Environmental, Social and Governance ("ESG") considerations for investment in Longreach Energy

Date April 2019

LONGREACH
ALTERNATIVES

TABLE OF CONTENTS

SECTION 1 – WHAT IS THE LONGREACH ENERGY STRATEGY?

Longreach Energy (LE) generates and delivers investment returns from US based gas and oil properties. In essence it can be considered to be a property investment where cash flows are derived from royalty payments linked to the extraction of gas and oil from the space underneath the property.

It is focused on properties deriving strong profits at current prices with little reliance on positive commodity price action to drive returns.

Natural gas reserves are expected to comprise at least 70% of the LE model portfolio. While gas is the targeted mineral, due to both gas and oil often being both present in the same rock, LE will often invest in properties that have some associated oil production.

Returns to investors will be a function of several variables including:

1. Production status of purchased property
2. Improvements in extraction levels of wells through additional access wells
3. Improvements in extraction efficiency through better engineering processes
4. Improvements in overall efficiency of materials usage
5. Changes in gas prices
6. Value enhancement and subsequent capital realisation through a liquid trading platform for properties and associated royalties
7. Investment in non-operated working interest (investment in the equity of the companies operating and implementing the process)
8. Mezzanine debt financing for the non-operated working interests.

The contributions to returns will primarily be in the form of yields (royalties) and capital gains (points 1 – 6 above). A full description of the investment process is available as a separate due diligence paper. The rest of this document will examine ESG aspects at every level of the strategy.

SECTION 2 - ESG CONSIDERATIONS

2.1 – Introduction

This paper will focus on the nature of the oil and gas sector as elements associated with the industry are the most publicly visible aspects of the strategy and therefore demand a valid, evidence based response and rationale. Hence we seek to produce in this paper only verifiable, not speculative, arguments and claims.

We regard this paper as a bona fide contribution to the investment decision making process for fiduciaries that seek to address prudence and practicality.

We do not address, nor do we think we should, ideology.

Section 2.2 - Environmental Considerations

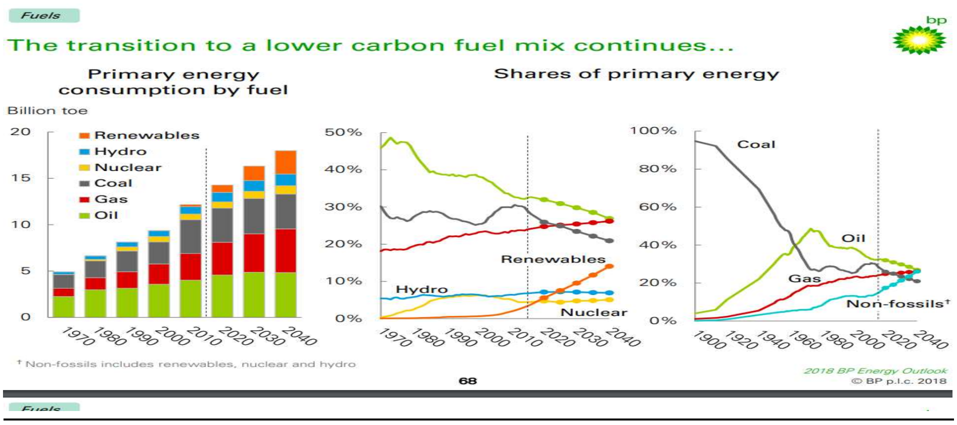
2.2.1 Carbon Dioxide Emissions Intensity

All forms of energy production will have a degree of CO_2 emissions. Renewables will require CO_2 intensive capital, associated infrastructure and ongoing maintenance. The global mix of energy sources for production of electricity, transportation, smelting and agriculture will take many decades to evolve to "low carbon intensity".

The alternative view is that there will be a sudden transformation of the industrialised economies that will see an as yet undeveloped, unproven and uncosted solution capturing electricity generated with intermittent renewals.

The following graph from BP's 2018 Energy Outlook illustrates the likely path of energy generation.

https://www.bp.com/content/dam/bp/en/corporate/pdf/energy-economics/energy-outlook/bp-energy-outlook-2018.pdf



This demonstrates that renewables will increase their share, coal and oil will diminish in share while gas will steadily increase its share.

From an emissions intensity perspective this is important, because natural gas (comprising 70% of the model portfolio) is the cleanest of all fossil fuels and produces approximately half the carbon dioxide emissions of coal. The US Energy Information Administration conducted a useful review on this topic on the 8th of June 2018.

