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# GREEN CAPITAL: SEEDING INNOVATION AND THE FUTURE ECONOMY

## HEARING

BEFORE THE

SELECT COMMITTEE ON
ENERGY INDEPENDENCE
AND GLOBAL WARMING
HOUSE OF REPRESENTATIVES

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# GREEN CAPITAL: SEEDING INNOVATION AND THE FUTURE ECONOMY

**WEDNESDAY, APRIL 16, 2008**

HOUSE OF REPRESENTATIVES,
SELECT COMMITTEE ON ENERGY INDEPENDENCE
AND GLOBAL WARMING,
*Washington, DC.*

The Committee met, pursuant to call, at 2 p.m., in room 210, Cannon House Office Building, Hon. Edward Markey (chairman of the Committee) presiding.

Present: Representatives Markey, Sensenbrenner, Blumenauer, Inslee, Cleaver, and Hall.

The CHAIRMAN. This hearing is called to order. Today, as President Bush gets ready to tell America that he has come around on global warming and that he supports freezing U.S. global warming pollution 17 years into the future, we welcome a group that does have the vision and ambition to seriously address this problem.

These individuals probe the technological trenches of Silicon Valley and other innovation hot spots to find the solutions that will solve the energy and climate crisis. They pull the strings of capitalism, enabling ambitious young geniuses to turn today's dreams into tomorrow's technological realities.

Venture capitalists play a key role in innovation. The $26 billion in U.S. venture capital investment in 2006 represented less than one percent of U.S. GDP, but the $2.3 trillion in revenues these firms generated made up 18 percent of U.S. GDP. Venture capital-based companies employed over nine percent of the U.S. private sector workforce. And job growth in these companies is occurring at nearly three times the rate of the rest of the private sector.

The corporate behemoths that dominate the business pages are mostly mature companies. They face fierce competition that often forces them to outsource manufacturing in order to stay competitive, but low-wage developing countries cannot compete with an innovative economy.

We should salute the American entrepreneurs that for decades have pushed the American economy to the technological edge, where wages and growth are high. The challenge today is to channel these creative energies to help solve our global warming problems and to help put the economy back on track.

Governments can take two approaches to solving great technical challenges, like reducing global warming pollution. They can prescribe the answer; for example, by massively subsidizing nuclear power generation, as President Bush supports, or they can set a

target and leverage the creative genius of the innovators of the world to find the answers.

The first is to cling to the technological past. It also means compliance at the highest possible cost. That approach is akin to investing in a candle-maker because Thomas Edison's light bulb will never catch on. It is like doubling down on mainframes because you don't believe many people will want computers at their desks.

We don't know what all the answers will be to the global warming problem, but investing taxpayers' dollars on yesterday's technologies will ensure that the world's innovators will have to look outside the United States to find the markets they need to develop tomorrow's innovations. And that will not be good for us. This is something that we cannot afford. And this hearing will help us to find a path that will take us down a different road.

That completes the opening statement of the Chair. I now turn to recognize the ranking member, the gentleman from the State of Wisconsin, Mr. Sensenbrenner.

[The prepared statement of Mr. Markey follows:]

**"Green Capital: Seeding Innovation and the Future Economy"**
**Select Committee on Energy Independence and Global Warming**
**April 16, 2008**

Today, as President Bush gets ready to tell America that he has come around on global warming and that he supports freezing U.S. global warming pollution 17 years into the future, we welcome a group that does have the vision and ambition to seriously address this problem. These individuals probe the technological trenches of Silicon Valley and other innovation hotspots to find the solutions that will solve the energy and climate crisis. They pull the strings of capitalism, enabling ambitious young geniuses to turn today's dreams into tomorrow's technological realities.

Venture capitalists play a key role in innovation. The $26 billion in U.S. venture capital investment in 2006 represented less than 1 percent of U.S. GDP. But the $2.3 trillion in revenues these firms generated made up 18 percent of U.S. GDP. Venture capital-backed companies employed over 9 percent of the U.S. private sector workforce, and job growth in these companies is occurring at nearly three times the rate of the rest of the private sector.

The corporate behemoths that dominate the business pages are mostly mature companies. They face fierce competition that often forces them to outsource manufacturing in order to stay competitive. But low-wage developing countries cannot compete with an innovation economy. We should salute the American entrepreneurs that for decades have pushed the American economy to the technological edge, where wages and growth are high. The challenge today is to channel those creative energies to help solve our global warming problem and to help put the economy back on track.

Many of the technologies under development by venture-funded firms are game-changing. They are technologies that will threaten the energy establishment. As we heard from an Exxon executive last week, that company is investing $10 million a year—less than one tenth of one percent of their $40 billion profit from 2007—to create an alternative energy future. I'm not a venture capitalist, but this business plan gets an "F" in my book. Not surprisingly, by 2030, Exxon is not expecting alternative energy to play any significant part in their business. Alternative energy—any alternative—is a threat when you are raking in the largest corporate profits in history.

We can not expect these companies to be the innovators that will solve the energy and climate challenge. But the planet's global warming cure is out there. It is in the mind of an innovator who will discover the world's most efficient solar panel. It is in the mind of another innovator who will devise a manufacturing process that will cut the cost of that solar panel in half. These infinite seeds of innovation will be sowed by venture capitalists

that will harbor entrepreneurs through the early periods when risk-averse commercial banks will steer clear.

Governments can take two approaches to solving great technical challenges like reducing global warming pollution. They can prescribe the answer, for example by massively subsidizing nuclear power generation, as President Bush supports. Or they can set a target and leverage the creative genius of the innovators of the world to find the answers.

The first is to cling to the technological past. It also means compliance at the greatest possible cost. That approach is akin to investing in a candle maker because Thomas Edison's light bulb will never catch on. It is like doubling down on mainframes because you don't believe many people will want computers on their desks.

We don't know what all the answers will be to the global warming problem. But investing taxpayers' dollars on yesterday's technologies will ensure that the world's innovators will have to look outside the United States to find the markets they need to develop tomorrow's great innovations. Unfortunately, the wider economic and job growth impacts of innovation will go to markets outside the United States as well. This is something that the Big Oil and Big Business Bush Agenda simply does not understand.

Leveraging private capital is the best chance we have of finding the solutions that will save us from the worst effects of global warming. Public dollars cannot and should not bring this fundamental shift on their own. A cap-auction-and-trade system that puts a price on carbon emissions that reflects the true costs of global warming is the most important step Congress can take this year. It will level the playing field for clean energy technologies and unleash the unequaled innovation of the American entrepreneur. And it will give smart money—the venture capitalist—every reason to go searching for those ambitious innovators.

Mr. SENSENBRENNER. Thank you very much, Mr. Chairman.

There is no disagreement about whether jobs created by investments in renewable energy are good. Of course, these types of investments will help the economy. And I am glad to see that venture capitalists and other private financiers are taking an interest in alternative energy, but these investments will help the economy most if they are created through free market decisions.

Costs of renewable energy are going down. And more communities will make investments in these types of technologies because they offer many benefits.

In some places, renewable energy is a great option for electricity production. In other places, renewable energies aren't as effective. And I am concerned that mandates will create unnecessary expenses that will only slow the economy.

One need look no further than Congress' ethanol requirements to see the effects these energy mandates can have on the economy. Just yesterday the New York Times reported that Congress' mandate for a fivefold increase in biofuels, namely ethanol, was helping drive food prices so high that they are causing unrest and even riots in some places. And gasoline is still as expensive as ever.

I agree with what we will hear from today's witnesses that tax credits can help spur the investment in new technology, which I believe is a key principle for any climate change policy. And I support extending these credits and, in the case of the R&D credit, making it permanent.

While our witnesses today will tout the benefits of renewable energy, they will also claim that without government mandates and regulations, renewable energy will not see significant share in the marketplace. Venture capitalists are famous for the risks they take, but that doesn't sound too risky to me.

I am skeptical of both the need for regulation and mandates and the idea that renewable energy won't expand without government assistance. I am especially skeptical of the idea that a mandatory cap and trade system is needed to bring about this sea change in energy production.

There are at least four reports analyzing the economic effects of the leading cap and trade bill in the Senate. And all forecast fewer jobs and slower economic growth in the future, all at a time when the economy is slowing down.

While it is true that alternative energy will create some jobs, the burden the cap and trade regulation will put on this economy will sap away many more. The EPA's model showed that by 2030, cap and trade could cost the U.S. economy nearly a trillion dollars in GDP. That should give any legislator great pause before deciding to support cap and trade, but it seems like some in Congress want to rush the U.S. economy into this flawed system.

One of our witnesses today, Mr. Daniel Braun, who also happens to be my constituent, warns lawmakers that a cap and trade system must be ready before it is rolled out. While I disagree with Dan about the need for a cap and trade system, he seems to have his own concerns about the speed in which Congress is rushing into this process. I do agree with Dan about the need to make the tax credits permanent, and I welcome him here today to testify.

Another concern that I have with cap and trade is that it fails to produce tangible, measurable results to the environment. Europe rushed together a cap and trade system. And, despite that, emissions are still rising there.

While the U.S., without a mandatory cap and trade system, saw a one percent drop in emissions last year, Europe's emissions rose 1.1 percent. Since the U.S. is not seeking to emulate these results, I can't see why we would want to adopt the same system.

I believe alternative energy technology can help us make great strides in confronting climate change. And I support advancing these technologies but not through heavy-handed government mandates that will cause far more economic pain without delivering any environmental gain.

I thank the Chair and yield back the balance of my time.

The CHAIRMAN. Thank the gentleman. The time has expired.

The Chair recognizes the gentleman from Oregon, Mr. Blumenauer.

Mr. BLUMENAUER. Thank you, Mr. Chairman.

I apologize in advance. I am going back and forth from the markup. I think you are also. But I am keenly interested, and I have had a chance to review the testimony. I am going to take in as much as I can.

This is one of the most important aspects of our work on climate change. Our witnesses here today can help provide some guidance about how public policy can help influence the billions of individual decisions that we all make every day as consumers, government agencies about where we shop, how we move, where we live, what we buy.

And being able to target, harness market forces to move in the right direction, to make it easier and less expensive to do the right thing and perhaps a little less expensive for things that damage the environment I think is very important.

With all due respect to my good friend Mr. Sensenbrenner, we are not rushing into this. We have an opportunity to build on the experience that we had with other markets that we have established in terms of dealing with acid rain.

We can look at our friends in Europe. And, in fact, Mr. Chairman, with your leadership, we have had a number of them here before us to testify to what they would do different if they were involved in it.

In 280 days, we are going to become a country that is no longer on the outside of this. We are going to be dealing with a carbon-constrained economy, no matter who is elected president. He or she is committed to a cap and trade or something of that nature.

We have an opportunity, as we have done with our energy bills, to realign the massive subsidies that are buried right now in the tax code and government policy. There isn't an invisible hand now, but listening to our witnesses, I think we can find ways to make that hand work better. And I look forward to the testimony and working with them to realign these policies.

The CHAIRMAN. The gentleman's time has expired.

The Chair recognizes the gentleman from Washington State, Mr. Inslee.

Mr. INSLEE. Thank you. Thank you. Thanks to the witnesses for being here.

You know, in about 12 minutes, we are going to hear a can't do policy from the White House. In about six or eight minutes, we are going to hear I think a can do strategy from our three witnesses in our ability to really unleash the creative talents of Americans when you marry it up with the investment capital that is really waiting for the signals it needs to simply say that these new technologies need to have somewhere close to a level playing field.

