June 2018

ENERCOM®

Energy Industry Data & Trends

DRILLING DOWN INTO OIL & GAS VALUATIONS

This report is the second in a two-part series examining EnerCom's 5 Factor Model. Last month investigated the reserve-based metrics in the 5FM: finding and development cost and production replacement. This month's report will cover the operations metrics in the model: operating costs, capital efficiency, and relative debt loads.

Operating costs directly examine a firm's operational efficiency, calculating the basic cost of producing one barrel of oil. The metric includes lease operating expense, production taxes, transportation and processing, in addition to cash and stock G&A costs. Some of these components, such as production taxes, cannot be influenced by omanagement teams, but most can be altered if a firm chooses to focus on them.

Capital efficiency considers the return companies are getting on recent expenditures, determining if recent capital expenditures have created EBITDA. The metric evaluates a company's trailing 12-month EBITDA per unit production, expressed as a percentage of three-year F&D costs per unit reserves added. If a company has a capital efficiency greater than 100%, this suggests it has spent money effectively, as it is making back more than the amount it has spent on adding reserves. If a company has negative EBITDA over the past 12 months, or did not add reserves in the past three years, a capital efficiency is incalculable for the firm. In addition, if its F&D cost is above $50/bbl it was judged to be skewed by impairments, these companies were also excluded from the metric.

The final operating metric concerns debt load, specifically total debt to trailing 12-month EBITDA. This metric became particularly important during the downturn, when debt levels soared while revenue dropped. While companies are no longer facing the existential threat of low commodity prices, balance sheet strength continues to be in the forefront of investors' minds with a push toward capital discipline which we have noted in previous reports.

In this Report – KEY SUMMARY POINTS:

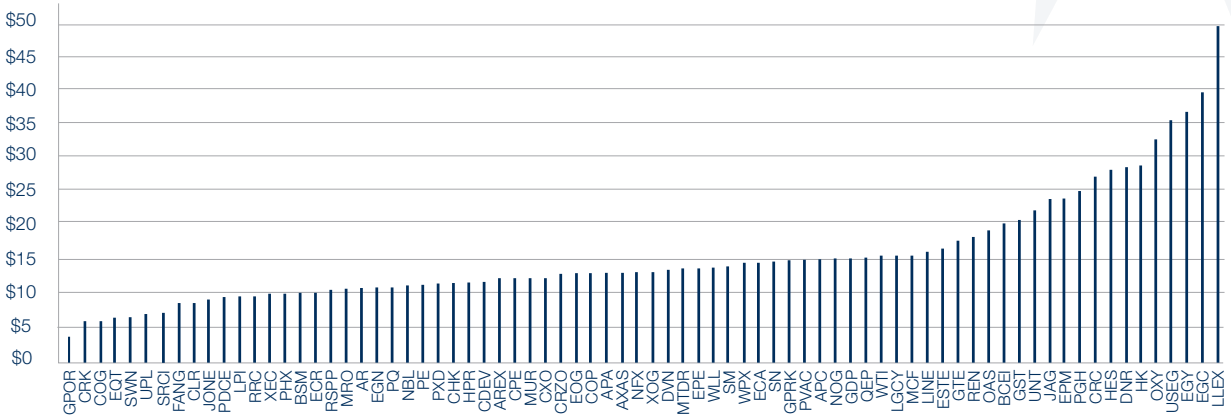
- Gas companies show lowest operating costs, though some oil-weighted firms are comparable
- Most large firms have low operating costs, offshore players are exceptions
- Operating costs are currently as important in valuations as they were in 2013 and 2014
- Canadian companies show higher capital efficiencies as a result of lower F&D costs
- Diversified companies have lowest average capital efficiency
- Investors are looking at capital efficiency based on anticipated expenditures to value companies
- Canadian companies hold significantly less debt than their U.S. counterparts, the result of differing investor priorities
- Small firms have highest debt loads
- Debt remains important, though not as critical as it was in 2015 and 2016
- Bakken and Permian firms are valued in line with fundamentals, DJ and Appalachian have disconnect

Operating costs range from $3/BOE to $59/BOE

Companies in the EnerCom Analytics database show a wide range of operating costs, from $3/BOE to nearly $60/BOE. Most firms, however, report operating costs between $10/BOE and $20/BOE. The highest operating cost in the database belongs to U.S.-based Lilis Energy at $56.15/BOE, while the lowest operating cost for a single company belonged to Canadian Peyto Exploration's $3.31/BOE. Overall, however, Canadian firms are paying higher operating expenses, as the average U.S. E&P spends just under $16/BOE in operating expenses, while the average Canadian company spends $18.10/BOE.

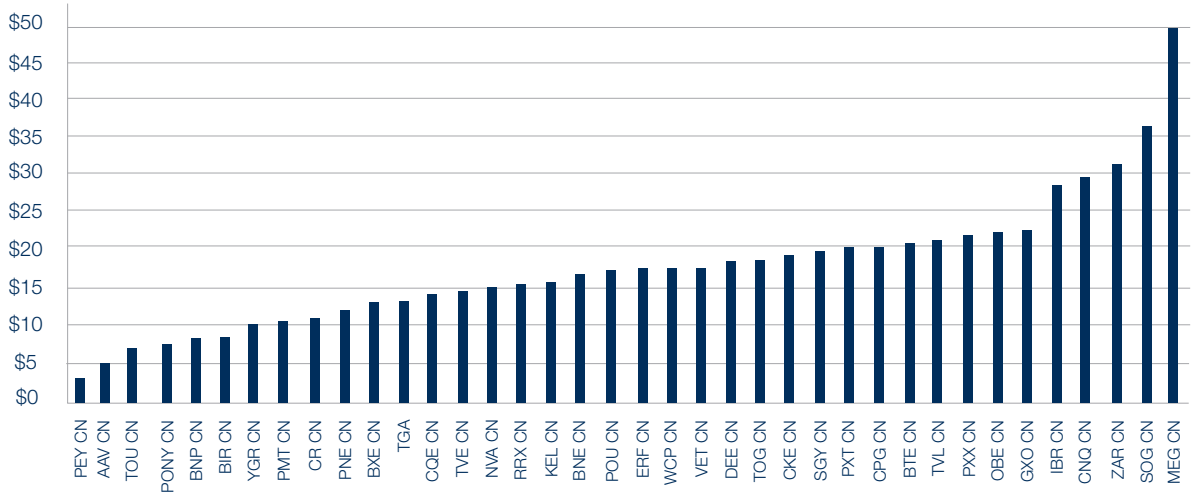
U.S. OpEx and G&A ($/BOE)

Source: EnerCom Analytics



Canadian OpEx and G&A ($/BOE)

