



# Investing in clean energy, clean technology and carbon trading: insights for investors



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**Far from hindering investment choices, concerns over climate change, increased interest in environmentally sensitive products and services, and high oil prices are creating opportunities for long-term investors.**

Environmental concerns are no longer seen as sources of risk that create an unnecessary legislative and cost burden for companies and their investors. On the contrary, heightened environmental awareness is now a catalyst for the development of new technologies, products and services, as well as a driver for changing consumer preferences.

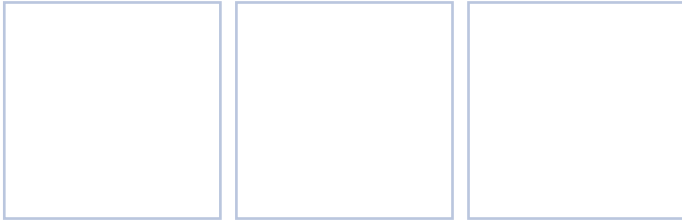
Today's business practices are not only shifting to adapt to consumer behaviors and national and international standards, but also to establish a competitive edge in new and innovative markets. This is why tomorrow's business environment may be defined by efforts on the part of sectors and individual companies to recognize and capitalize on these evolving issues.

Institutional investors have an opportunity to benefit from these trends. The number and variety of investment strategies focused on addressing concerns over the impacts of climate change – and approaches to mitigate those impacts – are increasing. To assist institutions in navigating this market segment, Mercer presents this paper, which includes insights gained from manager research and other experience in this area.

## Clean energy, clean technology and carbon trading: What are they?

**Clean technology** – or “cleantech” – is sometimes used as an umbrella term for all the investments discussed in this paper, but it can also be broadly defined as a range of products, services and processes that reduce or eliminate ecological impacts and/or provide superior performance while using fewer resources. More detailed academic definitions are available, but most investment funds define their own vision of cleantech along similar lines, including or excluding certain sectors. Typical areas are energy, environmental technology and controls, materials and resource efficiency, sustainable transportation (hybrid technology, batteries, etc.), agriculture, and water and waste management. The lack of a concrete definition makes it difficult to estimate the precise market size. However, cleantech research and consulting firm Clean Edge<sup>1</sup> estimates that the market for the four clean-energy technologies it designates as “benchmark technologies” – solar photovoltaics, wind power, biofuels and fuel cells – grew by 39 percent, to US\$55.4 billion, in 2006, and the company expects that market to quadruple to more than US\$226.5 billion within the next ten years. These energy technologies form the largest subset of the cleantech market, which indicates that the broad market for cleantech is larger than is represented by this estimate.

<sup>1</sup> [www.cleantech.com](http://www.cleantech.com)



**Clean energy** is a term that covers a range of low-carbon-emitting energy sources, including solar photovoltaics, solar thermal, wind, biomass, marine, geothermal and small hydro. It does not include energy derived from large hydro or nuclear projects, although funds labelled as “alternative” or “renewable” energy may include these latter categories. Clean energy (or renewable energy) funds include all funds focused on investing in companies developing low-carbon-energy technology and renewable energy projects. The market for clean energy is growing fast. New Energy Finance<sup>2</sup> estimates that total worldwide investment in all parts of the clean energy industry is currently between US\$500 billion and US\$600 billion per annum – around 10 percent of all total worldwide investment in energy.

**Carbon trading** – also known as emissions trading – is a system that provides economic incentives for achieving emissions reductions by buying and selling emissions credits that are priced by the market. The best-known mechanism is a trading scheme whereby a central authority sets limits or “caps” on each country and each pollutant. These caps are then translated into sector-level targets and subsequently translated to installation-level targets passed on to operating companies. Countries or companies that intend to exceed their limits may buy emission credits from entities that believe they can stay below their designated limits, creating an additional cost, whereas those that emit less than their limits may sell emission credits, thereby creating an additional source of income.

For many nations, the Kyoto Protocol provides a legislative framework for emissions trading, but voluntary targets are also used (UK scheme, Chicago Climate Exchange). Each nation that has ratified the Kyoto Protocol has agreed to limit emissions to the levels

described in the protocol. Those targets form the basis for the number of allowable credits. A number of emission trading schemes have sprung up in different regions over the past few years. The Chicago Climate Exchange and the UK Emissions Trading Scheme (which closed in December 2006 and will be succeeded by the Carbon Reduction Commitment<sup>3</sup>) were formed in 2003, and these were followed by the EU scheme in 2005. New schemes are now being established in Australia and the state of California.

