

## WATER, ALTERNATIVE ENERGY AND CLIMATE CHANGE - ENVIRONMENTAL INVESTMENT STRATEGIES

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Climate Change in its various manifestations is the most important environmental challenge of the 21st century. As the Intergovernmental Panel on Climate Change stated (IPCC); "Warming of the climate system is unequivocal, as it is now evident from observations of increases in global average air and ocean temperatures, widespread melting of snow and ice, and rising global average sea level." <sup>1</sup>As well as a pressing environmental - and even moral - issue, it is inherently a business one. Climate change can pose significant physical, regulatory, litigious and competitive risks for companies and these risks have become embedded, to a greater or lesser extent, in every investment portfolio. Savvy investors can endeavour to insulate their global portfolios by assessing the extent to which their investments are exposed to these risks and positioning their portfolios accordingly for the emerging low-carbon economy.

Climate change poses risks to companies, to a lesser or greater degree depending on the sectors in which they operate, but it also presents opportunities - astute companies are already taking advantage of new technologies, products and services and investors are increasingly seeking out these companies and integrating this theme in their portfolios. Renewable energy, clean technology, energy efficiency and carbon emissions trading are the most obvious examples of these opportunities, but, the climate change issue is also creating challenges and opportunities for investors in related themes such as water and agribusiness.

Innovative solutions to the challenges of climate change will provide significant opportunities to astute investors for years to come. The themes of energy efficiency and renewable energy in particular are supported by strong long term secular trends:

- Energy efficiency by the end user has a multiplier effect in relation to the original power source. Every 1 unit of energy saved at home or business represents up to 4 units saved at the power plant.<sup>2</sup>
- Approximately 2/3 of the projected Co2 emissions reductions by the year 2030 are predicted to come from energy efficiency.<sup>3</sup>
- The International Energy Agency predicts that renewable energy's share of electricity production will grow from the 2005 level of 3.6% to approximately 30% over the next 30 years.<sup>4</sup>
- Renewable energy costs have fallen considerably and are expected to continue to fall. Solar and Wind power in particular are expected to have continued significant reductions in cost through 2020.<sup>5</sup>

Water is also a significant theme, as climate change is one factor among several impacting the availability of water globally. In order to meet global water needs, there needs to be a significant investment in infrastructure over the next 20 years. Capital expenditures to meet the need for fresh

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water are estimated to be greater than \$1 trillion globally by the year 2025, with significant expenditures in the developing world in Asia (>\$600 billion) as well as over \$200 billion each in Europe and North America.<sup>6</sup>

This paper will focus on effectively constructing a diversified portfolio of stocks that are providing innovative solutions to the multitude of challenges related to climate change. While the focus will be on climate change specifically, the framework is equally applicable to other sustainable thematic funds such as those that focus exclusively on water or alternative energy. Given the nascent stage that companies and emerging industries reside, portfolio construction provides unique challenges. Traditional measures of portfolio risk and return that rely on historical data are less effective due to the short history of data for these industries, the changing and developing nature of risk going forward and the lack of a properly representative benchmark. Nevertheless, sound, fundamental and quantitative based portfolio construction techniques that rely on diversification and superior insights into the long term prospects for themes and individual stocks can provide a robust investment framework and ultimately a sound, well constructed portfolio.

**Portfolio Construction – A Hybrid Approach**

The portfolio construction framework for a climate change strategy can be an artful blend of fundamental investment insights with the philosophical grounding of quantitative portfolio management techniques. Fundamental approaches have an advantage in the depth of knowledge and unique insights they provide on individual companies. Quantitative approaches have an advantage in their ability to evaluate a large number of stocks through their models and in their ability to manage risk through a disciplined portfolio construction framework.

