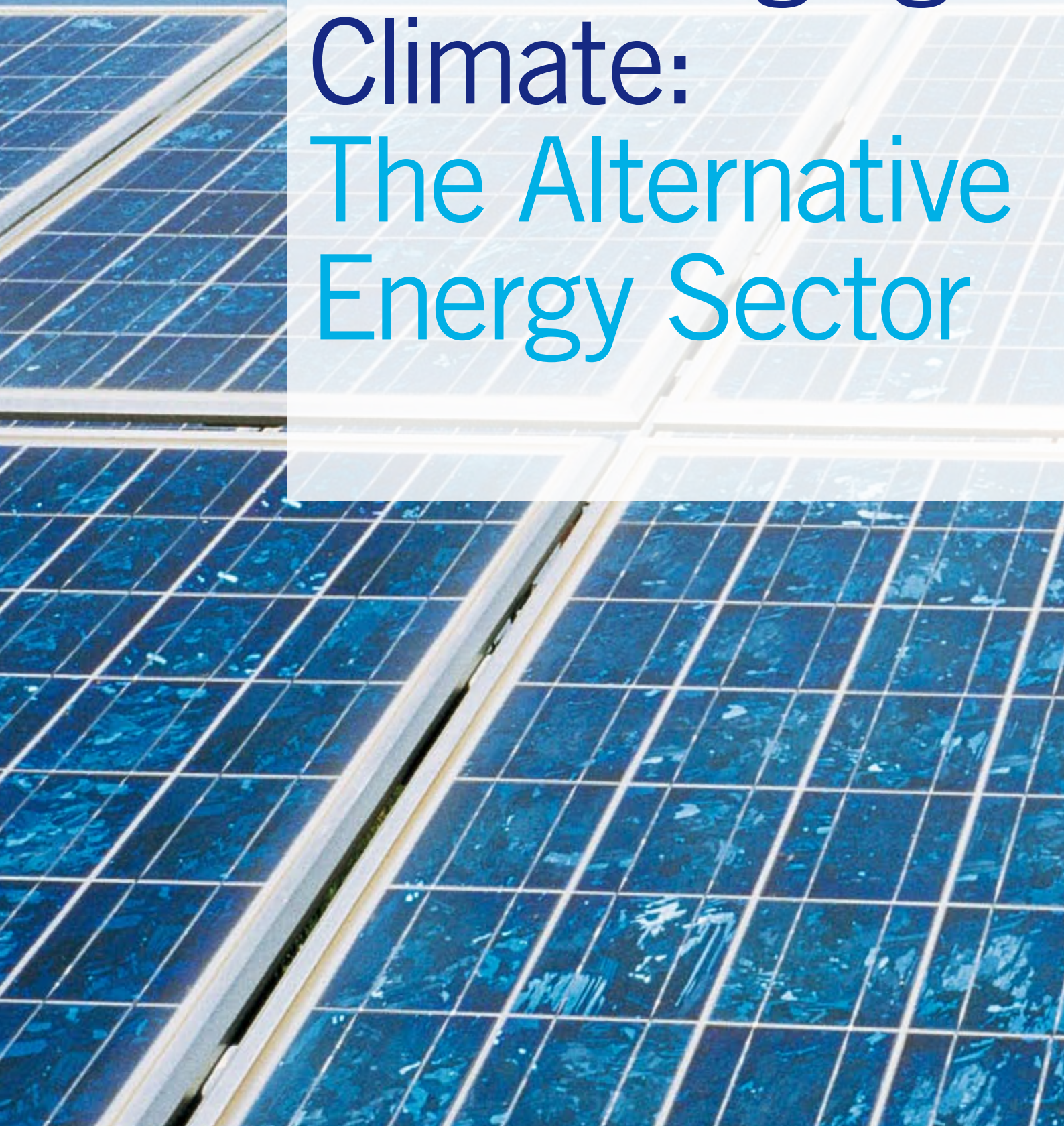
A publication
for the Institutional
Investors Group
on Climate Change

IIGCC
Institutional Investors Group on Climate Change

IMPAX
Asset Management

Investment Opportunities in a Changing Climate:

The Alternative Energy Sector



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This Report has been written by Impax Asset Management Ltd. for the Institutional Investors Group on Climate Change (IIGCC) in October 2006. Matthew Whittell, acting as a consultant to Impax, is the principal author.