And right now because of some short-sightedness over the last several years in D.C., we have given all of the advantages to the old technologies by allowing them to put their pollutants into the atmosphere in unlimited amounts at zero cost. And we would never allow anyone to back up their garbage truck and dump it in the city park in unlimited amounts for free when a clean technology is available. That is what we are doing right now. We need to remedy that situation.

And I think listening to our witnesses who are good enough to meet with us this morning with another group here, we are going to learn that there is enormous potential investment available with the right signals that can really skin this cat. And I appreciate it.

I want to point out two Washington figures: Steve McBee, who is a leader in helping the U.S. economy, sitting back here; another great investor, Max Vekich from Cosmopolis Washington at one time, in any event.

Thank you. I look forward to your testimony.

The CHAIRMAN. The gentleman's time has expired. The Chair recognizes the gentleman from Missouri, Mr. Cleaver.

Mr. CLEAVER. Thank you, Mr. Chairman. Thank you for being here, members of the panel.

I am in preparation of a meeting with the civic leaders in the metropolitan area of Kansas City, Missouri. And the subject of that meeting will be the subject of this hearing. And so I am very anxiously awaiting your testimony.

The potential for green industry to benefit our country is unlimited, especially when you consider the hemorrhaging nature of our economy today. If the studies are correct and that green industry can create a half a million new jobs in the next two years, then this is where we ought to place a substantial portion of our capital.

And as venture capital firms, such as those represented by those of you here today, invest in new and promising companies connected to the green industry, the benefit could be invaluable to Congress. And so I look forward to dialoguing with you further.

I hate this disruption that is going to occur, but I will return. Thank you, Mr. Chairman. I yield back the balance of my time.

[The prepared statement of Mr. Cleaver follows:]

**U.S. Representative Emanuel Cleaver, II**
**5th District, Missouri**
**Statement for the Record**
**House Select Committee on Energy Independence and Global Warming Hearing**
**"Green Capital: Seeding Innovation and the Future Economy"**
**Wednesday, April 16, 2008**

Chairman Markey, Ranking Member Sensenbrenner, other Members of the Select Committee, good afternoon. I would like to welcome our distinguished panel of witnesses to the hearing today.

Investment in green technologies is essential if our country is to achieve true energy independence. Presently, renewable energy provides only about six percent of the total energy used in the United States. For example, in 2007, solar photovoltaic installations increased by over 80 percent in our country. Although this statistic is expected to rise, it is not rising quickly enough in order to properly respond to the growing emergency of the cost of energy and global warming. The potential for green industry to benefit our country is unlimited, and this is especially vital considering the weak condition of our economy.

If the studies are correct in that green industry can create half a million new jobs in the next two years, then this is where we should focus a substantial portion of our capital. If venture capital firms – such as those represented by the panel today – invest in new and promising companies connected to the green industry, the benefits could be invaluable to our national economy. I hope that today's witnesses can provide advice into how Congress may aid in the further investment of a clean energy economy. Venture capital is vital for start-up green industries to move forward. I cannot encourage you enough to look closely at the emerging green tech companies.

I thank all of our witnesses for their insight and suggestions, and I appreciate them taking the time to visit with our committee this afternoon.

Thank you.

The CHAIRMAN. Thank you, Congressman Cleaver.

And we recognize the Congressman from New York, Mr. Hall.

Mr. HALL. Thank you, Mr. Chairman. I will keep it short.

The students at Arlington High School in Arlington, New York, Dutchess County, just came up with an idea to put solar panels on the roof of the new wing of their high school, which is being built, took the initiative to go to NYSERDA to get state funding and then came to our office and asked for help.

Rather than waiting for the uncertainty of appropriation, I was able to find, my staff was able to find private grant funding for it. And we presented them with a check for $108,000 to complete their budget for that.

Now, that is leadership coming from the next generation. And not only is that going on, but we have in district, in Orange County a private firm that is processing municipal solid waste from an entire town, which previously was being landfilled and now has taken it through this process, producing ethanol, gas that could be burned to spin a turbine and put the power into the grid, hydrogen that could be used from the gas because 48 percent of the gas they product is hydrogen so that they can charge fuel cells. And everything is being recycled and nothing is being put into the ground. And the total impact in terms of greenhouse gases from their process is 75 percent less than if they landfilled the same MSW.

In Wappingers Creek where it enters the Hudson River, there is a small low-head hydro private facility that is generating a flat two and a half megawatts of base power from hydroelectric. It is just happening by itself. And the more investment there is available to try to spur it and to make it possible to people with the imagination and the will I think the faster it will come on board. So I am excited about it.

I am excited to hear your testimony. I yield back, Mr. Chairman.

The CHAIRMAN. Thank you, sir.

The time for opening statements of the members has been completed. Unfortunately, while those statements were being made, four roll calls were called on the floor of the House, which will also include a recommittal motion, which means an additional ten minutes.

So I think it would be wise for us to adjourn for approximately a half an hour so that we could return to this hearing. We apologize to our witnesses, but this is just the nature of the Congress. So we apologize. The Committee stands in recess.

[Brief recess.]

The CHAIRMAN. If we can reconvene? Thanks for joining us. We have three great witnesses today. I had the pleasure of getting to talk to them earlier this morning. First, David Prend is the Managing General Partner of RockPort Capital. David joined Salomon Brothers in 1990. He was promoted to Managing Director and headed the Global Energy Investment Banking Group in 1998. He co-founded RockPort Partners, a merchant bank specializing in energy and environmental sectors. In 2001, he founded RockPort Capital Partners, which is a venture fund. And today he is also testifying on behalf of the National Venture Capital Association, which we appreciate their great work.

We also have Daniel Abbasi, who leads MissionPoint's regulatory and public policy research group. He is responsible for originating and structuring energy and environmental finance transactions. He was an appointee to the U.S. Environmental Protection Agency. He served as senior adviser to the Office of Policy. And he co-chaired the Strategy for U.S. Environmental Technology Initiative and helped to produce our first U.S. Climate Action Plan.

He is the author of a great book, which starts with the quote "We are faced with the first urgency of now." And that even is coming up in presidential debates. So people are listening to you. I hope you will tell us the name of your book.

Dan Braun then joins us. He is the Director of Global Environmental Finance of Stark Investments. And we appreciate him clearing his calendar on short notice to join us. He is currently co-managing an investment portfolio, which is centered on the theme of global environmental finance and climate change. We are looking forward to at least five minutes of good thoughts.

Mr. Prend, if you could start.

Mr. PREND. Sure. Thank you, Mr. Chairman, members of the Committee.

**STATEMENT OF DAVID PREND, CO-FOUNDER AND MANAGING GENERAL PARTNER, ROCKPORT CAPITAL PARTNERS, ON BEHALF OF THE NATIONAL VENTURE CAPITAL ASSOCIATION, ACCOMPANIED BY DANIEL R. ABBASI, DIRECTOR, MISSIONPOINT CAPITAL PARTNERS; AND DAN BRAUN, DIRECTOR, GLOBAL ENVIRONMENTAL FINANCE**

**STATEMENT OF DAVID PREND**

Mr. PREND. RockPort Capital Partners is a venture capital firm based in Boston and Menlo Park. Our funds comprise one of the largest pools of dedicated capital in the fast-growing sector of venture capital called clean tech. We manage about $400 million, and that amount is about to double.

As was said, I am pleased to be here also on behalf of the National Venture Capital Association, which represents approximately 480 venture capital firms in the United States and is committed to advancing those public policies that are conducive to entrepreneurship and innovation and U.S. competitiveness.

Over our history, RockPort Capital has invested in about 40 companies spanning a wide range of innovations, including renewable energy, such as solar and wind; next generation transportation technologies, such as hybrid and fully electric vehicles; smart grid technologies that enable more efficient use of the existing electric generation capacity; clean air and water technologies; and energy conservation and green building technologies.

I would like to start by saying that I think the outlook for continued growth and investment in the renewable energy sector is excellent. And it is driven by a number of factors, most important being the promise of exciting returns based on the innovation in this space.

We are today in clean tech where the IT industry was about 35 years ago and where the biotech industry was about 20 years ago.

And we are dealing in a much larger total market than either of those two markets.

The key issue today is what the federal government and, in particular, Congress can do to help cultivate the environment for this innovation. From what I know about the market demand and the technologies and, most importantly, the road maps of a number of these technologies, this is going to happen, regardless of how intelligent the energy policy we have from the United States.

So I think the challenge for the government is to come up with intelligent policies that foster a good transition to minimize the pain that this economy is going to face in this transition from old energy to new energy.

These technologies make sense. Other countries are aggressively pursuing them with policies that foster innovation. And there are a number of examples where other countries have taken the lead away from the United States already due to more enlightened policies.

So that is what we are really dealing with here in our humble view. It is not whether this is going to happen. It is where the U.S. is going to stand when this is all done.

For the purposes of my oral testimony, I would like to just focus on a few of the policies, suggestions that I have provided in the written testimony. The first is the long-term extension of the renewable energy investment tax credits and production tax credits.

We applaud the House for passing a very robust energy tax package. Ideally from the investment community, we would love to see these extensions over a long period of time, but I think we recognize the difficulty in longer-term credits from a budget point of view. However, I am here to urge you strongly to reach a compromise on the two bills and get a bill signed into law without delay.

I can cite several examples from my own portfolio companies where young, fragile companies that are doing good things for the economy and creating jobs in this economy are having to already—and, fortunately, small companies are good at being nimble—having to turn on a dime and move from sales in the United States to sales in places like Spain and Korea because of the uncertainty about the ITC.

Another important area is the national renewable energy standard, which I would recommend in the range of 20 percent, combined with decoupling of utility revenues to disconnect the utilities' incentive to get profits from increasing kilowatt hour sales. What we would really like to see is energy efficiency and not penalize the companies for this saving energy.

Third, transportation I think is very important. Rather than favoring just biofuels I think encouraging a results-oriented approach, we, in particular, have four investments in the areas of electric drive train and hybrid vehicles.

Even with the very meager subsidies that there are right now for those technologies, those technologies make a lot of sense from a marketplace, even without some intelligent incentives. If nothing else, just the CAFE standards helps to level the playing field among technologies, rather than favoring one type of transportation technology over another.

Fourth, I would like to highlight R&D spending. I serve on the Advisory Board of NREL, the National Renewable Energy Lab. And, in fact, two of our most promising companies use technologies that were not developed at NREL, but the expertise that was resident at NREL was substantially helpful in actually getting these technologies to the place where they are at market. One of them is in the market today and doing very, very well. The other one is about to launch an exciting new product in the solar space that I think is going to revolutionize the solar industry.

The Chairman earlier noted the tremendous impact that venture has on job growth and the economy. And I think the energy industry today is a new market opportunity, where innovation has the opportunity to create even more jobs and more exciting opportunities for people than these previous examples of success in the venture capital community.

Every single clean tech company that we invest in today holds a promise of bringing a much-needed innovation. When that happens, there are many winners. Our investors are definitely winners; entrepreneurs; and more importantly, the American public, who will benefit from new jobs, new companies, and a cleaner environment. For a venture capitalist, it is definitely the intersection of the best of all worlds. We can do well by doing good.

Thank you very much for the opportunity to testify. And I look forward to answering your questions.