This can be broadly viewed as a version of the concept of “Hybrid Approaches” described in a recent CFA Institute publication [Challenges in Quantitative Equity Management](#). Hybrid approaches combine elements traditionally associated individually with fundamental and quantitative equity portfolio management. The CFA Institute publication presents the observations of the authors based on conversations with asset managers, consultants and fund rating agencies and survey responses from 31 managers with a total of \$2,194 trillion in equity assets. While the overall purpose of the publication was to assess trends in quantitative equity management, one trend identified was that fundamental managers are using quantitative tools and techniques to build portfolios in a manner that can be described as hybrid approaches. Specifically, fundamental managers use screening techniques to narrow the opportunity set for stocks selection. Additionally, the authors point out that firms moving toward a hybrid process see higher alpha potential but more volatility in a fundamental approach and see a quantitative portfolio construction discipline as a means to better manage volatility.<sup>7</sup>

A hybrid approach to managing a climate change portfolio will rely primarily on fundamental insights to select stocks, but also will use them to help guide the construction of the universe of stocks that will serve as both the opportunity set for investment and as the benchmark for discipline portfolio construction process. Given the emerging nature of climate change opportunities, traditional quantitative techniques that rely on a long history of data and a well populated universe are not optimal for stock selection. Fundamental insights are preferable given the ability for specialist managers to develop insights on stocks of companies providing emerging solutions to the challenges of climate change.

Additionally, fundamental insights are also as a key component in establishing the universe of stocks for investment that will also serve as benchmark for a disciplined portfolio construction process that

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has been traditionally identified with quantitative managers. This is a strong point of differentiation between a Climate Change universe and that of other 'traditional' benchmarks.' Traditional approaches to index development generally will not reflect the scope of opportunity in climate change solutions as the traditional method of capitalisation weighting index constituents would put dominant weights on larger cap stocks and skew the benchmark away from smaller and mid cap companies who may be providing significant solutions. Top down and bottom up fundamental insights can play a key role in identifying and weighting the prominent themes within climate change solutions that will be the key component in establishing the universe of stocks for investment. This is an important first step in the alpha generation process; identifying the major themes within climate change and weighting them in a manner that will help design an investment universe that is positioned to deliver strong returns to the overall theme of climate change. Additionally, it establishes a benchmark for portfolio construction that sets weights for the component themes (or sectors) of climate change and their constituent stocks that will guide portfolio construction to add value at a second level; selection of the best performing stocks within each theme.

Defining component themes or sectors, their constituents stocks and establishing strategic targets to each theme is an essential foundation for defining the investment universe as a de facto benchmark to guide portfolio construction. A specialist focus is essential in bringing together the top down and bottom up fundamental insights that are vital in the construction of a thematic universe such as climate change where innovation and new technologies are significant sources of alpha. Once established, identifying better relative value among themes/sectors and identifying undervalued stocks best positioned to provide long term leadership within sectors are the focus. Investing across a number of themes/sectors, within disciplined constraints for component themes and holdings can lead to an appropriately diversified portfolio that has the potential to deliver significant long term returns.

**Universe Construction**

The composition of the universe is a critical first step in determining the alpha potential for a climate change portfolio. It needs to broadly reflect the factors and sources of greenhouse gasses, the thematic areas where solutions lie and the companies that compose each theme. By focusing on the dominant themes that are driving climate change solutions, you are creating a universe and framework that is positioned to deliver the dominant returns to the climate change theme over the long term.

Fundamental insights from both a top down and bottom up perspective are essential to constructing the universe. Top down analysis provides insights on the macro thematic drivers to climate change solutions. Bottom up analysis provides insights on emerging technologies and innovations that may be early signs of developing long term trends within component themes. Bottom up analysis is also useful in determining each theme's constituent companies, focusing primarily on pure plays, but also on diversified companies that are leaders within each theme.

A traditional capitalisation weighted methodology for index construction will skew the universe toward large capitalisation stocks and not be fully reflective of the power of the theme. Many of the companies that are and will be providing solutions to climate change are mid and small cap stocks and the universe needs to reflect this if investors are to fully benefit from the theme.

*Identification and weighting of themes*

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Since the objective is to benefit from companies that provide long term solutions, services and products that reduce greenhouse gas emissions, the first step is to identify the dominant themes within climate change solutions in which those companies lie. These component themes of climate change and their respective weights should reflect the sources of greenhouse gas emissions, the potential solutions to the reduction of greenhouse gasses and their role as a long term driver of investment returns. Power generation and the use of energy are the dominant components of greenhouse gas emissions. Hence energy generation solutions using alternative energy, clean energy and transition technologies within clean energy will be a dominant component of the universe. Similarly, given that energy efficiency is equally significant, companies that provide solutions to how we use this energy and how we can improve on energy efficiency will also be a significant component of the universe. This covers areas such as lighting and variable heating and variable speed drives and motors. Water is another significant theme, as climate change is and will exacerbate the need for new infrastructure to meet the ever growing demand for water. The remainder of the universe at present can focus on other themes such as waste management (recycling and materials) and carbon trading.