How much carbon dioxide is produced when different fuels are burned?

Different fuels emit different amounts of carbon dioxide (CO2) in relation to the energy they produce when burned. To analyze emissions across fuels, compare the amount of CO2 emitted per unit of energy output or heat content.

Pounds of CO2 emitted per million British thermal units (Btu) of energy for various fuels:

Coal (anthracite)	228.6
Coal (bituminous)	205.7
Coal (lignite)	215.4
Coal (subbituminous)	214.3
Diesel fuel and heating oil	161.3
Gasoline (without ethanol)	157.2
Propane	139.0
Natural gas	117.0

The amount of CO2 produced when a fuel is burned is a function of the carbon content of the fuel. The heat content, or the amount of energy produced when a fuel is burned, is mainly determined by the carbon (C) and hydrogen (H) content of the fuel. Heat is produced when C and H combine with oxygen (O) during combustion. Natural gas is primarily methane (CH4), which has a higher energy content relative to other fuels, and thus, it has a relatively lower CO2-to-energy content. Water and various elements, such as sulfur and noncombustible elements in some fuels, reduce their heating values and increase their CO2-to-heat contents.

What about Battery technology?

Currently, the possibility that cost effective and viable battery technologies will in the near term supplant the position that coal (particularly in Asia) and oil currently have and are projected to hold is practically impossible. This appears to certainly be the case for the time horizon of the Longreach Energy strategy.

Small scale battery technology requires substantial scarce resources which cannot easily be scaled. Small scale battery lifetimes are also uncertain. More scalable high temperature battery technologies using abundant metals are in their early development phase and still not proven.

Presently, Natural Gas is serving as a reliable, cheap and abundant source of energy which will serve as “the bridge to the low carbon future”. We cannot at this point say what the future will hold as the development of low carbon technologies (carbon capture and storage, nuclear fission, nuclear fusion, batteries) can never be discounted. However these are still speculative at this point in time. Wind and solar renewables remain intermittent sources requiring baseload and peaking backup.

In the time horizon in place for the Longreach Energy strategy, we can confidently make the claim that demand for gas will satisfy US industrial and individual consumers in an environment of increased demand for electricity production.

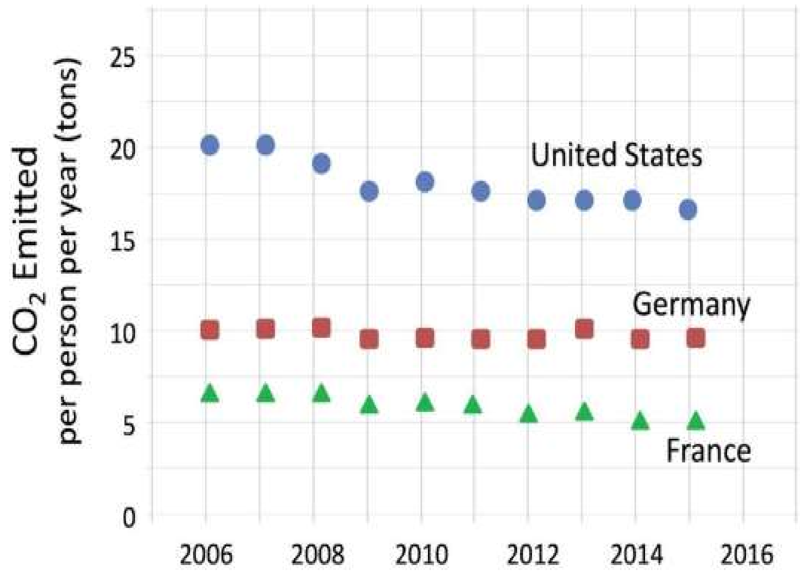
We can also make the claim confidently that as natural gas replaces coal (in particular) and oil, that CO_2 emissions intensity will be lower than could otherwise be the case.

In other words, for those concerned about CO_2 emissions, this strategy is actually achieving a better outcome than any other practical alternative.

It is also the case that the other alternatives to date, without new technologies, have resulted in failure to deliver lower CO_2 emissions. The example worth highlighting is Germany, the "poster child" for renewables policy.

https://www.forbes.com/sites/jamesconca/2017/10/10/why-arent-renewables-decreasing-germanys-carbon-emissions/#6c60c9ac68e1

"The problem is that even when renewables produce enough energy to supply all of the country's electricity, the variability of the renewables means Germany has to keep the coal plants running, over half of which use the dirtiest of all coal, lignite. In fact, in 2016, 7 out of 10 of Europe's biggest polluters were German lignite power plants."



