Clean technologies and venture capital

Venture capital has traditionally come to the aid of the non-traditional sectors of the market. Roland Pfeuti looks at investment in the so-called clean technology area.

There are some who argue that “sustainable technologies” (or “clean technologies” as the Americans prefer to name the sector) will be the next “big thing” in the venture capital business. It seems to me that it is still too premature for such a bold prediction. However, I do believe that the sustainable technology venture capital sector will continue to grow and will compete with the more established venture sectors such as biotech and IT/telecom.

This article will provide an overview of this emerging venture capital area, its driving forces, track record and outlook. The article is largely based on the experience of SAM Private Equity which, with US$180 million of funds under management, is the largest venture fund purely focusing on investing in sustainable technology companies. The article is also based on a few independent research studies.

**Definition and driving forces**

“Sustainable technologies” do not represent a single industry, but rather a theme that spans a multitude of sectors from alternative energy to water purification. While there is no uniform definition, the expression is typically used to summarise innovative technologies which address long-term trends and challenges. This can include climate change; environmental concerns; shifting demographics and an ageing society; growing energy demand and the related environmental, security of supply, infrastructure and other concerns; the water scarcity in many regions of the planet; evolving consumer values, particularly in the food and health area and natural resource depletion and resulting constraint.

Industry experts believe that the most important challenges, and to an equal extent opportunities for technology change and venture investing, will result from these sustainability trends and driving forces.

**EMERGING ENERGY**

De-regulation in the multi-billion dollar utility industry, climate change and environmental concerns, technological innovation, tremendous energy demand in emerging economies and security of supply concerns in developed countries are creating new business opportunities. These are related but not limited to: energy efficiency; renewable energy generation and conversion (including geothermal, wave energy and photovoltaics); energy management systems; mobility applications; energy storage; power quality devices; key enabling technologies; emission reduction; fuel cells and related technologies; fuel reforming; IT for facility management; and enabling information technologies.

**MATERIALS**

Long-term trends like natural resource depletion, scientific advances and innovation, population growth, environmental concerns and regulatory changes are expected to lead to substantial opportunities relating to business models, processes and services that improve efficiency while reducing environmental impact. Prospective investment areas include: nanotechnology, resource efficiency; recovery and extraction of high value materials; ultra light materials; reduction of toxic materials; facility management technologies and smart buildings; air pollution control.
TABLE 1 ESTIMATED RETURNS TO PRE-IPO INVESTORS BY INDUSTRY SEGMENT

<table>
<thead>
<tr>
<th>Industry</th>
<th>Number of IPOs</th>
<th>Returns to Priv. Average</th>
<th>Investors Median</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advanced Materials</td>
<td>6</td>
<td>16434%</td>
<td>251%</td>
</tr>
<tr>
<td>Agriculture &amp; Nutrition</td>
<td>2</td>
<td>124%</td>
<td>124%</td>
</tr>
<tr>
<td>Air Quality &amp; Emission Controls</td>
<td>-</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>Clean fuels &amp; Renewable Energy</td>
<td>6</td>
<td>694%</td>
<td>316%</td>
</tr>
<tr>
<td>Distributed &amp; Renewable Energy</td>
<td>6</td>
<td>924%</td>
<td>742%</td>
</tr>
<tr>
<td>Energy Information Tech</td>
<td>2</td>
<td>259%</td>
<td>259%</td>
</tr>
<tr>
<td>Energy Storage</td>
<td>4</td>
<td>754%</td>
<td>801%</td>
</tr>
<tr>
<td>Environmental Services</td>
<td>6</td>
<td>2032%</td>
<td>1668%</td>
</tr>
<tr>
<td>Instrumentation &amp; Process Controls</td>
<td>4</td>
<td>963%</td>
<td>756%</td>
</tr>
<tr>
<td>Power Conversion</td>
<td>11</td>
<td>714%</td>
<td>308%</td>
</tr>
<tr>
<td>Remediation &amp; Recycling</td>
<td>6</td>
<td>7707%</td>
<td>588%</td>
</tr>
<tr>
<td>Water &amp; Fluid Treatment</td>
<td>3</td>
<td>4508%</td>
<td>496%</td>
</tr>
<tr>
<td><strong>All IPOs</strong></td>
<td><strong>56</strong></td>
<td><strong>3491%</strong></td>
<td><strong>433%</strong></td>
</tr>
</tbody>
</table>

Overall returns on sustainable technology M&A transactions were 4.3x on invested equity based on over $90 billion in transactions tracked over the past decade. 

Source: Vortex Energy LLC, New York

precision manufacturing; natural chemistry; advanced packaging; thin film coating and enzyme technologies and related information technologies.

WATER AND NUTRITION
Global trends shaping the water sector include demographic changes, an ageing infrastructure in developed countries, liberalization of water and wastewater markets and growing health awareness amongst the world population. Segments with attractive potential include: water distribution and management; water metering; greywater recycling; wastewater treatment; disinfection of drinking water; desalination of sea water and technologies related to food production and irrigated agriculture.

