THE GREEN NEW DEAL

By

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Forward

In an economic environment that has been widely measured as a distant rival to the era of Hoover and FDR, advancing a "green" stimulus is being pitched as an integral aspect of reviving a struggling economy and jumpstarting American prosperity in the 21st century. Following the recent results of the U.S. presidential election, many believe plans will be set in motion to do just that.* Proponents declare this may serve to launch the next wave of a green revolution for investors and potentially be the biggest opportunity for economic and social mobilization since World War II. Others question the current momentum given a cyclical decline in oil prices and significant competing interests for public funds. As a result, we think it is worthwhile to discuss venture capital/private equity investing in clean technologies. What follows is an in-depth introduction to cleantech that is intended to serve as an educational tool for plan sponsors interested in understanding this emerging space. As we move forward, an important note is that our perspective is focused on return on investment with the social and environmental benefits of these technologies a secondary but very important consideration.

Introduction

Private equity and venture capital circles continue to buzz about a burgeoning investment opportunity coined "cleantech" or clean technologies. Proponents declare these technologies could be the largest economic opportunity of the 21st century with disruptive capacity that rivals the emergence of the IT and biotech industries. Skeptics stress that if there are real opportunities in this space they may be 10 to 20 years away and much of the impetus for growth is bearing on the back of government versus the proverbial invisible hand of the marketplace. Others have bellowed concerns of a "bubble" reminiscent of the late 1990's internet and telecom boom as a result of high energy prices, significant capital flows, and in some cases eyebrow-raising multiples paid for select portfolio companies. Despite these mixed emotions, there appears to be a confluence of factors driving the proliferation of clean technologies that are becoming increasingly difficult to ignore. These include the growing awareness of resource scarcity, rapid technological advancement, public policy support, corporate involvement, capital market recognition, environmental impact and our society confronting what many believe is the economic realities of the cost of carbon in our ecosystem. The convergence of these factors is helping create huge addressable markets for many clean technologies and arguably for the first time potential sustainable routes to many of these markets.

* President-elect Barrack Obama's pre-election energy plan included: Investing $150 billion over the next ten years to accelerate the commercialization of plug-in hybrids, commercial scale renewable energy, encourage energy efficiency, invest in low emission coal plants, advance second generation biofuels and transition to a new digital electricity grid; put 1 million plug-in hybrid cars on the road by 2015; ensure 10% of US electricity comes from renewable sources by 2012 and 25% by 2025; and implement a nationwide cap-and-trade program to reduce greenhouse gas emissions 80% by 2050.

What is Cleantech?

The Cleantech Group, a leading authority on cleantech, defines clean technology as a diverse range of products and services that harness renewable materials and energy; optimize the use of natural resources; and/or reduce the negative environmental impact of their use.[1] They are intended to create value by lowering costs over time and improve profitability. A very important takeaway is the *breadth* of clean technology and its application across a number of economic sectors. Many potential-investors incorrectly associate cleantech solely with energy-related technologies such as biofuels, solar and wind. Cleantech Group classifies 11 industries with over 40 sub-segments that make up cleantech investment. These are shown in the tables below:

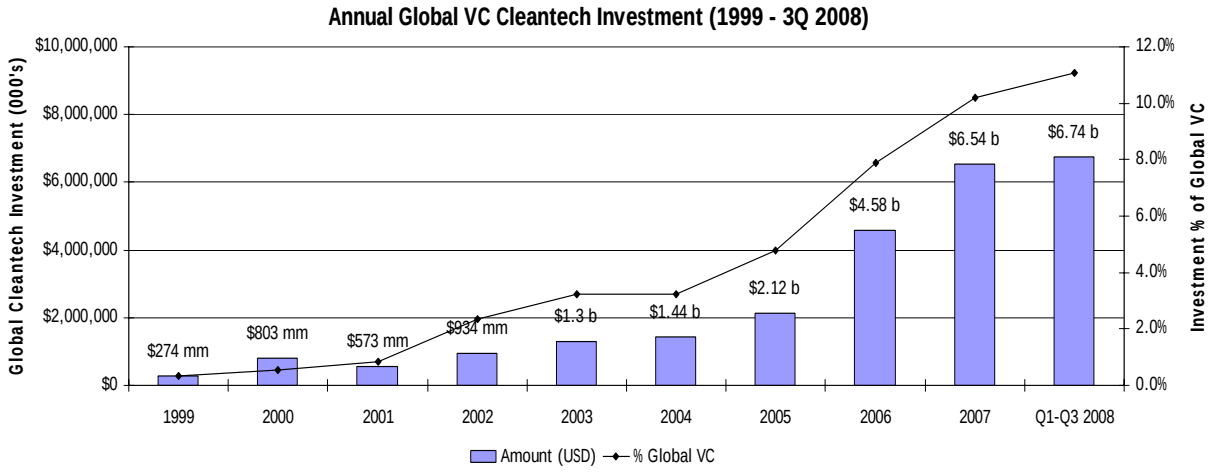
Energy Generation	Energy Storage	Energy Infrastructure	Energy Efficiency	Transportation & Logistics	Water & Wastewater
Wind	Fuel Cells	Management	Lighting	Vehicles	Treatment
Solar	Adv. Batteries	Transmission	Green Building	Logistics	Metering
Hydro/Marine	Hybrid Systems		Automation	Structures	Infrastructure
Biofuels			Conservation	Fuels	
Geothermal					

