

Turning Green into Green: Social Past, Financial Future

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Abstract

Green investing has historically been a socially responsible investment strategy to give institutional investors and their beneficiaries some comfort knowing they were supporting the environment. As environmental concerns impact large multinational companies, policymakers, and individuals worldwide, institutional investors have begun to recognize green investing as a financially attractive sector. The green opportunity set is broad; it includes renewable energy, energy storage, energy efficiency, environmental services, and environmental resources. While growth drivers support exposure to the green sector, there are many inherent risks to green investing, including market, execution, technology, financing, commodity pricing, and regulatory changes. This essay serves as a primer on green investment merits and considerations. Now that green investing is motivated by financial gains, investors should consider risk-adjusted returns as the main criterion for investment selection.

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Environmentalists may finally be able to crack open the bubbly. Large multinational companies, global policymakers, and citizens alike are intensifying their focus on the long-term impact of climate change on the economy and their bottom lines. Some may have once viewed environmental concerns solely as a social problem, but climate change is increasingly recognized as a broad, worldwide issue that may be as transformational as the Industrial Revolution or the Information Age.

Similar to historical paradigm shifts, the impact stretches far beyond energy and utility companies. Climate change issues, more broadly defined as green considerations, impact not only how energy is generated, stored, and transferred, but also how products are manufactured, transported, and recycled. Many believe that green considerations will not only alter the energy and utility companies' strategy, but they are likely to change the way large multinationals, policymakers, and individuals operate into the future. The landscape is characterized by both attractive investment opportunities and uncertainties such as regulatory, financing, and technology risks.

The Green Landscape

The term "green" typically evokes images of wind farms and solar panels on roofs. In fact, the landscape for green investment is significantly broader (Figure 1). It includes renewable energy, energy storage, energy efficiency, environmental services, and environmental resources. Although green strategies cut across industries, companies operating in these sectors all strive to reduce environmental impact while improving the productivity of natural resources. These companies represent a diverse range of assets, products or services, and company stages.





Source: Hewitt EnnisKnupp.

Green Investing Growth Drivers

As climate change has risen to the top of the agenda for an increasing number of corporations and legislators, green investing has shifted away from a socially responsible investment strategy to a broad sector strategy. Public market and private capital investors alike have begun to recognize the strong return potential available from investing in a sector dominated by macroeconomic growth trends. These growth drivers make green investing a compelling sector for consideration.

• Energy Self-Sufficiency. As worldwide demand for energy, water, and other natural resources continues to outstrip supply, our current consumption patterns are acknowledged to be unsustainable over the long term. Although some countries have a rich domestic supply of these natural resources to meet society's demand, others rely on imports. The financial and political costs of trading these resources can be high. The United States and many other countries have called for energy independence to reduce their reliance on imports. This independence may be achieved through discovery and innovation of clean technology and clean energy

resources that can supplement today's use of oil, coal, and natural gas. Those with significant resources are less likely to financially and legislatively support alternative energy research.

- Regulations and Incentives. Over a decade ago, countries around the world joined an international treaty known as the United Nations Framework Convention on Climate Change (UNFCCC) to consider ways to curb global warming. A subset of these nations approved the Kyoto Protocol, an international agreement linked to the UNFCCC that establishes binding targets for 37 industrialized countries and the European community to achieve stabilization of greenhouse gas concentrations in the atmosphere. It was adopted in Kyoto, Japan in December 1997 and came into effect in February 2005. The Kyoto Protocol is a legally binding legislation that has driven government stimulus packages, loan guarantees, and tax incentives designed to improve the environment. These tools have created demand for innovative green investing opportunities, including carbon methane capture projects and carbon trading. The Kyoto Protocol, which expires in 2012, will be superseded by an updated regulatory agenda outlined by the newly developed Copenhagen Accord. The Copenhagen Accord is a roadmap developed by the UNFCCC during its December 2009 meeting in Copenhagen that will create international policies and measures. In addition to setting global policy, G20 nations have recently supported climate change initiatives by committing a combined \$400 billion of \$2.6 trillion in economic stimulus allocations to clean technologies (Cleantech Group LLC 2009).
- **Technology Development.** For consumers and multinationals to shift away from ٠ traditional energy toward renewable energy, renewable energy needs to be costcompetitive with traditional energy. Technology innovation has evolved to such an extent that green energy is becoming more price and performance competitive. According to the Utility Solar Assessment Study, solar power is beginning to reach cost parity with conventional energy sources. Installed solar photovoltaic (PV) prices are projected to decline from an average of between 15 and 32 cents kWh in 2007 to between 8 and 18 cents kWh in 2015 (Clean Edge Inc. and Co-op America 2008, 6). This is expected due to a combination of factors, including improved cell efficiency and reduced silicon commodity prices. As solar prices decline and the costs for traditional energy rise, the study predicts that solar power will achieve pricing parity with traditional energy in 2015. According to the U.S. Department of Energy, the average cost of electricity across residential, commercial, industrial, and transportation sectors was 9.9 cents per kWh as of August 2010 (U.S. Energy Information Administration 2010).