Carbon dioxide emitted in metric tons (t) per person per year for the U.S., Germany and France from 2006 to 2015. After Peter Rez with data from Energy Information Agency and BP. PETER REZ

As the graph indicates, the levels of CO2 emitted per capita in the US has diminished while that in Germany has increased. The reason for this outcome in Germany is the impact of policy decisions favouring intermittent renewables over traditional sources eg coal, allowing market players to take advantage of higher prices during scarcity, similar to the situation in Australia.

As is often observed, the problem with renewables is not the technology, it is nature.

2.2.2 – Environmental impact of Extractive Technologies

The "gas revolution" has not been the result of discovery of extra gas resources, as its abundance in shales has been known and understood for decades. It has been the result of better technologies ranging from seismic geological surveying, IT, data analysis and materials science.

A key development however has been hydraulic fracturing (fracking), the injection of water and proppant into oil and gas reservoirs at high pressure in order to increase rock permeability. The materials used include sand (about 10%), water (about 90%) and trace chemicals (less than 0.5%. Additionally, it requires labour, capital and energy.

First used in 1947, fracking has been employed in more than a million wells to extract more than 7 billion barrels of oil and 600 trillion cubic-feet of natural gas from deep underground shale formations, trapped gas and oil under natural pressure for extraction to the surface.

Criticisms.

Much has been stated in the media, in documentaries and by environmental groups about the dangers of fracking. Since fracking has been undertaken over many decades in millions of wells across the US, it should be expected that the associated dangers and environmental impacts would have by now presented themselves unequivocally.

Fracking's track record.

Ensuring protection of the environment is essential for fracking to be successfully deployed and accepted by those communities most affected. Consequently, the protection of the environment, in particular the potential contamination of water tables from which local communities access their domestic and agricultural supplies is paramount.

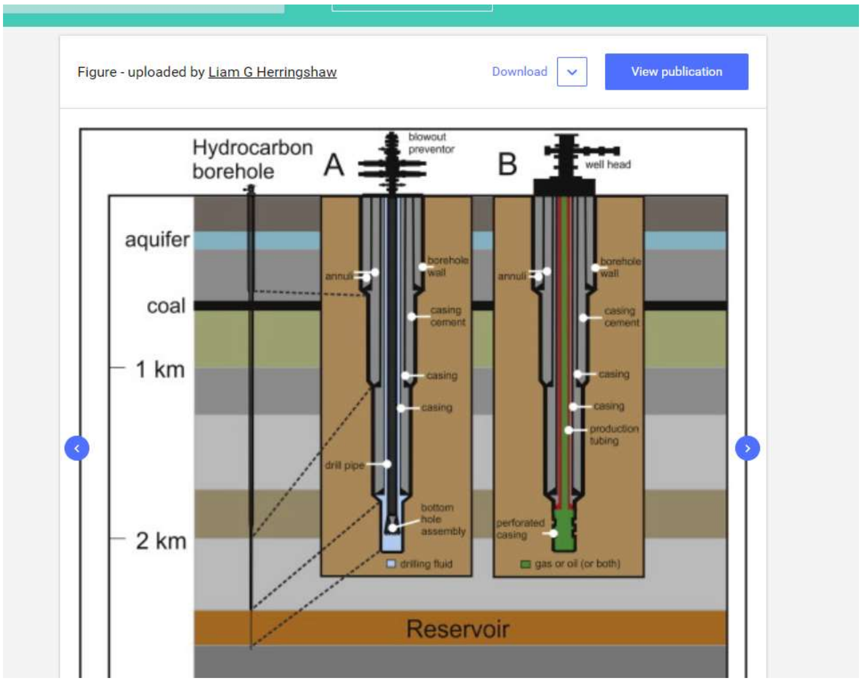
How is Environmental Safety managed?

Extraction of minerals in the fracking process involves drilling very deep wells.

A drill hole typically descends as much as one to four kilometres below the surface. The evolving drilling technology is enabling even greater depths, thereby enhancing the future potential value of properties. The wells are drilled to levels well below the levels of aquifers and there are multiple layers of rock structures providing further separation.

The structure and integrity of these drill holes is key to the elimination of the risk of contamination of the aquifer. The structure of a modern drill holes is shown below.

https://www.researchgate.net/figure/Schematic-diagram-of-typical-well-design-showing-A-structure-of-an-exploration-well_fig7_261030163.