Source: EnerCom Analytics

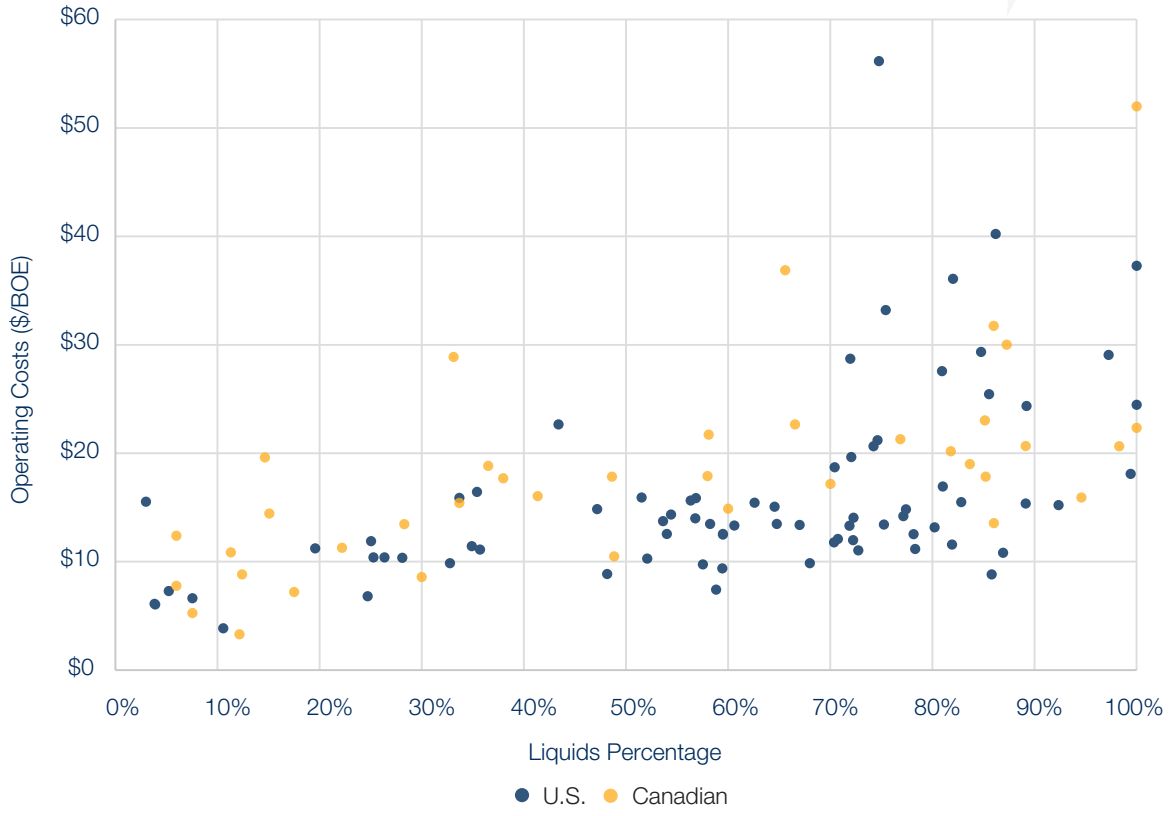


Operating costs generally dependent on production mix

With natural gas prices well below the level of energy equivalency with oil, it may seem likely that gas-focused companies would show lower LOE costs than oil-focused firms. This is mostly the case, though there are exceptions. The companies that report the highest operating costs are almost exclusively oil weighted, but there are also some heavily oil-weighted firms with low costs. Diamondback Energy, for example, produces 86% liquids and spends only $8.83 for each barrel it produces, among the lowest operating costs in the database. Canadian-based Iron Bridge Resources, on the other hand, produces 67% gas and pays $28.88/BOE, a price more commonly seen in offshore and diversified companies.

U.S. & Canadian OpEx and G&A vs Liquids Percentage

Source: EnerCom Analytics

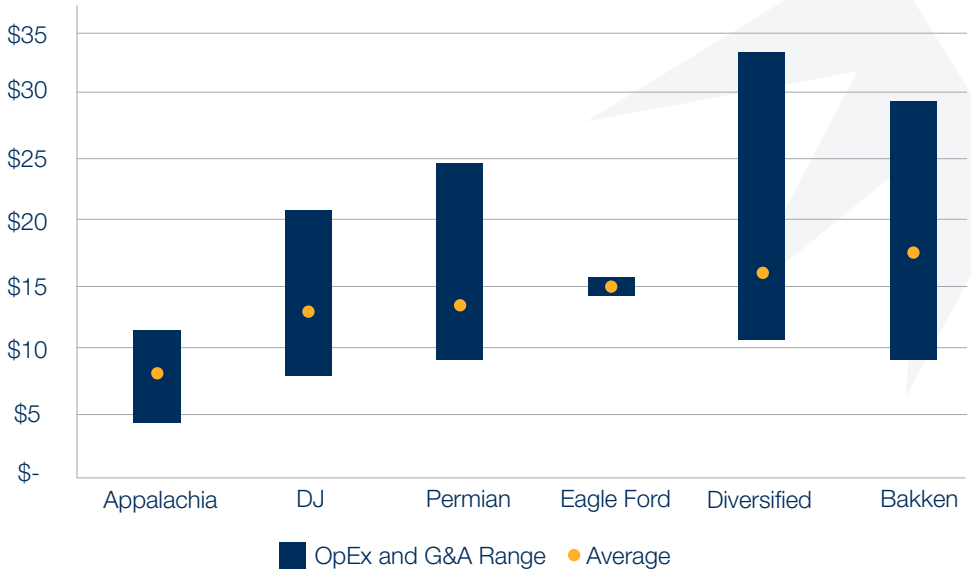


Operating costs can be heavily influenced by where operations are focused, as some of the firms with the highest expenses have similar assets. Offshore operations, as might be expected, typically have higher operating costs than those onshore. Vaalco and Energy XXI, for example, report two of the highest operating costs of any company in the EnerCom database.

The lowest cost firms are all gas producers, but are active in different plays. Gulfport Energy focuses on the Utica, while Comstock targets the Haynesville and Cabot operates in the Marcellus.

Basin OpEx and G&A Costs

Source: EnerCom Analytics

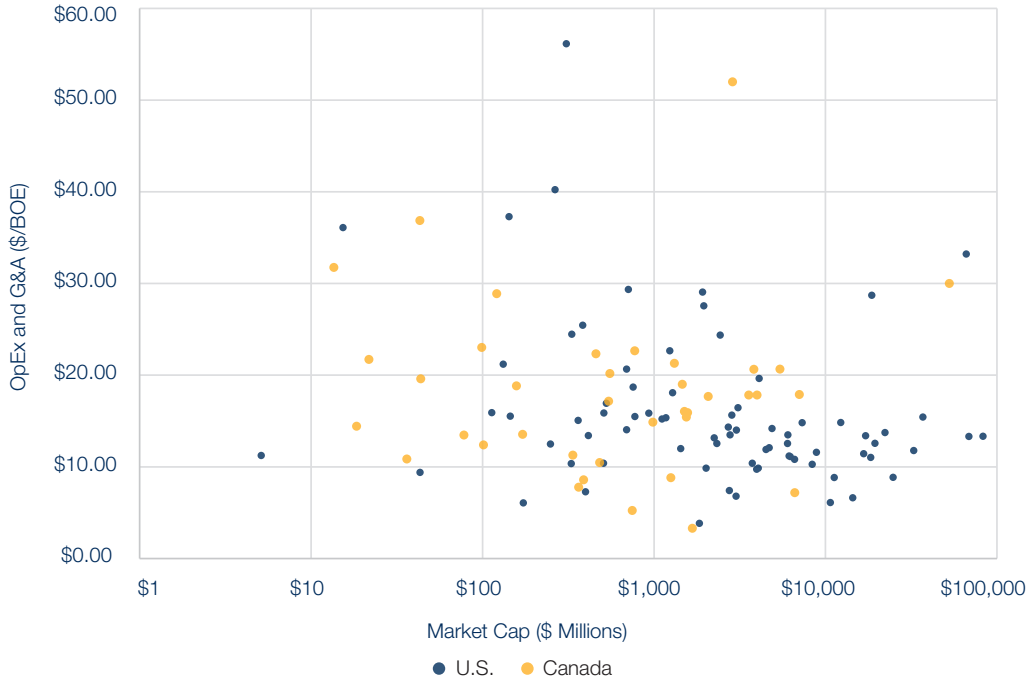


Overall, Appalachia has the lowest operating costs of any major basin, with the average firm paying $7.83/BOE. The DJ and Permian are very comparable in operating costs, as each averages roughly $13/BOE. The Eagle Ford has remarkably consistent operating costs, with a range of less than $1.40/BOE between the highest and lowest cost operators in the basin. This may be due to the relative maturity of the play. The Eagle Ford is well established, and factors that can differentiate a company's expenses in a developing play, such as having a dedicated gathering system, are less applicable.

Many of the highest operating costs are seen among diversified companies, especially those with international operations. Hess, for example, has extensive international and offshore properties, and pays nearly $30/BOE in OpEx and G&A costs.

Operating Expenses and Company Size

Source: EnerCom Analytics



Despite the high expenses seen in some large diversified companies, most large companies actually have operating costs near the overall average. The majority of high costs are actually found in small firms, as most companies with operating costs above $30/BOE have a market cap below $1 billion. This may be because large companies are able to take advantage of economies of scale in facets of the industry, from purchasing equipment outright instead of leasing to integrating more advanced technology into operations.

Operating cost importance at pre-downturn levels

While operating costs are very important when evaluating any oil and gas producer, the market is not consistent in how operating expenses influence valuation. As was previously noted, different basins have different levels of operating costs, and the importance of these costs varies. Overall, however, markets generally show a preference for lower operating costs, firms that can produce inexpensively receive higher valuations.

The value placed on lower costs was quite consistent in 2013 and 2014, with a given difference in operating expenses producing a similar change in valuations. Exceptions to the rule were common, however.