Air & Environment	Advanced Materials	Manufacturing & Industrial	Agriculture	Recycling & Waste
Emissions Control	Nanotech	Adv. Packaging	Natural Pesticides	Recycling
Emissions Monitoring	Bio	Monitor & Control	Land Mgmt	Waste Treatment
Trading & Credits	Chemical	Smart Production	Aquaculture	
Cleanup/Safety	Hybrid/Composite			

Source: Cleantech Group, LLC

How Much Venture Capital Has Been Invested in Cleantech?

According to Cleantech Group, from 1999 through the third quarter of 2008, an estimated $25.3 billion of venture capital has been invested globally in cleantech companies. This compares to over $640 billion invested in global venture capital over the same time period. Over 80% of the $25.3 billion total has been invested since 2003.

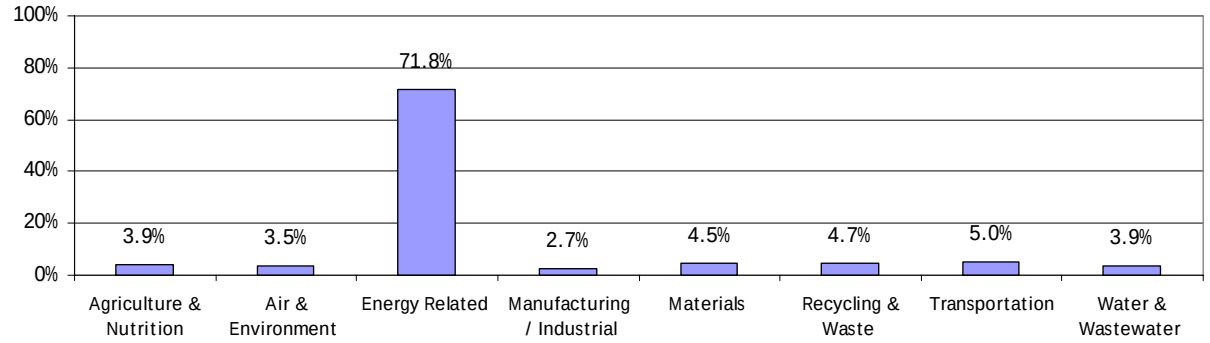


Source: Cleantech Group, LLC, Thompson Financial, Piper Jaffray & Co.

[1] The Cleantech Group: www.cleantech.com/about/cleantechdefinition.cfm

Within cleantech, energy-related technologies (generation, storage, infrastructure, efficiency) have received the majority of investment. According to Cleantech Group, from 1999 to 2008, energy-related technologies represented over 70% of global cleantech venture investment. Solar's share alone of total cleantech investment has risen from 8% in 2003 to over 36% during the first half of 2008. The table below provides the cumulative cleantech venture investment by industry since 1999.

Global Venture Capital Cleantech Investment By Industry (1999 - 3Q 2008)



Source: Cleantech Group, LLC. Total = $25.3 billion

Evolution of Cleantech / What is Different Today than in the Past?

The concepts and excitement associated with many clean technologies are certainly not new. Historically, there have been several instances when technologies focused on renewable and environmental sustainability have experienced heightened interest. Most notably, during the 1970's oil crisis a nascent solar industry was born and during the late 1990's fuel cells and the "hydrogen economy" became all the rage. According to Cleantech Group, despite bouts of significant momentum, the problem has always been that technologies never approached cost competitiveness with conventional technologies and once oil prices fell, both policy support and interest in the sector waned.[2] Michael Liebreich, CEO of New Energy Finance, a leading provider of research to investors in renewable energy, mirrors these sentiments as it relates to energy-related investments, "The venture capital world has had a stormy relationship with energy technology. Over the past twenty years, there have been a number of waves of interest in new and renewable energy technologies, usually coinciding with periods of high oil prices, but activity has always died back in the face of low-cost, fossil fuel-based energy."[3]

"Despite bouts of significant momentum, the problem has always been that technologies never approached cost competitiveness with conventional technologies and once oil prices fell, both policy support and interest in the sector waned."