Executive Summary

This Report aims to broaden the context of investment activity in a world economy that is increasingly threatened by climate change. By examining the Alternative Energy Sector (the 'Sector'), it seeks to demonstrate that, while acting defensively to mitigate the risks of climate change, investors seeking to maximise their returns may also benefit from the new investment opportunities that are likely to develop, in part as governments implement climate change-related policy.

The Sector is segmented into four Markets:

> **Renewables** – Energy harnessed using low carbon technologies;

> **Transport and Transportation Fuels** – Low carbon alternatives to fossil fuels;

> **Energy Efficiency** – Reducing energy consumption without impacting output or performance; and

> **Carbon** – New sources of perceived value linked to emissions trading markets.

The Alternative Energy Sector is already large and growing rapidly. Aggregate revenues of equipment and services across the four Markets are at least €30 billion per annum. Revenues in the Sector are growing faster than revenues in conventional energy markets; for example, since 2000, the market for wind turbines has been growing at between 20% and 25% per annum.

The drivers of this growth include factors that are linked to climate change policy, for example subsidies for renewable energy investment or generation. However, the 'landscape' is complicated by other drivers, particularly the rising costs of conventional energy sources, policy designed to improve the security of energy supply, the falling costs of alternative energy technology, and the weakness of electricity transmission and distribution networks.

For investors to profit by committing capital to these markets, they must understand the features of the business models that are particular to the Sector:

> **Technology Development**
New technology is at the heart of many of the investment opportunities in the Sector. Investors should pay particular attention to the firm's intellectual property, the business model designed to commercialise the technology, the expected return on capital employed, and the management team's experience.

> **Project Development and Ownership**
Investors should distinguish carefully the risks and return characteristics in the three phases of a project: development, construction and operation. Project success is a function inter alia of the scale and quality of the underlying resource to be exploited, the reliability of the technology applied to the resource, the terms of the contracts drawn up to govern the project and the strength of the project's stakeholders.

> **Services**
The analysis of the service businesses in the Sector is similar to that in other sectors. Market analysis, company strategy, the strength of the management team, and the investment characteristics of the specific opportunity are key.

Successful investment in the Alternative Energy Sector requires an in-depth understanding of the markets and business opportunities. The principal types of investment are direct investments (into quoted securities, private companies, projects and property) and funds.

Risk analysis in the Alternative Energy Sector is no different to risk analysis of investment securities of companies active in any other area of the economy. However, there are several sector-specific risks, in particular energy and environmental policy, industrial capital spending, and the future of fossil fuel prices.

01 Introduction

It is increasingly accepted that climate change poses a significant threat to the value of investment assets, and that investors should redouble their efforts to understand these risks and adjust asset allocation accordingly. In August 2005, Mercer Investment Consulting published a report commissioned by the Institutional Investors Group on Climate Change (IIGCC) and The Carbon Trust entitled *A Climate for Change – a trustee's guide to understanding and addressing climate risk*, which sought to highlight trustees' fiduciary duty to assess and address these risks.

However, if climate change is to have a significant impact across many parts of the economy and governments around the world continue to adopt policies to mitigate its effects and/or adapt to the consequences, then smart investors should be on the look-out for potential new investment opportunities.

This Report, which seeks to complement *A Climate for Change*, reviews the investment opportunities in the Alternative Energy Sector (the 'Sector'), a part of the economy that is flourishing, in part as a consequence of climate-change related policy.[1] It is intended to be read by individuals responsible for investment policy, investment management or the monitoring of investment performance at pension funds, insurance companies, charities and other investing institutions.

The Report begins with a market overview, highlighting the large scale and significant growth rates in the Sector, which is segmented into four Markets:

> **Renewables** – Energy harnessed using low carbon technologies;

> **Transport and Transportation Fuels** – Low carbon alternatives to fossil fuels;

> **Energy Efficiency** – Reducing energy consumption without impacting output or performance; and

> **Carbon** – New sources of perceived value linked to emissions trading markets.

For each of these Alternative Energy Markets, the report reviews:

– the main technologies underlying the investment opportunities;

– the key long term drivers and investment considerations which affect them; and

– the business models that are being applied to these opportunities.

For more detailed and specific investment advice, investors are encouraged to consult their financial advisers and external investment managers with expertise in the Alternative Energy Sector.

