The geography of cleantech ventures

Charles Fletcher examines the current market and growth in cleantech investments and the financing environments in Europe, the US, China, Israel and India.

Since the adoption of the Kyoto Protocol in 1997, climate change has increasingly dominated the international political agenda. As the economic consequences of climate change and government policy (both international and domestic) become clearer, venture capital (VC) investors and VC-funded companies face a number of challenges and opportunities.

This has given rise to the broad “cleantech” sector of venture capital investment. Within cleantech, there are various identifiable sub-sectors including:

- Energy generation.
- Energy storage.
- Energy infrastructure.
- Energy efficiency.
- Transportation.
- Water and wastewater.
- Air and environment.
- Recycling and waste.
- Agriculture.

The term cleantech is a broad one applying to commercial technologies, making the best use of natural resources.
Against this background, the article examines the:

- Current market and growth in cleantech investments.
- The financing environments in:
  - Europe;
  - the US;
  - China;
  - India;
  - Israel.

Overall investment activity in 2009

2009 has been an impressive year for cleantech VC deals. While aggregate levels of investment are significantly lower than in 2008, cleantech has accounted for a record proportion of overall VC investment.

During the first and second quarters of 2009, cleantech deal flow was particularly scarce compared to 2008’s bumper activity levels. Levels of activity improved markedly in the third quarter of 2009, but was 42% lower, like for like, than in 2008.

However, activity in the third quarter confirmed cleantech as the single largest category for venture capital investment, accounting for more than 27% of all venture capital investment in the second quarter of this year, up from 3% at the start of 2004 (compared to 24% for biotechnology, 18% for software and 17% for medical devices and equipment).

Additionally, the global increase in government stimulus programmes has provided a boost to the cleantech sector. The US, China, Germany, Australia, Spain, Canada, France, Italy, South Korea, Japan and others have earmarked prescribed percentages of GDP to promote clean technologies and related jobs.

Therefore, although activity levels have decreased significantly year on year, cleantech has cemented its position as the dominant destination sector for venture capital investment worldwide. In view of the global stimulus packages and the government policy imperatives to develop cleantech, the general consensus in the VC industry points to cleantech investment remaining at respectable levels in the longer term.

Europe

By reputation, Europe is the global centre of cleantech development, and has well-established incentives and infrastructure to encourage the use of cleantech. The economic crisis has reduced overall VC activity in European cleantech (particularly in capital-intensive technologies). However, the cleantech sector’s share of overall VC activity continues to rise.

Within Europe, certain countries are noteworthy for VC:

- **Denmark.** Its objective is to become 100% fossil fuel free. Therefore, with such a policy imperative on renewable energy, it is unsurprising that Denmark is Europe’s largest exporter of energy technology and can claim, with justification, to be the originator of wind technology. This pre-eminence has drawn major corporates to base their research and development (R&D) facilities in Denmark, and has fuelled the excellent reputation of the Copenhagen Cleantech cluster.

- **Germany.** Germany is the world leader in solar energy, with over half of all global solar energy being produced there. This strength has been amplified by government initiatives such as the feed-in tariff programme, which is an incentive structure to encourage the adoption of renewable energy through government legislation. As well as boasting the world’s leading solar sector, Germany had the highest levels of cleantech investment in 2008 in the EU.

Cleantech VC activity in Germany has grown massively in recent years, helped by policy initiatives and financial support from central government, who have introduced an integrated high-tech strategy for German technology and innovation. The German green building industry is also of global significance, and has been given a recent boost by the recent allocation of US$10 billion (about EUR6.8 billion) of government money to building efficiency.

- **Sweden.** Sweden is second only to Denmark in its emphasis on renewable energy. Not only have the Swedish people made their cities (such as Malmö) models for sustainable development, but also, Sweden has a great tradition of prioritising environmental matters. This helps to explain why it has been successful in cutting its greenhouse gas emissions over the last decade, and is a key reason behind the vibrant Swedish cleantech VC community.

- **UK.** The UK’s commitment to cleantech is strong and growing stronger. The UK VC industry is well established, and the channels for investment are widely recognised. In terms of VC houses, London is on a par with Switzerland as a pre-eminent centre for institutional cleantech money. Given the UK government’s policy commitment to cleantech and the mature VC industry in the UK, there is no question that the UK is a global hub for cleantech VC activity.

The recent key trend in European cleantech has been the shift away from more capital-intensive projects. In terms of favoured stages of investment, many European VC houses have cleantech portfolios that are weighted in favour of early-stage investment, as a result of the legacy of the early-stage investment spree seen in 2007 and 2008.

This has led to a number of prominent VC houses seeking to balance out their portfolios with investments into later-stage companies (which they have been able to do on relatively low valuations).

This portfolio risk management exercise, together with a lack of debt for later-stage companies, has led to the more recent emphasis on mid- to later-
stage deals. However, this emphasis has not been to the complete exclusion of the early-stage opportunities, and there is still a substantial proportion of European cleantech VC money going into the best early-stage companies.