- Cleantech Group, LLC

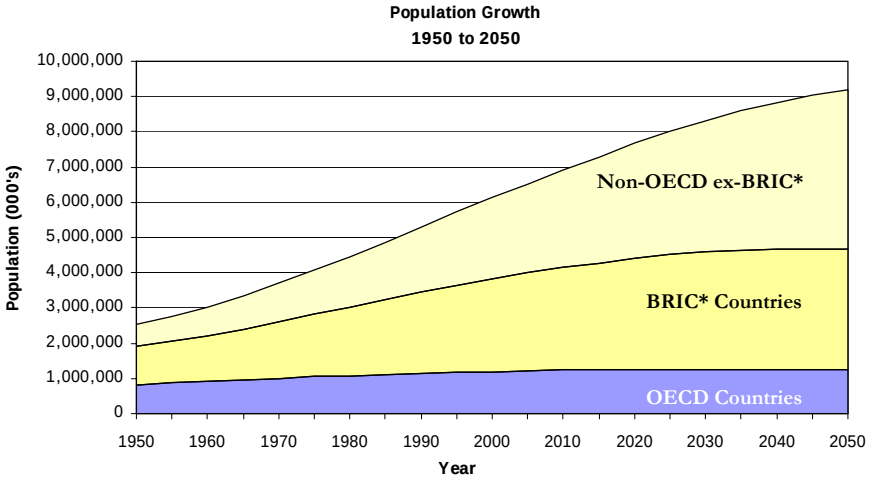
This then begs the question: What makes today's environment different? We believe there is a convergence of forces that have enormous potential to enable sustainable routes to market and commercial viability. These include the intersection of demographic issues, public policy, technology advancement, corporate involvement, capital market recognition, increased environmental awareness and dealing with the challenges of resource scarcity. We discuss these and other developments next.

[2] LoGerfo, James and Nicholas Parker and Diana Propper de Callejon, "Cleantech Venture Investing: Patterns and Performance." Cleantech Venture Network, March 2005.
[3] Michael Leibreich, New Energy Finance

What are Growth Drivers Behind Cleantech Investment?

Population Growth: A larger global population requires increased global food production, access to clean water sources, and more energy consumption. Thus, as the world population increases, there will be an ever increasing demand placed on Earth's resources. The world population was estimated to be 1.6 billion people in 1900. It now stands at 6.8 billion and has doubled since 1960. The world population is projected to increase to 9.2 billion people by 2050[4]. More than 95% of this growth is expected to be driven by the developing world including Asia Pacific, African and Latin American regions.

The projected 2.4 billion increase over the next 42 years is equivalent to the global population in 1950. Most of this growth will be absorbed by less developed regions whose population is projected to rise from 5.4 billion to 7.9 billion in 2050. In contrast, the population of the more developed regions is expected to remain largely unchanged at 1.2 billion and would have declined were it not for the projected net migration from less developed countries which is expected to average 2.3 million persons a year after 2010.[4]



Source: United Nations Population Division

Increased Urbanization: In addition, for the first time in history more people globally are projected to live in cities than in rural areas. Between 2008 and 2030, the world's urban population is expected to expand by more than 2 billion people to total 61% of the global population.[5] "Currently, we do not have the infrastructure to sustainably satisfy the demands of such large urban areas. We will need to invent and invest in technologies to generate and deliver large amounts of power to focused areas, provide effective transportation options to move many people within congested areas, and supply an adequate amount of purified water for personal and industrial uses."[6]

Increased Standards of Living†: It has been projected that in less than 40 years, the combined economic output (GDP) of Brazil, Russia, China and India alone could be larger than the G6.[7] What happens when countries with over 40% of the global population strive to achieve an American middle class standard of living in the next twenty five to fifty years? A steady increase in per capita income is

[4] United Nations, Department of Economic and Social Affairs, Population Division (2007). World Population Prospects: The 2006 Revision, Highlights, Working Paper No. ESA/P/WP.202. Note: We would like to acknowledge the historical and projected growth rates in population. In 1650, the human population numbered around half a billion and was growing at a 0.30% rate implying a doubling time of 240 years. By 1900, the global population had reached 1.6 billion and was growing at a 0.70% rate implying a doubling time of 100 years. By 1965, the population had reached 3.3 billion. The rate of growth had increased to 2% per year implying a doubling time of 36 years. By 2000, the population had grown to just over 6 billion but the rate of growth had declined to 1.2% per annum. In 2050, the expectation is that the population will grow to 9.2 billion representing a growth rate of 0.80%.

* BRIC = Brazil, Russia, India and China

[5] United Nations, Department of Economic and Social Affairs, Population Division (2007). World Urbanization Prospects: The 2007 Revision. Note: Currently, while it is estimated that ½ of the world lives in urban areas, the vast majority reside in small towns and villages, not large modern cities. 37% of urban dwellers globally live in cities with 1 million or more residents and just 8% are in megacities of 10 million or more.

[6] ThinkEquity Partners LLC, December 2006.