What this picture displays is the extreme care being undertaken to ensure that the contents of the operation, ranging from gas and oil, fluids, chemicals, residuals from the rocks and any remnant sand remain in a controlled environment and separated from the environment inhabited by humans, animals and agriculture.

The multiple steel and cement casings protect water aquifers at shallow depths with the fracking operations generally conducted at least 2,000 meters below the deepest water supply. Additionally, stringent state and federal regulations on well design and construction ensure that fracturing fluid additives do not migrate upward into active or treatable water reservoirs. There are serious financial consequences for operators who cut corners.

As a response to environmental concerns, an analysis of fracking operations and their impact on water resources was undertaken by the following authorities:

- The US Environmental Protection Agency (EPA)
- The Ground Water Protection Council (GWPC)
- The US National Ground Water Association and underground injection agencies (whose mission is to promote the protection and conservation of ground water)

They concluded that there have been no confirmed incidents of groundwater contamination from hydraulic fracturing. This is particularly noteworthy considering that over a million wells have been fracked in the US. Furthermore, according to the Interstate Oil and Gas Compact Commission (IOGCC) – the multi-state governmental agency representing states' oil and gas interests – each IOGCC member state has confirmed that there has not been a case of groundwater contamination where fracking was attributed to be the cause.

There have been instances of contaminated fracking fluid seeping into ground water from the above ground operations.

https://www.scientificamerican.com/article/fracking-can-contaminate-drinking-water/

However this is clearly a case of mismanagement of the site, not the failure of the well itself. As a response, today each site requires an impermeable liner to capture any potential spillage.

The overwhelming evidence shows that fracking is a safe operation and this is the mainstream scientific conclusion based on empirical evidence, rather than hearsay.

"Exploding Water"

Many environmental activists still believe fracking causes methane in household water supplies. This idea was promoted in a film from 2010 by director Josh Fox called "Gaslands". It depicted flames rising from the kitchen water tap of a home in Weld County Colarado. The source of the flames was determined to be methane, claimed to have been introduced into the water supply by nearby fracking operations.

The problem however, was that two years before the release of the film, Colarado regulators had already investigated this case and had determined that fracking had nothing to do with it.

http://cogcc.state.co.us/cogis/ComplaintReport.asp?doc_num=200190138.

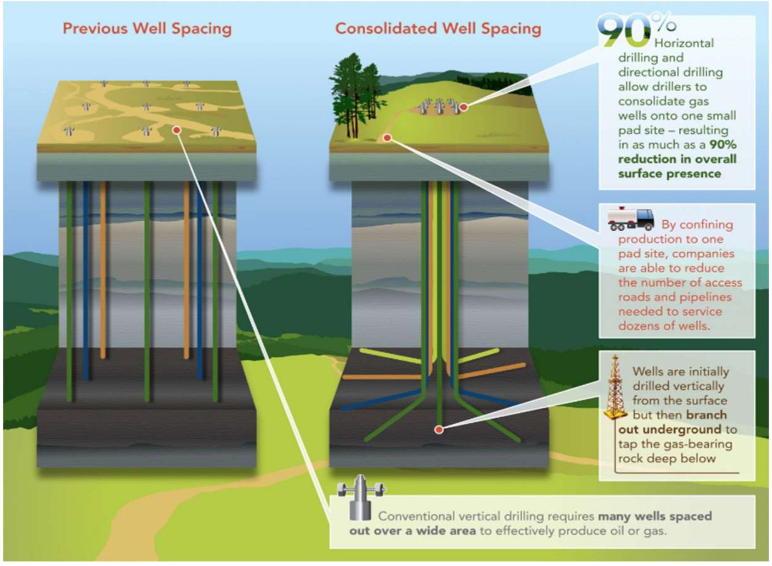
Every Industrial Process has its Environmental cost – but what are the benefits?

Note that LE does not claim that there are no environmental impacts in the fracking process. We do claim however that every industrial process has its impact on the environment and these impacts have to be weighed against the benefits. We believe that the claimed impacts of fracking in many cases are simply unsupportable, and in other cases can be assessed positively in terms of the benefits provided to consumers and industry. Some more of these impacts are discussed below as we look at the major technological breakthroughs that have spawned the gas revolution.

Horizontal Drilling – The key transformative Technology

Horizontal drilling transforms the traditional "Direct in a straight line" one dimensional extraction activity into a three dimensional activity – a vertical well can now access whole layers of gas bearing formations in any direction.

