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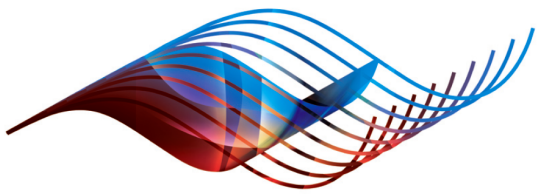

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Five Perspectives on an Emerging Market: Challenges with Clean Tech Private Equity

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Abstract

Private equity investment in technologies which deliver low carbon energy has grown as an area of both economic and social performance. This article offers a perspective on some of the challenges in the industry. It relies on case studies drawn from thirty five interviews with leading clean tech investment managers across Silicon Valley, New York and London. The findings suggest that despite the long-term growth opportunities, some investors have struggled to find attractive risk-reward premiums in early stage investments.

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Introduction

Climate change has put pressure on the market to deliver the infrastructure for a low carbon energy industry. As an emerging sector, however, relatively little empirical research has been conducted into the strains and stresses facing investors on the front line. This paper attempts to address this gap by consolidating the perspectives of thirty-five leading clean tech investment managers based in Silicon Valley, New York and London. Their experience suggests that successful investing in clean tech sector start-up companies requires a strong understanding of how this market differs from most other emerging technology markets.

What is clean tech?

Clean tech attracts many different definitions depending on who you speak to. Here, the term refers to investment in technologies which generate low carbon energy. While this is a narrow definition, there are important observations to be made about private investment flowing into these technologies.

Bloomberg New Energy Finance records data on private equity transactions in the clean tech space. The sector is a relatively nascent industry globally. Exhibit 1 illustrates the amount of private investment which has flowed into clean tech transactions over the last decade.

[Insert Exhibit 1]

Another noteworthy characteristic is that the vast majority of investment flows into asset financing rather than high tech private equity or venture capital. Breaking the clean tech sector into different financing sources, Exhibit 2 reveals that the vast majority of investment activity has been in asset finance (US$97 billion) and M&A activity (US$67 billion). A cross-section of clean tech deals from 2008 is not a complete reflection of the sector, but it offers a broad perspective on where investment flows easiest. It also raises some interesting questions. Does money flow towards later-stage investments because they require a larger size of investment? Or are there structural dynamics at play which make early stage investments less attractive?

[Insert Exhibit 2]

It is difficult to glean such insights from available statistics alone, and therefore it is the purpose of this paper to flesh out issues with leading practitioners in the field. As one might expect from a high tech sector, most practitioners in clean tech private equity are clustered in Silicon Valley, New York, and London. The author approached investors in these geographies based on firms which had the

largest size of funds under management and were generally regarded by competitors as the leading practitioners in the field. Interviews were then conducted in a semi-structured manner on the basis of strict confidentiality, as in Clark [1998], in order to enhance the reliability of responses. Thirty five investors responded in total: half are based in Silicon Valley, a third in London and the remainder in New York. The respondents reported investing in clean tech ventures for an average of approximately five years.

The outcomes of these interviews are distilled and presented below, offering perspectives on five key areas: market size impacts, attracting high quality deal flow, revenue drivers, managing capital intensity and exit opportunities. It is worth noting that there was a strong consistency to respondents' answers across levels of experience and geography.

Perspective 1: Market size

The International Energy Agency has estimated that approximately $10.5 trillion is needed by 2030 to finance the global transition to a low carbon energy economy [IEA 2009]. The immense volume of investment needed explains why institutional investors and especially pension funds (with long-lived fiduciary responsibilities) have been interested in the sector. However, investment managers interviewed cautioned against excessive hype in what the sector could deliver. When evaluating the prospects of start-up companies for their investment portfolio (hereafter, referred to as portfolio companies), they commented that overestimating the market size of a renewable energy invention was a common mistake.

An investment manager in the UK emphasized that renewable energy technologies are highly dependent on physical geography for generating electricity. In the solar photovoltaic sector, for example, technologies which could operate profitably in the bright conditions on the United States' west coast did not necessarily generate the same yield in continental European conditions where there is less sunlight. This meant that particular technologies would perform better in certain locations and would not necessarily operate efficiently under all physical conditions. This suggests that clean technologies have different characteristics from fossil fuel substitutes. A barrel of oil or a tonne of coal, for example, retain their utility regardless of where they are consumed. The same principle which applies in solar also applies to other location-specific technologies such as wind, geothermal, tidal and other renewable energy technologies.

The highly geographically specific nature of clean tech means that it exhibits characteristics more similar to real estate and commercial property investments than typical private equity investments. The implication of this is that potential market size must be estimated carefully. The end market dynamics are different from traditional private equity investments such as biotechnology and digital communications, where product sales are not necessarily tied to physical geography.