In the past five years, these drivers have shifted consumer and corporate accountability's response to green issues. Multinational corporations were initially driven by pressure to take corporate responsibility and manage their public relations, and were later encouraged by tax incentives. Many have now broadened their focus on green by integrating it into an overall business strategy. As an example, in July 2009, Exxon Mobil announced that it is committing \$600 million to research and develop algae-based biofuels. This investment is the energy company's first public validation of the need for alternative forms of energy. Multinationals are not only trying to reduce their carbon footprint and install solar panels in their plants and retail operations, but also lobbying legislatures to accelerate corporate and consumer support of such efforts. Wal-Mart, for instance, has a dedicated sustainability team that in July 2009 announced a sustainability index that formalizes a methodology to gather sustainability information about its products sold and to share this information with its customers. It asks consumers: To what degree can our daily purchases affect the environment? Consumers will likely embrace this additional transparency, as they have begun making direct connections between the environment and their personal health.

Corporations and investors will only embrace these green initiatives if there is a potential favorable return on the investment. Global financial markets have supported initial public offerings of high-growth renewable energy, resource efficiency, and environmental services and resource companies on such worldwide exchanges as London's Alternative Investment Market (AIM), NASDAQ, and the Frankfurt Stock Exchange. The aftermarket performance of less mature green offerings has been mixed since investors prefer supporting profitable companies with a proven revenue model that can demonstrate its ability to efficiently scale. Many companies are sitting on the sidelines, waiting to go public until the market becomes less volatile and their business models are more proven. Strategic buyers (that is, corporate investors) and financial buyers (that is, private equity, real estate, hedge funds) are also interested in this sector, as demonstrated by their merger and acquisition activity.

Green Alternative Investment Opportunities

HSBC estimates that 4% of the market capitalization of the world's public equity market derives over 10% of its revenue from climate change. HSBC defines climate change to include (1) low carbon energy production (for example, bio-energy, diversified renewables, gas, hydro/geothermal/marine, integrated power, nuclear, solar, and wind); (2) energy efficiency and energy management (including buildings efficiency, energy storage, fuel cells, industrial solutions, and transport efficiency); (3) water, waste, and pollution control; and (4) financials (for example, carbon trading and investment companies) (HSBC 2009). Yet, public equity investment does not provide access to the full

opportunity set. The differences in the sectors and stages in which green companies operate produce different financing requirements.

The public markets and private markets, including private equity, infrastructure, and real estate, both offer green investment opportunities (Figure 2). Private equity investment opportunities range from venture capital investments in thin film solar, smart grid, and battery storage technologies to growing renewable energy companies to energy buyouts. Investors interested in green assets can evaluate green infrastructure and real estate opportunities. Infrastructure funds will finance water treatment facilities, methane capture projects, and green transportation. Real estate funds invest in Leadership in Energy and Environmental Design (LEED)-certified buildings, agriculture-related carbon credits, wetland mitigation environmental credits, and brownfield projects. The U.S. Environmental Protection Agency defines brownfield projects as real property whose expansion, redevelopment, or reuse may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant. Cleaning up and reinvesting in these properties protects the environment, reduces blight, and takes development pressures off green spaces and working lands. Some energy buyout, infrastructure, and real estate investors will also consider wind farms, depending on their risk-adjusted return requirements. Investors may also take advantage of the growing and evolving green energy market through thematic-based long/short equity funds to exploit alternative energy market inefficiencies, commodities, and carbon trading.



Figure 2: Sample Green Investment Opportunities

Source: Hewitt EnnisKnupp.

Green Private Equity

Private equity investors use numerous strategies to target green companies that operate at various stages of development (Figure 3).



Figure 3: Green Opportunities within Private Equity

Source: Hewitt EnnisKnupp.