Key drivers in the nutrition area are: population growth in emerging markets; an ageing society in the developed world; changing consumer values; concerns about environmental quality in the food chain; and accelerating progress in technological evolution. These are expected to give rise to potential investments in areas such as: farming technologies; biopesticides and fertilisers; seed production and plant cultivation; organic agriculture; food traceability; food diagnostics and preservation; natural and organic food; nutraceuticals and functional food and food processing technologies and related information technologies.

Without a doubt, the markets which are addressed by these innovative technologies are large, well established and growing rapidly. In many ways, there is nothing new about sustainable technologies. By and large, the challenge for sustainable technology companies is to develop a better solution for an existing need, rather than create a solution for a need that does not yet exist.

Track record
The sustainable technology sector has undergone radical change over the last 20 years. Initially, demand was driven by environmental regulations and tax subsidies; venture investment was exceedingly rare. In more recent years, however, market developments, advances in technologies, and a series of actual or potential threats to national and global energy and power supplies have spawned a new wave of investment activity in a much broader range of companies.

Most recent research by independent research conducted by Vortex Energy LLC, a New York based research group, has discovered that sustainable technology investments have generated returns exceeding the venture capital average over the past decade via hundreds of liquidity events. The Vortex study, which was sponsored by a number of North American and European venture capital funds, has probably been the most comprehensive investigation of sustainable technology investment performance to date, covering over 75 initial public offerings and 700 M&A transactions for a total of

FIGURE 1 SELECTED SUSTAINABLE TECHNOLOGY M&A TRANSACTIONS, 1993 – 2003

(Annual data; $ MM)

Source: Vortex Energy LLC, New York
775 liquidity events that span a dozen industry segments.

Among the key findings are:

- Exits have been available to investors both through public offerings and trade sales;

- Over the past decade, returns to sustainable technology investors have exceeded the venture capital industry as a whole, even taking into account the dotcom bubble years;

- While overall venture returns have equalled 26% over the 10 years ending 31 March 2004, sustainable technology investment returns have approached 30%, assuming a five-year hold period on investments and a 40% write-off of investments in venture investment portfolios. The returns are considerably higher if these conservative assumptions are revised downwards.

- Sustainable technology IPOs yielded returns to pre-IPO investors of 5.5x, generating a 28% IRR based on the assumptions noted above, while European venture-backed IPOs generated returns of over 8x, generating returns of just under 40%.

- While investors in companies that went public in 1999-2000 generally benefited from the 2000 mini-bubble in energy technology stocks, earning average returns of 9.6x with an IRR of 42%, companies that went public before and after this period still returned over 5% to their early backers.

- Over a 10-year period from June 1994 to May 2004, a market cap-weighted basket of sustainable technology stocks traded in the US, outperformed the S&P 500 and Russell 2000, and kept pace with the Nasdaq Composite.

Why have sustainable technology deals generated above average returns? Evidence would suggest that over the past decade, a number of trends converged to expand the scope, transform the character and accelerate
the market adoption rate of clean technologies: advances in materials science, information technology, and manufacturing processes; policy changes favoring use of renewable resources; growing sensitivity to environmental issues; and a shift in business models from ensuring a customer’s regulatory compliance to enhancing a customer’s profitability. Today’s “sustainable technology” sector is very different from its historical antecedent “environmental technology”.

As sustainable technology companies have become more technology-intensive and market-focused, venture investment has begun to flow, much as it did 10 to 12 years ago in the biotech sector. Moreover, in recent years, sustainable technology venture investment has grown more rapidly than venture investment overall. Today, clean technology companies garner 5-8% of all venture dollars, or more than one in every 20 deals done. Over $3 billion has been invested by venture capitalists in sustainable technology deals in North America over a two-and-a-half year period from the beginning of 2002.

Sustainable technology sector in Australia and New Zealand
In co-operation with James Moody, one of Australia’s most talented young engineers, SAM Private Equity conducted a recent review of the sustainable technology sector in Australia and New Zealand. There is no straightforward publicly available statistical evidence of an outperforming emerging venture capital sector. However, there are several signs suggesting the attractiveness of this sector in this part of the world, where the climate change threat has been most apparent, where the water scarcity issue has been a front page theme for years, where one of the most competitive food and ag industry exists and where one of the most innovative biotechnology and industrial biotechnology research environments has developed.

GROWING MARKET
The national environmental expenditure for both public and private entities is estimated to be $A9 billion per annum currently (Chifley Research Center, Ernst & Young). Forecasts on the growth of this industry are above average and range from $A12 billion to $A50 billion within the next six years. The Australian government estimates the industry reaching $A40 billion, corresponding with a CAGR of 24%. Ten per cent of this turnover will be achieved by the renewable energy industry.