The downturn forced markets to reevaluate the importance of low costs, as operations that were comfortably economic in mid-2014 could be rapidly losing money just one year later. Having low operating costs gave firms a significantly higher premium in valuations in 2015 than it did in 2014 or 2013. This trend became even more pronounced in 2016, when commodity prices reached historic lows.

Operating Cost and Price/Cash Flow Per Share

Source: EnerCom Analytics

The preference for low cost operators began to diminish in 2017, with many high-cost companies receiving high valuations. Rising commodity prices, and an improved outlook for future prices, meant higher operating costs did not necessarily mean operations were uneconomic. However, markets still saw low operating costs as important, just not as important as during the downturn when many firms faced unsustainably low pricing and fragile balance sheets.

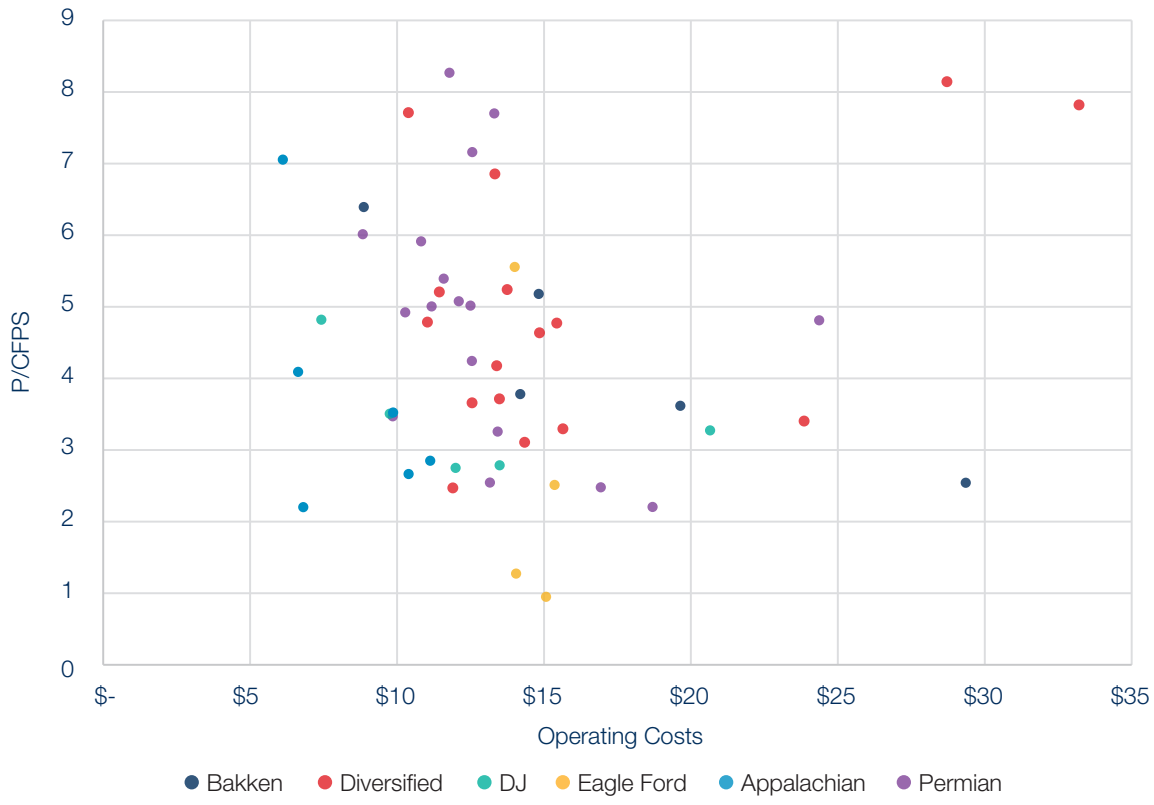
At present, markets are moderately concerned with operating costs, but lower costs do not produce as high of a valuation as they did in the heart of the downturn. The current relationship between operating costs and valuations resembles the relationship in 2013 and 2014 suggesting markets are returning to a more fundamentals-driven valuation model where operating costs are concerned.

High operating costs sometimes forgiven by markets

Equity markets are willing to forgive high operating costs in certain cases, and some firms consistently display both high operating costs and high valuations. Evolution Petroleum and Hess, for example, are regularly among the highest cost producers in EnerCom's database, but receive strong valuations. High operating expenses are essentially a fact of life for these firms, which primarily operate in CO2 enhanced oil recovery and international offshore, respectively.

Basin Operating Costs and PCFS

Source: EnerCom Analytics



The relationship between operating costs and valuations is clearer when individual basins are examined. Operating costs have the most direct effect on valuations in the Bakken, where the relationship between the metrics is quite consistent. The Bakken is a relatively mature play, with lower potential for rapid growth than in basins such as the Permian. This means operating costs are more critical, as most Bakken operations are focused on cash flow generation at this stage in their life cycle. The large range between the lowest and highest cost operators in the play is also important in the effect of operating costs on valuations. The Eagle Ford is similarly mature, but has such a small range of operating costs that it does not play a very significant role in valuing firms in the basin.

The effect is less consistent in less-developed plays such as the Permian. While in general Permian companies receive high valuations for low operating costs, there are exceptions. Chief among these is Jagged Peak, which has the highest costs in the basin but receives valuations near the middle of the pack. Markets are willing to look beyond Jagged Peak's high reported operating costs because a significant share of these expenses are stock-based compensation in the wake of the company's IPO last year, and these are not representative of continuing operations.

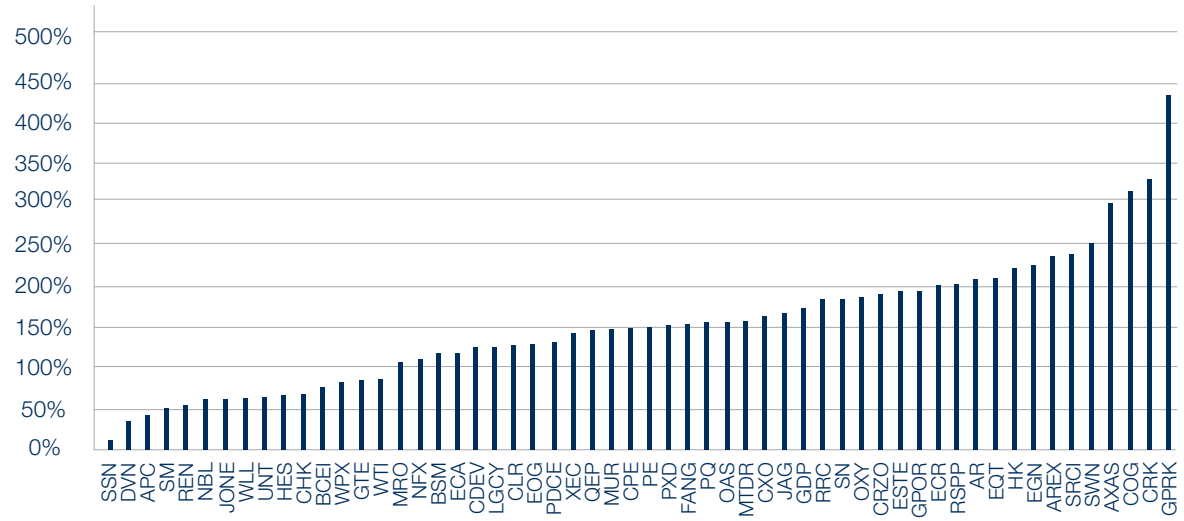
Capital efficiency heavily influenced by area of operations

The firms in EnerCom's database showed a wide range of capital efficiencies, ranging from 14% to 950%. A total of 26 companies have incalculable capital efficiencies, a higher proportion than seen in any of the other metrics in the 5 Factor Model. This was due in large part to incalculable F&D costs, a situation that was explored in depth in the May 2018 Trends Report. Several E&P companies also have negative EBITDA generation, making a capital efficiency number meaningless.

Outliers in capital efficiency can be the result of several factors including EBITDA generation, production, costs incurred and reserves added, each feature in the calculation of capital efficiency. Most of the highest-efficiency firms, such as Painted Pony, have very low F&D costs, meaning it does not take much EBITDA generation to see a high capital efficiency. Others, Yangarra for example, combine high EBITDA per unit production with more average F&D costs.

