

**DEVELOPING A CLIMATE LEADERS INVESTMENT FUND**

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ON THE WEB AT [HTTP://FIESTA.BREN.UCSB.EDU /~CLIMATE/](http://fiesta.bren.ucsb.edu/~climate/)

**Overview**

- Climate change present significant risks and opportunities to business, but few financial products incorporate evaluation of these risks.
- We constructed a portfolio of “Climate Leaders,” and analyzed its returns to determine whether such a product could be attractive to investors.
- Our results indicate that our investment strategy can produce returns equal to those of the market – and in some cases, higher returns for the same level of risk.

**INTRODUCTION**

Climate change poses substantial material risks to business. Investors have begun to recognize these risks and demand investment products that are designed to address and mitigate them. Our project examined whether returns on investment could be affected by a climate-focused investment strategy. We tested the performance of an equity fund that selects companies based solely on climate change-related criteria. We tested the relative volatility of the fund – the portfolio Beta – to measure its relative risk and infer whether it over- or underperformed the market (the portfolio Alpha). We interpreted our results in the context of a potential link between superior performance in climate change policy, and superior stock returns.

**BACKGROUND AND SIGNIFICANCE**

The importance of global climate change lies not in the fact the climate is changing, but rather in the intensity of the anthropogenic contribution. The impacts of climate change pose significant threats to worldwide commerce – yet also offer tremendous business opportunities.

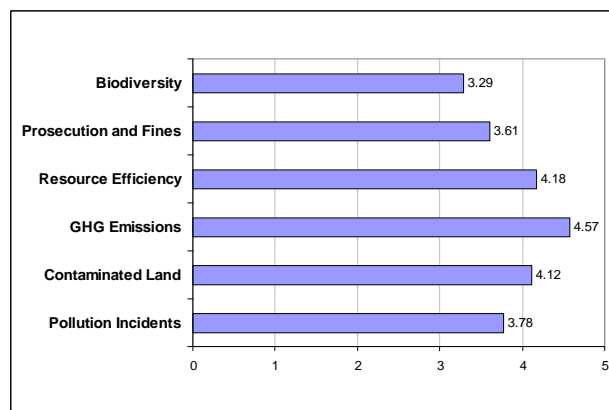
**Risks Posed to Firms by Climate Change**

- Physical: Asset damage
- Regulatory: Regulations mandating curtailed greenhouse gas (GHG) emissions
- Competitive: Changes in consumer demand for energy-intensive products and services
- Reputational: Poor public image, as a result of perceived management “inaction” and inadequacy of preparedness

A company that ignores these risks will suffer increased costs and threats to its profitability; a company well-positioned to address these risks recognizes the opportunities for innovation and a competitive advantage. Investor concern related to the implications of climate change is growing, along with the demand for financial products that seek to capitalize on climate-related opportunities and minimize the exposure to climate risks.

**SOCIALLY RESPONSIBLE INVESTING**

Climate change is becoming one of the principle themes for socially responsible investing (SRI), an investment strategy that integrates an analysis of social and environmental concerns into the stock selection process. The growing importance of climate change in SRI can be attributed to the recent increase in knowledge and publicity pertaining to global warming, as well as the increase in support for the Kyoto Protocol.



**Figure 1 Rating the Importance of Environmental Data for Asset and Fund Managers (on 1-5 scale)**

SOURCE: Thomson Extel/UKSIF 2006, 24.

Very few mutual funds screen for and analyze company responses to climate change, though the number of and the demand for them are growing. Climate-based investment products appeal primarily to green investors, who hypothesize a positive correlation between investing in environmentally-friendly companies and superior returns on their investments. Evidence indicating a positive correlation between

superior responses to climate change and superior expected returns is lacking.

A climate-themed mutual fund would satisfy investors' desire to invest in companies that limit harm to the environment. Were such a fund successful, companies excluded from it would be encouraged to adapt their operations and policies to address the business risks associated with climate change.

**CLIMATE CHANGE EVALUATION**

The majority of mutual funds use a “black box” investment process, which frustrates many investors. With SRI funds, screening criteria are often not well communicated – and these criteria themselves may be poor indicators of actual environmental performance. As a result, green fund managers have the challenge of demonstrating that they are making legitimately environmentally-friendly stock picks. Climate-conscious fund managers face additional challenges, in that a climate-themed fund would be based on the assessment of company policies, due to the absence of tangible measures of the impact of company emissions. We used assessment criteria for which data are publicly available, so investors would be able to monitor the fund’s stock picks, or make their own independently.