† Note: We would like to recognize that standards of living are measured across many metrics including income (GNP per capita), adequate housing, health standards, education levels, infant mortality rates, and life expectancies amongst others. Gross national product (GNP) per capita is often used as a summary index of the well being of different nations as well as a measure of the overall economic activity. One caveat is that the level and growth of GNP per capita does not show how income is distributed and the level of income inequality.

[7] Purushothaman, Roopa and Dominic Wilson, "Dreaming with BRICs: The Path to 2050." Goldman Sachs Group, Inc. New York: 2003. Note: G6 refers to the six major industrial democracies which include the United States, Britain, Germany, France, Japan and Italy.

related to an increase in the consumption of products and services and consequently more energy consumption, water use and waste generation.[8]

Electricity Demand: Increases in per capita income lead to rising consumer demand for lighting and appliances and growing requirements for electricity in the industrial sector.[9] According to the EIA, nearly one-half of the projected increase in energy consumption worldwide from 2005 to 2030 is expected to come from electricity generation.[10] Renewable energy sources including hydroelectric are projected to actually fall from 18% of world electricity generation to 15% in 2030. The share of coal-fired electricity generation is expected to increase from 41% to 46% worldwide in 2030.[10]

Transmitting existing electricity generation is also a critical issue. The U.S. is dealing with an antiquated and aging transmission system that has suffered from a lack of maintenance and upgrades. According to Global Smart Energy, "The transmission system – the high voltage portion that carries power long distances – has much in common with the Interstate Highway system. Both are roughly 150,000 miles. Both were begun in the Eisenhower era and largely completed by the 1970's. Both are essential to national security and prosperity. Both are seeing 'traffic' that far surpasses what they were designed to carry."[11] It is estimated that updating and upgrading the electric grid will cost nearly $1 trillion through 2030 in North America.[12] As a result, cleantech addressable markets also include smart grid applications across intelligent devices, two-way communication and advanced control systems to name a few.‡

Global Oil Supply & Demand Dynamics: At the beginning of the 20th century, oil made up less than 4% of the world's energy use. Today, this source accounts for more than 38% of the world's energy consumption.[13] The U.S. Energy Information Administration (EIA) predicts a worldwide increase of over 45% in primary energy demand by 2030 with much of the increase in demand coming from current developing nations including China, India and Mexico.[13]

In terms of supply to meet this demand, there is consensus among experts that conventional crude oil production will eventually "peak"† sometime in the not too distant future. While the experts may disagree about exactly when this peak will occur, they do agree that when it does, virtually all of the remaining untapped reserves of conventional oil will be left in countries of the Middle East or in unstable political regimes. The U.S. is already heavily dependent on foreign sources of oil consuming 25% of the world's oil with just 2% of its proven conventional reserves.[12] Therefore, in addition to supply concerns, national security fears translate into increased political support for renewable initiatives despite the price of oil.

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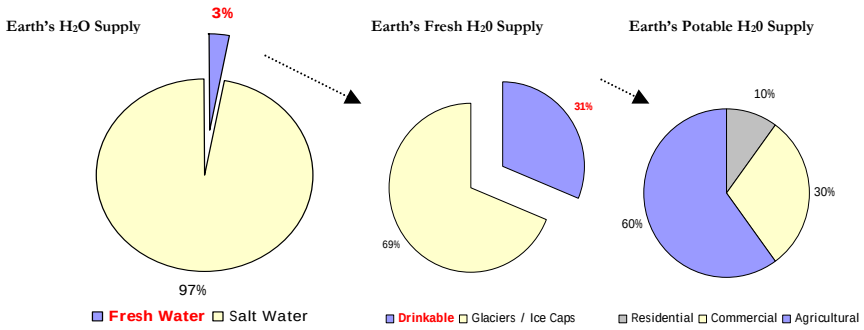
[8] Organization for Economic Co-Operation and Development (OECD), OECD Environmental Outlook to 2030. France: 2008. Note: For example, in 1980 China and India accounted for less than 8% of the world's total energy consumption. In 2005, that share had grown to over 15% and in 2030 is forecasted to be over 25%. In contrast, the U.S. share of global energy consumption is projected to contract from 22% to approximately 17% in 2030.
[9] United States Department of Energy, Energy Information Administration (EIA), International Energy Outlook 2007. Washington: September 2007.
[10] United States Department of Energy, Energy Information Administration (EIA). International Energy Outlook 2008. Washington: September 2008.
[11] Global Smart Energy. "The Electricity Economy: New Opportunities from the Transformation of the Electric Power Sector." 2008
[12] The Brattle Group, 2008.
‡ Note: See the U.S. DOE's 2003 report, "Grid 2030: A National Vision for Electricity's Second 100 Years" for more information. Download is available at http://www.oe.energy.gov/DocumentsandMedia/Electric_Vision_Document.pdf
[13] United States Department of Energy, Energy Information Administration (EIA). International Energy Outlook 2008. Washington: September 2008. Note: More than 86% of the world's energy consumption is from fossil fuels which breaks down to 38% from oil, 26% from coal and 23% from natural gas.
† A "peak" in global conventional crude oil production is believed to occur when half of the estimated ultimately recoverable reserves (EUR) of conventional oil have been produced. "Reserves" refers to the known quantity of oil that lies in fields and that can be produced with existing technologies at a commercially reasonable cost. "Resources" refers to the estimates of the total amount of oil that may exist in a region, including that which cannot be economically extracted or processed with existing technologies. Tar sands and shale oil are examples of resources. The theory goes that once global oil production "peaks", oil prices will begin a steady rise as nations, businesses and consumers vie for the remaining half of the reserves. M. King Hubbert theorized that exploitation of resources such as tar sands and shale would occur after production had peaked.