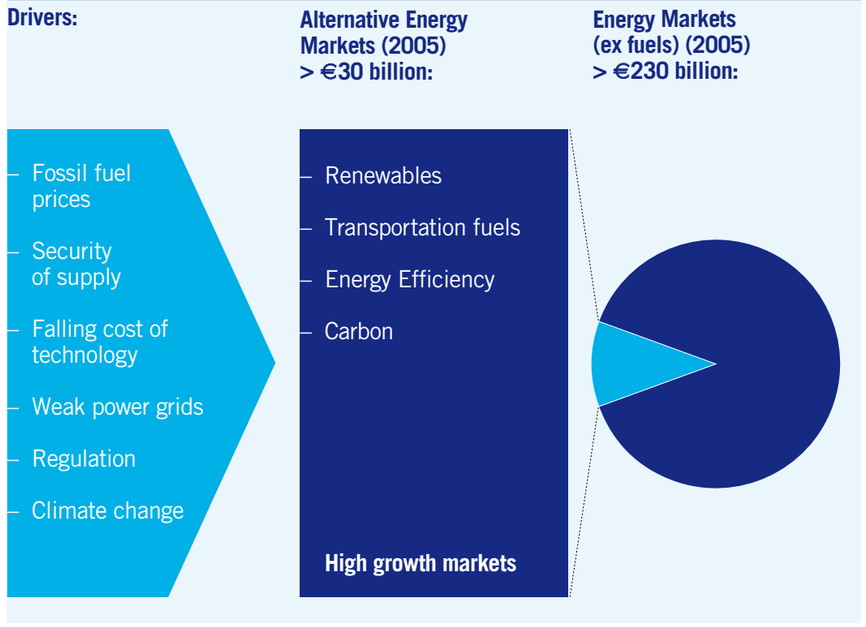
[1] In order to be focused and succinct, the Report does not address other investment opportunities that may be enhanced as a direct or indirect consequence of climate change, for example flood defence, water treatment or new sub-sectors within the agricultural or tourism sectors.

02 Market Overview

2.1 MARKET SIZE AND GROWTH

Alternative Energy Markets are already large and growing rapidly. The chart below provides an overview.

Market overview



Source: Frost & Sullivan; Impax analysis.

Aggregate revenues of equipment and services across the four Markets are at least €30 billion per annum. For example:

- the market for wind turbines was ca. €11 billion in 2005; and
- the market for solar panels and related equipment was ca. €9 billion in 2005.

In contrast, the aggregate annual revenues of equipment and services in the conventional energy sector are of the order of €200 billion.

Revenues in the conventional energy sector are growing at 2–3% per annum, i.e. broadly in line with GDP growth. However, revenues in the Sector are growing much more rapidly, for example:

- since 2000, the market for wind turbines has been growing at between 20% and 25% per annum; and
- since 2000, the market for solar panels has been growing in excess of 30% per annum.

If these growth rates are sustained, the sector's share of global energy markets should expand quickly.

2.2 MARKET DRIVERS

Growth of these markets is underpinned by a series of fundamental drivers. While policy linked to climate change is important, there are several other factors to consider, and the overall 'landscape' is complex.

> Rising costs of conventional energy sources

While there remain significant reserves of traditional fossil fuels, especially coal, and of unconventional hydrocarbons, for example tar sands, the demand for energy is currently putting pressure on spare production capacity. Higher fuel prices improve the competitiveness of Alternative Energy, for example by reducing the payback period of energy efficiency investments.

> Security of supply concerns

The concentration of fossil fuel reserves in areas of political instability has increasingly caused concern for policy makers. Against this backdrop, many renewable technologies can facilitate power generation using local resources, so improving the security of energy supply. This issue is particularly acute in the UK as it moves from being a net exporter of energy to a net importer as a consequence of the depletion of the North Sea oil and gas reserves.

> Falling costs of alternative energy sources

The relative costs of many forms of renewable energy are falling as their markets mature. Economies of scale and the availability of reliable technologies are driving down installation and operating costs.

> Weakness of electricity transmission and distribution

Demand for reliable power to support the digital economy is rising at a time of under-investment in the power grid. New technologies are providing solutions.

> Regulatory willingness to intervene

In response to these drivers (including climate change), regulators continue to intervene in the market. The Kyoto Protocol, which has been ratified by a majority of OECD member states, provides a framework for more focused legislation, which is considered in more detail in Section 3 overleaf.

2.3 MARKET PARTICIPANTS

The size and rapid growth of Alternative Energy Markets has attracted a wide array of companies, including smaller private and public companies, larger diversified companies, single purpose projects and utilities. A particularly interesting example is General Electric (www.ge.com), which has built up an alternative energy business generating ca. US$4 billion of revenues in 2005.

03 Alternative Energy Markets

This Section provides an overview of the four key Alternative Energy Markets: renewables; transportation and fuels; energy efficiency; and carbon.