While the European Union and its member states cannot even begin to approach the level of fiscal stimulus in the US, there is a strong policy impetus that continues to assist cleantech VC activity in Europe. Environmental concern and awareness among Europeans is unrivalled. In Europe, there is a strong domestic market for consumers of cleantech and support for central efforts to promote cleantech.

The most visible single initiative has been the plan to invest EUR105 billion (about US$133 billion) in the “green economy” through the EU Cohesion Policy, which was announced on 9 March 2009. This amount represents more than 30% of the regional policy budget for 2007 to 2013, and “offers a solid platform for job creation and a significant boost for regions and cities in their quest to maintain Europe’s global leadership in the field of green technologies”.

Within that amount, funds will be ring-fenced for certain areas of key strategic importance:

- EUR6 billion (about US$8.8 billion) for clean urban transport.
- EUR23 billion (about US$33.8 billion) for railway development.
- EUR4.8 billion (about US$7.1 billion) for renewable energies.
- EUR4.2 billion (about US$6.2 billion) for energy efficiency.
- EUR28 billion (about US$41.2 billion) for improving water and waste management.
- EUR3 billion (about US$4.4 billion) for general small- and medium-sized enterprise (SME) development of green products and services.

The European cleantech VC market is the most mature in the world, and the European consumer is the most environmentally aware. However, policymakers must continue to support the sector if this pre-eminence and the accompanying competitive advantages are not to be lost to the US and beyond.

**US**

In 2008, US-based VCs poured about US$5.9 billion (about EUR4 billion) into the cleantech sector, and this accounted for about 70% of global investment. These were record sums, and it is perhaps unsurprising that cleantech investment declined somewhat in 2009. However, with US$33 billion (about EUR22.4 billion) earmarked for renewable energy and a total of US$112 billion (about EUR76.1 billion) for broader cleantech development, the American Reinvestment and Recovery Act is a hugely positive step for the US cleantech market, and will continue to fuel interest in the sector.

The impact of President Obama’s economic stimulus measures has gradually fed through to the market, as funds have been allocated and spent in significant amounts in the second half of 2009. For example, the US Department of Energy recently announced US$3.4 billion (about EUR2.4 billion) in grants for energy grid modernisation projects, which the government expects to be matched by industry funding, bringing the overall funding to over US$8 billion (about EUR5.4 billion). This federal influence, together with the various initiatives underway at state level (where California, New York and Boston have been leading the way), means that the US is catching up with Europe in cleantech activity.

Within the US, there are numerous localised centres of cleantech activity, such as

- **Austin, Texas.** Austin’s Clean Energy Incubator is managed by University of Texas at Austin. The resident companies are incubating a wide range of technologies, and benefit from close collaboration with the city-owned utility, Austin Energy.

- **San José, California.** Silicon Valley continues to be at the heart of venture capital, and this is true for cleantech as it is for the new software start-ups. The Valley’s technological pre-eminence and VC community gives it clear competitive advantages in renewable energy development, particularly in solar energy applications.

- **Berkley, California.** A new US$500 million (about EUR340 million) centre for biofuels and energy research was announced at the beginning of 2009, which will have a shared base at the University of California at Berkeley and at the University of Illinois. Funded mostly by British Petroleum and partly by the state of California, the Energy Biosciences Institute is set to create a research and funding environment for biofuels technology with global pre-eminence.

With the combination of the federal stimulus package and state level initiatives, the US VC industry is becoming increasingly cleantech focused.

**Israel**

Following the proactive efforts of the government to catalyse a VC industry in the early 1990s through its “Yozma” programme, Israel continues to enjoy an active VC industry and remains an important global source of innovation. Israeli VCs are currently thought to hold over US$10 billion (about EUR6.8 billion) in capital.

Israel is a cleantech incubator of global significance. Within Israeli cleantech, certain sub-sectors have particular pre-eminence, including:

- **Water technology.** Israel recycles 75% of its wastewater, pioneered drip irrigation and is home to the world’s largest reverse osmosis desalination plant.

- **Electric vehicles.** Israel has been a key regional innovator, and recently became the first test market for a nationwide electric vehicle recharge network.

Due to governmental support and its clusters of cleantech companies, offering fertile incubation opportunities,
Israel presents great opportunities for early-stage companies.

The Office of Chief Scientist of the Ministry of Industry, Trade and Labour is responsible for implementing government policy concerning the support and encouragement of Industrial R&D in Israel.

The main feature of this support and encouragement is an R&D grant programme for the development of new products, or to significantly improve existing products. Grants can form up to 50% of R&D expenditures.

An annual budget of US$300 million (about EUR204 million) is spent on 1000 projects undertaken by 500 companies. There are also various seed and pre-seed initiatives to stimulate innovation and enterprise in Israel.

Israel’s dynamic VC industry has become a key feature of its economy.

**China**

China’s massive economic growth has led to spiralling demand for energy, water and raw materials. Further, rising Chinese output has led to increasing emissions of carbon and other waste products. The Chinese energy market has massive global economic and environmental significance.