Water Scarcity: As water is a vital resource with no substitutes for most uses, scarcity could affect virtually every industry, firm and individual in water-short regions. Over the next two decades, the UN estimates water use will increase by 40% and half the world's population will face water shortages.[14] As a result, a substantial increase in global investment in all forms of water-related infrastructure and services is needed. Technologies are being developed and deployed to increase clean-water supplies at lower cost, with fewer resources and in more environmentally friendly ways.



Source: USGS, S.H. Schneider

Water covers 71% of the Earth's surface

Of this water, 97% is salt water and 3% is fresh water

69% of fresh water is frozen in glaciers and ice caps with the remaining 31% or just 0.93% of all Earth's water, potable or drinkable.

Of the potable water we use, 60% is used for agriculture, 30% for commercial & 10% for residential.

Technological Advancements: Given the breadth of the cleantech opportunity set, technological advancements across many industries including information technology (IT) have been leveraged to aide the progression of market ready applications in cleantech. However, one common criticism is that many [not all] clean technologies are not cost competitive with existing technologies. We believe that over time, technological advancements will continue to drive increases in efficiency to help ensure economic sustainability of clean technologies. Taking a page from the information technology revolution supports this view. "In 1980, the first commercial modem transmitted information at 300 bits per second … today's transmission is 3 billion times faster. In 1980, 2 terabytes of storage [2 trillion bits] would've been more than $100 billion. Today, the retail price is about $600."[15]

Public Policy & Political Support: "Increasingly, policy-makers at the national and state level are recognizing that cleantech can be a valuable asset in creating jobs, improving environmental performance, and promoting national security as well as resource independence."[16] As an example, Renewable Portfolio Standards (RPS), which obligate electricity supply companies to include a certain amount of renewable energy in their generation mix, are already in place in over 27 states plus the District of Columbia.* However, it is important to understand that public policy and the commitment of domestic *and* international governments to advance clean technologies is a key factor for market introduction.†

Corporate Involvement: "Since the mid-1990s, companies began to view environmental technology as a source of potential margins, not just as a government-mandated expense; a way to create value, reduce costs, maximize resource productivity and improve profitability."[18] Many corporations have

[14] United Nations, World Summit on Sustainable Development (Rio Earth Summit +10). Johannesburg, South Africa.
[15] Dennis Hayes speech at Renewable Energy Finance Forum West (REFF West), October 2008.
[16] Clean Edge, Inc., 2006
* According to the U.S. Department of Energy, from 1998 to 2007 over 50% of the non-hydroelectric renewable energy capacity was installed in states with RPS policies. Examples of RPS include California's RPS requiring electric corporations to have 20% of retail sales from eligible renewable energy resources by 2010 and Texas RPS mandating 5,880 MW by 2015 and 10,000 MW in 2025.
† An example of potential policy includes the UN Framework Convention on Climate Change (UNFCCC), the forum responsible for international climate change negotiations, agreement to adopt the Bali Road Map at the 2007 UN Climate Change Conference. This road map lays out a binding commitment to succeed the Kyoto Protocol which expires in 2012. More importantly, the U.S., EU, China and India were all key signatories.
[18] LoGerfo, James, Nicholas Parker and Diana Propper de Callejon, eds. "Cleantech Venture Investing: Patterns and Performance." March 2005.

invested heavily in clean technologies in response to greater profitability, favorable public policy, consumer demand, commercial viability, reduced potential legal liabilities and a desire for environmental stewardship. Fortune 500 firms from General Electric to General Motors and Wal Mart to Weyerhaeuser have devoted material portions of their capital budgets to invest in clean technology-oriented initiatives. Virtually all major automakers including Toyota, GM, Volkswagen, Ford, Honda, Nissan and BMW are working on hybrid and fully-electric vehicles as well as advanced battery technology.