[The prepared statement of David Prend follows:]

**TESTIMONY OF**
**DAVID PREND**
**MANAGING GENERAL PARTNER, ROCKPORT CAPITAL PARTNERS**
**ON BEHALF OF THE**
**NATIONAL VENTURE CAPITAL ASSOCIATION**

**BEFORE THE**
**HOUSE SELECT COMMITTEE ON ENERGY INDEPENDENCE**
**AND CLIMATE CHANGE**
**APRIL 16, 2008**

**Introduction**

Good afternoon, Chairman Markey, Ranking Member Sensenbrenner, and Members of the Committee. My name is David Prend and I am a founder and managing general partner at the venture capital firm RockPort Capital Partners which has offices in Boston, MA and Menlo Park, CA. We invest in both early and later stage companies in the energy and power, process and prevention and advanced materials sectors. RockPort's funds comprise the largest pool of dedicated capital in the fast growing venture capital investment sector known as Clean Technology.

I am pleased to appear before you today on behalf of the National Venture Capital Association (NVCA), on whose Board I serve. The NVCA represents approximately 480 venture capital firms in the United States and is committed to advancing those public policies that are conducive to innovation, entrepreneurship, and US competitiveness. In no other sector are those ideals more critical than in the clean tech sector.

Over our history, RockPort Capital has invested in over 40 companies spanning a wide range of innovations including:

- renewable energy such as solar and wind power;
- next generation transportation technologies, such as hybrid and fully electric vehicles;
- "smart grid" technologies that enable more efficient use of the existing electric generation, transmission and distribution infrastructure;
- clean air and water technologies; and
- energy conservation and "green building" technologies.

RockPort has deep business and industry expertise gained from our partners' extensive backgrounds in management, technology, finance, and operations. This expertise and experience is invaluable as we identify, invest, and build high-growth companies in the Clean Tech markets.

I began my career in the energy industry as an engineer at Bechtel where I worked in the area of advanced energy technologies. Following Bechtel, I worked at Amoco in the Treasurer's Department and in the chemical and upstream oil and gas subsidiaries. Later, I joined Shearson Lehman in their Natural Resources Investment Banking Group where I advised companies in the energy, mining and forest products industries. In 1990, I joined Salomon Brothers where I was promoted to Managing Director and headed the Global Energy Investment Banking Group.

In the last 36 months, the venture community has seen tremendous growth in investment in the clean tech sector. According to data from Thomson Financial, venture capitalists invested over $2.2 billion into more than 200 clean technology deals in 2007, representing a 340 percent increase from 2005. In the last year alone, venture capital investment grew 47 percent and shows no signs of slowing. The number of venture capital firms investing in the clean technology sector more than doubled. This increased interest is driven by a number of factors, the most important being the promise of return on innovation in the space.

Being a venture capitalist investing in clean tech today is very exciting indeed. We are positioned right where the information technology and semiconductor industries were 35 years ago, and where the biotechnology industry was 20 years ago. There is a perfect, benevolent storm brewing as market demand, government support, technological breakthroughs and available risk capital are coming together to foster a revolution. What venture capital did for the Internet and Biotech revolutions, we are now poised to replicate with clean energy technologies with one difference: in the case of clean tech, the potential markets are much bigger in scale and scope and much more mission-critical for the entire globe.

I am pleased to be with you today to discuss what the federal government, and in particular, what the Congress can do to help cultivate the environment for the burgeoning clean tech industry. The clean tech revolution is going to be good for the U.S. economy and it is going to be good for job creation. Rest assured, these advancements in energy technology will take place regardless of whether the U.S. government acts to foster the advancement of clean technologies. While that is good news for the environment, it could be extremely problematic for our country. If our government doesn't assume a significant role in enacting policies that will advance these emerging technologies, the ramifications are twofold. First, the time and difficulty it will take to reach our goals of energy independence and a cleaner environment will be significantly greater. Second, other nations are ready, willing, and able to take the lead on driving innovation and will gladly leave the U.S. behind given the opportunity. As a country, we can either facilitate the renewable energy industry or be left in the dust by countries that support energy innovations.

I truly believe that nothing less than our nation's standing in the global marketplace is at stake. We can either lead that charge on the race for energy technology advancements or we can lose our competitive advantage to other countries that have rightly made this a priority.

Given the critical nature of the national energy crisis, I believe that victory will require a multi-faceted approach. There is no silver bullet, no single policy solution that is going to win the day. Just as we will need multiple energy innovations and technology advancements to resolve this crisis, so too do we need a multi-pronged policy approach. To achieve this goal, I have outlined nine policy suggestions on which the Congress can act that I believe will achieve our stated goals of energy independence and national

security while combating the threat of global climate change. This list by no means encompasses all the federal government needs to do, but it is a necessary start.

**Recommendations:**

1. **Long-term extension of the renewable energy Investment Tax Credits and Production Tax Credits** - The House has passed a very robust energy tax package, which I believe correctly redirects incentives from older, more established energy sources, to newer and very promising renewable energy technologies. Ideally, the extension would be even longer than two years in order to provide the maximum certainty for project development, but we recognize the difficulty in achieving longer-term tax credits. The Senate has recently acted with the passage of the Cantwell-Ensign measure as well. However, reaching compromise on the two chambers' bills and getting that compromise signed into law must occur without delay. This legislation cannot fall victim to election year politics because quite literally companies will fail, jobs are at stake, and our global competitors will seize the lead in the race to innovate if we fail to provide the necessary incentives for these nascent companies who rely on the ITC and PTC.

2. **The adoption of a National Renewable Portfolio Standard of 20 percent** - States are already adopting individual Renewable Portfolio Standards, creating a patchwork of programs that differ from one state to the next. This fragmentation is not going to serve anyone's interests – neither the utilities nor the companies that want to provide renewable energy to the utility. It is time for the federal government to adopt a single standard that sets a high bar and challenges the private sector to meet that goal. States should be allowed some flexibility in how they attain the RPS, but meaningful penalties should be enforced for non-compliance. This national RPS can be established quickly and should not wait for the adoption of a cap & trade program or other climate change legislation to be enacted.

3. **Embracing the innovation curve** - NVCA supports a technology-neutral approach to innovation and agrees that the federal government should not pick winners and losers, but there should be recognition that there is a high value in the government helping an industry "ride the learning curve" and reach market potential. This dynamic was particularly relevant in the silicon and semiconductor industries. Early support by the federal government helped these industries leverage the learning curve and reach their potential. In the case of solar and wind power, this support would be particularly helpful to drive the cost out of these technologies in the medium term and eliminate the need for subsidies in the longer term.

4. **A national agenda for energy efficiency** – Energy efficiency is critical to solving the energy crisis so we recommend an efficiency plan that pushes "de-coupling" with the utilities by disconnecting their profits from kwh sales.

Utilities have to be incentivized in order to achieve the best results. Telling utilities to lessen demand or improve efficiency is ineffective. Rather, they must be compensated through regulated income. We should continue to pursue strategies and technologies for energy efficiency and conservation, and not penalize utilities financially for doing so.

5. **Carbon cap and trade –** As Congress seeks to address this highly complex and controversial issue, we should look to the European markets who are ahead of the U.S. and seek to avoid some of the mistakes that have been made with the implementation of their program. With the adoption of any cap and trade program, it will be necessary to require that strong verification procedures be in place to ensure integrity in the marketplace. Consistent with the principles endorsed by the U.S. Climate Action Partnership, we believe a cap and trade program must be environmentally effective, equitable and economically sustainable.

6. **Redirect oil and gas subsidies** – We must wean the oil and gas industries off their long-enjoyed subsidies and re-allocate those funds toward more generous funding for renewable and next generation energy supplies in solar, wind, and electric vehicles. This strategy will greatly accelerate the end of subsidies for renewables and foster a supply/demand, purely economics-driven industry, which we all agree is the ultimate goal.

7. **Address the challenges in transportation head-on -** It is widely agreed that the transportation sector is a major contributor to global warming so advances in the electric drive train and electric and hybrid vehicles will be of tremendous environment benefit. Incentives for biofuels and continuing increases in CAFE will be positive improvements.

8. **More federal support for R&D across the spectrum of federal agencies** – Too often critical research done in federal agencies is subject to wildly fluctuating appropriations. The result is a scattered, disjointed effort on the part of the government to provide early stage basic research. The work coming out of the national labs, and notably the DOE Office of Science, the National Institute of Science and Technology, and the National Science Foundation, if consistently and adequately funded, would yield faster and improved technological advances.

9. **Creation of an ARPA-E** - Modeled after the Defense Department's highly successful and innovative DARPA program, the creation of an ARPA –E agency, whose mission would be to solve the nation's urgent energy challenges, would provide a focal point for critical projects. DARPA's success was due in large part to its small size, nimble abilities and willingness to take on risky ventures. There is no reason why this couldn't and shouldn't be repeated in the field of energy.

Not only does supporting the clean tech start-up community foster innovation, but it also supports economic growth. According to a 2007 study by Global Insight, venture backed companies accounted for more than 10 million jobs and 18 percent of US GDP in 2006. These companies have been proven to grow at a faster pace than their non-ventured counterparts in every industry sector. We expect clean technology to be no different.

**Conclusion**

Venture capitalists have an obligation to their institutional investors to identify the best companies and invest in the most promising technologies that will change the way people live their lives. The significant interest by the venture capital community in the clean tech industry is indicative of the tremendous market potential that this sector represents. Every single small clean tech company that we invest in today holds the promise of bringing a much needed innovation to life. When that happens, there are many winners: our investors, entrepreneurs, and most importantly the American public who will benefit from new jobs, new companies, and a cleaner environment. For a venture capitalist, this intersection is the best of all worlds: we can do well by doing good.

But we can't do it alone. We need to partner with US lawmakers, regulators, and the Administration to jumpstart our efforts and develop a strong pipeline of innovation in the clean tech space. The opportunities are abundant for those who choose to play. Just as we did with information technologies and biotechnologies years ago, the venture community chooses to play in clean technology. We only hope that Congress will again stand beside us so that we all can win and reach our goal of energy independence, a cleaner environment, and economic growth for decades to come.

Thank you very much for the opportunity to testify before you today.

Mr. INSLEE [presiding]. Thank you, Mr. Prend. And, just so you know, everything you said the Chair totally agrees with you. So that is bonus you will get. That is why you had additional time.

Mr. Braun.

Mr. BRAUN. Thank you, Mr. Chairman and members of the Committee.

**STATEMENT OF DAN BRAUN**

Mr. BRAUN. It is truly a great honor to be here today to discuss federal policy measures that will enhance investment in clean energy technology.

Before I begin my testimony, I would like to just take a moment to acknowledge Ranking Member Sensenbrenner. As he mentioned earlier in this conversation, he is my hometown congressman. I want to thank him for service to the Wisconsin 5th.

Mr. INSLEE. He did some great job for the country in India. You should compliment him. We went there, met the Dalai Lama. And he made some very eloquent comments about Tibetan religious freedom.

Mr. BRAUN. Excellent. A little bit about Stark Investments. We have got more than 20 years of experience. And over that time, we have grown to become one of the largest alternative investment firms in the industry, currently managing approximately $14 billion.

In my role as portfolio manager, my job is to allocate financial capital in alternative energy technology, among other investments. My focus is to explore the financial implications of living in a carbon-constrained world. Over the last several years, the Stark team has allocated capital to alternative energy investments in both public and private markets.

