



Investing in a Greenhouse World

Geoff Considine, Ph.D.

We are seeing a great deal of attention focused on climate change, not least in the financial world. There is increasing evidence that greenhouse gases will see substantial regulation in the future. Climate change is being taken seriously by a range of major corporations, as well as by institutional investors:

http://www.businessweek.com/bwdaily/dnflash/content/mar2007/db20070320_535194.htm

The recent Supreme Court decision that greenhouse gases are, in fact, pollutants is an impetus for regulation. This issue has acquired enough momentum that all investors need to consider the implications of climate change and related policy on their portfolios. In this article, I will review some of the key issues and demonstrate that it is possible to combine broad index funds (ETF's in my example) with a selection of individual stocks to develop a portfolio that is prepared for a world in which greenhouse gas emissions are constrained by a combination of regulation and market forces.

Calls for action

A range of major corporations are moving to stay ahead of the curve on climate change issues. Organizations like CERES (<http://www.ceres.org>) and the U.S. Climate Action Partnership (<http://www.us-cap.org>) are bringing corporations and environmental groups together to impact future policy and practice pertaining to Greenhouse Gases (GHG's). The common themes that show up in these groups' proposals are the following:

- 1) Companies must have clear reporting standards regarding their exposure to climate issues
- 2) Companies need to have plans that stabilize and/or reduce GHG emissions
- 3) A standard Cap-and-Trade (C&T) system must be developed

USCAP counts Alcoa (AA), BP (BP), Duke Energy (DUK), and DuPont (DD) among its corporate members. In a recent policy paper, USCAP summarized its position:

In June 2005, the U.S. National Academy of Sciences joined with the scientific academies of ten other countries in stating that "the scientific understanding of climate change is now sufficiently clear to justify nations taking prompt actions."

Each year we delay action to control emissions increases the risk of unavoidable consequences that could necessitate even steeper reductions in the future, at potentially greater economic cost and social disruption. Action sooner rather than later preserves

valuable response options, narrows the uncertainties associated with changes to the climate, and should lower the costs of mitigation and adaptation. For these reasons, we, the members of the U.S. Climate Action Partnership (USCAP) have joined together to recommend the prompt enactment of national legislation in the United States to slow, stop and reverse the growth of greenhouse gas (GHG) emissions over the shortest period of time reasonably achievable.

<http://www.us-cap.org/ClimateReport.pdf>

California is pursuing initiatives that require management of GHG's in electrical generation by utilities, raising standards for energy efficiency in buildings and for appliances, expanding use of residential solar technology, and expanding landfill gas recovery:

http://climatechange.ca.gov/climate_action_team/reports/2007-04-20_CAT_REPORT.PDF

The combination of scientific consensus, public pressure, legislation at the state level, the Supreme Court decision, and calls for action by both institutional investors and a range of major corporate interests create a great deal of pressure for action on GHG regulation.

Companies preparing for a changing climate

It is a good idea for investors to stay abreast of the issue of GHG management. If you have assets invested in a company that will be hit with substantial costs or simply lose potential earnings under GHG-constrained policies, you will need to evaluate your course of action.

In this article, I am going to present a model equity portfolio of firms that are proactive in terms of GHG management and in developing tools and technologies that will benefit (or at least be competitive) in a GHG-regulated environment. The companies in this portfolio do not represent a pure bet on GHG regulation, however. They are solid firms in their own rights, representing a range of industries.

To come up with my list of prospective firms to include in a model portfolio, I started with ratings of "governance scores" that rank company preparations for accounting for and managing GHG's (http://www.ceres.org/pub/docs/Ceres_corp_gov_and_climate_change_0306.pdf). I also looked at discussions of company policy provided by USCAP. I got a number of ideas from an article by Tom Konrad (<http://energy.seekingalpha.com/article/30122> see * in table below).

Another good place to go to get a take on these themes is Environmental Finance, a trade journal that deals with relevant topics:

<http://www.environmental-finance.com/>

Companies can be proactive with regard to climate change and related policy in a range of ways. Bank of America (BAC) has just made a major commitment (\$20 Billion over ten years) to developing services to support development of environmentally sound businesses, with a stated focus on reducing global warming:

<http://www.reuters.com/article/environmentNews/idUSWEN513520070306>

BAC is also going to start a carbon trading desk to assist clients in managing their GHG budgets. Honeywell (HON) is also active in a number of sectors that will benefit from increased regulation of GHG's, from improving automotive efficiency to improving energy efficiency in buildings. Waste Management (WMI) is active in capturing waste gases from landfills and in recycling. Companies that are actively engaged in developing alternative energy resources stand to gain in a GHG-constrained world, even if the energy that they generate is not currently cost-competitive.

A GHG-competitive portfolio

The list of stocks that I came up with through my fairly arbitrary procedure is shown below. I focused on companies in energy-related or energy-consuming sectors. There are plenty of companies that will not be hurt or benefit from GHG regulation. Companies which have substantial exposure to GHG regulation and which are being proactive can reasonably expect a performance premium from this approach. These are the types of companies that I want to examine.