The Kyoto Protocol established two other mechanisms for emission reductions relevant for investors: the Clean Development Mechanism (CDM) and Joint Implementation (JI). In simple terms, these promote the development of emission recovery projects that recapture greenhouse gases that would otherwise be released into the atmosphere. These recaptured emissions are then quantified, verified and turned into revenue-generating carbon credits. JI and CDM transactions comprise an increasingly larger share of the full market in carbon trading. According to the World Bank, the global carbon market tripled in size, to US\$30 billion in 2006 from US\$10 billion the previous year. However, some estimate that the size of the market may be as much as 25 percent higher due to options trading, which is less transparent.<sup>4</sup>

## Investment drivers

The investment drivers in the clean energy sector are compelling:

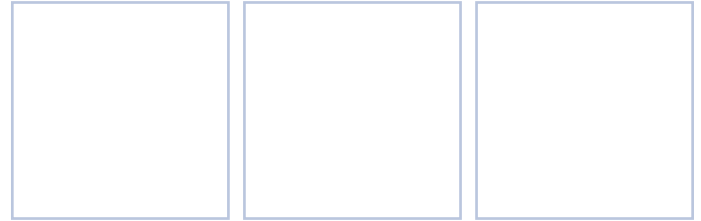
- **High and stable demand for energy, with the energy sector set for a period of high growth** – With the rapid industrialization of many developing countries and their heavy reliance on energy, demand is expected to grow significantly.

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<sup>2</sup> [www.newenergyfinance.com](http://www.newenergyfinance.com)

<sup>3</sup> <http://www.defra.gov.uk/environment/climatechange/trading/uk/index.htm>

<sup>4</sup> “Carbon market triples in value in 2006: World Bank”, Environmental Finance, May 2007



- **Rise in fossil fuel prices** – We have seen a steep rise from US\$20 to US\$30 per barrel (in real terms) throughout the 1990s, to more than US\$90 per barrel more recently.
- **Concern over continuation and security of fossil-fuel supplies** – Broadly speaking, geologists have already mapped out where oil is going to come from over the next century. In layman's terms, cheap, easy-to-access oil is no longer available and we are now at the stage of extracting and refining expensive, hard-to-get oil.
- **The global threat of climate change** – This is resulting in government legislation and intervention, including regulation, subsidies, tax relief and procurement strategies. Forty-five countries worldwide have enacted new laws, with commitments to increase renewable energy as part of the energy mix. For example, in China, 15 percent of the energy mix is set to come from renewable energy by 2020<sup>5</sup>; in Europe, the figure is 21 percent by 2010<sup>6</sup>. While there is no federal figure for the US, individual states such as California and New York have set themselves targets of 20 percent by 2017 and 25 percent by 2013, respectively.<sup>7</sup> In addition, eight mid-Atlantic and northeastern US states have joined the Regional Greenhouse Gas Initiative to discuss a regional emissions trading system. Even where fossil fuels such as oil and coal are still widely used, there is significant effort being made to minimize the negative environmental impacts of those energy sources through technology.
- **Rise of environmental legislation and regulation throughout the world** – For example, the Kyoto Protocol, which affects costs in all parts of the production chain, from the extraction of raw materials and the manufacturing process to packaging and waste.

- **Change in consumer preference** – While slow to start, there is now a growing movement toward more energy-efficient products among commercial, industrial and retail consumers.

While there are numerous drivers underpinning the investment case for this sector, risks are also prevalent. These typically include technology risk, regulatory uncertainty, a perceived dependence on high oil prices for the success of renewables and the survival rate of new companies.