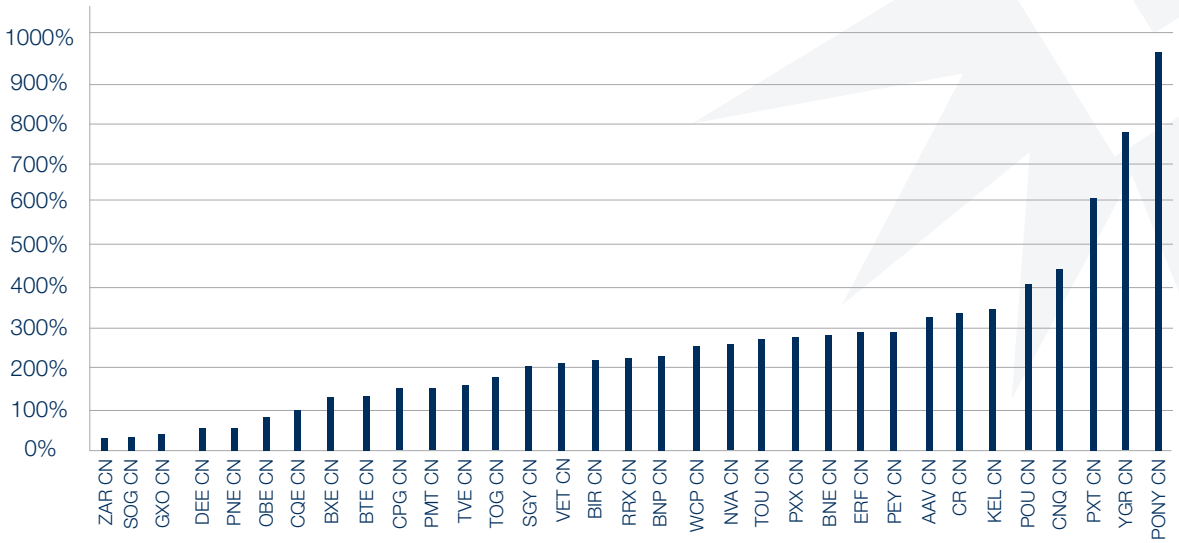
U.S. Capital Efficiency

Source: EnerCom Analytics



Canadian Capital Efficiency

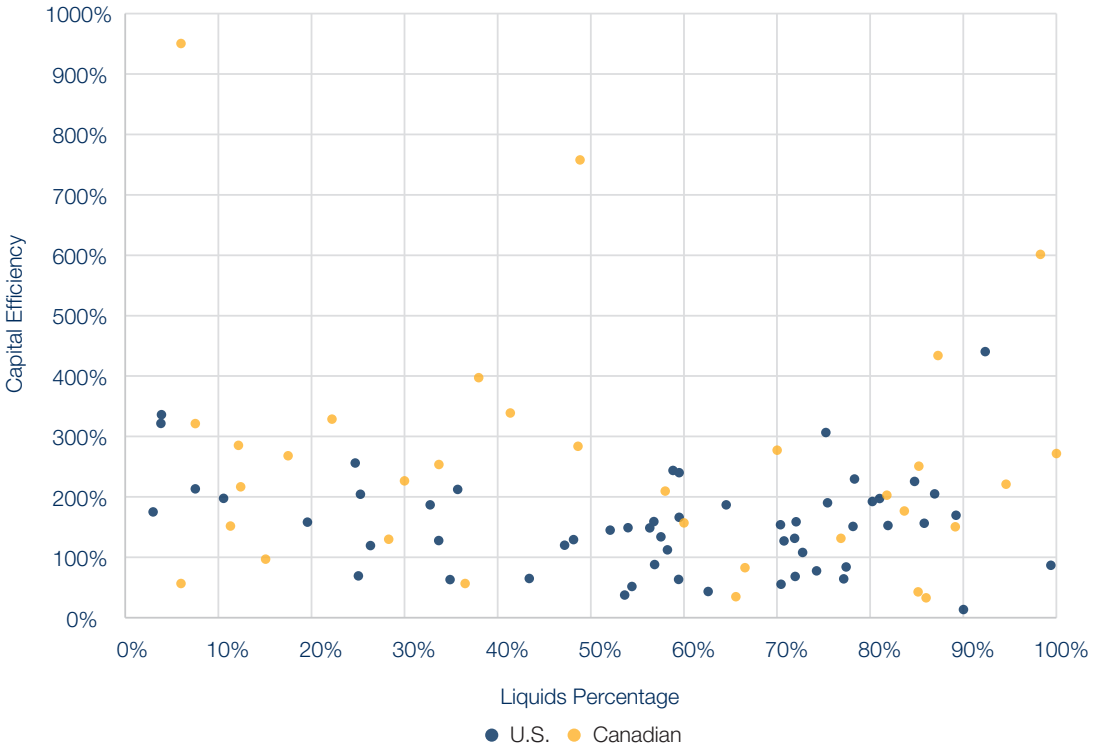
Source: EnerCom Analytics



Overall, Canadian E&P companies perform better than their American counterparts on a capital efficiency basis. Canadian companies have higher average capital efficiencies, the companies with the highest efficiencies are all Canadian, and a lower proportion of Canadian firms have incalculable capital efficiencies. This disparity is due to the difference in Canadian and U.S. F&D costs, Canadian F&D costs average $5/BOE lower than the F&D costs found in U.S. firms.

U.S. & Canadian Capital Efficiency vs Liquids Percentage

Source: EnerCom Analytics

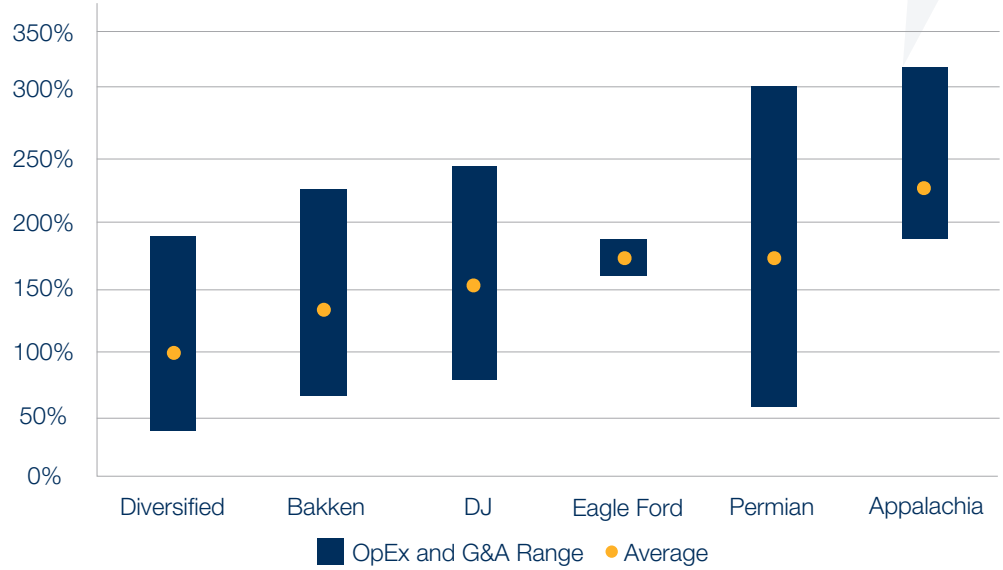


A company's production mix does not appear to have an impact on its capital efficiency, at least not a uniform effect. In general, firms that are focused on oil or gas have higher efficiencies than those that have mixed production. However, this is likely the result of being in certain basins, not specifically due to the relative merits of oil and gas.

This theory is reinforced by examining different basins. Diversified companies, which typically have a balanced production mix, show the lowest average capital efficiency. Diversified firms are also the only group to average below 100%. Diversified companies and those operating in the Bakken and DJ each have similar ranges of capital efficiency. In each basin, the difference between the highest and lowest capital efficiency is about 160%. As in operating costs, operators in the Eagle Ford are reporting very similar capital efficiencies, all around 175%.