Ticker	Company	Notes
AA	Alcoa	Proactive in GHG management
DD	DuPont	Proactive in GHG management
WMI	Waste Management	Recycling, waste to energy *
JCI	Johnson Controls	Energy efficient buildings *
CAT	Caterpillar	Equipment used in biofuel production *
GE	General Electric	Largest U.S. manufacturer of wind turbines
FPL	Florida Power and Light	Large wind and solar generation portfolio
DUK	Duke Power	Proactive in GHG management
TM	Toyota Motor Company	Energy efficient cars, proactive in GHG
IP	International Paper	Proactive in GHG management
BP	British Petroleum	Proactive in GHG management

Companies prepared to be competitive under increased GHG regulation

Frankly, coming up with a list of solid companies that are well positioned to be competitive under increased regulation of GHG's is quite easy. Many companies have decided that it is better to be proactive in this area, and there has been a lot of movement in this direction just in the last year. **The challenge for investors who want to create a portfolio concentration in companies that are proactive about GHG regulation is ensuring that they still have a diversified portfolio that meets their risk tolerance criteria.** To accomplish this task, I have used *Quantext Portfolio Planner*, a portfolio management tool.

In starting the process, I wanted to make sure that it was possible to build a portfolio of these equities that exhibited total risk levels that are reasonable. This constraint was a consideration in coming up with my list of candidates, too. The WilderHill Clean Energy fund (PBW) has exhibited fairly high volatility since it was launched at the start of March, 2005—about four times the volatility of the S&P500, about three times the volatility of the EAFE index, and about 1.7 times as much volatility as BP. To start out, then, it is important to see if we can constrain total risk levels to an acceptable benchmark. Risk tolerance varies between investors, of course, and this is just a single example.

As a sample benchmark for risk and return, I have chosen a simple portfolio of index ETF's:

Fund Type	Fund Name	Percentage of Funds
S&P500 Index	IVV	50%
EAFE Index	EFA	40%
Emerging Markets Index	ADRE	10%

Benchmark equity portfolio

This portfolio is a pretty aggressive benchmark because international equities have performed very well over the past four years. This portfolio has generated an average annual return of 19.4% per year, with a standard deviation of 8.9% over the four year period through March 2007. This is a high return—especially in light of the fairly low risk level (as measured by the standard deviation in return). *Quantext Portfolio Planner (QPP)* projects a more modest future for this portfolio, however, with an average annual return of 9.1% per year, with a standard deviation of 16.8%. I am not going to go into the details of the projections because there are many articles that deal with this topic on our website. The main driver for the more modest projected performance is that the broad equity markets—especially international markets—have been delivering unsustainably high returns for the level of volatility. Ultimately, risk and return will come back into balance. This means that the broad market indices should be expected to deliver lower returns in the future with higher volatility.

My goal in constructing a portfolio that emphasizes the stocks listed earlier is to get close to the level of risk in the benchmark portfolio and then to see what kind of return we can achieve from the portfolio of stocks. We could either focus on matching the historical benchmark portfolio risk (standard deviation of 8.9%) or on matching the projected future benchmark portfolio risk (standard deviation of 16.8%). I have chosen the latter. I constructed a portfolio which combines the index funds with allocations to the list of companies that are proactively preparing for a future in which GHG's will be more regulated—I will call this the ***GHG-competitive portfolio***.

Ticker	Percentage of Funds
IVV	4%
EFA	8%
ADRE	12%
AA	3%
DD	4%
WMI	7%
JCI	7%
CAT	3%
GE	10%
FPL	9%
DUK	8%
TM	6%
IP	3%
BP	3%
VFSTX	13%

Model GHG-competitive portfolio

The model portfolio has 24% allocated to the three ETF's that made up the benchmark portfolio. There is also a 13% weight put in a short-term bond fund (VFSTX) for risk control. The remaining 63% of the funds in this portfolio are invested in the list of stocks. The allocations were adjusted to make the most of the diversification available from these stocks. Over the four year period through March 2007, this portfolio has generated an average annual return of 18.6%, with a standard deviation of 7.6%. ***QPP*** projects that this portfolio will generate 13.8% per year in annual return, with standard deviation of 17%, in the future.

I designed the model portfolio to match the projected future portfolio risk in the benchmark—and the risk levels are very close (16.8% for the benchmark vs. 17% for the GHG-competitive case). The trailing historical risk and return characteristics of the two portfolios are also similar:

Historical Data		
	Start: 4/1/2003	End: 3/31/2007
	Average Annual Return	Standard Deviation (Annual)
GHG-competitive Portfolio	18.6%	7.6%
Benchmark Portfolio	19.4%	8.9%

Trailing historical performance

The fact that QPP projects about 4.7% higher average future return from the GHG-competitive portfolio (13.8% per year vs. 9.1% for the benchmark) is not because of any assumptions regarding future GHG regulations. The source of this projected benefit is the low correlations between the returns on the companies included in our initial list (see table below). Over the ten year period through March 2007, the correlations between the stocks in the model portfolio are far lower than the average correlations between domestic and foreign equities. The correlations shown in the tables below are for monthly total returns.