The pressures caused by scarcity of key resources have led to a focus on efficiency, energy security and domestic innovation in clean technologies. Efficiency is an obvious target sub-sector. China currently consumes more than three times the world average amount of electricity to produce one US dollar of GDP.

The Beijing administration has decreed that by 2020, 15% of Chinese power (double the present volume) should come from renewable energy sources, and has also set targets for reductions in energy intensity, pollutants and water consumption to be achieved by 2010. China’s President Hu has a highly publicised central objective “to create a harmonious society”. The detailed text of this policy is unequivocal in its promise to advance the cleantech agenda. It is clear that vast amounts of capital expenditure will be required to finance the Chinese cleantech effort.

Private investment in China has primarily been focused on later-stage investments in pre-initial public offering (IPO) opportunities. While early-stage venture capital firms have been active in China, it is only recently that they have started to invest in cleantech. Perceived cultural and administrative barriers to entry have proved off-putting to many.

China recently announced a CNY4 trillion (about US$0.59 trillion) economic stimulus package, identifying investment in energy as one of the key infrastructure targets. About 75% of this package is directed at infrastructure projects, including investment in the rail system and the improvement of Chinese airports.

A stimulus package for renewable energy and particularly for wind power is currently being formulated by the National Energy Administration. It is expected that the total size will be about CNY3 trillion (about US$0.44 trillion) and the wind power target for 2020 will increase from 30 gigawatts to between 100 gigawatts and 150 gigawatts.

While the detailed impact of the China stimulus package is difficult to predict, it is clear that there is a fast-developing market for cleantech in China. Not only is there a central desire to pursue environmental targets, but there is also a separate intrinsic need to replace outdated infrastructure.

Cleantech features prominently on the Chinese government agenda, and China will be a key target market for many cleantech companies globally. Western investors remain apprehensive about investing in China, but the huge demand for cleantech services will go a long way to allay their fears.

**India**

Although cleantech venture capital investments in India have more than doubled in recent years, cleantech remains a niche sector in India and one in which the line between venture capital and project finance has become somewhat blurred.

Traditionally, the government and NGOs, including the Indian Renewable Energy Agency, have provided funding for environmental or sustainable development projects in India. However, more recently, infrastructure funds, private equity houses and venture capital funds are emerging as significant investors in Indian cleantech companies.

Various barriers to growth have depressed the level of venture capital investment in Indian cleantech. These barriers include:

- A lack of capital (and in particular a lack of risk capital to fund early-stage projects).
- A perception that the government could do more to support the sector (and the various government and quasi-governmental bodies could operate in a more co-ordinated manner).
- The relative unfamiliarity with the various opportunities within the broad cleantech sector in Indian markets (and accompanying lack of information or market awareness among stakeholders).

For these reasons, cleantech in India tends to be dominated by private equity or infrastructure funds.

VC investment in India tends to focus on later-stage companies. From a sector point of view, investor attention in India tends to be focused on infrastructure (including transportation, electric power, water supply and irrigation), where there has been something of a boom in investment levels in recent years.

At a macroeconomic level, although exempt from specific greenhouse gas reduction levels, due to its status as a developing economy, India has ratified and signed the Kyoto Protocol and is a participant in the Asia Pacific Partnership on Clean Development and Climate.
Within India, government policy is an important driver of the cleantech industry, particularly in renewable energy. The Eleventh Five Year Plan (2007 to 2012) focuses on adopting, implementing and using technologies in clean and renewable energy.

Further, the Ministry of New and Renewable Energy has been seeking to encourage the development of renewable energy technologies. With a view to stimulating the development of these technologies, the government has adopted proactive measures, including providing budgetary support for R&D of clean energy technologies, and promoting private investment in cleantech through tax incentives.

However, commentators suggest that the policy regime can be somewhat bureaucratic, and suffers from a lack of transparency and co-ordination of efforts. There is also a perception that the Indian cleantech sector has suffered from a scarcity of quality management teams. Many top executives are drawn instead to India’s successful mainstream IT industry. The convergence of these factors means that India’s clean energy programme remains primarily private sector driven.

The government has not been as active as other global policymakers, and this has not helped the VC market in India. Aside from the infrastructure-related sectors, cleantech VC activity in India is rather underdeveloped at present, and suffers from a shortage of seed capital, with IT sectors tending to dominate Indian VC activity.

The future for cleantech
In December 2009, the successor conference to Kyoto will take place in Copenhagen, where it is expected that environmental regulations concerning carbon dioxide emissions will be renewed and extended (see Editorial). This will refocus attention on the cleantech sector, and will prompt further investment and growth opportunities. Government legislation and fiscal measures worldwide will continue to be the dominant theme in the sector going forward.

These factors mean that, despite the downturn in year-on-year levels of global cleantech activity, the cleantech bubble is unlikely to burst. Cleantech as a key target sector for international venture capital will continue to grow and develop in the years to come.

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