KBCAM currently gives dominant long term weights to clean energy (35%) and energy efficiency (30%), reflecting their essential role in greenhouse gas reductions. Water will be weighted somewhat less at 15%, but still reflective of the long term return opportunities from the anticipated large scale investment in water infrastructure globally. Finally, waste management is given a 10% weight in the universe reflecting its relative long term contribution as is carbon trading given the relatively early stage in which it currently resides within greenhouse gas reduction mechanisms.

The weighting process uses fundamental insights to create universe sector weights that are most representative of the climate change solutions and themes. These insights need to be regularly reviewed and challenged to identify emerging trends in new technologies and their contribution to climate change solutions. This can provide a challenge for traditional asset managers who, while solidly grounded in financial expertise, lack the scientific and industry specific knowledge to identify these trends in their earliest stages. Specialized focus in investment management of environmental portfolios and access to external scientific advice are essential to remaining on the cutting edge of emerging technologies and accelerating themes.

*Identification and Weighting of Companies*

Once the component themes of the climate change portfolio are specified and their weight in the universe determined, the stocks that make up each component theme can be identified.

Fundamental insights help identify two types of companies within each theme:

1. Pure Plays- Companies whose primary focus is on a product or service with an orientation toward climate change mitigation.
2. Market Leaders – Diversified companies who are market leaders within a particular climate change component theme.

Using revenues as a basis for identifying each type of stock is a basic yet efficient means of identifying companies. Pure plays should receive the majority of their revenues from climate change mitigation and be the dominant part of the universe. Market leaders are diversified companies that receive a meaningful level of total company revenues from climate change solutions and rank among the leaders in revenues in the particular area of climate change in which they operate. Including both

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categories of stocks enables primary exposure to companies that are directly focused on climate change solutions while also gaining exposure to larger, diversified companies that are dominating a particular area of solution.

Once the companies are identified their weight can be determined. As of June 2008, KBCAM has identified a climate change universe encompassing approximately 300 companies. To weight each company, the overall weight of the respective component theme is the essential reference point. All the stocks that make up the particular theme are aggregated and weighted in proportion to their capitalisation in a manner in which their total weight will equal the weight of the component theme in the climate change universe. By assigning a weight to each theme we are overcoming the issue of market cap bias that would overstate or understate the weighting of various themes; e.g. carbon trading would be understated on a market cap basis relative to its importance to the overall climate change theme. It is also important to note that there is still market cap bias within each theme/sector that needs to be addressed by means of a weighting limit or other consideration. Take for example the water theme - a weighting system that is calculated on market cap basis would have given Suez (a large diversified French utility which provides water and waste management solutions through its subsidiary Suez Environment) with a market capitalization of \$51 billion a weighting of over 20% within the water theme.<sup>8</sup> This would come at the expense of those up and coming companies whose innovation and new technologies would otherwise go largely underrepresented.

In summary, optimal universe construction is borne out of a hybrid quantitative and fundamental process, offering broad exposure to the underlying themes related to climate change. It addresses the limitations of a market capitalisation derived universe and emphasizes exposure to predominant themes that will drive long term returns within the overall theme of climate change.

**Portfolio Construction**

Having established the universe of securities that is positioned to benefit from the overall theme of climate change solutions, we have also established a benchmark from which to construct portfolios and add value at the second level- stock selection. The primary objective is to identify the companies that are best positioned to outperform within each component theme. Secondly, a broad risk management framework can be established to assure an appropriate level of diversification, gauge active positions and manage variances from long term weighting of the themes.

*Stock Selection - Process and Considerations*

Once themes have been identified, research effort should be focused on finding the best stocks which harness the potential within each theme. Stock selection is focused on using fundamental analysis to identify superior companies that are best positioned relative to competitors and then buying such companies at prices which represent a discount to fair value.