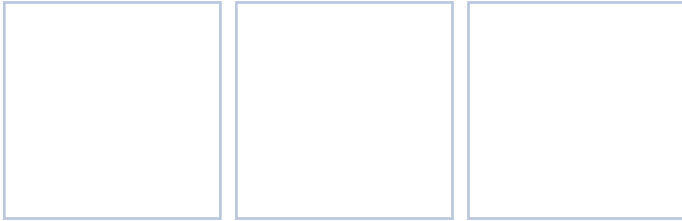
## Investment vehicles available to potential investors

A variety of funds are now available to institutional investors who want to capitalise on this type of opportunity. Broadly, these funds include private equity and venture capital, public equity, project finance (including infrastructure), or a combination of these. Funds can be sector- or theme-specific, ranging from broad cleantech funds to narrower alternative energy funds, or even narrower 'niche' funds, such as methane recovery and water funds. Most funds are actively managed, although a number of public equity index funds have recently been introduced, as have exchange-traded funds. Within the carbon trading market, funds fall into two broad categories: commodity trading funds that look to buy credits and sell them for a higher price and funds that invest in emission recovery projects that generate carbon credits through the CDM or JI.

<sup>5</sup> Goldman Sachs Global Investment Research, Alternative Energy, 27 April 2006, p5

<sup>6</sup> Martinot, Eric. Renewables 2005 Global Status Report, Worldwatch Institute and Tsinghua University, p5

<sup>7</sup> Evolution Markets Inc., Renewable Energy: State and Regional Compliance Markets <http://www.evomarkets.com/rec/index.php?xp1=3&mk=4>



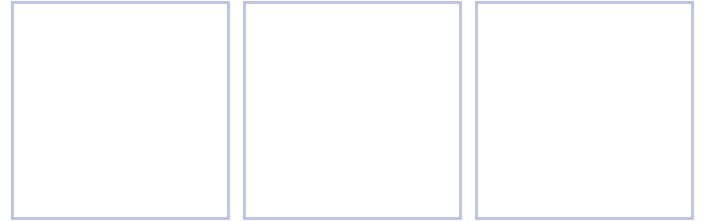
## General investment characteristics

At Mercer, we have undertaken considerable research into the investment opportunities available in the clean-energy market. With many hundreds of funds available to investors, we focused our research on a selection across a number of asset classes, geographic regions, sector specializations, sizes and business structures. The following section explores some of the common investment characteristics we encountered and shares some of the early insights from our research to date.<sup>8</sup>

- Investment horizons tend to be long term, thereby allowing for the maturation of markets, managers and investment opportunities.
- Risk and return profiles are hard to establish given the relative immaturity of these sectors, associated uncertainties and the prevalence of private equity. Risk and return are driven by the underlying investments, which tend to have high idiosyncratic risk and characteristics of sector concentration. Many funds aim to achieve comparable risk and return profiles to their counterparts in mainstream private or public equity markets, or project finance and infrastructure, although this varies on a fund-by-fund basis. Most funds do not yet have a meaningful track record. Where track records do exist, these may not be helpful when trying to forecast future risk and return profiles due to the rapidly evolving investment environment in which they are operating. The business environment in this area five years ago was vastly different from the operating environment today. To increase the chances of a favorable risk-return profile, investors should consider diversification, which is possible even within this relatively narrow sector.
- Manager skill is likely to be a deciding factor. As identified earlier, funds can have broad definitions of clean energy and cleantech, or they can be single sector or single technology funds. The clean energy and cleantech sectors are still young and rapidly evolving, and it is very difficult for even experienced technicians and investors to keep up to date with emerging technologies and opportunities across these sectors all over the world. Niche funds that track a single sub-sector allow fund managers to become experts in a particular area and develop a strong network of contacts, and enable superior access to investment opportunities. The funds with the best chances of success are likely to be those that have a clearly articulated focus designed to suit the experience and skill set of the manager or team and the resources at their disposal. In such a dynamic field, one so dependent on a mix of technology, politics and economics, a team that can demonstrate an ability to correctly forecast and stay ahead of current trends will be most desirable.
- Funds are being launched by both boutique organisations and large, well-established financial organisations, either directly or through affiliations. Each organizational structure can have its advantages. For example, the backing of a large organization can be positive, as it can bring business management benefits and access to resources and investment opportunities. Boutique organisations, on the other hand, may be able to move more quickly, have greater freedom and be less hindered by bureaucratic processes. In assessing manager ability, it is more difficult to get a true sense of how well run and controlled these smaller players are, and so investors looking to invest with a smaller organisation need to look even more closely at its management to consider whether the financial and management resources are stable and sufficient.