3.1 RENEWABLES

Energy sources that are not limited in the near to medium term offer significant potential for reducing carbon emissions by displacing conventional fuels. The box on the opposite page provides an overview of the main technologies for generating renewable power and heat.

Renewable power markets have the following key characteristics:

> Technologies are increasingly reliable

Wind, hydro, solar and some biomass conversion technologies are mature and backed by large companies, which are able to significantly reduce technical risk for their customers. In contrast, wave and tidal technologies are still under development.

> Projects are relatively small

Unlike power plants based on conventional energy, which can generate several thousand Megawatts (MW)[2] on a single site, renewable energy projects are typically smaller: a 150MW onshore wind farm would be considered 'large', while a 1MW solar array would occupy around 7,000 square metres.

> Costs are falling and becoming competitive

As technology improves and larger projects are developed, the cost of renewable power is falling. For example, the cost of wind power has fallen 80 percent in the past 20 years and, under certain conditions, is now competitive with conventional power. The full cost of generation must of course take into account the connection to an electricity grid of suitable capacity.

> Matching power output to grid requirements is key

To attract the best price, renewable power must be compatible with the load profile of the electricity grid. Wind power, which has a low level of predictability, may be less valuable than the equivalent capacity of biomass power, which can be switched on or off to match demand.

The box on the opposite page provides a comparison of the principal renewable power technologies.[3]

Renewable Type	Technology	Global Resource	Predictability	Economics
Hydro	● ● ●	● ●	● ● ●	● ● ●
Wind	● ●	● ● ●	●	● ●
Wave	●	● ● ●	●	
Tidal	●	● ●	● ●	
Biomass	● ●	● ● ●	● ● ●	●
Solar PV	● ●	● ● ●	● ●	●
Geothermal	● ● ●	● ●	● ● ●	● ●

[2] A Megawatt is a measure of power. A power station with an output of 1MW, operating continuously, would, in theory, be able to provide ca. 1500–1800 households with electricity (in the developed world).
[3] In the table, one dot means 'low,' 'weak' or 'unfavourable'; three dots means 'high' etc.

>> TECHNOLOGIES FOR RENEWABLES

Hydro

Currently the largest source of renewable power. Large scale projects can generate predictably at over 1,000MW for 50 years or more. The Three Gorges dam in China will generate over 18,000MW. Significant potential remains for small and micro-scale hydro.

Wind

A single wind turbine can generate up to 5MW of power. Wind farms (arrays of turbines) are now being built offshore, where economies of scale are potentially greater and planning constraints are typically lower than for onshore projects.

Wave

Potentially one of the largest energy resources. However, developing cost-effective, reliable technology that can survive in the extreme marine environment has proven difficult. In 2006, the first commercial scale wave devices are being tested.

Tidal

Also a large potential source of predictable energy without a proven technology. Installation of devices in areas of strong current is particularly challenging.

Biomass

Can produce energy through proven combustion processes or using advanced technology such as gasification or pyrolysis. However, biomass has a lower energy density than fossil fuels, and access to adequate quantities of feedstock can be a barrier to commercialisation.

Solar PV

Panels traditionally made with silicon, which releases electrons (i.e. electricity) when exposed to sunlight. The cost and availability of silicon are currently problematic. Alternative materials may generate at lower costs but most have disadvantages.

Solar Thermal

Solar energy is collected to provide heat, which is typically transferred to a water tank using a heat exchanger. This is proven technology that is already economic without subsidy in low-latitude countries.

Geothermal

Some geological formations trap heat that can be tapped directly to provide large-scale heating. In addition, the low-level heat of the ground may be harnessed with heat pumps for domestic scale heating. Both are highly predictable energy sources (though with limited potential in much of Western Europe).

3.2 TRANSPORT & TRANSPORTATION FUEL

Designing vehicles to run on clean fuels is not new: Henry Ford originally anticipated the Model T would run on bio-ethanol. However, today the vast majority of vehicles are powered by fossil fuels, and over 25% of the carbon emissions in the European Union arise in the transportation sector.

New markets are developing in three broad areas:

> Alternative Fuels

Low-carbon fuels can lead to significant reductions in CO_2 emissions. Natural gas (methane) has been used for several decades in larger vehicles such as buses or trucks. More recently, biofuels such as bioethanol and biodiesel have started to gain market share, driven predominantly by legislative targets. A particular advantage of biofuels is that they can be blended with standard fossil fuels with only limited engine modifications.