Physical geography constraints also raise supply chain issues. In one case study, a biofuels company had developed a technology to convert natural feedstock into a fossil fuel substitute called bio-butanol. However, the company made the mistake of assuming that its technology could be scaled globally. After establishing its operations in China it discovered that neighboring feedstock were a different variety than those tested in the lab. Transportation costs meant that the locations were not commercially feasible.

The importance of physical geography is a characteristic which is often underestimated in the business model of clean tech companies. Understanding the geographical drivers of clean tech is fundamental to an effective investment strategy.

Perspective 2: Attracting high quality deal flow

Investment managers interviewed reported that deal flow in high quality clean tech companies often originated from highly dispersed locations. Particular regions have technology strengths which capitalize on their physical environments. For example, Denmark has a cluster of wind companies such as Vestas, the United States has strength in energy efficiency and solar companies such as First Solar, Bright Source and Solyndra, and the United Kingdom has strength in tidal and wave technologies such as Polaris. The implication of this is that when operating in the clean tech sector, traditional private equity financial centers such as Silicon Valley in the United States and London in the United Kingdom might not enjoy their usual agglomeration effects [Saxenian 2002].

Venture capital firms positioning themselves towards investment opportunities in places like India and China should consider deal flow origination. Rather than expecting deal flow to come to them, successful private equity firms interviewed found it necessary to establish local offices in these foreign markets. Investment managers were typically recruited locally for these foreign offices and deal flow

was sourced locally. This reflected both the premium placed on proximity to management in private equity firms as well as the crucial role of government relationships and physical geography in securing commercial success in clean tech.

Perspective 3: Driving revenues in portfolio companies

Clean tech is an unusual high tech sector because many of the energy technologies being developed enter the market in direct competition to a well-established substitute: conventional fossil fuels. This distinguishes it from biotechnology and digital communications where novel technologies can be price makers in new markets. In clean tech, new energy technologies are invariably price takers in the market.

For this reason, it was observed that regulation often plays a pivotal role in driving the revenues of early stage companies. In particular, investment managers commented that feed-in tariffs rather than carbon price regulation where the dominant drivers for deal making. This finding supports other qualitative research on which policy interventions have the biggest impact on private investment decisions [Burer and Wustenhagen 2009]. A feed-in tariff is a subsidy which covers the incremental cost of generating electricity above the cost of coal-fired electricity. In Germany, a long-standing feed-in tariff has supported a strong solar industry [Büsgen and Dürrschmidt 2009]. In Spain, the government introduced a feed-in tariff for photovoltaic installations in 2008. However, it was wound back when an overly generous tariff resulted in excess supply. As a result, a number of companies which had set up in Spain to take advantage of the tariff regime went bust. The Spanish example reflects the high level of regulatory risk in clean tech deals. Given the dependence of regulation for many clean tech companies, their ability to sell into the market is closely correlated with regulatory policy.

The exception to this is investment in the energy efficiency sector. These technologies substitute existing goods and services with technologies which do the same job with less energy. An example of this type of technology is smart metering which monitors and manages residential and commercial energy usage. Investment managers noted that these technologies were able to reach profitability without regulatory intervention because of cost savings accrued on energy bills. As a result, energy efficiency has become an increasingly attractive subset of the clean tech market to invest in.

The distinction between energy supply (renewable energy technologies) and energy demand (smart metering technologies) is therefore an important one in a private equity firm's investment strategy. It may interest institutional investors to be aware of private equity investment managers who are able to reduce the investment risk of their offerings by focusing on the energy demand side.

Perspective 4: Managing capital intensity

A major investment barrier raised by clean tech investment managers was the capital intensity of clean tech deals. As one leading US investment manager commented: "Timeframe to commercialization tends to be a really big reason why we have to turn down companies." This comment refers to the fact that renewable energy technologies are a piece of technology which fits into large-scale piece of infrastructure. In order for these to be market-ready, private equity firms must finance demonstration of technologies at commercial scale. As a generalization, this can take up to 7 years from the time of first investment, which is significantly longer than alternative private equity sectors like biotechnology and digital communications. This is the point at which they typically become too risky for venture capitalists to invest. As one US investment manager said: "For energy or clean tech, if a company is seven years to commercialization then it's not a company we could typically invest in."

By virtue of the long timeframes to commercialization and the infrastructure nature of clean tech company's cost base, clean tech private equity may be described as 'capital intensive'. The costs to full-scale demonstration for an energy generation asset can be upwards of US$100 million. As one UK investment manager asked rhetorically: "How do you get the funds to scale up a technology if it requires a minimum of US$50 million?" By contrast, software companies have relatively small capital requirements of typically US$ 5-10 million. This means they have relatively low technology risk given the size of investment. Biotechnology start-up companies sit somewhere between these two polls. Although biotechnology companies can be capital intensive in the process of testing a drug for government approval, company executives have clearer foresight on the drug's success during the process. This allows investors greater flexibility to 'turn off' a deal if necessary.