The expected return on capital and risk declines as a company becomes increasingly mature. Venture capital funds will invest in companies that pioneer water, solar, and energy storage technologies all the way through funding pilot plants to commercializing the product. Growth equity funds will provide capital to scale a company, and buyout funds will acquire companies to broaden their product lines or streamline costs. In addition, many core energy funds have now carved out an alternative energy allocation to finance clean coal or wind farms. Each strategy requires varying degrees of capital that reflect the stage and size of a company. For instance, a venture capitalist could make a \$250,000 seed investment, while an energy fund may invest over \$100 million to finance a project's growth.

The green private equity universe includes both funds that are dedicated to the green sector and those that are more diversified. The attractiveness of a dedicated or diversified fund depends on the stage of the company and private equity sub-strategy. Investors in green private equity should research and select only managers who have expertise and a track record investing in this sector.

Venture capital investors take significant technology risk in addition to regulatory and market risks. These early-stage companies may be less capital-efficient than desirable, and the scale of investment required is much larger than in more traditional venture capital sectors. Venture capitalists have also noted that exit timeframes may extend further than those in traditional early stage investments. As an evolving sector, venture capitalists also take on market risk by investing in earlier stage companies.

Expansion stage and growth equity funds focused on the green landscape target profitable companies with high growth rates. Their investment thesis is that these companies can benefit from the growth of this sector without taking technology risk. Diversified buyout and energy funds that make a portion of their investments in green tend to be as attractive as funds that do not invest in the green sector. Energy funds do not anticipate achieving a premium for green deals because the large number of investors in the sector has inflated asset prices. These funds would earn a premium only if they undertake construction risk.

Green Infrastructure

Over the past century, countries around the world have built airports, highways, ports, water treatment and waste facilities, and power plants to support their growth and industrialization. Despite this large historical investment in infrastructure, there continue to be significant opportunities for infrastructure funds to invest in both industrialized nations and emerging markets. Booz Allen Hamilton estimates that there is a \$41 trillion global need to build and repair infrastructure through 2030 (Booz Allen Hamilton 2007, 69).

Industrialized nations need to improve and upgrade their infrastructure, yet their governments are unable to fund the demand through public sources as they have in the past. Instead, they are partnering with private capital to fund these projects. As emerging markets such as China and India continue to exhibit high growth and become increasingly industrialized, they will continue to require significant infrastructure investment.

Much of this infrastructure development over the past century has been unfriendly to the environment. Many of these assets rely heavily on fossil fuels and use or generate a significant amount of carbon. As awareness of and demand for environmentally friendly projects have increased, developers have recognized the need to reduce the environmental impact of these projects. Currently, renewable projects represent 7% of total infrastructure deal volume worldwide (RREEF 2009, 19).

Given the current poor condition of infrastructure within the United States, there is also strong demand to rebuild infrastructure, including incorporating green improvements. Approximately 25% of capital set aside for infrastructure projects in the American

Recovery and Reinvestment Act (ARRA) (between \$82 billion and \$111 billion) is designated for green projects. This capital supports climate change initiatives that include modernizing the power grid, providing funding for technologically proven renewables, and improving public transportation to reduce emissions.

An investor seeking to commit capital to green infrastructure can invest in a dedicated green infrastructure fund, although there are only a few partnerships that offer such a focused strategy. The majority of diversified global infrastructure funds will commit a portion of their capital to green projects that include waste and water treatment plants, recycling facilities, green mass transit systems, power grids, solar energy plants, and wind energy farms. Although the focus on climate change may not necessarily be the primary force behind a globally diversified fund's acquisition of an infrastructure asset, many of these assets are considered green.

Similar to traditional infrastructure projects, renewable energy infrastructure projects are typically quasi-monopolistic assets with steady income streams and high up-front capital costs. Significant scale is required for a successful project. These projects are often regulated and face high barriers to entry as a result of permitting restrictions and high capital requirements.

Unlike traditional energy, renewable energy projects should have minimal ongoing costs during their life as they do not have perpetual fuel costs. They also tend to have power purchase agreements that produce highly predictable fixed revenue streams.

Investors should project a return premium for greenfield projects that have a build-out or construction phase, or for higher-risk projects. Although some green infrastructure opportunities may be higher-risk greenfield projects, others are lower-risk brownfield projects and may not command a return premium.