The following illustration shows the benefits of horizontal drilling and the reach available to a single well. It is not to scale, however we are looking at kilometres of range from the central well.



The benefits.

The smaller the amount of land area need to extract a given amount of energy represents a better outcome for the industry, consumers and the environment, be it natural or farming.

This is what modern gas drilling with horizontal wells looks like.

..as opposed to old vertical wells.

A grid of drilling sites and roads, similar to those used in fracking, lies across the landscape near Odessa, Texas.

With traditional drilling, subsurface formations would need to be accessed by multiple drill heads, thereby impacting on land area requirement (the drilling pad, roads and other capital required).

With horizontal drilling, one single drill pad can access formations around and below the subsurface, thereby having much less impact on the surface. The life of a well may be between 20 and 30 years, after which, when the resources are no longer viable the land can be returned to its former use.

In essence, horizontal drilling's environmental benefits translate into having much greater energy extraction per unit area of land, thereby preserving more land for alternate uses and capturing more financial returns to secure associate environmental standards and outcomes.

Enhanced Scale.

From an investment perspective, in any industrial process operational leverage (getting more out of your capital and labour inputs) is a desirable outcome. In the case of environmental benefits, as every additional scalable element of the operation is happening kilometres underground, the impact is not translated to the surface.

2.2.3 – Resource Usage

Critics have argued that fracking requires massive resources and those resources are better deployed in other energy sectors, in particular renewables. It is worth breaking the resources requirements down to the operational levels to demonstrate why this argument is overly simplistic.

There are four resource elements involved in the fracking and horizontal drilling process for extraction of mainly gas and some associated oil.

<u>Sand</u>

Sand is used as a proppant to open the cracks in the fractured shale deposits. It constitutes about 10% of fracking fluid. Some critics have argued that vast amounts of sand are required in the fracking process and they are correct. Vast amounts are required. Typically, for each meter of drilled pipe, 1000kg of sand may be used for proppant purposes. This sounds extreme, especially when translated to a pipe which may be 2000 meters in horizontal length (2 million kilos of sand).

However, the real question is not how much sand is required, but how much shale is able to be impregnated. The answer is staggering and is evidence of the sophistication of the process. Natural fractures in shale deposits can extend as much as 400 metres.

Fracking creates fractures much smaller than these natural fractures, perhaps up to 200 meters in distance from the pipe. If we assume average fracture distance of say 150 meters outside the pipe, then per meter of pipe, the volume of shale that would be impregnated is about 71,000 cubic metres. This means that at 1000kg per meter, the amount of sand impregnating the shale is about 1/70th of a kilogram (or about 14 grams per cubic meter). In this context, sand is hardly noticeable. Additionally, sand is an abundant resource and is inexpensive. It is precisely the type of resource that should be used.

<u>Water</u>

Water constitutes 90% of fracking fluid, by far the most voluminous constituent. Water needs to be trucked in and stored in local tanks to supply to the fracking phase of the operation. The fluid is used to propel the drill head and to carry the proppant into the fractures in the shale formation. Most of it returns back to the surface where it carries impurities from the shale formation and some of the additives (to be discussed later) including some sand.

Several methods have been proposed and acted upon to deal with the "waste water" created by the fracking process. As always, problems demand real solutions and the waste water issue is no exception. Companies such as Baker Hughes, Halliburton and FTS International are now treating water from fracked wells to the extent that it can be recycled.

Until recently, many companies considered treatment of waste water to be too expensive so the "solution" was to inject non producing wells with the waste water. The very good news is that the use of this recycled waste water is proving beneficial in the fracking process compared to using pure water and is further reducing operational costs (including haulage).

https://www.scientificamerican.com/article/analysis-fracking-waters-dirty-secret/

The key point is clear. In an industry where industrial processes are well understood and engineering skills are well developed, problems can be solved and investors can be confident that risks can be properly managed.

Additives

The media and activists have made abundant claims as to the toxicity of the additives used in the fracking process. Below are the chemicals typically used (excluding proppant like sand) and their common everyday uses.

Water: 99.5%

Other: 0.5% including:

- Citric Acid (common cleaner and food additive)
- Hydrochloric Acid (common industrial chemical)
- Glutenalamide (Disinfectant)
- Guat (Ice cream additive)
- Dimethyl Formaldehyde (used in plastics)
- Isopropanol (Deodorant)
- Borate (Soap)
- Ammonium Persulphate (Hair Dye)
- Potassium Chloride (used in IV drips)
- Sodium Carbonate (Detergent)
- Ethyl Glycol (Anti-freeze)
- Ammonium Bisulphate (Cosmetics)
- Petroleum Distillate (Cosmetics).