In identifying the best stocks within these themes it is important to look beyond near term noise to analyse the longer term prospects of the business based on climate change solutions and financial drivers. Superior companies can be identified in terms of analysis of their positioning in relation to a broad array of criteria:

- **Sector Analysis**

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- Life cycle of sector
- Structure of value chain
- **Company Analysis**
  - Life Cycle of company
  - Structure & quality of management
  - Product & services range
  - Positioning in value chain
  - Strategic positioning and vision
- **Financials**
  - Balance Sheet
  - Access to capital
  - Earnings Growth
  - Profitability
- **Valuation**
  - FCF Models
  - Sum of Parts
  - 12mth FW PE
  - EV/EBITDA
- **Price Targets**

Much of the analysis mirrors sound fundamental approaches that are applied to selecting stocks in many sectors in the broad market with appropriate adaptation to the developing markets for climate change solutions. Evaluation of management, their long term strategy and their ability to execute are critical. The general health of the company's balance sheet and financial statements are assessed to confirm that it can generate a sustainable growth profile for the longer term. Analysis of the product mix, in terms of positioning in the sector/theme value chain, the demand supply gap and the barriers to entry for competition are sound components of fundamental analysis, and especially critical in companies within developing sectors/themes within climate change. Geographical exposure to the countries where maximum growth is expected, market share and pricing power are used to assess if the company can grow margins while increasing volumes.

Understanding where a company sits within the structure of the value chain<sup>9</sup> for a particular component theme is critical. For example, the photo voltaic solar value chain consists of the refinement of polysilicon to make wafers which are used to manufacture of cells for solar panels which are ultimately installed in businesses or residences. Key to this analysis is identifying where in the value chain pricing power and competitive advantages exist. Within photo voltaic solar value chain, polysilicon is the initial raw material required to make a solar panel and it remains the most complex and capital intensive process along the value chain. By comparison, solar installation and distribution is a straight forward process with little value added technology. There are currently just



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fewer than 10 silicon manufacturers worldwide (though this number is set to almost treble) enjoying EBIT margins of +30%, while there are hundreds of solar installers who typically generate modest margins (OP 3-5%).

Regulatory impact is a particularly critical component within a climate change portfolio, where incentives to reduce emissions through increased efficiency and adoption of renewable energy are critical determinants of potential demand. Analysis of changes in the regulatory environment across sectors, product types, countries and regions to assess the impact of regulation on a company's long and short term prospects are critical. A recent example are the solar companies which saw volatility around anticipated changes in German and Spanish feed in tariffs, which are tax rebates for implementing solar energy. At the same time opportunities continue to develop in other countries (Italy, France, Greece and South Korea in particular) that are providing government incentives for encouraging renewable energy.

Valuation is a multidimensional exercise conducted relative to the stocks own history and versus peers. Price targets are arrived at using multiple quantitative measures combined with sound fundamental judgement. Choice of methods will depend on the structure and business of the company utilizing methods of valuation such as discounted cash flow, sum of the parts and P/E sensitivity. More mature diversified companies with a varied mix of businesses will generally result in greater importance given to a sum of the parts valuation and other traditional metrics such as P/E, EV/EBITDA and P/B. Higher growth, early stage businesses where future cash flow assumptions can be reasonably arrived at, more importance is given to a discounted cash flow method.

Lastly, as environmental reporting becomes more prevalent, analyzing the emission footprint and related emission trading strategies will be able to be done with more precision. This will help to better project related costs while valuing the company, as carbon costs will continue to be an integral part of the cost structure analysis of companies.

*Portfolio Construction: Parameters to Manage Risk*

Portfolio construction parameters are designed to provide a *broad* risk management *framework* to assure some diversification within the primary objective of capturing long term returns. It is important to emphasise that this is a *framework* to guide construction of a portfolio whose primary objective is to generate superior long term returns from the fundamental insights into themes and stocks and not a tightly risk controlled portfolio. Nevertheless, techniques traditionally associated with quantitative portfolio management such as risk models and assessments of active weights of individual holdings can be broadly applied to help guide portfolio construction.