> Improvements in Existing Engines

Incremental design changes continue to improve the efficiency of the internal combustion engine. In the last few years, 'hybrid' engines that employ energy saving technology, e.g. regenerative braking and variable-value timing, have been adopted by mass market vehicles, e.g. the Toyota Prius.

> New Drive Trains

In the longer term, markets may develop for entirely new types of 'engine'. Significant investment is being made in drive trains based on fuel cell technology. Fuel cells convert hydrogen, methane or other gases into electricity with little or no local pollution. However, their high cost and low reliability currently prevent them being commercially viable in the transportation sector. Furthermore, the infrastructure for distributing transportation fuels is not capable of delivering hydrogen without substantial, expensive modification.

The box on the opposite page describes the principal clean fuels in the transportation sector while the table below provides a comparison of 'alternative energy' innovations in transport.[4]

Transport Option	Technology	CO_2 Reduction	Infrastructure	Economics
Bioethanol/biodiesel	● ● ●	●	● ● ●	● ●
Advanced biofuels	●	● ● ●	● ● ●	●
Pyrolysis/gasification	●	● ●	● ●	●
Hybrids	● ● ●	●	● ● ●	● ●
Hydrogen	●	● ●		●

[4] In the table, one dot means 'low,' 'weak' or 'unfavourable'; three dots means 'high' etc.

>> TRANSPORTATION FUELS

Bioethanol

Alcohol produced by fermentation of sugars may be mixed with petrol or used alone in modified petrol engines. Suitable feedstocks are agricultural crops (e.g. corn, sugar beet) in temperate regions and sugar cane in the tropics.

Advanced Bioethanol

Cellulose in woody plant matter may be broken into fermentable sugars by heating or applying specialised enzymes. In this way, a high proportion of the energy in the biomass is used, and ethanol yields can be more than doubled without competing with food uses.

Biodiesel

Vegetable oils may be used directly in diesel engines, and performance is improved if the oil is processed further (trans-esterification). Normal agricultural crops include oil seed rape, sunflower and oil palm (in the tropics).

Pyrolysis

Organic matter burned with limited oxygen yields a range of solid, liquid and gaseous fuels. Pyrolysis may be used to concentrate the energy content of biomass for transportation to larger processing facilities.

Gasification

As an extension of pyrolysis, biomass can be turned into a combustible gas, which can be burned directly or converted to high quality liquid fuels. In many cases these synthetic fuels are more efficient than the fossil fuels they can replace.

Hydrogen

Hydrogen, which produces no pollution when burned directly, is best thought of as an energy carrier rather than a fuel. It is produced (using energy) either through electrolysis of water or as a by-product of a number of chemical processes.

3.3 ENERGY EFFICIENCY

With high and potentially rising fossil fuel prices, energy consumers have strong incentives to make investments in products and services that can reduce their energy usage. Five areas are of particular interest:

> Process and flow control
The industrial sector is used to reducing costs by investing in energy efficiency measures. According to the International Energy Agency, between 2005 and 2020, efficiency measures could turn an estimated 18% rise in global industrial energy consumption into an 8% fall.

> Insulation
Wall, cylinder and pipe insulation can reduce the energy required for space and water heating dramatically. In many countries, low levels of thermal energy loss are a standard requirement in building design.

> Monitoring
Lights that switch themselves off when there is no demand for lighting and simple thermostats to regulate domestic heating can save energy. Smart electricity meters that facilitate variable customer pricing are already supplying established markets in many countries.

> Co-generation
Using the heat produced during electricity generation is often a 'quick win' in improving energy efficiency. However, heat must be utilised locally, so generation must be near a commercially viable heat load.

> Alternative design
Improved technologies can deliver the energy services consumers require with lower energy requirements. For example – in 2003 and 2004 the State of California distributed tens of millions of compact fluorescent tubes, each of which reduced power consumption by 75%. In addition, there is growing investor interest in the energy efficiency characteristics of property.

3.4 CARBON

While the markets described in the previous sections are based on tangible products and services, carbon trading is a derivative market underpinned by the Kyoto Protocol.

Currently, the most significant carbon market is the European Emissions Trading Scheme (EU–ETS), which has established a market for permits to release CO_2 into the atmosphere. Other countries and regions are considering establishing additional markets.

Under the EU–ETS, larger companies in certain industries have received both a legally binding 'cap' on their CO_2 emissions plus an allocation of permits to emit CO_2; they are free to trade these permits. Investment opportunities arising from this scheme include:

> Generation of further emissions reduction credits
The Kyoto Protocol also provides for the recognition of carbon savings by one country as a result of investment in appropriate projects in another country. The developers of projects in developing countries can augment their income by selling their carbon credits into the EU–ETS.