The capital intensity challenge of clean tech deals has been described by Grubb [2004] and others as a valley of death. Clean tech private equity firms flee investment at the demonstration stage of deals because they struggle to follow through on required financing rounds. From a public policy perspective, this might result in the under-utilization of valuable intellectual property. From a private

investors' perspective, it serves as a warning that private equity firms should not enter capital intensive deals unless they have the means to follow a deal to completion.

Various possible solutions have emerged to assist in addressing the challenge of capital intensity. The first might be a greater role for government intervention in the form of public financing assistance. In the wake of the financial crisis, the U.S. Department of Energy took the opportunity to offer loan guarantees to some of the US's most promising venture-backed clean tech companies. A $535 million loan guarantee was offered to Californian based solar company Solyndra in early 2009 to expand its manufacturing facilities. The money was used to cover approximately 73% of the costs of building a 500 megawatt factory in California. In early 2010, a similar conditional loan guarantee of S$1.37 billion was made to another Californian based solar company, BrightSource Energy Inc. The loan guarantee came under the U.S. Department of Energy's Title XVII loan guarantee program which has been in place since 2005.

An alternative route is to rely on greater syndication with other private equity firms to cover the cost of investment. Syndication refers to the process by which investors share equity ownership in a portfolio company proportionate to the size of their investment. This is typically a more common feature in smaller venture capital firms than in growth equity or later stage private equity firms who typically deal with less risky investments. However, a number of US and UK investment managers commented that they expected syndication to be an increasingly prominent feature of clean tech deals. This would especially be applicable in the United Kingdom where fund sizes are typically smaller. In the UK and Europe, $250 million size funds are regarded as medium size funds, whereas in the US these would be small. Several prominent US firms have funds under management in excess of $1 billion. However, syndication across the Atlantic in the clean tech space is yet to emerge in full flow. This has in part been affected by the recent financial crisis where liquidity in all asset classes has been significantly reduced globally. It remains uncertain whether the change in investment climate will lead to greater syndication in clean tech deals.

A third alternative strategy is to try and raise larger specialist clean tech funds. One investment manager who has pursued this strategy is Vinot Khosla of Khosla Ventures. In 2009, Khosla closed a specialist clean tech fund in excess of $1 billion. The fund's investment strategy was focused on following through to final financing rounds on targeted portfolio companies. This was a novel attempt to address the unique challenges of the clean tech asset class, although its success is yet to be proven.

Perspective 5: Exit opportunities

Effective strategies for exiting clean tech portfolio companies remain an open debate in the private equity community. This is largely because very few clean tech companies are yet to successfully make it through to a public listing. Traditionally, investment managers in early stage companies seek to exit their investments either through a public listing or a trade sale to a larger company. However, a number of investment managers commented that the model of easy public listings through NASDAQ in the United States or the AIM markets in the United Kingdom is less feasible due to the lack of liquidity in those markets.

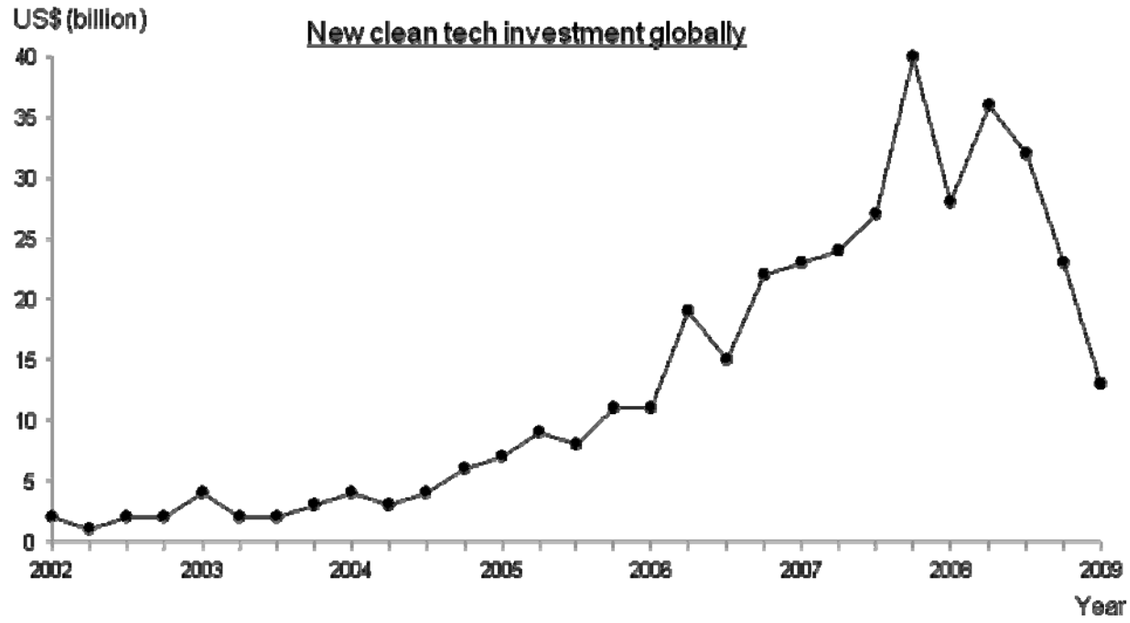
One way in which a number of interviewed funds had tried to address this issue was to aggressively pursue trade sales early on in the investment process. In one case, a small UK venture capital firm interviewed had approached a European multinational corporation to be a syndicating co-investor in a portfolio company. There were two major intentions behind this strategy. Firstly, this strategy potentially eased the capital intensity dilemma faced as early stage clean tech companies progress through several rounds of financing. Large corporations typically have dedicated budgets for corporate venture or research and development activities. This makes them a reliable financing partner for capital intensive deals. Secondly, syndication with corporations builds relationships between the start-up and larger company which can be valuable when the time for exit arises. If the company is in the same sector as the start-up there are also ancillary benefits through shared know-how and contacts.