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<sup>8</sup> This is a growing area in the market at large as well as with Mercer clients. Our research in this area is ongoing.



- Idea generation and implementation are crucial to the overall success of the fund. Given the rapid increase in capital being allocated to this sector, if there is too much money chasing too few investments, the danger arises of a bubble being created where companies are overvalued due to immediate market conditions as opposed to long-term value-creation prospects. In addition, shifts in government programs and public sentiment may cause changes in valuations. Investors should pay particular attention to the stage of technology being targeted for investment. A later-stage strategy that is focused on mature and price-competitive technologies may be less susceptible to changing government priorities. However, valuations also vary by sector. At any given time, certain sectors may appear over- or undervalued relative to other cleantech industries. It is therefore important to understand the value drivers of the particular sector or sub-sector being examined as well as where that sector is geographically located. In our research, we found a variety of approaches to idea generation and implementation, and we concluded that funds that actively research the sector, source their own deals and use their networks to find leads are more likely to have better access to good investments and are therefore better placed to perform in the long term.
- In portfolio construction, diversification is a key issue for investors who want to reduce their portfolio risk. This can be done by considering a mix of fund characteristics, such as geographic distribution, asset class, sub-sectors and technological stages. For example, a broader strategy with a particular cleantech fund will include a range of sectors, from energy to information technology, whereas niche funds will obviously offer less diversification. In addition, the variety of asset classes discussed previously offers a way to address diversification.

Investors may also consider one of a few cleantech/clean-energy fund of funds. In summary, the risks here are similar to those of other investment strategies, requiring investors to view cleantech in the context of their overall portfolio.

## Specific investment characteristics by asset class

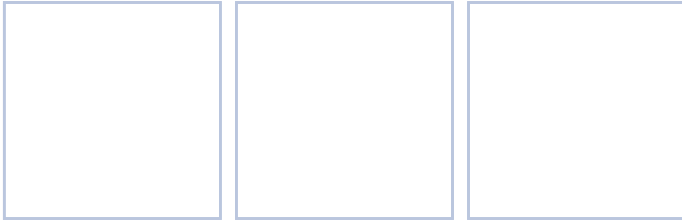
### Private equity

There has been a strong rise in the number of clean energy or cleantech private equity funds coming on to the market. This has been the fastest growing area of the private equity market, with the Cleantech Venture Network<sup>9</sup> estimating that total US and European venture capital investment in cleantech – technologies and companies devoted to advancing sustainable use of natural resources – reached a record US\$3.6 billion in 2006, representing a 45 percent increase in 2005. Approximately 72 percent of this investment was in energy-related cleantech.

As is generally the case with private equity, the market covers different stages of investment, from early stage/start-up through development capital and expansion financing to funding management buyouts from larger, frequently listed companies. Diversified investments in private equity are expected to achieve returns above those available from the quoted market over extended time periods. This expectation is based on two factors: the existence of a premium for illiquidity and the enhanced ability to capture returns that arise from companies entering a phase of rapid growth. The success of private equity investment is extremely sensitive to the choice of investment managers and the timing of the commitment. This is no different for clean energy or cleantech private equity choices, and the risk may be slightly higher due to the technological and regulatory risks as well as the relative newness of these sectors.

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<sup>9</sup> [www.cleantech.com](http://www.cleantech.com)



Arguably, the very long-term, highly illiquid nature of these investments makes private equity inappropriate for poorly funded or very mature liability funds. Investment tends to be via pooled funds structured as closed-end vehicles. In the area of clean energy and cleantech, demand for these funds is proving to be high, with investors such as investment banks, entrepreneurs, family offices and a handful of public funds tending to lead the way. Investors need to be swift, though, as funds are tending to reach their close on time, and sometimes well beforehand.

### Public equity

There are a growing number of actively managed funds and indices in the public equity markets. Exchange-traded funds are becoming available based on, for example, the Ardour Global Index, the Wilderhill Clean Energy Index and the Cleantech Venture Network's Cleantech Index. Some of these funds may include industrial conglomerates or other (arguably) non-pure-play holdings, which is why there is reasonable liquidity in public equity markets, with many funds offering daily liquidity. However, due to the smaller number of underlying companies available and the smaller capitalization of most pure-play clean companies, clean energy or cleantech funds may not be as liquid as their non-clean-energy or cleantech counterparts. Risk and return profiles appear comparable to those of private equity investments in other sectors, although given the relative immaturity of the cleantech sector, track records, where available, should be considered along with other factors.