I would like to focus my testimony today on four major issues. And I will get through this quickly so we can get to questions. First is the connection between federal energy legislation and capital market engagement. Second, I will be addressing the need for an unencumbered price signal for carbon. Third, I will deal with market uncertainty. And, finally, I will touch upon some of the lessons learned from the European Union emission trading scheme.

First, the recently signed energy bill and future legislative efforts by this body to regulate greenhouse gas emissions will directly affect capital market allocation. With regard to potential $CO_2$ emissions reduction program, all eyes are on Washington. The Congress has been working pragmatically to pass climate change legislation. It is also significant that today President Bush just finished presenting his ideas on dealing with these types of issues.

Institutional investors, like myself, are watching this activity closely because we will only be able to engage if there is a clear legislative mandate, a point that we discussed earlier today. Second, if Congress is interested in the full engagement of the capital markets, the most powerful action this body can take is to set a hard physical limit, or cap, on $CO_2$ emissions and mandate a long-dated tax credit and loan guaranty portfolio for clean energy solutions in addition to cap and trade. It needs to be a combination of short-term and long-term solutions.

The most important aspect of a capital market solution is the idea of an unencumbered price signal. Cap and trade markets with artificial price conditions, safety valves, off-ramp conditions will ultimately distort the price signal for greenhouse gas emissions and make it difficult for investors to engage completely.

Using the basics of supply and demand, we know that a market clearing price will lead to the best use of financial or technological resources. Any artificial price condition disrupts that very simple balance.

Third, I would like to address the issue of market uncertainty. I have listened to policy-makers and stakeholders talk about market-based solutions. And having encountered both fact and fiction, one common theme is that volatility is a bad thing. In fact, some degree of volatility is characteristic of a properly functioning market. The price of a financial asset or liability is very important information to institutional investors.

We also heard from skeptics that there is free money to be made by financial players investing in alternative energy under a cap and trade system. I can only wish that was the case. On the contrary, private sector investors will apply financial resources to investments that will use a return as a function of risk. In simple terms, new technologies are extremely risky investments. We run a great risk of being wrong.

Finally, I would like to discuss lessons learned from the first phase of the EU–ETS. The over-allocation of credits in the learn while doing first phase of the program caused financially trading credits to expire with negligible value.

To those that use that argument to say that cap and trade does not work, I would suggest, to the contrary, the market considers all available information to arrive at a price. It is worth noting that the second phase of the EU–ETS has seen relatively stable prices because there was not this issue of over-allocation of credits.

In conclusion, a necessary element involved here is the trust that capital markets will work. The commoditization of carbon dioxide emissions is not without precedent. We now trade greenhouse gas emissions that resulted from the 1990 amendments to the Clean Air Act. If done correctly, investors will fully engage in creating the solution set. The mandate of the capital market is to assume the risk of developing and commercializing nextgen alternative energy technologies so taxpayers don't have to.

As we move beyond politics and money, we will see that this is a partnership between capital markets and Washington that is capable of achieving sustainability, energy security, and a low-carbon global economy.

I respectfully submit my testimony to the public record, look forward to answering questions, or providing further comment. Thank you, Mr. Chairman.

[The prepared statement of Dan Braun follows:]

# TESTIMONY OF DANIEL G. BRAUN
# DIRECTOR OF GLOBAL ENVIRONMENTAL FINANCE
# STARK INVESTMENTS

## BEFORE THE SELECT COMMITTEE ON ENERGY INDEPENDENCE AND GLOBAL WARMING
## U.S. HOUSE OF REPRESENTATIVES
## APRIL 16, 2008

Mr. Chairman and members of the Committee, my name is Daniel Braun and I am the Director of Global Environmental Finance for Stark Investments, headquartered in Milwaukee, Wisconsin. I appreciate the opportunity to discuss federal policy measures that can enhance investment in clean energy technology.

I also would like to take a moment to acknowledge my hometown Congressman, Ranking Member James Sensenbrenner, and thank him for his leadership on energy security and climate change and other issues of critical importance to the Fifth District of Wisconsin.

**About Stark Investments**

Stark Investments is an alternative investment firm. We invest on behalf of pension funds, endowments, fund of funds, family offices and high net worth individuals. With over 20 years of investment experience, Stark has grown to become one of the largest alternative investment firms in the industry, with over $14 billion of assets under management.

As climate change science has matured, and concerns about increasing greenhouse gas emissions have intensified in the United States and around the world, Stark has been involved in the global capital markets for greenhouse gas (GHG) emissions reductions and alternate energy technology.

In my role as Portfolio Manger of Global Environmental Finance, I have a mandate to allocate financial capital in the alternative energy space. The focus of the Portfolio is an exploration of the financial implications of living in a carbon constrained world: A world in which emissions of carbon dioxide and other greenhouse gas emissions carry a price and that price will affect a wide spectrum of financial assets (and liabilities). Over the last several years, the Stark team has allocated capital to alternative energy investments in both public and private markets. In addition, we have been very active in the European carbon markets, the Kyoto compliant markets and the United States early action market traded at the Chicago Climate Exchange.

**How Public Policy Decisions Impact Capital Investment**

I have been closely following the ongoing public policy debate on global warming here in Washington. I applaud Congress for the recent passage of the Energy and Independence Security Act of 2007 (EISA 07), which includes an aggressive new vehicle fuel economy mandate, renewable fuels mandate, and building efficiency standards. The passage of this legislation is a positive step in decreasing global greenhouse gas emissions. As important, is the need to continue to evaluate the full life cycle of GHG emissions resulting from our policies to ensure that we do not cause intended negative consequences.

The recently signed energy bill and future legislative efforts to regulate GHG emissions will directly affect capital market allocation. With regard to a potential CO2 cap and trade program, all eyes are on Washington, and in some respects, the legislative element is now the only thing that matters. The most powerful action this body can make is to set a hard physical limit or cap on CO2 emissions, then let the private sector invest in the development of the alternative technologies required to continue to meet energy demand while hitting the mandated reduction target.

Furthermore, I believe that a clear, consistent and long-dated tax credit and loan guarantee portfolio defined by this body will augment a cap and trade system and set the stage for the development of the solution set of next-generation alternative energy technologies.

This recommendation is based on the capital market interpretation of and response to legislative action (or inaction), and underlines the need for clarity and long-dated legislation. To this end, and given that these two conditions are met, I believe that the capital markets can engage completely. However, if tax credits are short-dated, subject to legislative uncertainty, or if a cap and trade program is designed and then constantly modified, the capital markets cannot and will not be able to make optimal or well informed decisions. In short, if this is not done correctly, I believe the capital markets will not fully engage, which will reduce the level of private sector investment in the necessary low carbon technologies of the future. As a result, the goal of hitting a greenhouse gas reduction target will be harder to achieve.

The most important aspect of a capital market solution is the idea of an unencumbered price signal. Cap and trade markets with artificial price conditions, safety valves and off ramp conditions will ultimately distort the price signal for GHG's. Using the simple but elegant supply-demand dynamic found in any basic economics text, an artificial price condition will cause sub-optimal resource allocation. In practical terms, if a price is held artificially high, investment decisions will be made that "game" the system and if a price is held artificially low, investment allocations will be unprofitable and, therefore, cannot be funded. Thus, we will either fail in our attempt to achieve an environmental goal, or place an unnecessary cost on our economy in our attempt to achieve those goals.

Parenthetically, a carbon tax behaves like an artificial price condition. I understand that it is the easiest policy from an administrative standpoint but it is functionally the worst in terms of efficacy; not to mention the political challenges associated with imposing new taxes.

I've listened to policy makers and other stakeholders say we need an "Apollo-Project" approach in order to commercialize next generation technology. Given the scale of the challenge before us, I believe that the private sector and capital markets must be fully engaged and that American ingenuity cannot be driven solely by the public sector. With the correct public policy measures, that ingenuity will hit its full stride by funding in the private sector.

**Market Manipulation**

I have been involved in meetings on the Hill with Members and Staff for a little more than a year. During that time I have encountered both fact and fiction about market based solutions. One common theme is that volatility (which is the degree to which the price of a commodity fluctuates) is a bad thing. In fact, some degree of volatility is a characteristic of a properly functioning market. The magnitude and duration of changing price signals are extremely valuable information about the supply-demand dynamics at any given point in time.

From the standpoint of an investment firm having to deal with financial volatility on a daily basis, price certainty is not a consideration. A transparent and liquid forward price curve is required in our valuation analysis – volatility comes with the territory.

A second common misconception is that price certainty is always a good thing. In fact, price certainty is not a natural feature of any other commodity market, and can be very destructive if it is certain that the price will not support the investment of risk capital in a new market (such as a safety valve price, well below the marginal cost of abatement).

Another misconception is that there is free money to be made by financial players investing in alternative energy under a cap and trade system. Private sector investors will apply risk capital to investments that will yield a return that is a function of the risk. Because the innovative technologies needed to create the low carbon economy of the future are unproven, by definition, the expected return on investment has to relate to that risk. Investors believe the longer we delay creating the policy to unleash the private capital markets towards this investment, the higher the costs will be to our economy because we will have to achieve more in less time.

Much is also made about "lessons learned" from the first phase of the European Union Emissions Trading System (EU-ETS). In simple terms, the over-allocation of credits in the "learn while doing" first phase of the EU-ETS caused financially traded credits to expire with de minimis values. To those that say this proves that cap and trade does not work, I would suggest that this proves to the contrary: The market is a discounting mechanism that considers all fundamental factors to arrive at a market clearing price. In

the case of first phase of the EU-ETS, the over-allocation of credits caused supply to dwarf demand – the terminal value of these credits fully reflected this condition. It is important to note that the second phase of the EU-ETS has seen relatively stable carbon prices because it has been determined to be "short" or intentionally under-allocated.

The most important lesson of the first phase of the EU-ETS is that we cannot over-allocate credits. In fact, a very positive attribute of the 1990 amendments to the Clean Air Act is that we have extremely accurate GHG emission data for generating facilities in the United States. This historical data will help to enable us to set a good baseline from which to establish the declining cap over time.

Earlier in my testimony I mentioned the Chicago Climate Exchange. Dr. Richard Sandor, CEO of the Chicago Climate Exchange, and his team have developed an early action market. This is a new market that allows companies that will be compliant and financial firms that provide liquidity to begin transacting in the US CO2 emission markets. Early action will smooth the economic transition as we approach the beginning of the compliance period. Companies and financial firms that engage in early action should be credited for CO2 reductions in excess of "business as usual," and that credit should be recognized in the compliance program.

**Conclusion**

A necessary element involved here is the trust that capital markets will work. This is complicated by the current status of the credit crisis. But the commoditization of carbon dioxide emissions is not without precedent. We now have fully functioning markets for sulfur dioxide and nitrous oxide, SO2 and NOx, two new commodities borne from the 1990 Amendments to the Clean Air Act. To those that may not agree that there is a connection between SO2/NOx and the commoditization of GHG emissions, my point very simply is that a pollutant can be commoditized, capped and traded to achieve emission reduction goals. If done correctly, the private sector will fully engage in creating the solution set. The mandate of the capital market is to assume the risk of developing and commercializing the solution set of alternative energy technologies. In the end, as we move beyond politics and money, we will see this as a partnership between capital markets and Washington that is capable of achieving sustainability, energy security and a low-carbon global economy.

I respectfully submit this testimony into the public record, and look forward to answering questions or providing further comment. Thank you, Mr. Chairman.

Mr. INSLEE. Thank you, Mr. Braun.