Environmental Impact: Greenhouse gases, particularly CO_2, from human activity have been linked to climate change. Fossil fuel-based energy consumption is responsible for over 65% of the CO_2 emissions produced annually.[19] Furthermore, world greenhouse gas emissions are projected to increase 57% between 2000 and 2025 with the largest percentage increases expected from India, Mexico, China and Brazil.[19] "More activist federal energy policies – such as cap-and-trade systems for carbon-based emissions [which serve to limit and reduce emissions], expanded renewable energy mandates or even a federal carbon tax – would further drive the sector."[20]

These factors all suggest cleantech industry growth will be far less susceptible than it has been in the past to the attenuation of any individual driver such as energy prices or political shifts.

What Are Some Risks of Clean Technologies?
Clearly, there are risks universal to the venture capital/private equity space including risks associated with illiquidity, subjectivity of valuation and dependency on an exit strategy to "realize" a return on investment among others. Below we outline some general risks associated with clean technology many of which may apply to venture/private markets investing in general.

Commercialization & Market Adoption: Can the technology be produced cheaply enough to displace the current technology? Is there a route to market and will commercial viability be realized? When? According to Nick Parker, co-founder of Cleantech Group, "If you want to get businesses to embrace a more sustainable way of operating and convince customers to adopt a more sustainable lifestyle you've got to go back to basics: Will this lower costs/monthly bills? Will this improve operational efficiency? Will this lower risk? Will this give me an edge over rivals?"[21] In a nutshell, this is saying that *sustainable* market adoption must be driven by economic sense versus any fervor for the environmental or social value these technologies may create. For many companies, commercial viability is uncertain and routes to market may be even less clear.

Technology Risk: Will the technology work? The answer to this question is important because it addresses obvious things such as the reliability and safety of the product, whether it can be produced cheaply enough, and the path that will lead to mass or niche markets. The potential of a technology may be significant, but investors might have to take substantial R&D (research & development) risks to get there. For example, hydrogen fuel cells are very attractive alternatives to fossil fuels because they are more efficient in generating electricity than traditional grid-based systems, the energy generated is a renewable source and there is little to no greenhouse gas emissions. Thus, this technology has tremendous widespread commercial application and potential to dislodge traditional fossil fuel-based alternatives if it can be harnessed in a cost-competitive way. However, there are significant challenges associated with producing, delivering and storing hydrogen. Billions of dollars of

[19] World Resources Institute (WRI)
[20] Pricewaterhousecoopers. "Cleantech Comes of Age: Findings from the MoneyTree Report." April 2008.
[21] Nicholas Parker. Cleantech Blog. August 2006.

hydrogen-compatible infrastructure would also be required in order for widespread market adoption to occur.[22]

Regulatory / Political Risk: As early as 2005, there were more than 300 financial incentive programs and over 340 rules and regulations covering renewable energy.[23] Critics of clean technology are quick to point out that many of these technologies, especially in the renewable energy space, would not be economically available to the market without government subsidies and incentives to drive initial growth.[*] These subsidies may initially make a company's business model dependent on public policy. This increases uncertainty for capital budgeting and investment especially in industries such as energy that are capital intensive, highly regulated, have high barriers to entry and long lead times to get projects operational. An example of a financial incentive program is the production tax credit (PTC)[†] for wind power development. The PTC has expired and been reinstated four times since 1992 and was set to expire in 2008. In our opinion, regulatory drivers can be seen as a risk as well as an opportunity. These policies are what ultimately bridge the gap to potential commercial viability for some major technologies like wind, solar and biofuels. Policies should be embraced to the extent investors have confidence they are sustainable and create intended outcomes.

Managerial & Operator Risk: Given the nascent status of cleantech, especially relative to established venture capital industries such as biotechnology and information technology, many question whether the managerial talent and operator experience is sufficient. Management talent is critical to the success of a start-up company and deep venture capital experience is necessary to optimize the value added features of venture capital finance including established networks and industry reputation.

Exit Risk: There is always a risk of not realizing returns on investment due to a lack of exit opportunities in venture. According to the Cleantech Group, from 1987 to 2004, there were 67 cleantech offerings on U.S. exchanges and 29 offerings on European exchanges for a total of 96 transactions which raised gross proceeds of $6.3 billion.[24] In terms of M&A activity, from 1990 to 2003, Cleantech Group reports over 700 deals in more than 30 countries representing a reported deal value of $90 billion. Overall, there historically has been a narrow window for IPO exits which have largely involved energy-related offerings; M&A transactions have dominated cleantech exits accounting for well over 80%; M&A activity has largely occurred in North America as well as Europe with total deal count and transaction values driven by a short-list of multi-national corporate strategic buyers.

What are some investors saying about cleantech?

Included below is a sample of perspectives across industry participants who we respect and consider reputable sources. Some have been kept anonymous in order to ensure a candid viewpoint.