Green Real Estate

Investors seeking to invest in green real estate have limited options in terms of strategies and vehicles (Figure 4). Green real estate can be accessed either directly through a dedicated green real estate fund or indirectly through an established real estate fund that may develop and/or refurbish assets in compliance with green principles. Dedicated green funds typically use a value-added or opportunistic strategy, and are therefore higher-risk investments than a core strategy that may include a portion of green assets in a portfolio. There are only a handful of dedicated green real estate funds in the market today; separate accounts are an option for larger mandates.



Figure 4: Green Opportunities within Real Estate



The most common green real estate funds build or renovate and then sell buildings that are LEED-certified. LEED is a third-party verification that a building or community is designed and built using characteristics that are environmentally sustainable. Some examples include buildings with efficient water-saving devices or advanced recycling systems. These funds typically focus on the office and multifamily sectors in the United States.

One challenge dedicated green real estate funds face is the constantly evolving standards set by the U.S. Green Building Council (USGBC). Another is little tenant incentive to pay a green premium. As a result, very few managers have seen a green premium through rents, occupancies, or sales prices. Many dedicated green funds are losing their competitive edge as other real estate funds undertake development or repositioning strategies and seek LEED certification.

We believe a dedicated green real estate fund is not a compelling investment opportunity since these funds have not yet yielded a return premium. The increased cost of compliance with LEED is not meaningful. Over the long term, green real estate may become mainstream as all new properties strive for the certification. Properties can further distinguish themselves by achieving gold or platinum certification, but there may be

substantial cost to this status that is typically not rewarded. Investors may also be already exposed to green assets through established real estate funds.

Investors might consider brownfield opportunities, in which a real estate manager will clean up a site or convert a condemned structure into a new-use building. In the example of a manager who rehabilitates a derelict industrial property with contaminated land and soil, the improved property will then be vetted by a third party and certified by government entities. Brownfield projects may also include responsible land stewardship, where a portion of the reclaimed land is put into a conservatorship, such as a park. Brownfield funds are primarily domestic and typically focus on urban infill locations. It is important for potential investors to recognize that due to the environmental cleanup involved, investments are highly risky and may be more expensive than expected, requiring additional capital and reducing potential returns.

Investors who seek to invest in green real estate and brownfield projects should select managers with strong track records and a long history of investing in the strategy. Topperforming managers will use their network of highly skilled joint venture partners. Further, we believe managers need to have in-depth knowledge to identify the markets and tenants that are green-friendly prior to commencing a project. This requires a thorough understanding of domestic and emerging markets that may offer environmental programs and credits. In addition, if applicable, the manager should be certified by the USGBC through its LEED program.

Beyond LEED-certified buildings and brownfield projects, some fund managers seek to monetize environmental assets, such as agriculture and wetland mitigation. These managers can augment asset returns by producing environmental credits that can be traded through brokers, including carbon, wetlands mitigation, water quantity and quality, and biodiversity offsets. This strategy produces returns that combine current income with significant upside from the growing environmental credit markets.

Some agriculture managers target investments that promote sustainable land management practices and capture the opportunities from environmental credits. One example is farming with techniques to limit soil erosion, mineral depletion, and pollution. These will generate carbon credits that the manager can then sell in the carbon market. Another method to facilitate green investing is to reserve a portion of acreage for wind power generation. The manager will lease the land to a developer that will build and manage the wind farm.

Wetland mitigation is another strategy that combines environmental assets and credits. The Wetlands Protection section of the Natural Resources and Environmental Protection Act of 1994 requires landowners to replace wetlands that may be destroyed through development by creating new wetlands in another location or by restoring them. Wetland mitigation bankers facilitate compliance with permits by offering wetland credits to offset environmental impacts on wetland functioning and acreage. Credits are awarded to a landowner only if the project improves wetland functioning. This allows development on a wetland without repercussion.

The market strategies for agriculture and wetland mitigation funds, and their related credits, are emerging in a sector that is constantly evolving. An attractive investment strategy now might quickly become obsolete. There is currently a small investable universe of these types of opportunities.

Green-Related Public Equity Funds

Institutional investors are becoming increasingly aware of the impact of green on the future earnings potential of companies. To fully assess the fundamental values of target companies, investors need to understand the environmental, social, and governance (ESG) factors impacting the companies. One of these is climate change. A consortium of 41 asset managers, pension funds, and foundations sent a letter to the Securities and Exchange Commission (SEC) in June 2009 to request enhanced disclosure from public companies regarding the potential impact of climate change on future earnings. The authors believe a greater understanding of the ESG factors will help managers make better long-term investment decisions.