Mr. Abbasi.

**STATEMENT OF DANIEL ABBASI**

Mr. ABBASI. Good afternoon, Mr. Chairman and members of the Committee. My name is Dan Abbasi. And I am a Senior Director with MissionPoint Capital Partners, which is an investment firm in Norwalk, Connecticut that is exclusively focused on financing the transition to a low-carbon economy.

The Committee requested our perspective as clean energy investors on the outlook for the renewable energy industry and what policies, including what carbon regime, would best promote deployment and innovation.

So I appreciate the opportunity to summarize my testimony to the Select Committee at this important moment in national policymaking on these issues and would ask that my written testimony be submitted for the record.

Mr. INSLEE. So ordered.

[The prepared statement of Daniel Abbasi follows:]

**Testimony of Daniel R. Abbasi**
**Hearing: "Green Capital: Seeding Innovation and the Future Economy"**
**Select Committee on Energy Independence and Global Warming**
**U.S. House of Representatives**

**April 16, 2008**

Good afternoon. My name is Dan Abbasi, and I am a Senior Director with MissionPoint Capital Partners ("MissionPoint"), an investment firm based in Norwalk, CT that is exclusively focused on financing the transition to a low-carbon economy. I lead MissionPoint's policy oversight effort in addition to originating and closing investments.

Thank you for the opportunity to speak to the Select Committee about the future of the renewable energy industry and to highlight its critical role in the effort to transition to a low-carbon economy. It is a privilege to be with you at this crucial juncture in national policy-making on energy independence and global warming.

The Committee has requested our perspective as clean energy investors on the outlook for the renewable energy industry and what policies, including what carbon regime, will best encourage innovation and deployment of clean energy.

While the renewable energy industry has seen tremendous investment and growth over the last year, comprehensive and intelligently designed policy is critical to its continued success. We need policy vision and a robust, stable framework of laws capable of stimulating a profound transformation in our system of energy production and use.

This transformation will cost trillions of dollars, and as such we agree that legislators should design policy with the needs and interests of investors in mind. It will be critical to attract significant private capital to the task, since public dollars cannot and, we believe, should not be the sole source of funding to facilitate this important shift.

MissionPoint's carbon-centered investment thesis stems from two strongly held convictions:

1) that unabated climate change is the greatest foreseeable risk facing humanity;

2) that mitigating it constitutes one of the greatest investment and job creation opportunities in history.

Our firm was founded and is chaired by Mark Schwartz, former Chairman of Goldman Sachs (Asia) and CEO of Soros Fund Management. Our team has deep energy and environmental domain expertise, based on senior roles in finance, technology, policy and operations at such organizations as General Electric, ABB, SwissRe, FMC and U.S. EPA.

I would like to make 5 points in my testimony today:

First, MissionPoint's outlook for growth, investment and job creation in the renewable energy industry is bullish.

Second, our ability to continue to invest in realizing this positive forecast and accelerating the industry's growth depends on a comprehensive and stable set of supportive policies – including extension of the investment and production tax credits that remain in limbo today.

Third, we believe it is now time for Congress to provide the credible, long-term price on carbon that we need as a foundation for this industry's growth – and I'll describe our preferences on some key design points to consider in your deliberations.

Fourth, we would encourage the Congress to consistently support and stimulate not only renewable energy, but the broader set of high-impact carbon mitigation options in the fossil fuel industry, from optimization of power plants to carbon capture & storage.

Fifth, while we believe it is important not to oversell "conservation and efficiency" as the single panacea offering all the painless carbon mitigation we need, there are enormous opportunities here that are untapped, often because of financing gaps.

**First, MissionPoint's outlook for growth and investment and job creation in the renewable energy sector is bullish, and let me explain why.**

The two primary criteria for energy used to be that it be cheap and reliable. Now we've added two words to that: secure and clean. Managing this now more complex four-dimensional equation requires us to bring unprecedented innovation and entrepreneurialism to the energy sector. Simply put, we must find new ways to produce, deliver and consume energy.

MissionPoint sees the future success and growth of renewable energy sector as a critical element in the solution to this equation. A strong renewable energy industry in the U.S. will offer:

- Greater energy security and diversification, marked by resilience to volatility and scarcity pricing in traditional fuels;
- Greater national security through less dependence on oil and gas imported from politically unstable areas of the world;
- Long-term international economic competitiveness;

- Creation of hundreds of thousands of high-quality, technology-led jobs for both U.S. workers -- and workers overseas, which should increase the global standard of living;

- A critical instrument in our decarbonization plan for the U.S. and global economy.

The magnitude and quality of investment in the renewable energy industry over the long term will be tied to economic value creation, which today is driven by:

- Supportive, but still relatively unstable, subsidization programs that are critical to increasing the economic certainty necessary to attract meaningful amounts of growth capital;

- Long term expectations of economic value as we achieve increasing scale of production and adoption; and

- Growing demand for clean and reliable energy, due to emerging market preferences.

Growth will continue as long as these drivers persist, but in the future will be driven increasingly by:

- Realization of cost reduction through scaling, with many key technologies maturing to the point that subsidization becomes unnecessary;

- Expanding market demand, beyond Renewable Portfolio Standard quotas;

- Improvement in relative economics as traditional fuels are required to absorb a carbon price.

Success along the way toward this future will create positive feedback loops that attract:

- More talented management
- More innovation
- More capital
- More solutions
- Lower costs

MissionPoint is highly confident, based on the success we have seen to date, that we can achieve this future – and not in 20 years but far sooner.

Declining Cost Curves

The declining cost curves over time -- due largely to scale and learning economies – for wind, photovoltaics, concentrating solar power, geothermal and other renewable energy

technologies constitute a robust trend. Further cost reductions are attainable to a varying extent across technology sets, and we aim to selectively accelerate those with the most so-called "entitlement" for further gains.

Solar is particularly attractive in this regard, offering substantial cost reductions to come. We believe, for example, that as the cost of producing solar energy continues its steady downward march towards "grid parity" (generally viewed as 10 cents per kilowatt-hour, or "kWh"), the demand for solar energy will grow very quickly to a staggering level. DOE Solar America Initiative estimates that solar energy will achieve price parity at panel costs of $1.25 per watt – and that the industry will get there by 2015.

We believe that Levelized Cost of Energy (LCOE) is the most important metric by which one can measure the competitiveness of energy technologies. This figure is calculated based on the installed cost of the system, the energy produced over the life of the asset, its operational & maintenance costs, and its financing costs.

Most PV modules today are made from crystalline silicon (c-Si) and cost approximately $3.00 per Watt to produce. Even without a shift to more advanced thin film technologies, the cost of the incumbent c-Si technology is projected to drop to $1.70 per watt by 2011, $1.31 by 2016, and $1.10 by 2021.

The cost reductions are expected to come largely from manufacturing economies of scale rather than major technological breakthroughs, reinforcing the importance of sustaining a strong policy stimulus so we can ride down the cost curve.

Aggregate installed system costs – which is what the customer ultimately pays – are largely driven by module costs, but also account for the "balance of system" electrical equipment and mounting structures as well as labor costs for field installation.

According to Deutsche Bank, installed costs for c-Si systems today average approximately $7.29/watt and are expected to decline to $4.38/W in 2011, $3.26/W in 2016 and $2.61/W in 2021 (assuming a commercial-scale 150kW system).

The LCOE of c-Si systems today averages about $0.32/kWh and is expected to decline to $0.19/kWh in 2011, $0.14/kWh in 2016 and $0.11/kWh by 2021. The Energy Information Agency projects that average residential grid electricity prices will rise from $0.104/kwh today to $0.108 in 2009 before declining to $0.104 in 2021 – demonstrating a small and relatively stable dispersion around 10 cents and a coming solar cross-over with average grid prices.

Of course, many people pay more than the average grid price today: the market size today for electricity at prices greater than 15 cents is $30 billion, a price that solar systems can meet in areas with appropriate sun once federal (and sometimes state) tax credits and incentives are factored in.

Advanced thin-film technologies, the next generation after c-Si, are expected to produce even steeper cost declines as they grow in manufacturing scale and increasingly drive industry-wide pricing. First Solar, today's lowest cost thin-film producer, is manufacturing cadmium telluride thin film PV modules at $1.25/watt and expects to produce over 400 MW in 2008.

The Prometheus Institute estimates that global solar manufacturing capacity will grow from just under 2 GW in 2006 to 40-60 GW by 2015. This estimate suggests a 50% compounded annual growth rate.

- Assuming a capex/watt of $1.00 in 2015, this estimate implies up to $60 billion in capital investments into manufacturing capacity.

- Assuming a total installed system cost of $3/watt in 2015, a 40 GW manufacturing base will produce $120 billion annually in solar power generation systems, of which the solar panels themselves will constitute about half and the remaining "balance of system" and installation will constitute the other half.

Job Intensity of Renewable Power

The job creation story is correspondingly attractive:

- According to research by Roger Bezdek for the American Solar Energy Society, in 2006 the wind industry created 16,000 direct jobs and 36,800 total jobs in 2006.

- According to a study by the Renewable Energy Policy Project, a national development of 50,000 - 70,000 MW of wind energy could potentially create 215,000-331,000 full time equivalent job/years of employment.

- The Geothermal Energy Association (GEA) reported 4,583 direct jobs in 2004, with an average salary of $40,000-50,000.

Two key points to add here are that the job-intensity and quality of renewable energy jobs are comparatively high.

There are some basic reasons for this. One of the key liabilities of renewable energy is its low power density – meaning it produces less energy per unit of land and other material inputs. This low power density tends to be associated with high labor intensity, meaning that we tend to see more job creation per unit of energy than we see with fossil fuel power. DOE, for example, reports that wind energy produces 27% more jobs per kwh than coal-fired energy, and 66% more jobs than natural-gas fired energy.

Second, renewable energy tends to generate highly skilled manufacturing, construction and high-tech jobs – as well as new white collar jobs in high-growth companies. Particularly as our nation absorbs job losses from the economic downturn, renewable

energy should offer welcome job creation. Many of these jobs are likely to be inherently domestic and localized, as well as long-term rather than transient. For example, the U.S. has distinctive expertise and competitive advantage to leverage into the high-tech segment of the renewable industry, such as advanced materials. And the service and installation/asset deployment jobs are not easily subject to overseas outsourcing. There remains risk that manufacturing will move to low-cost overseas operations, but Congressional and state-level support can mitigate this risk through cost-sharing grants for new manufacturing facilities.

SunEdison, LLC ("SunEdison"), a MissionPoint portfolio company that I'll discuss later in this testimony, created 370 high-quality jobs in two years. But we must not be complacent that job creation will necessarily be domestic, for there are cautionary signals: A major U.S. solar panel manufacturer reported having diverted jobs and in-demand solar panels to overseas markets as a result of aggressive incentives in Europe, into areas that are less attractive than the U.S. on a solar energy productivity basis.

To sum up point #1, rapid growth rates and very large future market sizes are what we in the private equity community look for in an investable market sector and the renewable energy industry offers this.

It is worth noting, however, that these estimates are based on *production* forecasts, which are ultimately derived from *demand* forecasts. Solar energy is not price competitive today on an unsubsidized basis. Therefore, the current demand forecasts are based on aggregating the demand created by the numerous subsidy programs in place around the world.