Basin Capital Efficiency

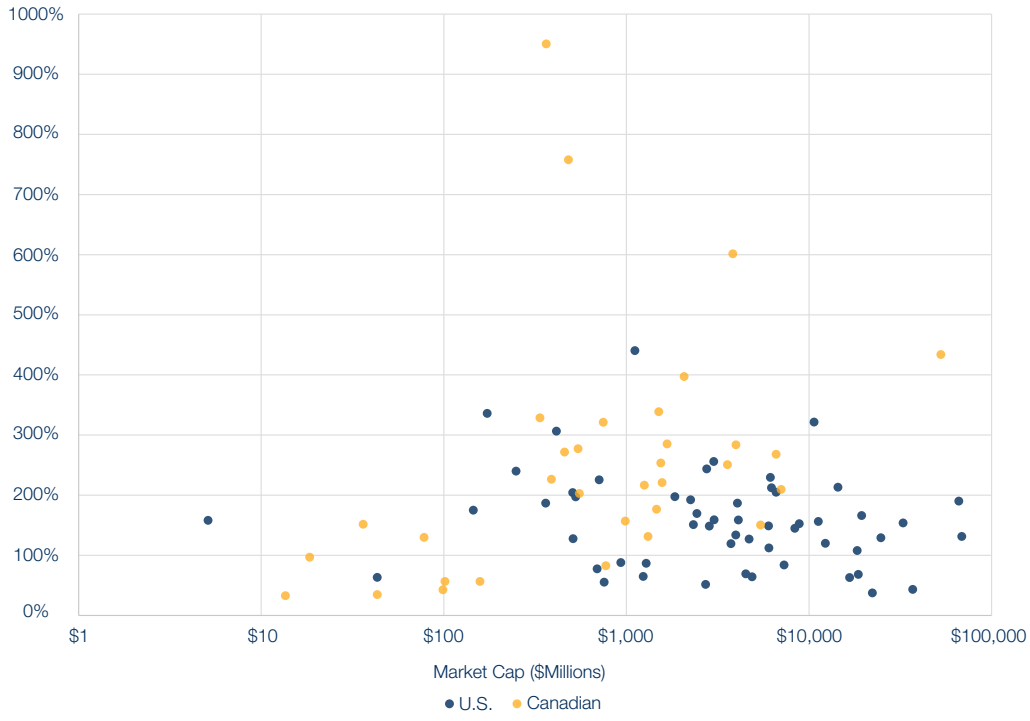
Source: EnerCom Analytics



Companies operating in the Permian show a wide range of capital efficiencies, with the highest and lowest firms ranking among the top and bottom of EnerCom's overall database, respectively. Appalachian firms have the highest average capital efficiency, at over 225%. This is likely due to the lower F&D costs enjoyed by these companies.

Capital Efficiency and Company Size

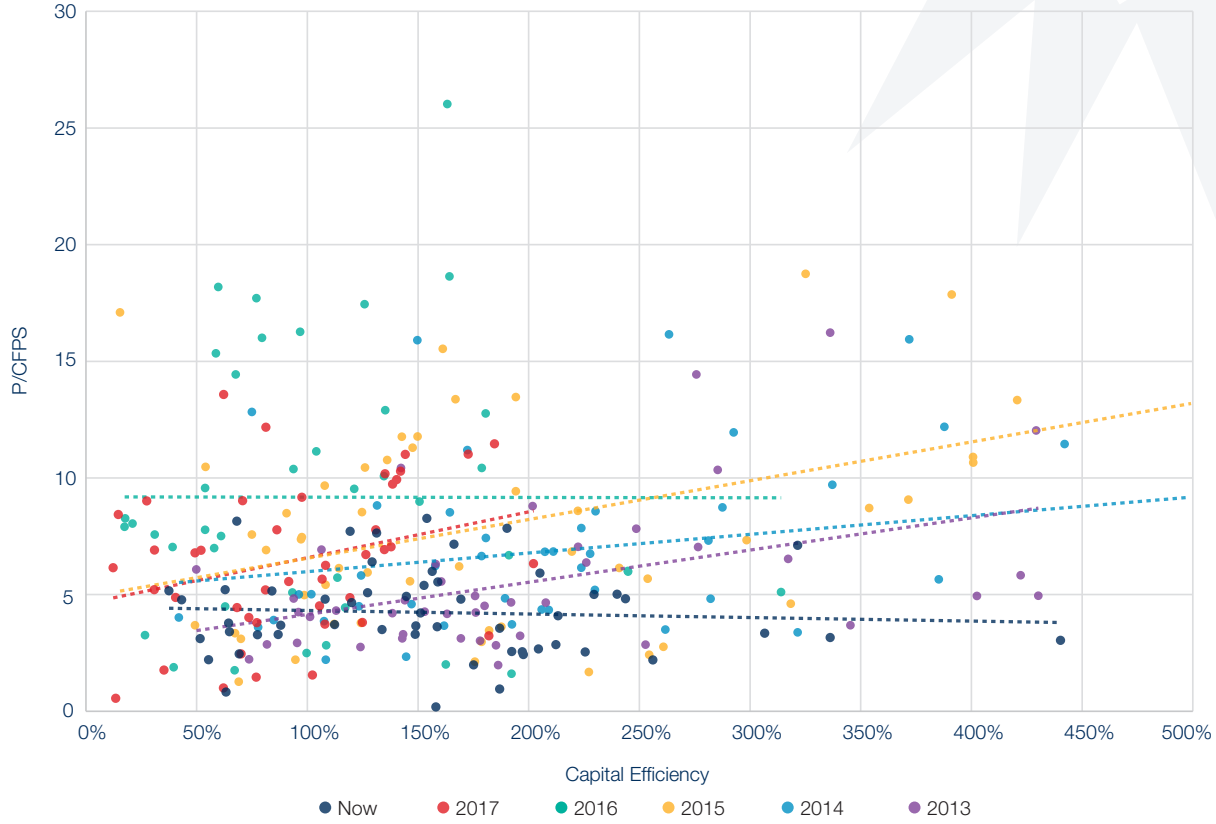
Source: EnerCom Analytics



Capital efficiency has an inconsistent relationship with company size. In the U.S. most larger companies have lower capital efficiencies, likely because these companies are diversified. The highest capital efficiency is generally seen in mid and small cap firms, but there are numerous exceptions to the rule. In Canadian companies, by contrast, the smallest firms tend to show the lowest capital efficiencies.

Capital Efficiency and Price/Cash Flow Per Share

Source: EnerCom Analytics



Like every other metric in the 5 Factor Model, capital efficiency's relevance to valuations has shifted in the past six years.

Higher capital efficiency produced a significant boost in valuation in 2013, 2014 and 2015. Markets disconnected from capital efficiency in 2016 as low costs and a strong balance sheet became the most important factors in weathering the downturn.

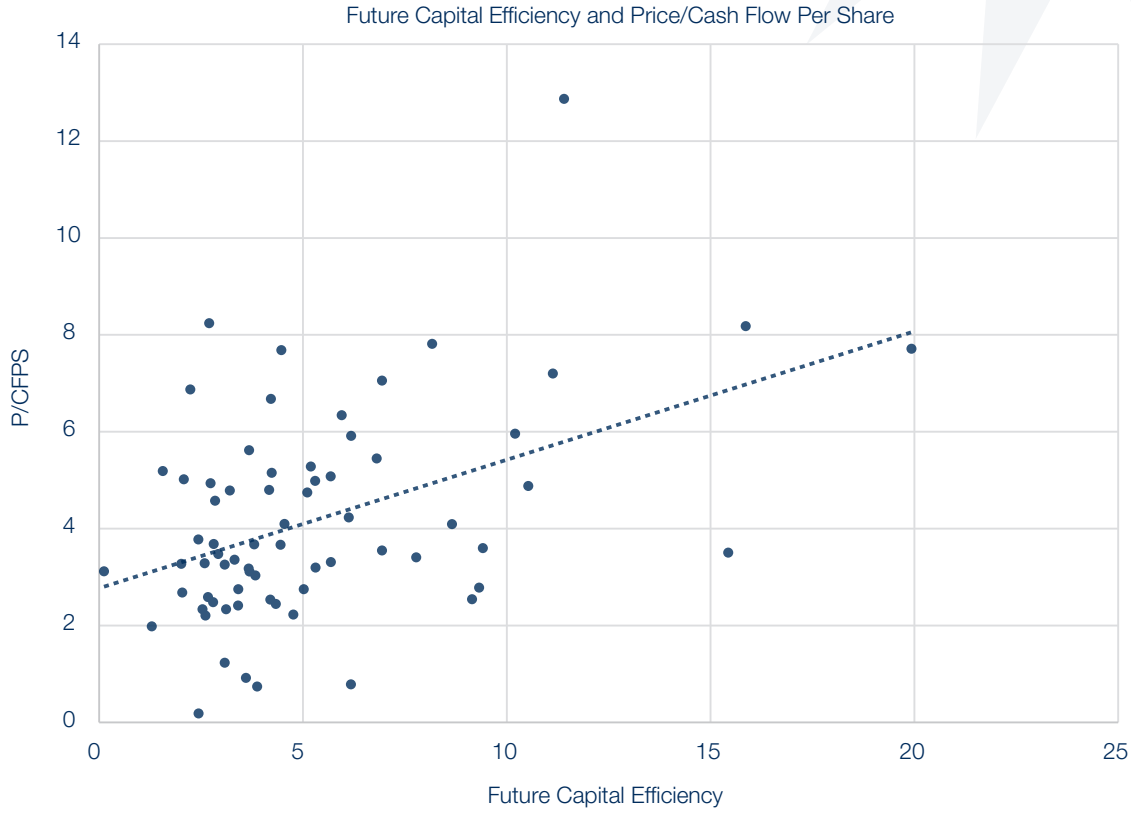
Capital efficiency returned to importance in 2017, but this may be skewed by the market environment at the time. As noted previously, equity markets were still experiencing "Permian fever" in mid-2017, and companies operating in the basin often received premium valuations beyond what a fundamentals-based model would suggest. This is the case for most highly-valued companies in 2017, and if these are excluded the markets were essentially indifferent to capital efficiency.