> Carbon trading and services
The new carbon markets provide business opportunities for traders, market makers and consultants to verify that carbon benefits have been correctly established and documented.

> Carbon sequestration
Involves pumping carbon dioxide under pressure into the underground geological features that previously stored oil and gas. After a number of years, it is expected that the CO_2 will be structurally absorbed into the surrounding rock. A small number of test sites are experimenting with carbon sequestration today to establish viability.

04 Analysing the Business Model

The previous section described the wide spectrum of Alternative Energy Markets, most of which are experiencing sustained high growth rates. For investors to profit by committing capital to these markets, they must understand the features of the business models that are particular to the Sector.

Three key business models are discussed in this section:

- businesses based on the development of a new technology;
- projects that use technology to generate clean energy and/or energy savings; and
- service businesses within Alternative Energy Markets.

CASE STUDY:
VESTAS WIND SYSTEMS A/S

- Vestas started to manufacture wind turbines in 1979 in Denmark and has been one of the largest suppliers to the wind industry ever since.
- Since its stock market flotation in 1998, the company has grown rapidly, particularly on the back of strong demand in Germany and the United States.
- Vestas' first commercial turbines delivered a maximum of 55kW of power and were designed for onshore use only. Today, the company is supplying machines generating up to 4.5MW and is a pioneer in the development of turbines suitable for offshore environments.
- Between 1998 and 2006, Vestas' market capitalization has grown from ca. DKK 1.3 billion (€100 million) to DKK 30 billion (€4 billion) and its share price has increased at an annualised growth rate of ca. 27% (although it has been volatile over this period).

4.1 TECHNOLOGY DEVELOPMENT

New technology is at the heart of many of the investment opportunities in the Sector. When analysing companies that are developing technology, investors should pay particular attention to:

- The protection of the firm's **intellectual property ('IP')**. As with many technology-based businesses, competitors may be able to replicate or circumvent weak IP.
- The **core value proposition** of the business once the technology has been developed, including its price points, expected gross and net margins, and its competitive advantage. Many energy-based products and services are commodities, and it may be impossible for an entrant to establish and maintain attractive levels of profit.
- The likely **return on the capital** required to reach the target functionality. Developing a new energy technology can require several hundred million euros of investment. Investors at different stages in the development of these businesses may realise widely different returns.
- The **management team's track record** in developing similar businesses Management must have sufficient understanding of energy markets but not be driven by a 'utility mindset' and be able to generate profits from assets that may be little more than intellectual property.

4.2 PROJECT DEVELOPMENT & OWNERSHIP

Large scale delivery of Alternative Energy products and services can be through projects, either in the private or public sectors. The three phases of a project's life are:

> Development
A relatively high risk phase where the developer confirms the commercial proposition, secures the necessary permits (including use of land and environmental permits), and negotiates contracts for construction and operation of the plant and for the sale of power or other end products. Finally, the developer must secure construction finance on terms that make the project viable. A project may take up to five years to develop, and many development initiatives fail.

> Construction
With a lower risk of failure than in the development phase, the contractor takes responsibility for building the plant on time and to specification. Construction should last between six months (for a small wind farm) and two years (for a biomass-fuelled power plant).

> Operation
The plant should operate for up to 25 years (or even longer). A third party operator is usually responsible for maintaining a prescribed level of plant performance. This should be the lowest risk phase.

Project success is a function of several factors, particularly:

- The scale and quality of the **underlying resource** to be exploited (the amount of landfill gas produced, for example, or the water flow rate for a hydro project);
- The **reliability of the technology** applied to the resource;
- The **terms of the contracts** drawn up to govern the different aspects of the project and especially the degree to which they accurately allocate the risks and returns among the contracting parties; and
- The strength of the **project's stakeholders**.

Successful investing in projects requires an expert understanding of these issues plus a detailed analysis of the investment's cashflow.

CASE STUDY:
CANADIAN HYDRO DEVELOPERS INC.

- Canadian Hydro Developers (CHD) is a developer, owner and operator of power plants based in Canada utilising wind, hydro and biomass power.
- Currently, the company operates 18 facilities and has an ownership interest in a net 230MW of power generation capacity.
- CHD's business model is to raise capital which it then deploys to fund (a) project development and (b) equity stakes in those projects that have been successfully developed.
- Listed on the stock market since 1990, the company therefore offers investors exposure to all three 'phases' of a project.
- Over the past 6 years, CHD's share price has grown at ca. 18% per annum and its market capitalisation is currently C$610 million (€425 million).