Asset managers with thematic fundamental analysis strategies support these additional disclosures to assist them in implementing strategies. Many of these managers have explored equity strategies that take advantage of the soaring global energy demand and consumption patterns, corporate and consumer attitude shift, and regulatory incentives that will continue to stimulate investment in green companies and projects.

Equity managers may offer both long-only and long/short funds focused on green investments. Long-only funds will purchase companies with the best growth outlook given the manager's view of regulation and technology. Some long-only equity managers have created a negative screen to filter out companies that do not include green principles in their operations strategy. These managers believe that failure to consider green principles will ultimately impact their bottom line. Other long-only equity managers have created a portfolio of companies that operate across the green landscape.

Indices have been developed based on this investment principle, including the HSBC Global Climate Change Index, which is composed of global companies operating in low-carbon energy production, energy efficiency and energy management, and water, waste,

and pollution control. HSBC believes these companies are best suited to profit from the challenges presented by climate change.

Long/short funds will buy similar high-growth companies while selling short those they expect to underperform given anticipated changes in the industry. One strategy that long/short hedge funds employ is to take sector-based views of alternative energy. Managers will devise a strategy that is consistent with their long-term views of the political environment and advancement of alternative energy. A manager who believes in the long-term opportunity of solar power, yet believes ethanol to be less attractive, could take long positions in solar power companies while selling short ethanol-producing firms. Another strategy includes buying shares in green utilities and selling short conventional utilities. This strategy would make sense if a manager anticipates rising clean-up costs for traditional energy utilities and rising goodwill for clean energy companies. This strategy assumes these issues have not yet been fully priced in the equity market.

Carbon Trading

The Kyoto Protocol includes mechanisms to reduce climate change. These mechanisms have resulted in a growing demand for emissions trading such as European Union Allowances (EUAs) and Certified Emission Reductions (CERs). EUAs are credits generated by the government. Each EUA allows an entity the right to emit one metric ton of carbon dioxide. Entities that emit beyond their cap must obtain additional allowances from another entity that emits carbon dioxide (cap-and-trade) or purchase CERs, which are generated by carbon projects that reduce carbon emissions. EUAs and CERs are the two transaction types that frame the cap-and-trade and carbon projects investment approaches.

At the onset of these international regulations, the European Climate Exchange and the Chicago Climate Exchange were developed to facilitate the trading of carbon futures and options. These exchanges are driven by the supply of and demand for carbon credits. A government may set a limit (a cap) on emissions that is consistent with a carbon stabilization level. Businesses can meet the emissions reduction requirement a variety of ways, including installation of pollution controls and implementation of efficiency measures. The regulations also allow the sale or purchase of EUAs, known as cap-and-trade. Businesses that can reduce emissions are able to sell excess credits to other businesses that need to reduce emissions but tend not to because it is either too costly or strategically prohibitive.

The total trading volume of greenhouse gas in the United States and Europe differ substantially, with volume correlating to Europe's stronger regulation (Figure 5). The global carbon credit market traded 8.7 billion tons of carbon credits valued at \$144.3

billion in 2009 (Ecosystem Marketplace and New Carbon Finance 2009, ii). Countries throughout Europe have initiated varied cap-and-trade legislation that has supported the 175% compounded annual growth rate of the European Union Greenhouse Gas Emission Trading System (EU ETS) trading volume since the inception of the Kyoto Protocol requirements.



Figure 5: Total Greenhouse Gas Trading Volume in the U.S. and Europe

Source: European Climate Exchange, Chicago Climate Exchange.

In the United States, where there is currently no government-mandated compliance program, trading volume has remained low. United States policymakers had reviewed a landmark energy cap-and-trade bill, sponsored by Representatives Henry Waxman (D-CA) and Edward Markey (D-MA), that may have driven a significant increase in the carbon trading market volume by impacting the supply of and demand for carbon credits. However, this bill has stalled in the United States Senate and cap-and-trade is now considered a dead issue.