Equity markets appear to be looking beyond capital efficiency in valuing companies at present, as there is little correlation to valuations. Capital efficiency's diminished importance this year is likely a temporary condition; we expect that the metric will become more relevant in coming years. The reason for this decline is the same as last month with the downturn disrupting company reserves, many firms took large impairments. These impairments sometimes skew F&D costs, which then skews capital efficiency. With an F&D component that is not always representative of future operations, markets are looking elsewhere to value E&P equities.

To account for skewed F&D costs, we examined future capital efficiency, a forward looking metric similar to capital efficiency, to account for downturn-related impairments. Future capital efficiency is calculated as EBITDA per unit production divided by future development cost per unit reserves. This means the metric examines current returns and expected future expenditures. While future development costs are theoretical, and not necessarily representative of the development plan that will actually be executed, this metric shows a strong correlation with valuations. This indicates that the investment-return concept evaluated by capital efficiency remains important, even if the downturn has temporarily forced equity markets to shift which specific metric for investment is examined.

Future Capital Efficiency and Price/ Cash Flow Per Share

Source: EnerCom Analytics

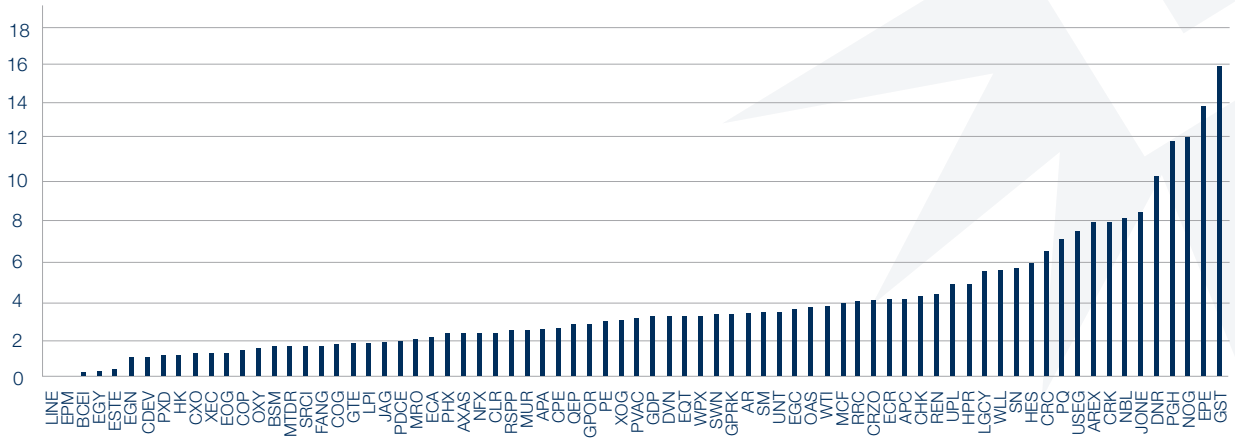


Canadian companies show significantly lower debt than U.S. firms

Most companies in EnerCom's database reported debt loads below 4 times TTM EBITDA, though some firms hold significantly higher levels of debt. Gastar Exploration has the unenviable position of highest relative debt load, with a total debt that is sixteen times EBITDA. Other companies with high debt include EP Energy, Northern Oil and Gas, Pengrowth Energy and Strategic Oil and Gas. Only three firms have zero debt: Linn Energy, Evolution Petroleum and Iron Bridge Resources. Every other firm has some level of debt on their balance sheets.

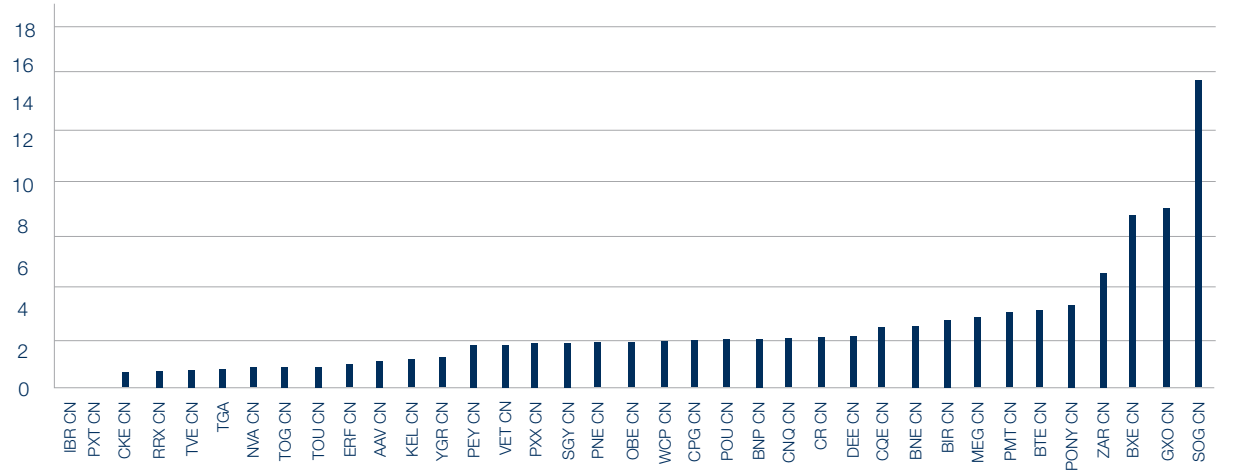
U.S. Debt/EBITDA

Source: EnerCom Analytics



Canadian Debt/ EBITDA

Source: EnerCom Analytics



Canadian firms typically hold lower levels of debt than their U.S. counterparts, which is indicative of a significant difference in investor sentiment. In general, Canadian investors are much less comfortable with high levels of debt than U.S. investors, and this is apparent when observing the two groups.

The vast majority of Canadian companies have debt levels below four times EBITDA, only five firms exceed this level. There is a surprising level of consistency in Canadian debt levels, with one third of all firms between 2 and 2.5 times EBITDA.

American E&P firms have no such consensus on appropriate debt levels, with companies showing a distribution of debt levels between one and eight times EBITDA. In fact, most of the high-debt Canadian companies have significant exposure to U.S. shareholders, with Strategic and Granite both having large U.S. holders and Bellatrix being fully traded on the NYSE.