4.3 SERVICES

The rapid growth of the Alternative Energy Sector has already stimulated the development of a broad range of related service businesses. Many of these, such as financial services and consultancy, are familiar from other sectors of the economy. Others, such as Carbon Trading, are specific to the Sector itself.

The analysis of these service businesses is in many ways similar to that in other sectors:

> Market Analysis
In a rapidly evolving Sector, an understanding of the regulatory issues and fundamental economics is essential. For example, demand for consultants to map wind resources has recently been sensitive to the timing of tax credit legislation supporting wind farm operation in the United States.

> Company Strategy
The Sector is complex and already highly competitive. For example, new companies offering energy efficiency services must expect incumbent utilities to use their customer bases to compete aggressively. Many service-oriented businesses, for example consultancies, may be unable to scale up their operations.

> Management Team
To execute strategy successfully, management must typically apply an entrepreneurial approach to penetrating a slow moving incumbent sector.

> Financial Issues
Margin targeting, balance sheet structure and cash flow management are critical (as they are in most companies). Service businesses in the Sector, for example companies operating power plant may require only a limited balance sheet, and, as a consequence, achieve high return on capital employed.

CASE STUDY:
CHLORIDE GROUP PLC

- Founded over 100 years ago, Chloride initially built a global presence in battery manufacturing and supply. Recently, however, the company has reoriented its business towards power management solutions for industrial customers.
- Chloride's market is expanding rapidly as industrial electricity consumers realise the economic value of power quality for critical operations such as manufacturing, Chloride Group plc continues to sell products (such as back-up power systems, advanced switches and software) into this market, but is increasingly offering services based on remote monitoring and diagnostic services to support customers' power management in real time.
- Over the past four years, Chloride's share price has grown at a compound average of 14.5% per annum, and its market capitalisation is currently ca. £275 million (€410 million).

05 Opportunities for Investors

Successful investment in the Alternative Energy Sector requires an in-depth understanding of the markets and business opportunities. This section summarises the principal types of investment that can provide exposure to the Sector, namely direct investments and funds.

Investors are encouraged to review these opportunities with their advisers.

5.1 DIRECT INVESTMENTS

Opportunities for direct investment can be categorised as:

> Quoted securities

Most large power companies and many large, diversified industrial companies have some exposure to the Sector. In addition, there are over 200 'pure play' smaller companies whose principal business is in the Sector. There is good quality third party research on many of these opportunities.

> Private companies

Many institutional investors will avoid direct investment into private companies. However, for those able to undertake (or review) the necessary due diligence material and mitigate the wide set of risks, returns may be attractive. In particular, when the Sector's prospects appear bright, private companies have been able to realise profitable exits for their investors through initial public offerings or trade sales.

> Projects

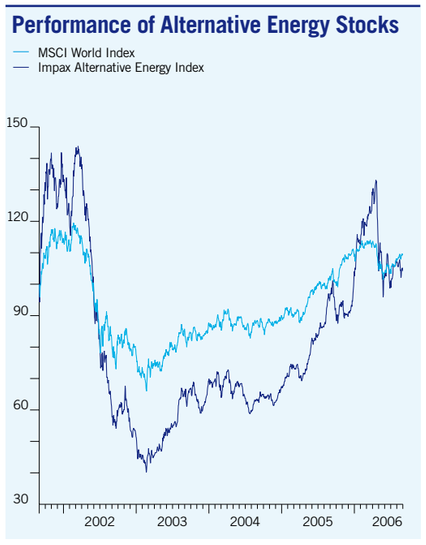
Investment directly into power generation assets (or similar) is also a specialised activity that many institutional investors would seek to subcontract. Although the cash generated by projects may map well onto a pension fund's liability profile, it can be particularly difficult to effect an exit that preserves or enhances value.

> Property

Many institutional investors have wide experience of direct investment in property. Although not typically 'alternative energy' investments in their own right, many property investment opportunities are increasingly influenced by the building's expected energy consumption (which forms part of the operating cost). Some larger properties may generate their own heat (and possibly electricity), for example through gas-fired boilers or solar panels.

The graph below shows the performance of a basket of 80 Alternative Energy stocks over the past five years compared to the MSCI World Index. During late 2001 and 2002, the Sector was hit by collapsing equity markets and a significant drop in industrial capital expenditure. However, over the past three years, alternative energy stocks have recovered strongly, partly in response to the strengthening of drivers described in Section 2.