The Australian Mandatory Renewable Energy Target (MRET) scheme (which requires 9,500 gigawatt hours of renewable electricity per year to be produced in Australia by 2010) promotes investment in the same way. However, further improvement in technology development has resulted in economic benefits to the customers independent of regulatory benefits, such as the technologies developed by groups such as the CRC for Environmental Biotechnology.

SOURCES OF INNOVATION
There is a significant base of innovation and new technology development in Australia. The government of Australia is supporting federal research with A$2.9 billion over five years. The private sector is contributing up to A$5 billion per year to R&D.

- CSIRO, the Commonwealth Scientific and Industrial Research Organisation, is a world-renowned research centre focusing on application research with 3,000 employees. The sustainable technology-related divisions make up 40% of the whole institute, with research focusing on energy, wind, water, infrastructure and manufacturing. Currently, CSIRO is in the process of commercialising more than 50 technologies in the sustainable technology domain.

- 62 CRCs, Cooperative Research Centres, are a unique Australian feature aiming to bring together knowledge from research and industry to commercialise on technologies. Several companies have already been spun off from these centres. About 15 CRC units are focusing on products in the sustainable technology sector, hence providing an impressive network of new innovations and enabling startup companies.
Overall, the Environment Industry Expertise Database lists over 2,000 organisations which provide environmental products and services, with about 500 of these having a technology focus. These companies, research institutes and the universities provide a strong base to stimulate innovation and new potential investment opportunities.

INVESTMENTS TO DATE
On average about $A5 to $A10 million per year have been invested into sustainable technology deals over the last eight years, not considering the bubble years 1999 and 2000 with higher investments. However, it is fair to say that the number of businesses in this sector which were able to receive funding from public markets (usually through IPOs far too early in the company’s development) or from private sources and family offices is estimated to be far greater than the few businesses which were backed by domestic generalist venture capital funds.

A review of all Australian and New Zealand investees by region using data sourced from Private Equity Media was undertaken from the commencement of the 96/97 financial year to end financial year 03/04. In this review the industries chosen were agribusiness, environment or technology, and the investment stage was early expansion, restructure or turnaround. Of the 72 investees during this period, each was then verified to ensure that they were within the scope of the sustainable technology industry, reducing the number of investee companies to 42. After the bubble years, these sustainable technology investments shrank to a minimum, but picked up again in 2003.

Data on return on investment in Australia is not publicly available. Several exits occurred in recent years either as IPO (e.g. GeoDynamics, BioProspect, Environmental Solutions) or trade sales (e.g. Primergy, Memtech). However, there is no reason to assume that sustainable technology exits in Australia and New Zealand would show a different pattern from the ones in the USA and Europe. Therefore, although there is only indirect evidence for good exits, there is no sign of the contrary.

Conclusion
There is strong evidence to suggest that smart investors can continue to generate competitive returns from sustainable technology ventures. Indeed, there are many analogies to biotech venturing. It took 13 years from the landmark IPO of Genentech in 1979 for biotech to take more than 10% of venture dollars and today the industry is still not, by and large, profitable. Yet, biotech is a well-established investment category with understood business models. Other factors contributing to a positive outlook for generating returns in the sustainable technology space include:

- A confluence of “tipping point” events such as $50 a barrel oil or Russian ratification of the Kyoto climate change protocol, combining with ever cheaper and more reliable alternative energy technologies, to drive a major shift towards cleaner energy generation and end-use;
- Increasing interest by major corporations in adopting sustainable technologies to drive productivity and reduce waste, leading to the kind of corporate partnerships, investments and acquisitions in the sustainable technology area that have long existed in other tech areas such as telecoms;
- The rise of “serial” entrepreneurs in the sustainable technology field, both entrepreneurs bringing their experience from other tech areas and those who have already successfully exited from a sustainable technology venture, such as those profiled in this report; and
- A levelling of the “playing field” – with the bursting of the dotcom illusion, sustainable technology venture capital can now compete for investor attention based on realistic and historical returns and exit timeframes and benchmarks.

Is “sustainable technology” a viable investment category? The answer in part depends on whether investors can make money in this space. Clearly, there is evidence to suggest sustainable technology can compete with other venture categories. At the very least, the Vortex study puts to rest the notion that investing in sustainable technology companies somehow means accepting sub-standard performance.

Based on SAM Private Equity’s experience, sustainable venture capital can provide attractive risk return ratios. Whilst the time required to a successful exit may be longer than in other sectors, the underlying businesses and technologies are often solid with strong intellectual property protection. In addition to the reasonable expectation of attractive returns, it makes intuitive sense to support innovation in sustainable technologies, given the global trends in human exploitation of natural resources.

Increasingly governments, large industrial players and even institutional investors including some of the largest funds such as CalPers and CalStrs seem to understand and actively address the importance and potential impact of this very basic and tangible area of investing in sustainability.