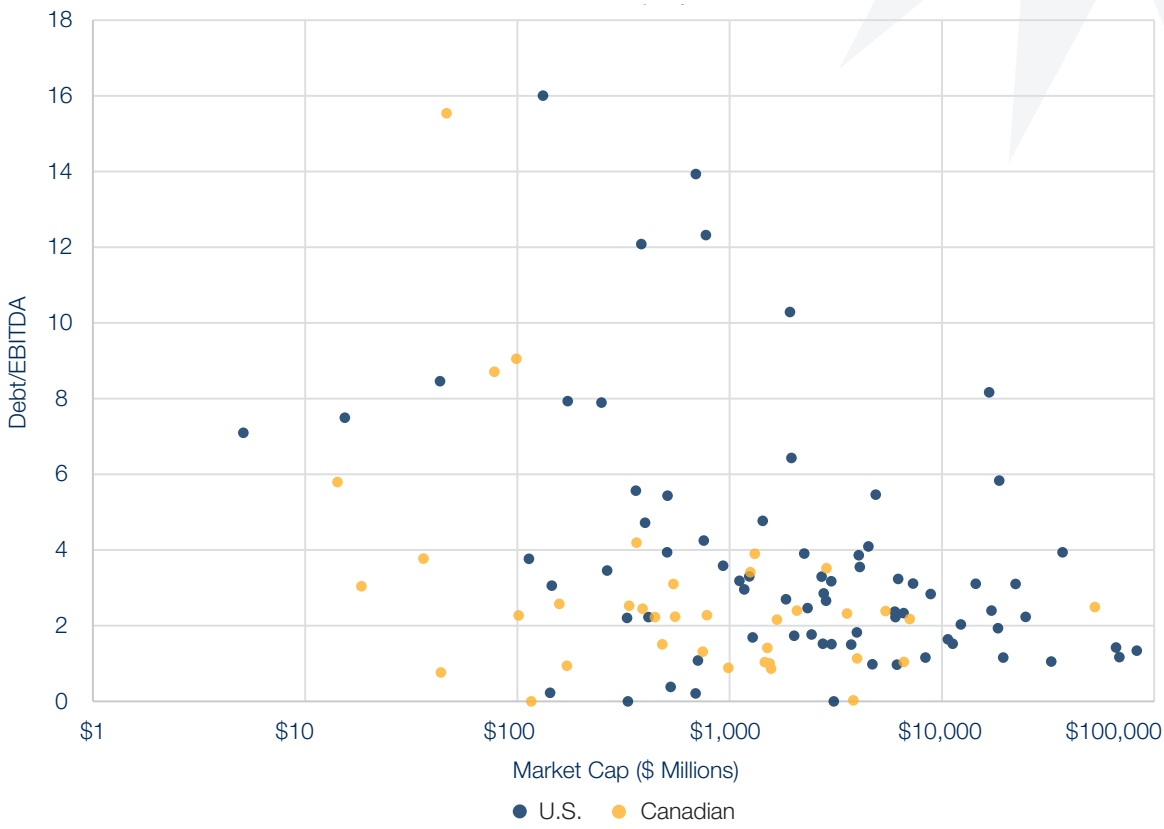
This aversion to debt can be a help and hindrance for Canadian firms. Lower debt levels allowed Canadian E&P companies to better weather the downturn with few companies forced into a rapid bankruptcy as was the case for some U.S. firms. However, constrained access to capital markets means that most Canadian companies have more limited potential for rapid growth than U.S. firms.

Debt loads reflect expected company life cycle

In general, large relative debt loads are confined to small companies, with only a few large firms holding more than five times EBITDA in debt. The Canadian aversion to high debt loads is apparent, as all companies with debt above five times EBITDA have market caps below $100 million. U.S. investors are much more lenient, as several mid and large cap companies have debt above this level. Overall, however, most larger companies have lower debt levels.

Debt and Company Size

Source: EnerCom Analytics



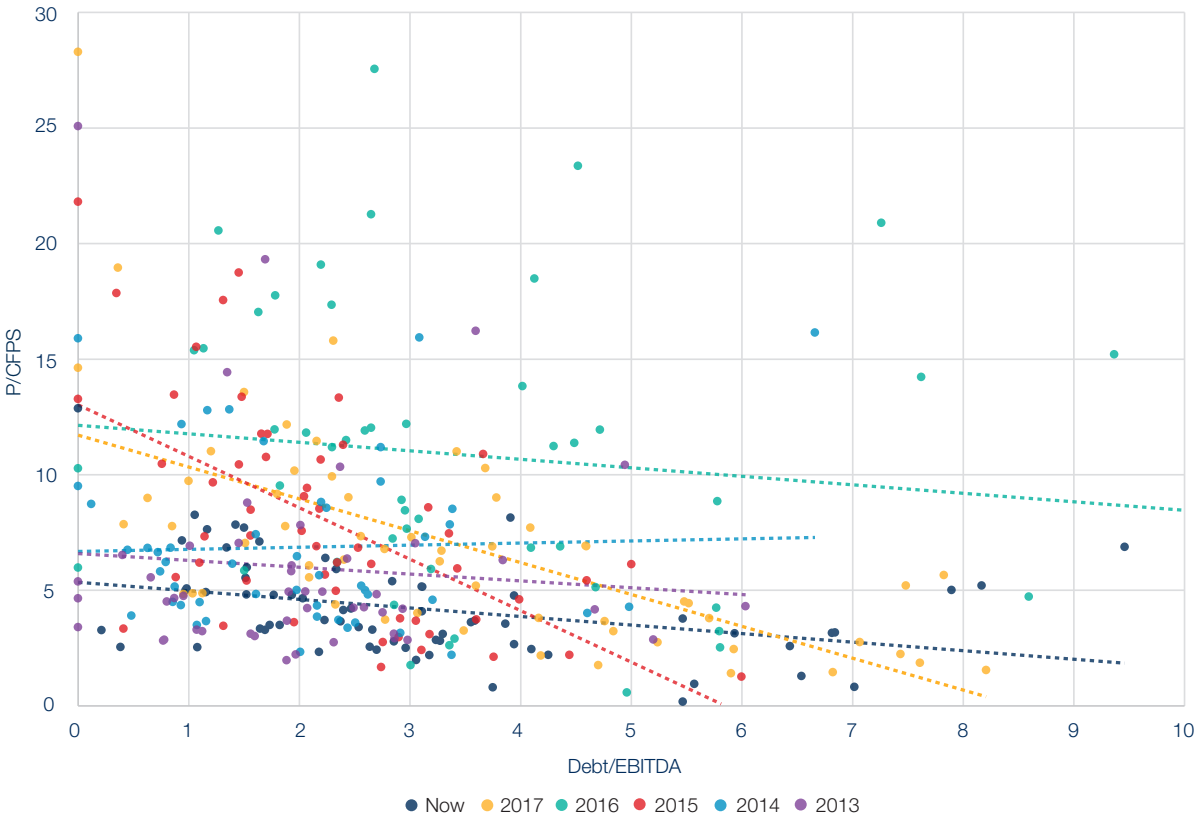
This makes sense from the perspective of the life cycle of a company. Establishing a significant production base can be a very expensive endeavor, whether a company is acquiring an established asset or developing an undeveloped area. Debt can provide the funding necessary to achieve this. However, when a company is in the early stages of its life cycle it typically has low earnings and production. This makes any debt on the balance sheet significant, outweighing an early-stage company's limited EBITDA.

Ideally, this situation changes as a company grows. A more mature firm typically sees relative debt loads fall with production growth. An established production base brings with it significant EBITDA generation, reducing the relative size of a given amount of debt. In addition, some of the EBITDA generated can be used to pay down debt, reducing a company's debt loads further.

Debt remains important, though not as critical as during downturn.

Debt Load and Price/Cash Flow Per Share

Source: EnerCom Analytics



Investors' tolerance to debt has changed over the past six years, with the downturn forcing markets to reassess acceptable debt levels. Debt was not a major concern for most investors in 2013, and while higher debt levels generally produced lower valuations, the trend had many exceptions. This was also the case in mid-2014, when markets continued to be comfortable with high debt levels.

The downturn forced the markets to reassess, as lower commodity prices made debt levels appear much more unsustainable. Firms with low relative debt levels saw much higher valuations, with very few exceptions to the trend. Companies with high debt, on the other hand, were almost universally punished by equity markets, receiving low valuations. This trend appears to subside in 2016, but that is likely artificial. Markets were highly catalyst-driven in 2016, and valuations partially disconnected from fundamentals.