Performance of Alternative Energy Stocks



Source: Thomson Datastream

5.2 FUNDS

Focused funds that follow an investment strategy within the Alternative Energy Sector are likely to develop significantly. In principle, such funds offer several advantages including specialised investment manager expertise, economies of scale and diversification of risk. However, investors must take into account a fund's expenses (including management fees) in assessing likely investment performance.

5.3 INVESTMENT RISKS

No overview of an investment opportunity is complete without a comment on risk. Conceptually, risk analysis in the Alternative Energy Sector is no different to risk analysis of investment securities of companies active in any other area of the economy. However, there are several sector-specific risks, for example:

> Energy and environmental policy

Many of the markets described above are dependent to some degree on regulations, financial incentives and/or penalties imposed by governments to 'level the playing field' between conventional energy and alternative energy markets. If such policies were to be diluted or removed, investments in the Sector may suffer.

> Industrial capital spending

Markets need customers! A significant percentage of the investment and expenditure in the energy sector is driven by the private sector companies, particularly utilities, which are exposed to the 'business cycle.' In an economic downturn, such companies are likely to cut back on their investment in the Sector.

> Fossil fuel prices

In seeking to replace conventional energy, Alternative Energy products and services may experience reduced sales if the price of oil, gas and/or coal fall. Markets with legally binding targets (such as the renewable energy market in Europe) or that provide savings or 'value added' independent of fossil fuel prices (such as smart electricity meters) may have minimal risk in this area.

A comprehensive review of risk is outside the scope of this Report. Financial advisers (including pension fund consultants) and specialist investment managers can provide further information.

06 Conclusion

The aim of this Report has been to broaden the context of investment in a world economy that is increasingly threatened by climate change. By examining the Alternative Energy Sector, it has sought to demonstrate that, while acting defensively to mitigate the risks of climate change, investors seeking to maximise their returns may also benefit from the new investment opportunities that are likely to develop, in part as governments implement climate change-related policy.

There are of course many risks for investors who commit capital to exploit these opportunities. There is no guarantee that the Sector will develop in line with current expectations, particularly if policy makers choose to limit legislative support for Alternative Energy Markets, and/or if the price of fossil fuels remains relatively low. Even if these 'macro risks' are unrealised, there are still many 'stock-specific' reasons why a particular investment may fail to meet expectations.

However, in fulfilling their fiduciary duty not just to understand the risks faced by their portfolio but also to pursue attractive risk-adjusted returns, institutional investors should consider being pro-active in reviewing and possibly committing capital to new opportunities such as those in the Alternative Energy Sector.

About Impax Asset Management Ltd.
Impax Asset Management Ltd. (IAM) is an investment manager focused on the management of portfolios of quoted and unquoted companies within the environmental markets sector, particularly alternative energy, waste management and water treatment. IAM, which is authorised and regulated by the Financial Services Authority, is a subsidiary of Impax Group plc, which is quoted on the Alternative Investment Market of the London Stock Exchange.

As of September 2006, IAM is investment manager or adviser to over £400 million (€600 million) of funds on behalf of more than 100 institutional investors. IAM's largest funds are Impax Environmental Markets plc, which invests in quoted companies and 'late stage' private companies active in environmental markets, and Impax New Energy Investors LP, a private equity fund sponsored by Impax and Dexia Crédit Local which targets investments in projects in the renewable energy and related sectors, predominantly in Western Europe.

For more information, please visit:
www.impax.co.uk
email info@impax.co.uk.

IMPAX Asset Management

About the Institutional Investors Group on Climate Change (IIGCC)
The IIGCC is a forum for collaboration between asset owners and asset managers which was established to address the investment risks and opportunities associated with climate change.
It seeks to: (a) provide members with the knowledge and tools to assess the investment implications of climate change on the assets they own in order to preserve and enhance their value; (b) encourage investors to manage the investment implications of climate change and to integrate climate risk into investment analysis; and (c) advocate public policy and market solutions that ensure an orderly and efficient transition to a secure climate system which is consistent with long-term investment objectives.

Since 2005, IIGCC has been run as a semi-autonomous programme of The Climate Group (TCG), an NGO dedicated to identifying and supporting corporate and government leaders who are acting to reduce the risks of climate change. The IIGCC is governed by a Steering Committee of its members, with day-to-day management carried out by TCG according to a Memorandum of Understanding.

For more information, please visit:
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IIGCC
Institutional Investors Group on Climate Change

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