[22] Rifken, Jeremy, The Hydrogen Economy. 2001.
[23] Global Energy Decisions. "Renewable Energy: Bottom Line." Boulder, CO: Global Energy Decisions, 2005.
[*] Note: We would like to recognize that traditional sources of energy (oil, coal, natural gas etc.) are heavily subsidized as well. For example, according to Dr. Roger Bezdek, president of Management Information Systems Inc., 60% of the $700 billion in U.S. federal energy incentives over the past 50 years have gone to the oil and gas industries. See paper at http://www.misi-net.com/publications/IJGEI=V27N1-07.pdf
[†] Note: The PTC gives wind project owners tax credits for energy produced and is critical in providing certainty to developing wind projects as well as financing new power installations. Congress recently extended these energy tax credits as a part of the Emergency Economic Stabilization Act of 2008 which authorized the $700 billion plan to shore up the U.S. financial system.
[24] LoGerfo, James, Nicholas Parker and Diana Propper de Callejon, eds. "Cleantech Venture Investing: Patterns and Performance." March 2005.

"There's no doubt in my mind over the next 25 years, how we drive, how we build our houses, how we fly, how we build our buildings will all change … and just when six or eight billion people in the developing part of the world are starting to accelerate their consumption of energy, these technologies are coming on and that's an opportunity. That's a massive opportunity."
- Vinod Khosla, Cofounder Sun Microsystems & founder of Khosla Ventures

"The energy market is $6 trillion. I like to say it's the mother of all markets. Compared to the internet, this is much bigger, much more exciting. But the challenge is much larger. Going green – solving that problem will be the largest transformation on the planet."
- John Doerr, Partner at venture capital firm Kleiner Perkins Caufield & Byers

"Today we use far too much carbon in a variety of solutions. The reality is that carbon is going to become the third currency on this planet … the cost of capital, the cost of a barrel of oil and the next is going to be the cost of a ton of CO_2 [carbon]. Technologies that are going to allow the world's big industries to move to lower carbon solutions are going to be attractive ones. Those are going to be places where tons of existing investments will be washed over into new solutions … it is going to be a very long wave."
- Erik Straser, Partner at venture capital firm Mohr Davidow Ventures

"There are major opportunities for VC's to totally reshape the energy market throughout the world as governments, consumers and companies are demanding innovation in this space. However, as has been demonstrated in the IT and life science arenas, investing in new technologies can be fraught with pitfalls and is not for the inexperienced or faint of heart. Prudent, long-term, knowledge-based investment in cutting edge technologies has been the hallmark of venture capital and should be the mantra in the Cleantech space as well. Short-term 'tourists' should steer clear."
- Mark Heesen, National Venture Capital Association (NVCA) President

"We believe the best opportunities [in cleantech] are in late stage, revenue generating companies in contrast to early stage companies with technology risk. Tremendous gains will be made by knowledgeable and disciplined investors with experienced cleantech-focused VC and infrastructure funds. Significant losses likely will be incurred by others."
- Anonymous

"Two to three years ago we were more bullish on cleantech simply because there was more room to put money to work. At this point in time, there has been a lot of capital flowing into the space. These days, we would not necessarily label [cleantech] as low hanging fruit. You have to become more buyer aware [in this environment] and make sure you get a good GP that is smart enough, able to find good deals, structure good deals and get out of good deals."
- Anonymous

"For many VC's out there in cleantech, you just don't have a track record. There has not been enough time or enough of an IPO or strategic acquirer market to actually prove out that these guys are actually good pickers of technology and are able to realize it. Conversely, on the project side, there has been enough time. You can look at guys who have a track record of sourcing opportunities, investing, building and ultimately selling businesses."
- Anonymous

How Can Plan Sponsors Gain Exposure to Cleantech?

It is important to point out that the opportunity set in cleantech can range from early/late stage venture capital to project finance (e.g., wind farms and solar projects) and private equity-oriented transactions. In essence, an investor's opportunity set extends across providing risk capital and financing for a technology through various stages of market development whether it is for R&D, commercialization, and/or full-scale deployment. Alternative bank financing is often unavailable for venture start-ups due to the uncertainty associated with any unproven technology or commercial viability. Therefore, a need for venture capital exists. Project finance often involves investment in the commercial deployment of renewable projects with proven technologies and more certain revenue

streams. Thus, the continuum of cleantech investment has different risk and return profiles. As a result, the cleantech portfolio mix of early/late stage venture capital and project finance/private equity is important to consider.

As cleantech is an emerging area with wide-spread technological application, it is difficult to determine which technologies will be the "winners" or "losers" over time. Therefore, we believe that broad exposure to these technologies in venture capital and private equity is beneficial and may serve to diversify the risks associated with any one particular technology. The caveat here is the extreme importance to invest with experienced general partners. Fund-of-funds solutions are available in the market place to enable plan sponsors to achieve these objectives.