Note that these all perform a particular function in the drilling process and some operators have different (but very common) chemical equivalents.

The key observation here is that every consumer resident in any industrial community will have exposure to such chemical throughout the course of their lives – some on a daily basis, some less often. Most people are not aware of the chemicals to which they are exposed and this is reasonable, as long as the chemicals at a given level of exposure are not toxic.

2.2.5 – Seismic Activity

There is seismic activity primarily associated with the injection of waste water into used wells, however the degree of seismic activity is very low. It is also noted that waste water recycling will likely deal with this issue in time.

Section 2.3 – Social Considerations

2.3.1 – Industrialised and Electrifying Society – Meeting an increasing consumer demand.

In an industrialised and increasingly electrified world (replacement of internal combustion engines with electric engines – mainly Electric and Hybrid vehicles), the need for reliable baseload (or on demand) electricity is essential. Presently baseload electricity is best provided by heat sources that can be quickly tuned to provide synchronous currents. Furthermore, those sources of baseload on demand and synchronous energy are best located as close as practicable to the demand for that energy, thereby reducing the amount of energy loss across high tension powerlines.

From a power-grid stability perspective, the output of an electricity supply with a high proportion of intermittent energy sources can be difficult to predict or control and can make matching electricity supply to consumer demand problematic.

Electricity supply must be matched to demand minute-by-minute. Despite continued improvement in battery technology, electricity cannot be stored at volume for any significant time. Existing battery technology is for peaking purposes – not baseload storage. If supply falls short of demand and no spare generating capacity is available, the grid will have to ration electricity (blackouts).

Wind and solar energy are considered intermittent and therefore unpredictable because their electrical output depends on environmental conditions: the speed of the wind and the amount of sunlight striking a solar panel. This means that back-up energy sources are required to ensure electricity demand can be met when there is no sun or wind. Large scale solar farms are less affected by environmental conditions however they are often located large distances from the consumer which implies transmission losses and more infrastructure.

Some coal-fired and most gas-fired and hydroelectric power stations can alter their output rapidly enough to do this. It is essential to have a secure level of baseload power – the minimum supply of electricity needed to keep the lights on and the grid enabled. Getting a disabled grid back to an operational state is costly both in terms of grid costs and economic on-costs. Avoiding a grid collapse is the first priority.

"Demand management", batteries and rationing has been suggested as a means of managing renewables intermittency. At present this is entirely unproven at large scales. Potentially it may be a solution, however it is not likely to be so in the near or medium term.

Renewables can today participate in the power supply when the baseload needs and peaking gaps are delivered by power stations that use gas, coal or nuclear fuel that excel at producing a continuous and high electrical output. Baseload gas power stations are therefore a crucial link in the forecastable period as demand for electricity grows in developed economies.

Demand for Electricity

Over the fund's investment period, central grid demand for electricity will continue to increase because of the following factors:

- GDP growth. In the US, the country is adding over 2 million people and $300-400 billion in GDP each year
- The bi-partisan political focus in the US on a "manufacturing renaissance" and a return of energy-intensive output
- "Deep electrification," where the goal promoted by those concerned with particulate pollution in addition to CO_2 is to basically "electrify everything," such as cars, buses and high speed rail.

A research paper written by the US Department of Energy in 2017 highlighted the widespread electrification of end-use services across the US transportation, buildings and industrial sectors, leading to a doubling of electricity consumption by 2050, alongside moderate improvements in the energy efficiency of end-use devices.

You can therefore argue forcefully that for a modern society to operate optimally and reliably, natural gas should be a favoured source of energy alongside other sources.

2.3.2 – Providing Income and Jobs for Local Communities

Property Rights are key.

Unlike in Australia (and elsewhere) owners of property titles in the United States have rights to minerals under their land. It was very easy in the past to identify the royalty derived from a given land parcel when drills went directly down. With horizontal drilling, royalties can accrue to multiple land holders as the length of the horizontal section may extend kilometres. With developments in geo-sensing and positioning, systems to determine the rights to royalties from drilling operations which are under your land, but whose drill head is located on someone else's land, have been developed.

The impact of fracking on the communities involved in the industry should not be understated. Unfortunately we tend to see a one-sided portrayal of its impact on communities and these have more often than not been shown to be massive exaggerations or outright untruths (e.g. Gasland).