Due to easier accessibility and greater liquidity compared to private equity, public equity investment vehicles may make exposure to the clean-energy and cleantech markets more appealing to a wider group of investors. There are also sector-specific funds focusing on themes such as water or energy that invest in both cleantech and traditional industries, helping to get around the issue of there being few listed-equity clean-energy investments.

### Carbon funds

As identified earlier, in the carbon trading market, funds fall generally into two broad categories: commodity trading funds that look to buy carbon credits and sell them for a higher price and funds that invest in emission recovery projects that generate carbon credits through the CDM or JI. In our research of funds to date, we have found that greater returns potential and richer sources of idea generation tend to come from funds that focus on opportunities in the CDM and JI areas rather than in carbon commodity trading. This is likely due to lower barriers to entry in terms of capital and knowledge for carbon traders, with less opportunity for fund managers to have an edge over their competitors.

### How to invest

For investors considering an investment in private equity, public equity or carbon funds that focus on clean energy or cleantech, either a satellite investment or part of the normal asset allocation (such as private equity allocation, public equity allocation or alternative assets allocation) may be appropriate. Either way, while only a small portion of the assets is likely to be invested, active oversight should be performed.

Benchmarking is notoriously difficult to undertake in this area, whatever the asset class. This is due in part to the variety of definitions being used by fund managers. For example, one clean-energy or cleantech fund may be defined very differently from another, making it difficult to compare like with like. Similarly, clean-energy or cleantech public equity funds have severely restricted universes and different capitalization exposures compared to mainstream global equity indices such as FTSE Global or MSCI World. As these sectors mature, benchmarking may become easier. In the meantime, a cautious and developed understanding of the expectations of the funds and how the allocation fits into the overall portfolio are recommended, together with close monitoring and oversight.



## Conclusion

Clean and renewable energy investments could play an important (and multidimensional) role in a long-term investor's broader investment strategy. Generally, they are likely to have a relatively small but meaningful allocation within a diversified portfolio. Given the secular trends in place and the idiosyncratic nature of investments, we expect a low correlation with other assets. Hence, a diversified "clean" portfolio can, in turn, offer diversification benefits by lowering the overall investment risk. For investors pursuing responsible investment strategies, cleantech may offer the benefit of allocating resources to resolve environmental issues.

Long-term investors are beginning to direct their money into these funds. In the US, five state-sponsored funds have invested a total of more than US\$1 billion in cleantech strategies.<sup>10</sup> The Oslo Pensjonsforsikring (Norway's largest municipal pension plan), ABP (the

Dutch government and education sector retirement fund), and several local authorities in the UK have made commitments to these funds as well.<sup>11</sup> Investment has come from corporate pension funds, including that of British Airways.<sup>12</sup> Many major corporations, such as BP, GE, Sanyo, Sharp, Shell and Siemens have also made considerable renewable energy investments and acquisitions.<sup>13</sup>

Finally, we would note that "clean" energy does not necessarily mean "responsible" or "environmentally friendly". The growth potential of the clean-energy and cleantech sectors has led to many funds branding themselves "cleantech" in order to ride the wave of popularity, but many do not consider the true social or environmental impact of their investments alongside the financial returns. So investors looking to this sector as part of a responsible investment strategy need to ensure they identify funds that have a philosophy aligned with their own.

For more information on Mercer's research and services in this area, please refer to the contacts below.

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<sup>10</sup> The five funds are the California Public Employees' Retirement System, the California State Teachers' Retirement System, the New York State Retirement Fund and the treasurer's offices of Oregon and Pennsylvania. All are members of the Investor Network on Climate Risk ([www.incr.com](http://www.incr.com))

<sup>11</sup> Hernandez, Sandra. "Pensions tack with the wind: funds pursue low risk, high yields in power from the skies", Wall Street Journal, 31 July, 2006

<sup>12</sup> Ibid.

<sup>13</sup> Martinot, Eric. Renewables 2005 Global Status Report, Worldwatch Institute and Tsinghua University, p5