The climate change benchmark/universe has been constructed to assure exposure to the component themes that are positioned to deliver strong returns to the overall climate change theme. Portfolio construction wants to assure exposure to these primary themes while maintaining broad diversification across all component themes. While these themes are positioned to out-perform over the long term, over shorter periods there may be misvaluations between themes within climate change or more opportunities from a bottom up perspective for individual stocks in a particular theme. Consequently, given the opportunities to add value, broad guidelines for variance should be in place to assure flexibility to add value while assuring there is no over concentration in any one theme. A plus or minus 10% range around the long term weight of the constituent theme can allow this level of broad flexibility

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Risk models can provide a broad guide for tracking error targets to the climate change benchmark universe despite the less than precise ex ante measures of stock specific risk. Given the opportunity to capture active returns, tracking error targets should be wide and flexible. Again, given that the benchmark universe has already been positioned to benefit from the dominant themes within climate change, the tracking error of the portfolio to the benchmark universe should have stock selection as its primary source.

Fundamental insights into each stock determine the active weight of each stock in the portfolio. Active weight is a concept traditionally associated with quantitative managers that represents a stock's position in the portfolio relative to its neutral weight. A neutral assessment for each stock is represented by its weight in the climate change benchmark universe. While most fundamental investment processes can not evaluate the full breadth of the market universe as quantitative processes are able to do, in thematic strategies where the universe is more limited (approximately 300 stocks for the climate change universe) analysts and portfolio managers can better follow the vast majority of stocks in their universe. Analysts and portfolio managers use their fundamental insights to develop assessments of stocks and make judgements on the stocks weights in the portfolio, with higher conviction stocks receiving higher active weights. Broad position limits are designed to assure the ability to capture the fundamental insights of analysts while avoiding undue concentration in any one holding. Smaller cap stocks can have a tighter band around their neutral position reflective of their higher risk. Large cap stocks have wider active weights, but are constrained to avoid concentration in any one name.

Below is an example of broad risk management parameters that KBCAM has used to manage its thematic portfolios. The parameters are broad and reflective of the active nature of the strategy's objective, yet they nevertheless provide a useful framework to assure a level of diversification that avoids unwanted concentration in any component theme or individual holding.

<b>Tracking Error</b>	6-8 % vs. universe benchmark
<b>Sector/Theme</b>	+ or – 10% of the component theme
<b>Stocks:</b>	
With Market cap of less than Euro 1bn	+ or – 2% of neutral position
With Market cap of more than Euro 1bn	+ or – 4% of neutral position

### Conclusion

Innovative solutions to the challenges of climate change will provide significant opportunities to astute investors for years to come. Evolving development of themes and assessments of their contribution to climate change solutions will continue to be a major source of potential investment return. Identifying the stocks best positioned to deliver innovative solutions within each theme is a second means of delivering alpha. Fundamental insights combined with the creative use of quantitative techniques will continue to be essential components of analyzing and defining themes, establishing the investment benchmark universe and building diversified portfolios of stocks that are best positioned to deliver strong long term returns.



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**ENDNOTES**

<sup>1</sup> Intergovernmental Panel on Climate Change, Climate Change 2007: The Physical Science Basis, February 2007

<sup>2</sup> Tester, Drake, Driscoll, Golay, Peters, Sustainable Energy, Choosing Among Options, July 2005

<sup>3</sup> International Energy Agency, World Energy Outlook 2006

<sup>4</sup> Renewable Energy Policy Network for the 21<sup>st</sup> Century, Renewables Global Status Report 2006 Update

<sup>5</sup> United Nations Economic and Social Council, Renewable Energies to Support Sustainable Development in the UNECE Region, November 2002

<sup>6</sup> Gartwaite, Curtis, Water, Credit Suisse Global Equity, June 2007

<sup>7</sup> Frank J. Fabozzi, CFA, Sergio M. Focardi, Caroline Jonas, Challenges in Quantitative Equity Management, Research Foundation of CFA Institute, April 2008

<sup>8</sup> The description of Suez and its market capitalization are reflective of its business prior to its merger with Gaz De France which became effective on July 22, 2008.

<sup>9</sup> The structure of the value chain refers to the stages within a component theme from the refining of raw materials for the products to the manufacture of component parts to assembly of the product and finally to distribution and installation.

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