**This brings me to my second major point, which is that our ability to continue to invest in this industry's growth depends on a comprehensive and stable set of supportive policies.**

In order to keep our risk profile within the bounds dictated by our fiduciary responsibility, we must continually assess the stability of the policy framework that provides indispensable support for this phase of renewable energy growth in our country. So we strongly encourage Congress to extend and to further intensify use of the full suite of policy instruments, such as investment and production tax credits, Renewable Portfolio Standards, expanded use of federal procurement authority, loan guarantees, higher RD&D expenditures and others.

The fact that significant investment is already happening today should not be interpreted as a signal that strengthened policies are no longer needed. In fact, the investment community is already anticipating this strengthening and if it fails to strengthen soon, it will be akin to a negative earnings surprise on Wall Street that could put the U.S. even further behind in this strategic industry.

The pending and still uncertain extension of the Investment Tax Credit is the most timely example of this investor expectation – and the risks of disappointing it.

MissionPoint believes that Congress should deliver on what was left behind when the 2007 energy bill was passed, and renew as soon as possible these crucial tax credits to support a clean energy future.

Extension of the Production Tax Credit will stimulate accelerating investment in and production of wind and geothermal power, two of the fastest growing renewable energy industries. The Investment Tax Credit will support manufacture of clean solar technologies. Both are set to expire at the end of this year unless Congress acts to extend them.

Unfortunately, the "on-again/off-again" status of the PTC has contributed to a boom-bust cycle of development in the wind industry. There are significant consequences to not renewing PTC prior to expiration. In '01–'02, there was a 2 month gap between expiration and renewal, and wind capacity additions fell by a factor of four. By contrast, the PTC was extended in 2005 prior to expiration, and the next year capacity additions increased. Clearly other factors are not identical between the various time points, but historical failure to renew before expiration has resulted in dramatic decrease in installations.

These are the short-term consequences, but just as important are the long term consequences of having a PTC that runs even the risk of expiration every few years. A longer term PTC would enable a more stable and substantial domestic industrial capacity to develop, including investment in manufacturing capacity, permanent job creation, an ecosystem of domestic component suppliers, and private investment in R&D. It would be good, for example, to have domestic capacity to produce specialized wind turbine components, rather than relying on substantial equipment imports as we do today.

What makes the expiration risk so problematic for investors? Uncertain and erratic policy increases the cost of capital. Quite simply, you need to pay a higher cost of capital to equity providers or lenders for your renewable project, if you cannot count on supportive policy in your cash flow projections. Moreover, even when the tax credit extensions are enacted, they are typically too short in duration to match to the long-term cash flows we are trying to finance. So the net present value of the project is driven down. This is particularly problematic in the energy industry, because these are capital intensive businesses that require long-term cash flows in order to justify the upfront investment.

All of this undermines the credibility of our domestic renewable market with capital providers, as well as with top quality entrepreneurs and large strategic players. It is important to recognize that this is not just about small start-up or mid-market companies. Even major equipment manufacturers like GE Wind Energy are unable to economically start and stop the retooling and production plans of their plants, if the policy and market framework is not stable. They will only allocate resources to long term sustainable businesses, otherwise they will exit or shift their production to more attractive foreign markets.

By undercutting the diversification of our energy supply into renewables through uncertain policy, we not only undermine our domestic innovation and adoption cycle, but we also perpetuate our dependence on volatile and high cost commodities like natural gas and oil.

We recognize that the House and Senate differ on whether and how to pay for the renewable incentives and that there are competing priorities on the legislative calendar, but with recession risk still on the horizon this is no time to fail to pass a critical bill and therefore interrupt the most substantive growth and job creation story in the U.S. market today.

Renewable energy manufacturing already has a track record of creating jobs and growth in economically depressed areas – particularly those areas hardest hit by the exodus of domestic manufacturing jobs. Examples and figures cited by industry participants include:

- Gamesa, a Spanish wind turbine manufacturer, created hundreds of jobs and invested tens of millions of dollars to build three factories in areas of Pennsylvania after the collapse of the local steel industry;

- Maytag closed its factory and corporate headquarters in Newton, Iowa after being bought by a competitor, causing thousands of lost jobs. In 2008, a new wind turbine factory is opening in Newton, generating hundreds of new, high-paying jobs;

- A study by the Blue/Green Alliance shows that investments in renewables could create over 820,000 new jobs nationwide.

- Industry estimates indicate that renewable tax incentives would help to prevent the cancellation of 42,000 MW of planned renewable energy projects in development today in 45 states – an amount equivalent to 75 base-load electricity generation stations.

In our view, the renewable tax incentive package does not create an unfair advantage for renewables, but rather a leveling of the playing field with long-subsidized traditional resources. Moreover, as we have discussed, solar power and other renewables will continue to reduce their costs as they scale up, so in the mid to long-term, no subsidies will be required. For most of the technologies aided by this package, this is a crucial transitional support, not a long-term dependence.

In a globalized marketplace, we cannot afford to let other countries continue to surge past us in renewable energy. While the United States ranks high on the list of countries with the capacity and natural resources for a robust renewable energy sector, the lack of certainty around the PTC and the ITC are consistently pointed to as the most significant de-stimulus for growth and financing in the industry. There is evidence that we are already losing the U.S. edge with key manufacturers in relation to overseas activity. One

major solar company, for example, recently shifted to a Plan B strategy, relocating the bulk of its U.S. sales force to Europe and Asia after the ITC/PTC extension failed to pass in December 2007 or January 2008.

Germany, Spain, China and India have stable public policy incentives and impressive job growth in the renewable sector. The #1 and #2 job creating industries in Germany in the past five years are the wind power and solar energy industries.

The tax credits are crucial for investors to continue to bring emerging technologies to scale and cost parity. Therefore, we would seek their longest possible extensions. The credits are vital to provide investors with certainty commensurate to the cash flow cycle for major renewable energy projects – without this, their very financeability is undermined.

Therefore, we favor the House Bill's extension of the Investment Tax Credit to 2016 – or even further to 2020 or beyond. We favor the House Bill's extension of the Section 45 Production Tax Credits to 2012 – but 10 years to 2016, or even longer, would be better.

SunEdison and the ITC

Allow me to describe how one of our portfolio companies has built an innovative business model for diffusing solar power that depends in its initial phase on Investment Tax Credits.

SunEdison basically leveraged good policy and their ingenuity to solve a longstanding problem: how to mitigate the high up-front capital costs and transaction headaches associated with buying solar electricity.

This has been a good example of policy bridging a crucial gap. While their model will eventually be self-sustaining, it still depends on the Investment Tax Credit in these pioneering days.

We invested in SunEdison when it had 2 people and a business plan, and today it is the largest solar developer in the country – having creating over 370 jobs inside the company (primarily in MD and CA) and many more sub-contracting jobs outside it, with accelerating growth ahead.

SunEdison this year will install 75MW of power. At about $6-8M+ investment per MW, this means approximately $450-600M of capital investments will be made in SunEdison's 20-year solar assets in 2008..

Its unique business model provides solar power to large national accounts like Wal-Mart and Kohl facilities throughout the country.

There are plenty of commercial and municipal customers out there interested in buying solar power, but they don't make the move because they don't want to have to shop

around for systems, contract their own installation and, essentially, pay for twenty years of electricity costs today. SunEdison, headquartered in Baltimore, Maryland was started to simplify solar for those same customers by being a one-stop shop. The Company develops the project, manages the process, puts the solar system on the customer's roof and sells them the power from it for less than what they'd be paying for utility power, without their having to deal with the hassles of owning and maintaining the system or financing the cost.

Solar power has typically been treated like energy efficiency. People asked, "What's the payback?" Utility companies don't think payback. They think, "delivered cost of power." SunEdison allows people for the first time to think, "What's the delivered cost of power from solar?" The answer is that solar is cheaper than fossil fuel power in many places once available (and transitional) subsidies are factored in.

SunEdison packages the power for sale in 10 or 20 year contracts, and uses all available incentive programs and structuring creativity to close the gap on solar and scale it up much more rapidly:

- Solar Renewable Energy Certificates (from the state RPS programs)
- Pass-thru of Solar Investment Tax Credit to Tax equity providers
- Accelerated depreciation

In about five years, the economies of scale SunEdison is already achieving will bring solar to parity with fossil fuel electricity without subsidies in areas with good sun and high electricity prices, e.g., Arizona, California, Hawaii, Nevada, New Mexico, and others.

SunEdison is truly creating a market – it has produced a few imitators but it has a significant advantage and has since vertically integrated by buying some of the largest installers in the U.S. and setting itself up to move further ahead.

UpWind Solutions, Inc. ("UpWind") Complements the PTC

MissionPoint has also created and capitalized a new company that, in effect, complements the PTC by supporting the growth of its primary industry beneficiary – wind energy.

Unbeknownst to many of its enthusiasts, wind energy has faced significant performance problems. MissionPoint's investment method is to analyze bottlenecks to the diffusion of low-carbon technologies. In the case of wind, we saw that gearboxes were failing prematurely and turbine manufacturers were offering shorter warranties and moving away from post-warranty O&M services. The lack of operating history on the installed base of turbines creates increased likelihood of power output shortfalls due to mechanical failures, thereby creating demand for experienced O&M and optimization providers

This created an opportunity for 3rd party providers, so we founded a new wind turbine operations & maintenance company, rather than another wind developer.

UpWind provides services to keep wind turbine installations well maintained and optimized for maximum energy production – the company is hiring rapidly and its customers need the PTC extension if they're going to keep growing – and hiring Upwind in states like TX, CA, Iowa, and Montana.

UpWind works with project owners to improve performance through preventive maintenance and inspection services. All these services combined serve to improve operating performance and increased turbine lifespan, both of which increase the potential carbon benefit from wind power.

UpWind highlights how emerging renewable industry growth will spawn additional supporting service industries, including labor intensive industries such as O&M

And the underlying growth of the overall wind market in N. America and worldwide appears very strong. The industry is expanding rapidly with >$10 billion spent in 2007 and 5,000 turbines of more than 1MW capacity installed in the U.S. to date – with an additional 11,000 projected by 2011. The American Wind Energy Association reports that new and announced wind turbine and turbine component manufacturing plants in 2007 have created, or will create 6,000 new jobs in the U.S.

National RPS

MissionPoint also favors a national RPS. But, before its reintroduction, we believe some modifications are needed to the version that was passed by the House last year before failing in the Senate. As currently constructed, it does not include a specified minimum of the renewable quota that must come from solar power, which means that most of the required power will come from wind power only.

Solar power, while more expensive per kWh than wind today, is on a trajectory to eventually overtake wind as a cheaper source of power. Its maturation toward that point, and soon thereafter to unsubsidized grid parity, requires further scale up of manufacturing – and that in turn argues for a solar "tranche" in the national RPS, a feature that is included in many state-level RPS.

MissionPoint further believes that the national RPS, while useful, should be considered secondary to the urgent need for passage of national carbon legislation. Therefore, we would not want to see an RPS re-introduced ahead of carbon legislation and risk slowing down the latter.

We are also concerned that quota-based instruments like an RPS often produce a volatile price signal (tradeable RECs), which may not satisfy some financiers' needs for predictability. Some of this has volatility has reflected market opacity and the difficulty of translating a cross-state patchwork of different technology eligibiligies for each RPS

into an accurate supply/demand forecast. A national RPS could produce some harmonization that would overcome this and allow this particular market-based mechanism to produce a more stable signal to the financial markets. Even so, it is worth noting that a long-term feed-in tariff has been a successful alternative in scaling up renewable production in Europe, especially Germany and Spain, in part because of its firm price signal to investors. Similarly, the production and investment tax credits (and ideally, these would be made "strippable", or re-sellable to those who most value the tax benefit) offers an attractively stable signal.