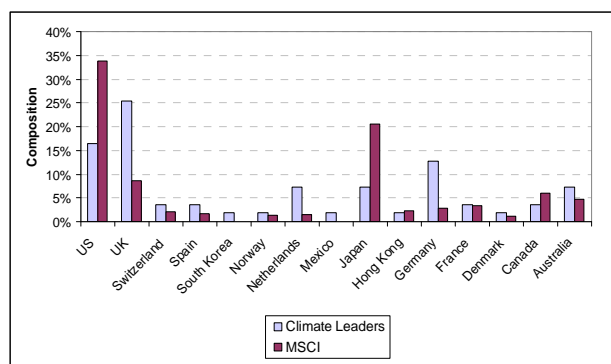
The Carbon Disclosure Project (CDP) is a valuable tool for assessing companies’ climate performance. It surveys over 2,000 global companies annually, with a focus on the world’s 500 largest publicly-traded companies (listed on the Financial Times 500). Voluntary responses to the survey are used to evaluate companies based upon the following ten topics, each of which is a valuable indicator of how a firm is positioned to address climate change risks.

1. Commercial risks and opportunities
2. Impacts of GHG regulations
3. Physical risks
4. Relevant technologies and innovation
5. Management responsibility
6. Total annual emissions (tons of CO<sub>2</sub>e)
7. Emissions from products and services
8. Emissions reduction programs and targets
9. Emissions trading
10. Energy costs

**APPROACH**

*Building a Portfolio of “Climate Leaders”*

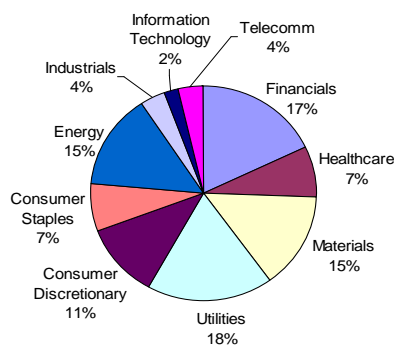
We used unadjusted company scores from the 2006 CDP to rank the FT 500 companies according to their climate performance. We identified the top 55 performers for in our “Climate Leaders” Portfolio; each of these companies scoring at least 85 out of a possible 100 points on the CDP survey. Figure 1 shows the geographical diversification of the Portfolio, and Figure 2 shows the balanced sector diversification.



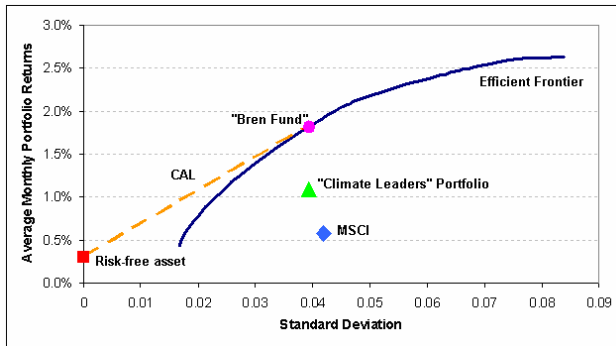
**Figure 1 Geographic Distribution of "Climate Leaders" Portfolio**

*Portfolio Optimization*

Our first approach, the “Climate Leaders” Portfolio assumed naïve diversification (equal weighting of stocks). We plotted its efficient frontier and simulated active management by optimizing the portfolio and developing the “Bren Fund.” This optimal allocation represents the best possible return-to-risk tradeoff available for this bundle of stocks. Figure 3 illustrates the results of the optimization process.



**Figure 2 Sector Distribution of “Climate Leaders” Portfolio**



**Figure 3 Allocative Efficiency of "Climate Leaders" Portfolio**

We used the two-factor Capital Asset Pricing Model (CAPM) in regression form to compare the performance of the “Climate Leaders” Portfolio to the market and the “Bren Fund” to the market, over three investment horizons (The market is represented by the MSCI World Index<sup>1</sup> as a proxy for the FT 500). Table 1 compares the performance of our “Bren Fund,” “Climate Leaders” Portfolio, and the market.

**RESULTS**

We found that the “Climate Leaders” Portfolio Beta is not significantly different from 1.0 for the ten-year data set, which signifies that the excess returns to the Portfolio over ten years is obtained for the same level of risk as the market. The volatility of the ten-year returns of the “Bren Fund” is significantly less than the market, suggesting a substantial bargain. All other

in general, our strategy is more risky than the market portfolio.

The “Climate Leaders” Portfolio Alphas are not significantly different from zero for any investment horizon, so no abnormal returns are attributable to our climate change-based strategy. The “Bren Fund” Alphas vary from insignificant over one year – to significantly negative over five years – to significantly positive over ten years. We conclude that no significant positive or negative correlation between superior climate change performance and superior stock performance exists.

**DISCUSSION**

Investors should interpret these results positively, in that they can adapt their investment strategy to incorporate environmental values, without taking on additional risk or sacrificing returns (ex-expenses) in the long run. More broadly, our results suggest that a climate-themed investment product may encourage companies to more seriously address the physical and business risks associated with climate change, without negatively impacting share price performance.