How much the non-binding Copenhagen Accord can supersede the Kyoto Protocol's post-2012 time period will depend on the extent to which it becomes politically binding. Its success will also depend on the level of each country's emission targets. The United States has pledged to reduce emissions by 17% and the European Union promised a 20% reduction of 2005 levels by 2020. The outcome will drive the future volume and price of the EU-ETS options and futures contracts. Beyond cap-and-trade strategies, investors can invest in green carbon finance projects that generate greenhouse gas emissions credits. Carbon cap-and-trade regimes generally allow for the import of credits on green carbon finance projects from other countries. Carbon projects that are approved to generate carbon emissions credits include renewable energy sources and technologies such as solar energy, wind energy, hydropower, and biomass energy (for example, biofuels and geothermal energy). Many methane recovery, fuel switching, and energy efficiency projects have also been approved to generate credits. These projects are typically located in developing countries such as China, Brazil, Russia, Ukraine, and India. In some instances, a project will capture revenue from generating alternative energy as well as through selling carbon emissions credits to potential buyers.

Unlike EUAs, project-based credits need to be created through energy generation projects, which results in assumption of additional project development, performance, and regulatory risks. Recent experience has demonstrated that investors need to research green carbon projects thoroughly, as there is a risk that some projects may be considered ineligible to generate carbon emissions credits. The United Nations, which certifies the eligibility of projects for participation in carbon trading, has changed the standards for project approval over time.

Green Investing Considerations

In evaluating the numerous alternative investment opportunities in the green sector, it is important to understand that, in addition to traditional investment risks, there are other significant risk factors to this developing sector. Its high-growth evolving nature fosters investment opportunities, but also challenges investors to evaluate companies, assets, and equities long term. Factors that potential investors should consider include market, execution, technology, financing, and commodity pricing risks as well as regulatory changes.

Market and Execution Risk

Although the market recognizes the significance of green investment opportunities, there is no certain way to know which alternative energy technology will be most widely accepted. Companies may quickly find that a market they sell to has fallen out of favor as other forms of alternative energy become more widely accepted. Many managers do not have extensive track records in the green sector and are unfamiliar with navigating the execution risks. For example, infrastructure and real estate managers face environmental risks that may affect their performance, including soil and ground water contamination, and remediation of asbestos, lead paint, and radon.

Technology Risk

The technologies impacting the green landscape are cutting edge, yet in many instances, unproven. Until the technologies can demonstrate their maturity and scalability, demand may be low and prices higher. This supports the notion that renewable energies are unlikely to become mainstream until the products achieve pricing parity with traditional energy sources. Supply-side constraints or oversupply of core materials such as silicon will dramatically impact the economic opportunity for some technologies. As technology continues to develop and prices decline, renewable energy, which represents 8% of United States energy consumption, will become a more widely accepted form of energy (U.S. Energy Information Administration 2010).

Financing Risk

Green companies and projects can be highly capital intensive and are typically structured using a combination of equity and debt. Recent volatility in the financial markets due to the economic downturn has hindered the ability of green companies to raise equity through an initial public offerings, with many who have continued to postpone going public until the market stabilizes.

Many projects require significant up-front capital and costs are mainly fixed, such as renewable energy infrastructure projects and green real estate investments. The current recession has constrained the European and United States financial institutions that are the traditional suppliers of debt capital to these investments. These debt sponsors became more reluctant to lend capital to green projects. Many investments were unable to close or were delayed, as the projects now required a club of banks to complete the financing package. The cost of capital, one of the key factors that will determine their economic success, has become expensive in this challenged economic environment.

The result has been fewer green deals being executed in the United States and Europe. This allowed China, which was less impacted by the financial crisis, to surpass the developed world to become the largest investor in sustainable energy investment in 2009.

Public Market Risk

The performance of green investments is highly susceptible to the pricing of commodities and valuations of companies and assets. Highly volatile commodity prices, particularly oil, impact the adoption of alternative energy. As the price of oil neared \$150/barrel in the summer of 2008, interest in alternative energies soared; then, as prices fell below \$40/barrel, opportunities became less compelling.

This correlation is explained by today's high cost of alternative energy. On average, renewable energy is considerably more expensive than oil and gas because of fluctuating core material pricing and the higher cost of small-scale production. As market adoption of alternative energy increases and technology innovation improves, we would anticipate costs to decline. Once conventional energy and alternative energy achieve pricing parity, we would anticipate an increased correlation between commodity prices and renewable energy indices.

High commodity prices also drive valuations of alternative energy companies higher (Figure 6). Valuations of alternative energy companies also increase due to the projected supply/demand imbalance of oil reserves.