	AA	DD	WMI	JCI	CAT	GE	FPL	DUK	TM	IP	BP
AA	100%										
DD	54%	100%									
WMI	32%	26%	100%								
JCI	50%	36%	23%	100%							
CAT	61%	56%	41%	42%	100%						
GE	30%	41%	5%	30%	18%	100%					
FPL	-8%	22%	17%	-13%	6%	16%	100%				
DUK	8%	10%	17%	5%	13%	22%	58%	100%			
TM	34%	31%	1%	29%	19%	47%	8%	0%	100%		
IP	64%	56%	28%	37%	60%	30%	7%	7%	32%	100%	
BP	37%	32%	6%	20%	41%	23%	18%	22%	34%	42%	100%

Trailing ten-year correlations (through March 2007)

These low correlations are not a fluke. Even over the past four years, with a boom in energy, basic materials and commodities, the correlations between these stocks have been quite low:

	IVV	EFA	ADRE	AA	DD	WMI	JCI	CAT	GE	FPL	DUK	TM	IP	BP
IVV	100%													
EFA	77%	100%												
ADRE	74%	75%	100%											
AA	59%	58%	56%	100%										
DD	46%	29%	26%	46%	100%									
WMI	45%	41%	25%	25%	29%	100%								
JCI	30%	29%	33%	43%	43%	16%	100%							
CAT	51%	47%	64%	46%	20%	20%	26%	100%						
GE	26%	12%	-5%	-6%	36%	2%	9%	-11%	100%					
FPL	21%	25%	19%	-7%	-7%	2%	-9%	-16%	-9%	100%				
DUK	22%	37%	15%	10%	-18%	5%	-16%	-16%	13%	59%	100%			
TM	28%	53%	28%	12%	22%	29%	20%	14%	22%	23%	17%	100%		
IP	48%	50%	34%	55%	47%	14%	27%	37%	43%	-16%	1%	37%	100%	
BP	33%	51%	52%	37%	3%	16%	-4%	35%	-12%	18%	38%	21%	24%	100%

Trailing four year correlations (through March 2007)

In particular, note how much lower the correlations are between the returns on these stocks and between the broader equity funds. The S&P500 fund (IVV) has exhibited a correlation of 74% to the emerging markets fund (ADRE). There is not a single stock in our list of equities that approaches this level of correlation to the S&P500 fund, the EAFE fund (EFA) or the emerging market fund (ADRE).

The outcome that combining assets with low correlations enables you to build a portfolio with higher return for the same level of total portfolio risk is the foundation of portfolio theory. All such projections into the future are somewhat suspect—as they should be. That said, even if we discount the projected performance benefit substantially, this remains a reasonable equity portfolio.

Summary

Developing a solid portfolio of companies that will be prepared for a future in which GHG's are more heavily regulated is within the capabilities of a reasonably sophisticated investor or financial advisor:

- 1) Identify a series of candidate stocks
- 2) Determine a reasonable performance benchmark
- 3) Develop a portfolio allocation that exploits diversification benefits
- 4) Ensure that portfolio risk/return is within benchmark performance range

It is reasonable to layer in some allocation to solar energy and other clean energy technologies. These companies will benefit from increased regulation of GHG's. A reasonable candidate would be WilderHill Clean Energy fund (PBW), but this fund (and related investments) can only be added to an equity portfolio in modest amounts because of their high volatility and high Beta. The high levels of volatility (i.e. risk) in pure plays on solar technology and other clean energy technology remain a limitation to substantial allocations to these sectors. There is currently a somewhat frenzied environment around 'clean energy' firms that gives me pause.

There are, of course, plenty of companies and sectors that are not major energy users and thus will not be substantially impacted by GHG policy. I am not suggesting in this article that investors simply go out and load up on heavy industrials because these firms are talking about climate change. My basic premise is the following. As GHG's are increasingly regulated, there will be new costs that companies must bear and these costs will have an impact on corporate earnings. There are also companies that will see increases in earnings in this situation. Companies that have the potential to be impacted by increased regulation and that are actively preparing for GHG regulation have a good chance of out-performing their peers and providing their shareholders with the attendant benefits of their forward-looking actions. Including a range of these firms in a portfolio provides a pragmatic way to be prepared for this environment.

Disclosure: the author holds positions in DUK, BAC, HON, and AA

Quantext Portfolio Planner is a portfolio management tool. Extensive case studies, as well as access to a free extended trial, are available at <http://www.quantext.com/gpage3.html>