Conclusion

As clean tech emerges as a new offering in the private equity asset class, institutional investors and investment managers have become increasingly interested in learning more about it. The outcomes of case studies involving in depth interviews with leading practitioners in the field indicate that , clean tech presents both unique opportunities and challenges which need to be well-understood and carefully managed. The analysis herein draws on the experience and mistakes of managers investing in clean tech private equity in the United Kingdom and the United States. Importantly, these investors point out

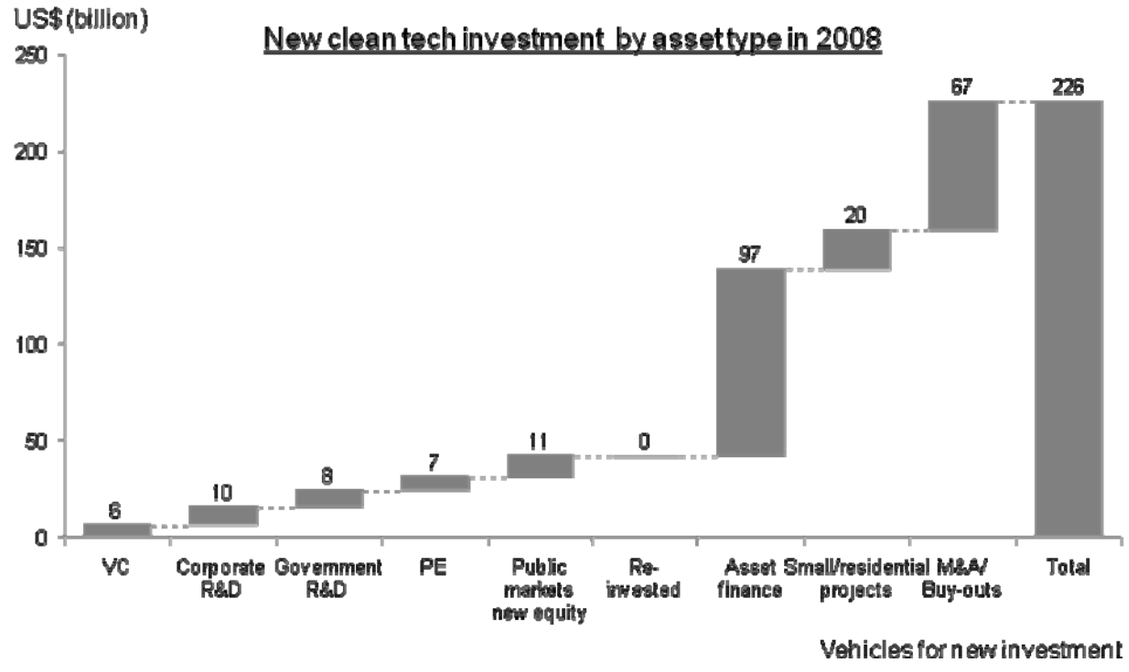
that clean tech is characterized by both high technology risk because of its capital intensity and high market risk because of its reliance on regulation. Estimates of any particular portfolio company's potential market size should also be scrutinized as they are often exaggerated. The path to exit for these investment firms remains an area for development amongst investment management professionals. Despite these challenges, given that the long-term demand for alternative energy is likely to be strong, persistence in getting over these hurdles will likely be rewarded.

Exhibit 1: New global clean tech investment (US$ billion)



Source: Bloomberg NewEnergyFinance

Exhibit 2: New clean tech VC/PE investment globally (2008)



Source: Bloomberg NewEnergyFinance

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