Figure 6: High Commodity Prices Impact Climate Change Index Valuations

According to the strongly debated Hubbert Peak Theory, which predicts the peak and decline of production from oil wells and fields, the production of oil may have peaked in late 2006 (Energy Watch Group 2007, 12). This is consistent with an International Energy Agency (IEA) analysis of 800 oilfields that demonstrated a 6.7% annual decline in oil production that is expected to grow to 8.6% by 2030 (International Energy Agency 2008). If this decline of oil supply turns out to be factual, it will become a significant issue for the world economy given the anticipated 45% increase in global energy demand between 2006 and 2030.

Source: Bloomberg.

Oil supply can increase with new mining technologies and sites, such as oil shale or deep water drilling. We anticipate this supply/demand imbalance will drive up oil prices and valuations for alternative energy companies. As valuations increase, the risk of equity investments increases and the expected returns decline. Skilled managers who invest in green companies and projects can offer substantial returns if they know how to minimize public market risks as they execute their investment strategy.

Regulatory Risk

It is important for an investor in green opportunities to understand global and national energy policies, as regulatory changes create risks and opportunities that will significantly impact investment returns. These regulations are constantly changing. They typically endorse a menu of mechanisms to curb climate change and foster financing and technological innovation.

To illustrate, the goal of the Kyoto Protocol was to achieve stabilization of greenhouse gas (GHG) concentrations in the atmosphere. It allowed countries to meet their GHG limits through three mechanisms: (1) emissions trading, (2) the clean development mechanism, and (3) joint implementation. These three mechanisms have driven the development of investment innovations such as the carbon trading market and green carbon finance projects.

It is noteworthy that the United States did not ratify the Kyoto Protocol and does not currently have any federal policy on emissions reduction. Historically, this has been left up to each state, resulting in a hodgepodge of legislation that includes: carbon pricing, which includes cap-and-trade and carbon taxes; incentives and subsidies, such as investment tax credits and renewable energy credits; and, standards that obligate electric utilities to produce a specified fraction of their electricity from renewable energy. The absence of an established policy has resulted in weak supply of and demand for GHG reduction credits on the Chicago Climate Exchange (Figure 5).

Once the United States determines a federal policy that corresponds to the new global protocol being developed, many of the current tools used to curb GHG emissions will disappear. However, the Waxman-Markey climate bill that passed the House of Representatives in June 2009, which supports carbon cap-and-trade, along with other bills, has stalled in the United States Senate, as the federal and state governments continue to move forward with proposed legislation. Cap-and-trade is currently considered a dead issue at the federal level.

The United States' pledge to reduce emissions by 17% of 2005 levels by 2020 matches the Waxman-Markey emissions reduction proposal. As many countries in Europe have

developed climate change policies, these regulations are creating market mechanisms and investment opportunities, and driving healthy trading volume on the European Climate Exchange.

The Copenhagen Accord establishes an international plan to review and monitor compliance with emission reduction commitments, including development of a consistent set of standards to measure country targets. To limit global temperature increases caused by man-made GHG to two degrees Celsius, it relies on individual countries to establish their own pledges rather than establishing international emission reduction limits.

The Copenhagen Accord also builds a financial framework to support these efforts, with a \$100 billion commitment by 2020 from industrialized nations to support the more developing countries' adaptation to and mitigation of the effects of climate change. To fund this commitment, the United States will provide public and private funding using a variety of not-yet-determined strategies. Sources may include taxes, allocations from the cap-and-trade system, or the development of an International Monetary Fund plan. The United States' ability to raise the necessary capital will depend on the outcome of climate change legislation to support a nascent cap-and-trade financial market and comply with the Copenhagen Accord.

Companies and investors are paying close attention to the discussion. The outcome is likely to eliminate some investment opportunities while providing a window for new ones. Part of a manager's ability to add value lies in the capacity to navigate the regulatory environment or select companies that are less impacted by regulation, depending on an investment strategy.

Conclusion

There is an increasing supply/demand energy imbalance throughout the world. Consumers and multinational corporations alike are changing attitudes toward alternative energy. Two motivations are to enhance corporate responsibility and to minimize costs. Green investing is a global transformation that will impact large multinational companies, policymakers, and individuals worldwide. For institutional investors, this presents both uncertainty and opportunity.

The inherent risks in green investing, which include market, execution, technology, financing, commodity pricing, and regulations, make it complicated to evaluate alternative assets.

