables have a target return of 20% to 25% and cleantech investments have a target return of 25% to 30%.

*Energy Services*

Companies in this category provide services to all sectors of the energy industry. These services include oil and gas rig leasing and operation, marine vessel leasing and operation, computer software, drill bit manufacturing, and construction. The target return for investments in energy

service companies ranges from 20% to 25%. Of the energy sectors, services are most correlated with the overall economy and resemble a traditional leveraged buyout investment structure the most. Leverage is typically used in energy services investments.

Private partnerships investing in energy related assets will usually focus on one specific category, though some offer diversified funds that make private investments across more than one category. In some instances, an investment manager may sponsor multiple funds where each will target a different category.

*Past Performance*

Private energy partnerships as a group performed well over the last 20 years, both absolutely and relative to index benchmarks. Exhibits 2a and 2b report on a 20 year history for the Cliffwater Private Energy Index compared to other private buyout partnerships; an index of energy related commodity futures; and a public stock index of energy stock.

Exhibit 2a
Cliffwater Private Energy Index Performance versus Benchmarks
20 years ending December 31, 2009

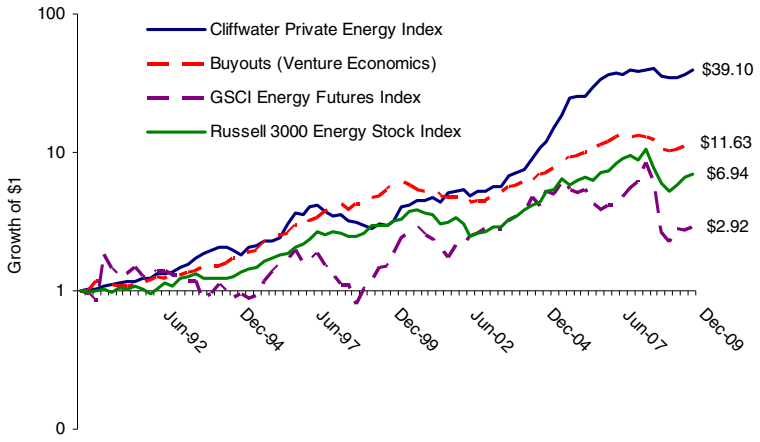



Exhibit 2b
Cliffwater Private Energy Index Performance versus Benchmarks
Annualized 20 Year Return and Risk

| | Cliffwater Private Energy Index | All Buyouts | GSCI Energy Futures Index | Russell 3000 Energy Stock Index |
|---|---|---|---|---|
| Return (annual) | 20.12% | 13.05% | 5.51% | 10.17% |
| Risk | 17.70% | 11.45% | 42.95% | 17.95% |
| Return/Risk | 1.14 | 1.14 | 0.13 | 0.57 |

The Cliffwater Private Energy Index returned 20.12% annually over the last 20 years, well above buyout funds. Most of the incremental return came during the last 10 years when oil prices rose. However, as Exhibits 2a and 2b show, private energy partnerships performed well in excess of energy related futures contracts and energy stocks, both of which benefitted to the same degree from the rise in energy prices.

However, the volatility of private energy partnership values is also significant, measuring 17.70%, and well above the 11.45% annualized risk for other buyout partnerships. The higher risk is due

to the more volatile nature of energy prices and the fact that private energy partnerships invest in a single industry while buyout returns reflect a multi-industry investment strategy. On a risk-adjusted basis, private energy partnerships have the same 1.14 ratio of return-to-risk as buyout funds.

The correlation between energy and buyout partnerships has averaged 0.3, suggesting that private investors would benefit strongly by adding energy investments to their overall private portfolio.