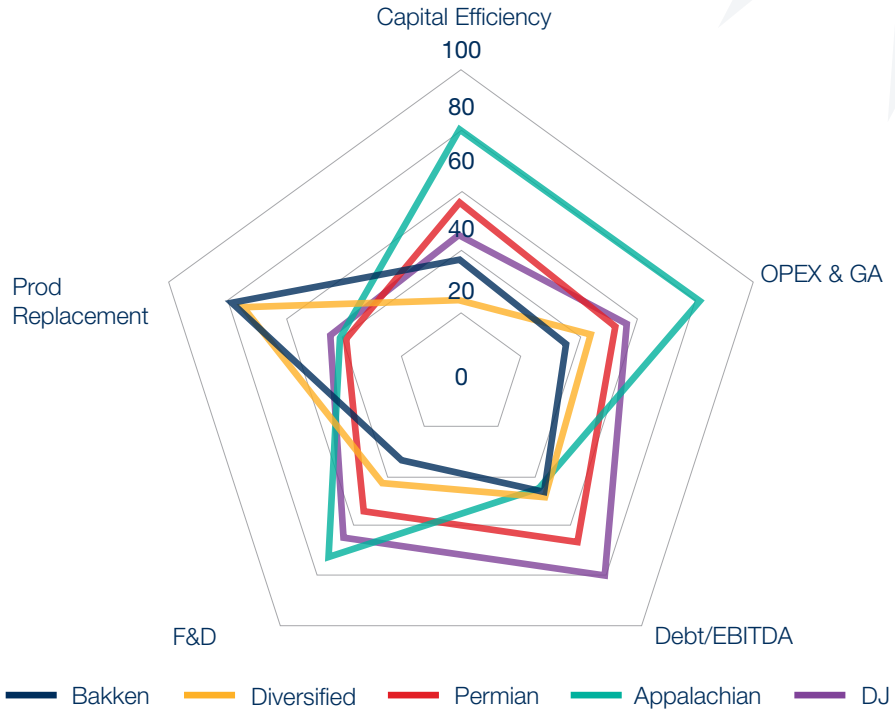
As commodity prices rose in 2017, markets began to normalize, with fewer catalyst-driven companies. Balance sheet strength remained important, however, with few high debt companies receiving high valuations. This is generally still the case today. Most companies are rewarded for having low debt levels, but the premium received for low debt is smaller than in the downturn years.

Bakken, Permian valued in line with fundamentals, DJ, Appalachia show disconnect

To compare companies using the full 5FM, EnerCom Analytics indexes each component of the model from 0 to 100. A company with a very low relative debt load, for example, would receive a score near 100, while a company with a high debt load would receive a score near 0. When these normalized scores are plotted it shows the relative merits of firms operating in each basin, what EnerCom calls the Performance DNA.

Basin Performance DNA

Source: EnerCom Analytics

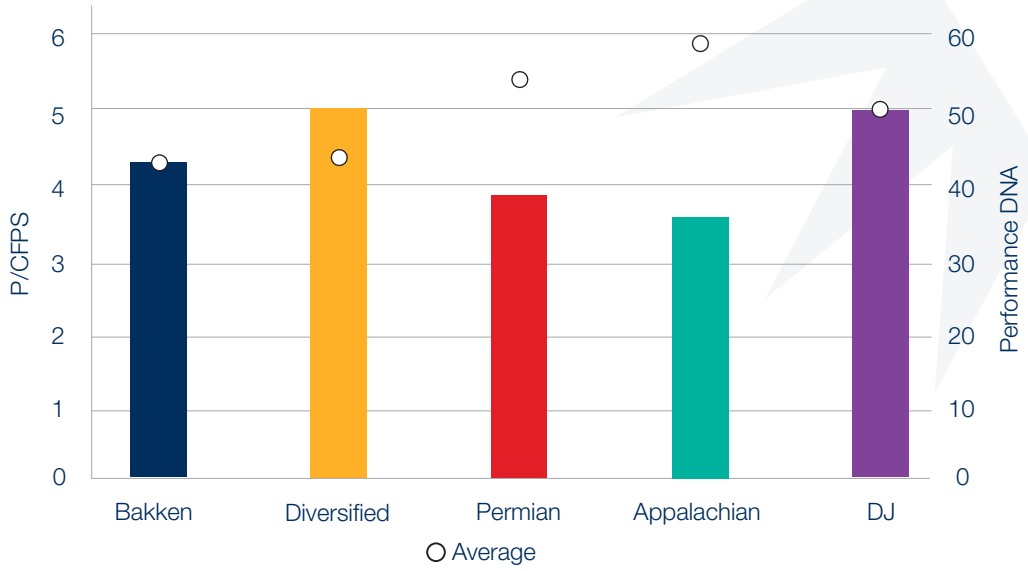


This shows that firms operating in Appalachia have, on average, the strongest operational metrics, with capital efficiency and operating costs that significantly exceed competing basins. The play also has superior F&D costs, though several other basins are close behind. The country's most popular shale basin is something of a jack of all trades in terms of Performance DNA. The Permian has above-average ranks in four metrics, but is never the best in any specific area.

When Performance DNA is combined with current valuations, the degree to which markets examine fundamentals when valuing a company can be observed. On average, diversified and Permian companies are receiving the highest valuations at present, while firms operating in Appalachia receive the lowest valuations.

Basin P/CFPS and Average Performance DNA

Source: EnerCom Analytics



While some basins appear to be valued in line with fundamentals, others show a significant disconnect. The Bakken and Permian show average valuations that are dead on with what would be suggested by their Performance DNA, suggesting markets are primarily fundamentals-focused in these plays. There is a moderate disconnect in the valuations of diversified firms, these companies are receiving valuations beyond what their Performance DNA would indicate. This is likely the result of the current focus in equity markets on cash flow generation, as has been investigated in previous reports. Most diversified companies have large market caps, and are in the portion of their life cycle where they are able to generate significant cash. This ability is likely what is driving the disconnect with large diversified firms being rewarded because they can produce the free cash that markets currently desire.

Appalachian companies also see a significant disconnect in valuations, and are valued well below what fundamentals would suggest. This is a historic problem among Appalachian companies, and was also noted when EnerCom Analytics generated the Performance DNA of different firms in 2017. However, the reason for the disconnect may have changed.

Appalachian operations have historically been constrained by pipeline capacity, which has weighed on valuations for years. Numerous new pipelines are on the way, though, and several are already beginning operations. In theory, this development should allow Appalachian companies to see higher valuations, as firms are able to move their gas out of flooded local markets. However, the overall U.S. gas market is not supportive of more supply, and the new pipelines in Appalachia contribute to the overall glut. Significant supply growth in gas is expected, which prevents any major commodity price growth. This situation is likely what is holding back Appalachian firms at present, in short, equity markets have an unfavorable view of gas, due to looming supply growth.

The value disconnect in the DJ is more likely transitory. Operators in the basin recently dealt with significant takeaway problems, primarily related to gas gathering. Extraction Oil & Gas CEO Mark Erickson mentioned facing “an extremely difficult midstream operating environment impacted significantly by both high line pressures and freeze-offs on a third-party system” in the company’s recent Q1 call. Executives at PDC Energy and SRC Resources made similar comments, gas takeaway is a problem in the basin at present. However, several gas processing plants are coming down the pike, with the first major plant beginning operations in Q3 2018. Further expansion will come online in Q2 2019 and in 2020. This buildout should allow DJ companies to see valuations more in line with their fundamentals. Additionally, while gas is a major component of DJ production, oil drives the economics of most locations. In an environment where oil is viewed more favorably than gas by equity investors, this should prevent the DJ from suffering from the level of disconnect seen in Appalachia.

Overall, equity markets are returning to fundamentals in evaluating oil and gas companies though some metrics have temporarily declined in relevance. The downturn, and the impairments caused by falling commodity prices, mean finding and development costs are not as representative of continuing operations for the time being, so markets are looking beyond this metric in valuing firms. Production replacement is rewarded by companies, though not to the degree seen before the downturn. We expect each of these metrics to rise in importance as the downturn fades into the past.

Operating metrics remain relevant in valuing E&P firms. Capital efficiency, when based on expected numbers from future operations, is well-correlated to valuations, showing a return on investment remains important to investors. While markets are willing to forgive high operating costs in a handful of firms, in general low costs are approximately as important now as they were in 2013 and 2014. Finally, relative debt loads remain a major consideration for oil and gas investors, though not to the degree seen in the midst of the downturn.

As oil prices remain stable at a level conducive to profitable operations, markets are beginning to shift away from catalyst-driven valuations and back toward factors under the control of management teams.

Markets appear to be unsupportive of gas despite the strong Performance DNA of some firms, particularly those in Appalachia, but valuations in several of the country's major plays are coming into line with fundamentals. This is a promising trend for companies looking to drive the value of their companies through their own actions rather than hoping outside events will support their business, and we believe fundamentals will continue to grow in importance moving forward.

A Word of Thanks

Thank you again for putting your trust in ENERCOM. Please do not hesitate to contact us with questions or additional needs. And, remember that you can get frequent updates and analysis on Oil & Gas 360® at **www.OAG360.com**