Federal Procurement Authority

We would encourage the Congress to consider all opportunities to rationalize federal procurement authority in ways that would support renewable energy. To take just one example, DOD recommended in February 2008 that Congress extend the length of power purchase contracts that DOD can enter into to 20-years. This would allow it to compete on a level playing field with other renewable energy buyers to enter into long-term purchase contracts. Current Federal law limits Pentagon energy contracts to 10 years, a tenor that is too short to satisfy the financing needs of most renewable developers and investors. This change would enable Air Force bases, for example, to buy directly from renewable energy generators, rather than purchasing renewable energy credits.

Increase RD&D

MissionPoint believes that a carbon price signal will spur private RD&D, but that the price volatility of $CO_2$ under cap-and-trade will likely produce sub-optimal long-term investment in certain categories of high-risk and/or long-term technology. So far, instead of rising to meet the carbon challenge, DOE annual expenditures of $3B on energy R&D is less than half, in inflation adjusted terms, of peak level of spending reached in 1978.

We will therefore still need a dramatic increase in public energy RD&D, and it should be administered not only through established agency channels but also through a nimble model like the authorized but not yet funded ARPA-E.

MissionPoint recommends that the increase be funded not only by allocating a significant portion of $CO_2$ allowance auction revenue to this purpose, but that it also institute new federal wires & pipes charges in areas under its jurisdiction, similar to state System Benefit Charge fees.

Policy support is needed not just for early R&D, but for deployment support via deployment grants and risk-sharing as well as instruments like the RPS, because progress down a declining cost curve requires reductions in costs throughout the cost structure (i.e., not just the core device but the balance of plant and soft costs, including integration, installation, market learning, etc.)

MissionPoint will be looking shortly for state and federal support for a high-tech manufacturing company in which we will be investing – whether through programmatic appropriations or earmarks. Consistent with the evolution of national RD&D policy, we would anticipate a public/private cost-share to improve accountability above that of a pure grant.

All stabilization targets focused on 2050 assume that emissions thereafter plunge toward net zero. That will only happen if we make public and private R&D investments now in low-carbon and zero-carbon technologies that will be ready for deployment as early as 2040. It's important that we avoid counting on the silver bullet, but we should still allocate investments to try to discover one. MissionPoint expects climate mitigation to be recognized as a national and international emergency within 10 years – inspiring commitment of a massive upscaling of public RD&D spending in the U.S. and around the world. But we should not wait for that catalytic moment. RD&D is an inescapably extended process and we should not wait for the emergency.

**My third point is that it is time now for Congress to provide the credible, long-term price on carbon that we as investors need. We urge you to act this year, rather than putting this off to 2009 or beyond.**

A key message I want to convey here is that MissionPoint has mobilized hundreds of millions of dollars in capital from blue-chip investors to invest in decarbonization of our economy – in fact we were heavily oversubscribed and had to turn prospective investors away. We have built an expert team of resource allocators and business builders, and we are already executing on compelling investment opportunities.

However, we stand ready to do much more to accelerate the transition to a low-carbon economy if you in the Congress will pass a law to set some long overdue rules of the road.

We need a long term stable price signal for carbon is imperative to encourage innovation and promote investment. It needs to be long enough to provide for the necessary payback period clarity to induce investors to take all of the other technical, construction and market risks required to make an attractive return on capital investment

Just as evidence indicates that climate change is accelerating, even to the point of routinely astonishing field scientists, our firm believes that we in the financial markets are going to have to respond by accelerating the formation and deployment of capital to reduce emissions in the narrowing window that remains open to us.

We believe carbon mitigation is primarily a commercialization rather than an innovation problem. In fact, while we need to fund early-stage R&D, we need to be cautious about letting visions of transformative new technology paradigms (like the hydrogen economy) divert us from allocating resources and policy support to the solutions already available

or near-commercial that need to be diffused – after all, the science indicates that we need to make significant progress on mitigating carbon in the next decade.

In December of 2007, McKinsey & Company released an analysis showing that the U.S. has the technologies available today that could cut emissions 28% below 2005 levels by 2030. They identified 250 opportunities within the U.S and found that no less than 80 percent of these reductions can be had with technologies that have already been proven to work at a commercial scale, while the remainder can be achieved by existing technologies with high-potential for commercialization by 2030.

Consistent with this perspective, MissionPoint is more a growth-stage private equity investor than a venture capital investor. We typically invest in companies with commercial or near-commercial offerings that are now poised for accelerated adoption. We do, however, reserve a certain limited portion of our portfolio for pre-revenue, venture-style transactions, where we believe the technology is unique and transformative.

Robert Socolow, the Princeton professor who co-authored the widely cited "Wedges" framework of carbon mitigation, is a special advisor to MissionPoint, and we share his belief that many of the needed technologies are already available and need to be pulled through. This fact makes it all the more frustrating for us as investors to wait on long-needed policy signals, since all the other ingredients are in place for rapid growth, job creation and carbon mitigation.

Investors, in general, do not like to invest in businesses that are dependent on regulation – and right now most investors are unable to factor possible future $CO_2$-based revenue streams or incremental demand into our valuations of companies. We mostly treat it as a free option, an enticing one given the probability of future $CO_2$ pricing, but not one that can be prudently underwritten. So we focus our valuation on core revenue streams like power production or equipment sales.

Once an adequate price signal is in place, we and other market participants will invest – with extraordinary discipline and hustle – in maximum emissions avoided per dollar invested.

We have launched a U.S. carbon originator called Greenhouse Gas Services, LLC ("GGS"). GGS is a new business that we created with GE and AES. We saw that the U.S. carbon market is at a critical stage of development. The U.S. voluntary carbon market is highly fragmented and characterized by growing demand, inconsistent standards, and a lack of credible suppliers. Companies purchasing offsets place a premium on quality. GGS was designed to take advantage of these market conditions, become the provider of choice to voluntary buyers and those pursuing early-action compliance credits, and ultimately to position itself as a leading source of carbon offsets in the mandatory cap-and-trade system we anticipate the Congress will eventually form.

GGS's partners will potentially allocate to it hundreds of million dollars in financing capability to produce domestic carbon offsets, another source of capital that can be even

more rapidly deployed when the Congress acts. And these projects will create thousands of domestic jobs as well.

GGS has core competencies in the development and operation of energy projects, in risk analysis and transaction structuring for energy projects, in marketing and in carbon markets.

We are also investing in other parts of the trading infrastructure needed to facilitate a robust and orderly carbon market in the U.S., which some believe could reach $50- $100 billion annually, early in the regime.

Let me describe our preferences on a few of the key design points for the carbon law:

a) Cap-and-trade: We believe that a properly designed cap-and-trade policy is the preferred mechanism to price carbon over a carbon tax. Cap-and-trade sets a firm emissions reduction target and then allows the price of an allowance to float. By contrast, a carbon tax sets a firm price and allows emissions levels to float – thereby undermining the core environmental goal of controlling emissions levels. MissionPoint believes that we do not know the demand elasticities well enough in our economy to set the tax rate needed to get the desired level of emissions reductions, so we need the certainty of a cap to be able to attain emissions reduction goals. Given deep national anti-tax sentiment, political realities would probably set a carbon tax rate that is too low to support investment in the needed technologies.

b) Emissions target: We support stringent emissions targets capable of stabilizing atmospheric concentrations at 450 ppm of $CO_2$ equivalent – by getting to at least 1990 emissions levels by 2020 and then reducing at least 4% per year to reach 80% below 1990 levels by 2050. We believe a prompt start is needed – no later than 2010 – and that anything less than $25/ton in the early years would be inadequate. Scientific considerations, not political horse-trading must unambiguously come first in setting targets. Note that according to the latest science, even a 450 ppm target would give us only a 50% chance of keeping the global average temperature from rising more than 2 degrees C (or 3.6 degrees F) above pre-industrial levels – a level at which increasingly severe impacts may occur; droughts, floods, heat waves, species extinction, sea level rise, ocean acidification, wildfires, spread of infectious diseases. Prominent NASA scientist, Jim Hansen, noting the accelerating breakup of the ice sheets and other impacts, has recently urged lowering our stabilization target even further to the already-passed figure of 350 ppm.

c) Composite scientific index for target adjustment: This is a new concept we're introducing for your consideration. Some pending climate bills call for periodic review of targets with input from bodies like the National Academy of Sciences. However, we believe that such reassessments are too open-ended and not sufficiently directive of the decision-makers. Therefore, MissionPoint favors a

more prescriptive approach whereby a composite index of scientific indicators would be specified in the legislation itself so that when each reassessment date arrives – and it should be yearly – the emissions targets would be reset to reflect whether impacts are as forecast, are better, or are worse. This would insulate what should be a scientifically driven decision from recurring political pressures. Indicators in the composite could include: average global temperature, rate of melting of Greenland or West Antarctic Ice Sheet, drought extent and magnitude, biological indicators including climate-sensitive disease spread, composite measure of extreme weather events, ocean acidification, etc.

d) Upstream Point of Regulation: We favor an upstream point of regulation requiring submission of allowances by all producers and importers of carbon-based fuel (coal, oil, natural gas), rather than downstream fuel users/emitters. This would reduce the risk of leakage to non-covered sectors or to smaller companies under the regulated size threshold, and thereby maximize environmental integrity in attaining the cap. It would achieve administrative simplification by obligating approximately 2,000 fuel producer or importers to surrender allowances for compliance, rather than over 400,000 downstream large emitters. Our view is that it makes sense to spread carbon costs widely and send price signal throughout economy so that all entrepreneurs can respond, so that we don't concentrate burdens on single industries, which would be unfair and could create a backlash that ultimately kills the program. We also believe that a pervasive price signal will facilitate the smoothest possible adjustment in asset prices in response to the carbon price signal and will also facilitate maximum stringency in carbon reduction, again because the burden will not be unfairly concentrated.