It has often been stated that the best form of welfare is a job. In this respect, the communities serving the oil and gas industry have both benefited from income and associated jobs, and similarly have relied less upon the state and the consequent societal problems associated with unemployment.

The bottom line for local communities?

Royalty Income for land owners be they individuals, government or native title holders provides income for individuals and families, income for necessary community programs and support for indigenous title holders.

The following articles and extract demonstrates the benefits accrued to local communities where the industry is popular.

https://www.kansascityfed.org/~/media/files/publicat/reswkpap/pdf/rwp16-12.pdf

"The recent oil and gas production boom in the United States has generated tens of billions in additional royalty income for owners of oil and gas rights. We use the royalty income shock to study the local multiplier effect of unanticipated income and find that each royalty dollar received by county residents created an additional $0.50 in local income, mostly through greater wage income. The finding suggests that royalty payments and government transfers have similar local multiplier effects. In aggregate, the total income effect from royalties was $68 billion in 2014, or 0.5 percent of U.S. personal income. Over the 2000 to 2014 period, royalty income and its multiplier effect accounted for more than two-thirds of the local income effect of oil and gas development."

And the positive impact on employment is described in this link.

https://www.reuters.com/article/usa-fracking-employment-study-idUSL8N13159X20151106

Since 2014 the industry has expanded and royalties have increased. Through the exchange mechanism for royalties rights, the LE strategy effectively provides upfront capital to land owners in exchange for royalties. The development of the properties provide further employment opportunities and subsequent economic activity. What is clear is that without the capital and expertise applied to these properties, their inherent value would not arise.

The ability to gain income from an asset has multiple positive affects which lead to a much greater degree of independence and wellbeing at the individual and family levels, with benefits accruing to the rest of the community.

2.3.3 – Geo-politics – Shifting Sands.

One of the benefits of the gas and oil boom has been the enhanced role of the US as an energy producer and potentially moving to energy independence. This means that OPEC nations, Russia and other producers will have less power than in the past. This should be regarded as a positive development for their respective regions. They will need to seek to further diversify their economies as the restrained price of fossil fuels (particularly oil) will likely focus attention on other forms of growth. There no longer exists a premium for owning or controlling fossil fuel reserves.

2.3.4 – Risk Management.

Smaller Scale means Lower Risk

The two largest industrial accidents in recent history were the Piper Alpha North Sea Oil platform disaster in 1980 and the BP Deepwater Horizon Gulf of Mexico disaster in 2010. Such platforms represent massively higher concentration risk compared to the distributed risks associated with the smaller scale but numerous fracking and horizontals drilling operations.

Shorter Development Duration means Lower Risk

It may take 20 years to plan and develop a large scale energy facility (offshore oil and gas, nuclear etc). During this developmental phase, investors must accept some greenfield risk and interim financing and even political risk. By contrast, after a property is identified as positive for fracking and drilling purposes, the time required to develop the site may be as short as six months after which the drilling equipment is transferred to a new site to be redeployed and the well is subsequently in production. Few energy sources can be developed in such a short period of time. In essence the development phase of each project is short duration, a direct result of the industrialisation of the engineering processes, the availability of expertise and materials and the existing infrastructure.

Section 2.4 – Governance Considerations

2.4.1 – The Gas and Oil Industry in the US is highly regulated.

The shale gas development in the US domestic fields has been a game changer for the US natural gas market, turning the US into the largest gas producer and the largest consumer of natural gas in the world. The country's rising oil production is being met with declining domestic oil consumption due to stricter fuel-efficiency policies. This, together with the rise in natural gas production, has many experts predicting that the US will achieve energy independence within the very near term. It is noted that liquefaction facilities in Texas ports (e.g. Freeport project) that were originally designed for gasification of natural gas imports, are now undertaking export services for fracked natural gas.

The production and delivery of natural gas and oil in the US is subject to significant regulation from a number of regulatory bodies, including the Department of Energy (DOE), The Federal Energy Regulatory Commission (FERC), the Department of Transportation (DOT) and State regulatory bodies.

At the state level, public agencies generally regulate oil and natural gas development and production, while the leasing of private land for oil and natural gas development is generally left up to each individual land owner.

The regulation of transportation of oil and natural gas in the US is divided up between the federal government and state authorities. The Federal Energy Regulatory Commission (FERC) is the primary agency governing oil and natural gas transportation.