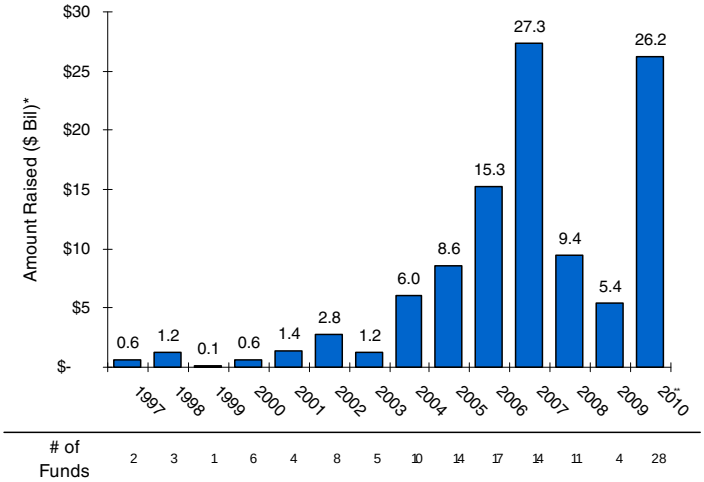
*The Energy Market*

Oil and natural gas reserves are depleting assets. Coupled with an increasing demand in energy, the need and opportunity to invest in new sources of reserves becomes significant. An estimated $500 billion per year is spent on bringing new reserves into production. Additionally, the global M&A market also provides private investment opportunities to investors with approximately $100 to $150 billion of existing oil and gas assets bought and sold annually.

The International Energy Agency[i] has projected the need for a cumulative $20 trillion energy investment over the next 30 years in order to meet global demand, much of which is needed for China-led non-OECD developing countries. Additionally, investments will be needed in developed countries to refurbish an aging infrastructure and deteriorating power generation capability.

Institutional investors have also been investing in private energy assets for many years with peak investment occurring from 2004 to 2007. Exhibit 3 shows that $80 billion of private partnership capital has been raised in the trailing ten years ending December 2009. Looking ahead, more than $25 billion is estimated to be raised in 2010 and 2011. Target fund sizes over the past ten years have ranged from $80 million to $12 billion but have significantly increased in size over the last five years. The median fund size over the last ten years was $550 million compared to $1.1 billion over the last five years.

Exhibit 3
Historical Energy Partnership Fundraising




* Source: Thompson Reuters Venture Economics
** Cliffwater collected target fund size from GPs in market

[i] Source: The International Energy Agency World Energy Outlook 2006

*Geographic Focus of Private Investments*

The majority of private energy investments have occurred in North America with the U.S. taking the lion's share. The North Sea, which includes the U.K. and Nordic countries, has the second largest concentration of private investment. Oil and gas resources in the rest of the world are typically sovereign owned, discouraging private investment.

*Private Energy Fund Differentiation*

Private energy investments have many unique characteristics, although they retain some similarities with traditional leveraged buyout and venture capital investments. One common characteristic is a reliance on sourcing and partnering with qualified management talent. Regardless of the industry or sector, identifying company leaders is a crucial step in the investment process.

Private energy investments differ from buyout and venture capital investments in that they are tangible assets. Upstream investments provide exposure to commodities. Midstream and downstream investments provide investors with physical plant and equipment (pipelines, power plants, etc.). Another unique characteristic of private energy partnerships is their ability to provide a hedge against inflation. Midstream and downstream investments will often have agreements with counterparties providing for the long term delivery of oil and natural gas. These agreements allow for price adjustments based on inflation.

The production of oil and gas from upstream investments is usually hedged against a commodity futures price curve in order to guarantee cash flow and limit volatility. The hedging will eliminate the realization of price increases above the futures curve but will protect the investor from prices falling below the curve. The hedging has the potential for eliminating inflation sensitivity but GPs will normally leave a portion of the production un-hedged. Additionally, any new production has the potential to offset any unanticipated inflation.

Energy funds do use leverage, though not to the same extent as buyout funds. Leverage may range up to 40% for upstream assets and up to 80% for midstream and downstream assets. Banks will only lend to oil and gas companies if they have producing assets.

*Inclusion in an Institutional Investment Portfolio*

Institutional investors differ in how they allocate private energy partnerships to established asset classes. In the past, most have placed energy funds in their private equity allocation. That is changing as more investors designate private energy partnerships within a "real asset" category, along with TIPS, commodities, infrastructure, and real estate.

*Cliffwater Private Energy Index Construction Methodology*

Cliffwater created the Cliffwater Private Energy Index (the "Index") to assist institutional investors in making asset allocation decisions and to help the performance evaluation process by providing an investable benchmark for energy partnerships. As of March 31, 2010, there were 32 active energy funds reporting into the Cliffwater Private Energy Index. Energy funds classified as Upstream, Midstream, Downstream, Energy Services, and Renewable Energy are included in the Index. Mineral Resource funds and Energy Fund of Funds are not. Performance is calculated using a quarterly "pooled IRR" methodology. Beginning asset values, quarterly cash flows, and ending asset values from all funds included for the period are aggregated. An IRR is then calculated quarterly from the aggregated values.

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