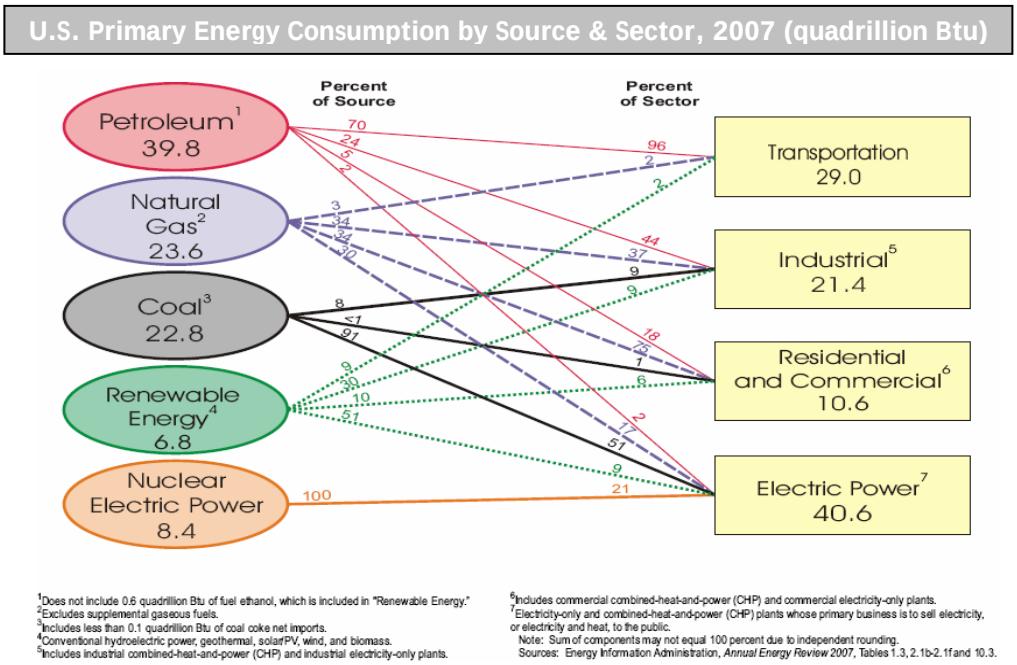
For plan sponsors who already have a private equity fund-of-funds allocation or established private equity program, it may be likely that there is already cleantech industry exposure through existing investments. So, it is important to check for overlap in an existing program before investment.

Conclusion:
As we continue to confront the limits to growth and the adverse environmental impacts thereof, clean technologies serve as market-oriented solutions with enormous potential addressable markets. Over the long-term, we feel the union of macro trends, resource scarcity, public policy, capital market recognition, corporate involvement and environmental impact all support this view. Even in the short run, there is no shortage of momentum and pressure building to catalyze a transition to a low-carbon economy.

With that said, the cleantech investment opportunity is not without significant risks many of which simply encompass the very nature of venture/private markets investing. Many investments in cleantech can be in highly capital intensive businesses that need scale and/or widespread market adoption in order to generate required rates of return. Many business models also have a dependency on public policy and subsidies to drive growth and routes to market. Now more than ever, there is no shortage of competing interests for public funds. Of course, there are operating difficulties, financing challenges and a dehydrated IPO market to contend with in the short-run as well. As a result, we believe that a healthy dose of selective patience is needed in this space as the opportunity unfolds. In the short run, we also believe investors need to be wary of pockets of exuberance especially in areas like solar and solar-related investments.

Despite these risks, we believe an abundance of opportunity looms in the balance for long-term venture/private investors who invest with experienced general partners capable of navigating the uncertainty and any exuberance of cleantech.

Appendix Section I*



Source: Energy Information Administration (EIA), "Annual Energy Review 2007"

- Oil links to transportation: 70% of U.S. petroleum usage is for transportation in the form of gasoline. Only 2% of petroleum is used to generate electricity. More fuel efficient vehicles, plug-in hybrids, all-electric vehicles, and increased renewable energy sources are all methods to reduce petroleum dependency.

- Coal links to electricity: Electric utilities are the largest energy consumers with 50% of electricity generated by coal, 21% by nuclear and 17% by natural gas. Coal is the "dirtiest" form of energy given its high carbon content. Caps on carbon emissions may serve to significantly alter the outlook and costs for coal-fired power plants.

- Natural gas is balanced: Use is balanced across industrial (34%), residential/commercial (34%) and electric power (30%). Many including T. Boone Pickens, have pushed to route more natural gas into the transportation sector via natural gas vehicles (NGV).

- The industrial sector consumes twice the energy as residential/commercial. Energy efficiency strategies could be the most effective here in the intermediate term.

- The two primary users of renewable energy are utilities (50%) and industry (30%). Renewables impact on the transportation space may occur primarily through electricity. There are significant opportunities for advancement in the transition to a "smart-grid" for transmission and distribution. These include demand-side management, smart-metering devices, visualization software, distributed generation, microgrid, grid-scale electricity storage, and vehicle-to-grid applications among many more.

* Inspiration for this section drawn from a November 2008 Merrill Lynch Report "The Sixth Revolution: The Coming of Cleantech" by Steven Milunovich, CFA.