Now that many institutional investors have recognized that green investing across asset classes can be financially attractive as well as socially beneficial, managers need to

ascertain the level of in-house knowledge that will give them a clear edge in the global market. Those managers with in-house knowledge of environmental policy, global capital markets, and specialized knowledge will have better insight to evaluate the opportunities and risks in their green investment strategies.

Many green investment opportunities are compelling. Some are less compelling because they are still emerging or subject to changing regulations. Investors who want to obtain green exposure can invest across the more attractive green investment strategies rather than develop a specific allocation to the green sector. Investors who seek remunerative green exposure should examine the attractive green investment strategies that exist in private equity, infrastructure, real estate, and public markets (Figure 7).

Figure 7: Green Investment Opportunities

Private Equity	Infrastructure	Real Estate	Public Markets
 Dedicated Green Venture Capital Diversified Venture Capital Green Growth Equity Renewable Energy Buyout 	 Dedicated Green Infrastructure Funds Diversified Infrastructure Funds 	 Dedicated Green Value-Added Funds Diversified Value- Added Funds Dedicated Green Opportunistic Funds Diversified Opportunistic Funds Brownfield Funds Wetland Mitigation Funds 	 Long-Only Green Equity Strategies Long/Short Green- Related Equity Strategies Carbon Trading Strategies

Source: Hewitt EnnisKnupp.

Acknowledgements

A special thank you to Keith Black, CFA, CAIA, and Heather Christopher.

References

- Booz Allen Hamilton. 2007. "Lights! Water! Motion!" Available from http://www.boozallen.com/media/file/Lights_Water_Motion.pdf
- Clean Edge Inc. and Co-op America. 2008. "Utility Solar Assessment Study." Available from <u>http://www.cleanedge.com/reports/reports-solarUSA2008.php</u>
- Cleantech Group, LLC. 2009. "Clean Technology Venture Investment Falls to \$1 Billion in 1Q09." April 1. Available from http://cleantech.com/about/pressreleases/040109.cfm
- Ecosystem Marketplace and New Carbon Finance. 2009. "Fortifying the Foundation: State of the Voluntary Carbon Markets 2009." Available from <u>http://www.ecosystemmarketplace.com/documents/cms_documents/StateOfTheVolunt</u> <u>aryCarbonMarkets_2009.pdf</u>
- Energy Watch Group. 2007. "Crude Oil: The Supply Outlook." Available from http://www.energywatchgroup.org/Oil-report.32+M5d637b1e38d.0.html
- HSBC Global Research. 2009. "Climate Change June 2009 Quarterly Index Review." HSBC Equity Quantitative Research Global. June 11. Available from http://graphics8.nytimes.com/images/blogs/greeninc/hsbc.pdf
- International Energy Agency. 2008. "New Energy Realities WEO Calls for Global Energy Revolution Despite Economic Crisis." November 12. Available from <u>http://www.iea.org/press/pressdetail.asp?PRESS_REL_ID=275</u>
- RREEF. 2009. "Infrastructure Investments in Renewable Energy." Available from http://www.dbcca.com/dbcca/EN/ media/Invest in RE Infrastructure 092309.pdf
- U.S. Energy Information Administration. 2010. "Renewable Energy Consumption and Electricity Preliminary Statistics 2009." Released August 2010. Available from <u>http://www.eia.doe.gov/cneaf/alternate/page/renew_energy_consump/rea_prereport.ht</u> <u>ml</u>
- U.S. Energy Information Administration. 2010. "Electric Power Monthly." Released November 15, 2010. Available from <u>http://www.eia.doe.gov/cneaf/electricity/epm/epm_sum.html</u>

Biography

Shari Young is a private equity consultant in the Global Private Equity group at Hewitt EnnisKnupp and is a member of the Investment Committee. She consults on the private equity programs for numerous public and corporate pension plans, endowments, and foundations. Shari has sourced and conducted due diligence on funds and co-investments across the full spectrum of private equity.

Prior to joining Hewitt EnnisKnupp, Shari focused on growth stage venture capital investments at Chicago Venture Partners and was a Summer Associate at Sterling Venture Partners. Previously, she was an investment banking analyst for ThinkEquity Partners and senior analyst at First Annapolis Consulting, a boutique strategic consulting and M&A advisory firm focused on financial services.

Shari holds a B.B.A. with distinction in finance and marketing from Emory University Goizueta Business School and an M.B.A. in finance, accounting, and entrepreneurship from the University of Chicago Graduate School of Business.