The regulatory standards of the oil and natural gas markets in the US compared to other competing countries are very strong. Competing sources of crude oil for example include:

- Russia: comparable quality, low cost but severe governance issues
- Nigeria: comparable quality, low cost but severe governance and community issues
- Middle East: low cost but poor quality and significant governance and community issues
- Venezuela: poor quality, severe governance and community issues

The American Geosciences Institute provides more detail around the US regulation of oil and gas operations, highlighting that regulation has been in place in various forms for over 100 years.

2.4.2 – Australia and Fracking

It is not new. Major oil and gas companies have used the fracking process to produce oil and gas in South Australia and Queensland for nearly 50 years. Hydraulic fracturing was first used in the NT in 1967 and the practice has since been used consistently from the early 1980s to enhance oil and gas recovery.

However the more recent response to fracking (as opposed to horizontal drilling techniques) has become a point of contention involving farmers, environmental advocates and industry.

Several recent enquiries into fracking in Australia have drawn the same conclusions.

The inquiry into fracking undertaken by the Northern Territory government summarised its findings as follows:

"... and with any new industry, it is not uncommon for problems to emerge. However, it is the Panel's opinion that, provided that all of the recommendations made in this Report are adopted and implemented in their entirety, not only should the risks associated with an onshore shale gas industry be minimised to an acceptable level, in some instances, they can be avoided altogether. In short, the Panel is of the opinion that with the full enactment and implementation of the robust and rigorously enforced safeguards recommended in this Report, the waters shall continue to flow "clear and cold out of the hills" and the "dawn chorus of " Magpie Geese, Brolgas, Budgerigars, Black Kites, Blue-winged Kookaburras "and scores of other bird voices" shall continue to reverberate across the NT landscape."

https://frackinginquiry.nt.gov.au/inquiry-reports?a=494327

In June 2013, the Australian Council of Learned Academies (ACOLA) released a comprehensive report (peer-reviewed by the CSIRO) that found:

"The evidence suggests that, provided appropriate monitoring programs are undertaken and a robust and transparent regulatory regime put in place (and enforced), there will be a low risk that shale gas production will result in contamination of aquifers, surface waters or the air, or that damaging induced seismicity will occur."

An interview with Professor Alan Finkel supporting the findings above is in the following link.

https://www.abc.net.au/lateline/interview:-dr-alan-finkel,-newly-appointed-chief/6890722

2.4.3 – Health Impacts in the gas industry (where fracking is used).

Fracking is gaining prominence in the UK which has vast reserves of shale gas. A UK health and safety regulator (Public Health England – an autonomous executive agency of the Department of Health) found that the risks to workers in the industry and nearby populations were very low if the operations were managed properly. This is clearly the case in any industry where there are potential hazards. It is clearly the experience of the US based operations into which the LE strategy has invested.

https://www.appea.com.au/wp-content/uploads/2014/08/Public-Health-England-shale-gas-report.pdf

Section 3 – Summary

From an Environmental, Social and Governance perspective there are many reasons why fiduciaries can demonstrate that investment in the US Energy revolution, via intelligent selection and management of primarily gas bearing property assets, provides a net benefit to the environment, to communities and to investors.

Capital must be allocated to where it is most needed and in the most efficient manner. While it may be possible to envisage a future without fossil fuels, it is not possible to meaningfully invest in such a future in a manner that provides attractive risk adjusted returns. The long term future is always difficult to forecast, especially with the development of new technologies, which themselves may turn presently worthless resources into stores of value.

The practical decision, we argue is to ensure that as an investor you can participate in a better solution to deliver global needs and be rewarded for taking that decision.

The LE strategy seeks to provide a means to bridge the gap to a cleaner energy future via gas, the cleanest fossil fuel, displacing thermal coal for both the domestic US market and increasingly export markets in Asia.

We can confidently claim:

- The Longreach Energy Investments strategy will continue to facilitate reduced global carbon emissions by a significant degree (as witnessed primarily in the United States).
- The Longreach Energy Investments strategy will serve to promote wellbeing in the communities in which it makes its investments and provide a source of affordable energy for its consumers, thereby creating a higher standard of living and more jobs.
- The Longreach Energy Investments strategy has minimal surface area and water based environmental impacts. Almost all waste product will either be recycled, trapped many kilometres

below ground or eventually sealed in impregnable multi-layered stainless steel and cement wells. The surface environment will eventually be returned to its prior or preferred use.

- The Longreach Energy Investments Strategy will facilitate a shift in geo-political power where the ownership and concentration of energy assets will be of less importance - in other words, a safer world.