	10 Years			5 Years			1 Year		
	“Bren Fund”	“Climate Leaders”	MSCI	“Bren Fund”	“Climate Leaders”	MSCI	“Bren Fund”	“Climate Leaders”	MSCI
Monthly Volatility ( $\bar{\sigma}_r$ )	3.95%	3.94%	4.18%	4.19%	3.71%	3.58%	3.58%	2.73%	2.07%
Monthly Return ( $\bar{r}$ )	1.62%	0.84%	0.54%	1.94%	0.88%	0.72%	3.44%	2.14%	1.46%
Alpha (95% confidence)	1.10±.798%	.242±.468%	-	1.20±.97%	-.069±.05%	-	.43±1.75%	.243±.711%	-
SE	3.56x10 <sup>-3</sup>	2.39x10 <sup>-3</sup>	-	4.95x10 <sup>-3</sup>	2.63x10 <sup>-3</sup>	-	8.92x10 <sup>-3</sup>	3.63x10 <sup>-3</sup>	-
t-stat	3.15	1.01	-	2.41	-0.26	-	0.483	0.66	-
p value	0.002	0.31	-	0.018	0.79	-	0.63	0.51	-
Beta	0.67±.161	1.04±.111	-	1.03±.026	1.32±.142	-	1.91±.729	1.35±.288	-
SE	8.19x10 <sup>-2</sup>	5.68x10 <sup>-2</sup>	-	1.33x10 <sup>-2</sup>	7.27x10 <sup>-2</sup>	-	3.72x10 <sup>-1</sup>	1.47x10 <sup>-1</sup>	-
t-stat	8.18	18.3	-	7.78	18.14	-	5.13	8.81	-
p value	3.71x10 <sup>-13</sup>	3.94x10 <sup>-36</sup>	-	1.28x10 <sup>-10</sup>	8.21x10 <sup>-26</sup>	-	3.25x10 <sup>-4</sup>	2.57x10 <sup>-6</sup>	-

Betas are significantly greater than one, indicating that

<sup>1</sup> The Morgan Stanley Capital Index (MSCI) is a global index of the world’s largest companies by market capitalization. It is widely used as a market proxy.

# Bren Climate Leaders Portfolio (USD)

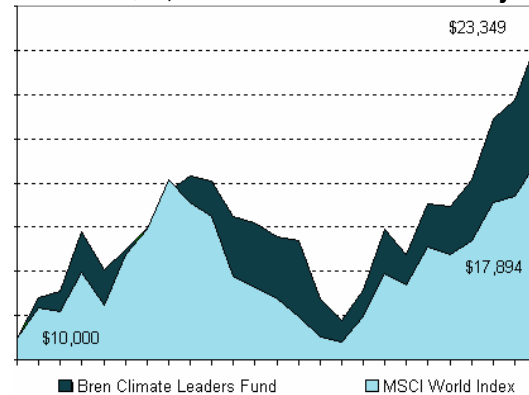
Data as of January, 31 2007

## Summary of Investment Approach

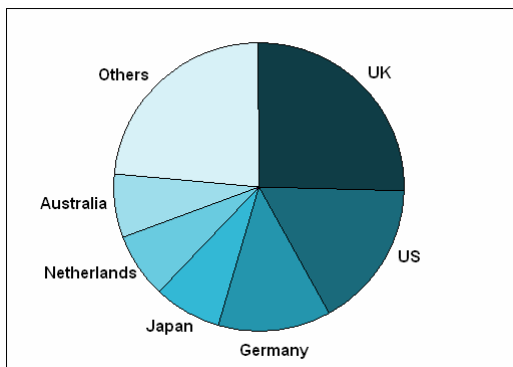
The Fund invests in global companies that meet or exceed strict requirements for climate performance. It does not follow any sector or country allocation biases to invest only in those companies that are absolute Climate Leaders. Climate performance is defined by the actions the firm takes to mitigate its physical, legal and regulatory risks related to climate change. The stock-picking process ensures the Fund invests only in Climate Leaders.

## Fund Performance<sup>2</sup>

Growth of \$10,000 initial investment over 10 years:



## Portfolio Holdings – by Country



## Cumulative Returns:

	<u>Bren Fund</u>	<u>MSCI World</u>
10 yrs.	170.8%	99.8%
5 yrs.	64.5%	41.4%
3 yrs.	34.8%	23.1%
6 mos.	17.6%	12.7%
3 mos.	12.2%	8.3%
1 mo.	2.1%	2.0%

## Largest Ten Holdings and Climate Score

Suncor Energy Inc	85
National Grid Plc	85
Novo Nordisk	85
Iberdrola	90
Baxter International	85
Scottish Power	85
POSCO	85
Centrica	85
Siemens	90
BHP Billiton	90

## Characteristics of the Fund

SECTOR	GLOBAL EQUITY
STYLE	GROWTH
CAPITALIZATION	MID/LARGE
RELATIVE RISK	
PORTFOLIO BETA	1.04
SHARPE RATIO	1.05

<sup>2</sup> Past performance is not a guarantee of future performance and is provided for information only.