While it might seem counter-intuitive for a firm that has invested in carbon market originators and infrastructure to advocate for a potentially leaner system with fewer compliance participants, I would underscore that our investment thesis is that low-carbon business models will be valued more highly whether or not they generate a tradeable instrument. In fact, MissionPoint invests in very few pure-play environmental commodity businesses. Rather we favor the pick-and-shovel businesses that will help others unlock what we call the "carbon entitlement" (the attainable reduction in carbon). These businesses should still thrive under an upstream point of regulation. Moreover we anticipate a vigorous trading and offsets market even under an upstream point of regulation.

e) Safety Valve: We strongly oppose inclusion of a safety valve that fixes the maximum price of an allowance. This would limit the upside associated with our carbon-mitigating investments. Moreover, as with a carbon tax, it would, in effect, forego the all-important cap on emissions. Our fallback position is that if one must be included, it should be no lower than $25/ton in the first implementation year and rising thereafter, and all revenues generated should be allocated directly to R&D in carbon-mitigating technologies. The proposed $12/ton Bingaman/Specter safety price would likely be triggered and some independent estimates suggest this would lead to a level of emissions approaching the low-

growth business-as-usual scenario. Alternative, far more prudent cost containment options exist, such as providing for limited borrowing of allowances from future compliance periods, with interest. Banking should also be permitted to allow firms to build their own buffer inventory against future shocks. We favor the "Carbon Fed" provision of Lieberman-Warner as a flexible and discretionary cost-management provision that should make inclusion of a safety valve unnecessary.

f) Auction/Allocation: We do not agree with many who think 100% auctioning is imperative at the outset. We do support auctioning a meaningful (and growing over time) portion of the allowances in order to garner revenue for both: providing revenue the government can use to subsidize RD&D on carbon-mitigating technologies.

g) Early action: We favor allocation of credit for early-action emissions reductions since a date prior to enactment – perhaps 2002 – as long as authoritative third-party benchmarking and validation is documented.

h) Offsets: We strongly believe that offsets should be allowed as part of the overall cap-and-trade program since they can reduce costs and increase flexibility. We oppose geographic or quantitative limitations on offset credits so as to maximize the opportunity to reduce GHG emissions at the lowest cost. As for international offsets, we favor allowing them on a 1:1 or adjusted basis for specific project types to the extent they can be screened to those assuring a similar level of accountability and project rigor. We favor broad eligibility for offsets among technologies, selectively using allowance multipliers to provide an early stimulus to some technologies that may be higher on the abatement cost curve but crucial to providing a large magnitude of reductions (e.g., for Carbon Capture and Storage). Offsets should be real, additional, independently verifiable, permanent, enforceable, and transparent. A protocol or standards-based approach should be used rather than case-by-case review to assign offset credits to avoid bureaucratic slowdowns.

i) Border carbon levy: We believe Congress should actively consult internationally, especially with China, in formulating the provision of the domestic bill intended to preserve international competitiveness of U.S. industries vis-à-vis competitors in initially uncapped developing countries. We believe that a formula could be incorporated into the domestic legislation that anticipates strong linkage to the international agreement yet to be negotiated. We recommend that if the border carbon levy concept advanced by AEP and the IEBW and incorporated in the Lieberman-Warner bill is included, that it be modified as follows. The Congress should anticipate that future national targets under the global cap will need to allow development headroom for developing countries, while not overly disadvantaging the U.S. by virtue of its higher per capital emissions. So we would propose a target composed 50% on the basis of emissions per capita (U.S. is higher than China in this factor) and 50% on the basis of emissions per unit of

GDP (in which China is higher than U.S.). Then, the carbon border levy could be adjusted by this blended target factor. We believe a compromise along these lines could mitigate Chinese and other developing country objections to this provision, while paving the way for a compromise on targets in the post-Kyoto regime that would be compatible with domestic U.S. legislation.

j) Nuclear: We advocate favorable treatment of nuclear power in any carbon regime, and broader continuation of loan guarantees, liability coverage and production tax credits that are contributing to the nascent nuclear "renaissance".

By the way, we would suggest adding one other provision to the carbon bill. We believe Congress needs to conduct more careful carbon accounting, akin to standard budget scoring, for all its proposed bills – whether directly energy-related or not. This could be accomplished through an in-house capacity, at the Congressional Budget Office for example, or through reliance on another governmental or non-governmental body. The purpose would be to avoid ill-informed policies that exacerbate our economy's carbon performance, and potentially nullify some of the gains from the expected comprehensive carbon bill.

This change would accommodate a more prominent policy focus on $CO_2$ in our nation's policy-making. While such an innovation might seem bureaucratic, such procedural advances have made a big difference in achieving substantive policy goals in the past, as in the case of the National Environmental Policy Act's requirement to perform Environmental Impact Statements.

For example, Congress should make carbon mitigation a central, defining criterion for all provisions of the coming Reauthorization of the U.S. Transportation law (the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU), which authorizes the 5-year period 2005-2009).

With this capability, Congress could apply analytically rigorous lifecycle carbon accounting as it apportions RD&D dollars for technologies. It should allocate dollars to those technologies capable of delivering maximum emissions reduction per dollar expended over specified timeframes, recognizing that the potential for R&D breakthroughs on future technologies cannot be fully quantified. In general, we believe that a $CO_2$ accounting approach would likely limit policy support for hydrogen fuel cells, and increase support for efficiency, geothermal and CCS.

Two examples serve to underscore the value of Congress having this new analytical capability: our biofuels policy and the widespread use of imbalanced scoring of the GDP costs of carbon regulation without valuing at all the avoided costs of inaction.

MissionPoint believes our biofuels policy has been sorely misguided from a carbon standpoint. Our firm is research driven, so we carefully identified what categories of impacts other Life Cycle Analyses had left out. We found that the adverse environmental and carbon impacts had not been fully recognized, including increased N2O emissions

from increased fertilizer use or the hypoxia in major water bodies such as the Gulf of Mexico resulting from fertilizer runoff, which in turn imperils the $CO_2$ absorbing ability of such water bodies.

A big question is what the implications will be of the additional evidence published this year of the "carbon debt" that accrues when carbon is emitted by land displacement (deforestation and release of soil carbon) to grow biofuels. EPA is reportedly assessing now whether to incorporate such international land-use changes in its life-cycle analysis.

The 2007 energy law imposed a 20% lifecycle improvement requirement on biofuels (50% for advanced biofuels) alongside its mandate for a ramp-up to 36 billion gallons. MissionPoint advocated against this Renewable Fuel Standard before its passage.

At this point, MissionPoint would suggest that if biofuels prove unable to attain this codified lifecycle requirement, that the standard not be waived in response to political pressure, but that an alternative fuel source be pursued. One that would offer great efficiency gains, as well as energy independence advantages, would be to allow Fuel Electricity (i.e., electricity generated and transmitted to plug-in hybrids and electric vehicles) to count toward the RFS on a Btu- equivalent basis. This would:

- Create an alternative to the scale-up of biofuels, with all their adverse environmental consequences and limited carbon mitigation potential;
- Stimulate one of the most attractive carbon-mitigating technologies in existence – the plug-in hybrid. Note that even if the electricity were sourced from coal, the pick-up in efficiency from moving from a conventional combustion engine to an electric drive train would still be dramatic;
- Elicit support from the utility and merchant power sectors by awakening them to the tremendous opportunity they have to expand their market into the transportation sector;
- Reduce the amount of land that would need to be diverted from other uses to provide an equivalent scale of energy (given the higher energy conversion of a photovoltaic cell relative to plant matter on a per square meter basis);
- Be a winner with consumers, as the vehicle stock turned over, given that fuel electricity would cost them less than gasoline per mile traveled.

A second argument for building this carbon accounting capability comes from the gathering, and potentially decisive, debate over the GDP costs of various carbon bills, and the likelihood that this issue will be revisited many times during its multi-decade implementation.

MissionPoint believes that arguments about the costs to GDP from imposing a price on carbon must confront the intellectual honesty of accounting for the severe, and much

greater, costs of inaction (i.e., climate change impacts). The Stern Report out of the UK, and many other analyses, have shown that the GDP costs of inaction are likely to outweigh the calculated GDP costs from carbon pricing by a factor of 5 to 1.

This is before allowing for the income and job creation resulting from stimulus of low-carbon technologies and business models, including efficiency, which will at least partly offset the costs to carbon-intensive sectors.

**My fourth point is that we would encourage the Congress to consistently frame the objectives of its new energy policy to promote the broad set of low-carbon energy options, rather than renewable energy only.**

We invest vigorously in renewables, but the low-carbon playing field – both for policy and investing – is much bigger than that. There are large, often cheaper, and more immediately available carbon reduction opportunities in seemingly mundane areas like optimization of fossil fuel plants or emerging areas like Carbon Capture & Storage (CCS) on coal plants.

Though not as iconic or photogenic as a new wind turbine, many of these pathways offer higher emissions avoidance per dollar invested than renewable energy, partly due to the large and centralized carbon flows they target. This would include greater capture and use of waste heat from industrial and power plant facilities, an underutilized resource that exceeds our economic renewable energy potentials.

MissionPoint believes that there is a widespread perception that Carbon Capture & Storage is a futuristic technology, when we believe it could start relatively soon if the policy stimulus and framework is delivered.

Because of our broader view of the low-carbon playing field, we were concerned that the House deferred beginning its work on a comprehensive carbon bill last year in order to first pass an energy bill that focused largely on renewable energy (though it did also contain good efficiency provisions and directed EPA to inventory waste heat sources). Some immediately touted the carbon mitigation benefits of that bill as if to check carbon legislation off the to-do list, when in fact its carbon reduction contribution is nowhere near what the science is calling for.

MissionPoint is not just investing in renewable energy.. We have a much broader view of the carbon mitigation potentials in the energy industry that encompasses a vital but less-emitting role for fossil fuels.

Advanced Aerofoil Technologies, AG ("AAT")

For example, one of our portfolio companies, AAT, which is based in Switzerland, is a supplier of products and services for the industrial gas turbine industry. AAT was founded as a partnership between MissionPoint Capital Partners and MTS AG, a provider of combustion solutions for gas-fired and thermal power plants since 1995. AAT's core

team is comprised of seasoned engineering, operations and marketing executives from the world's best known power system companies including ABB/ALSTOM and GE Energy.

AAT's hardware division manufactures structural components for OEMs of heavy-duty gas turbines. The division's proprietary fabrication processes, which result in unprecedented control over cycle-time, yield and reliability, will allow its OEM customers to accelerate the introduction of higher turbine efficiency performance and lower environmental impact.

AAT's software division provides power plant owners with a suite of optimization products for startup, shutdown and base-load operations that increase power availability while simultaneously reducing fuel usage and emissions. Widespread deployment of this technology will provide attractive, unsubsidized economics and mitigation of $CO_2$ emissions.

Global markets for thermal power plant application software and gas turbine structural components exceed $1 billion and $3.8 billion per year, respectively.

AAT is an investment play on the widely expected acceleration of natural gas power plant installations flowing from the carbon price signal – we will need to use this increasingly precious fuel efficiently. The gas turbines capable of being optimized by AAT account for 33% of capacity but will be 63% of non-coal capacity growth from 2006-2016. Industrial gas turbines will remain the preferred method to convert fuel to power and steam within industrial and utility-grade applications. Major OEMs like GE, Siemens, ALSTOM, Mitsubishi, and Hitachi are increasing their R&D and commercial resources in this area in preparation for a sustained, long-term growth cycle – we will be there to service them.

MissionPoint recognizes that challenges do exist in balancing the need for clean, renewable energy with a global economy still largely powered by hydrocarbons. For example, some may be concerned that the general proposition of facilitating options like fossil optimization entails extending rather than transcending the fossil fuel era. But there is a contrary and very real risk, which is relying on renewables as our primary vehicle and therefore not reducing emissions materially in near term. Non-hydro renewable energy faces enormous constraints in scaling-up from its miniscule portion of global energy to displacement of fossil fuel in the next few decades.

Further, the generally low power density of renewable energy relative to hydrocarbon fuels implies substantial land-use challenges. Its intermittency often requires fossil fuel backup power, thereby negating much or all of the carbon benefit and exacerbating its cost disadvantage vis-à-vis fossil power. Its remote location makes its scale-up contingent on massive additional investment in T&D infrastructure. And even where it succeeds in gaining interconnection, the intermittent renewables, especially wind, generate reactive power and harmonic problems that have prompted some utilities to turn away from incremental wind as penetration increases. All of these are good and valid

reasons to invest in technologies that reduce the carbon impact of hydrocarbon fuels, rather than relying on renewables as the sole near-term panacea.

Another reason to keep fossil power on the decarbonization playing field is that some of the best opportunities for renewables themselves are in hybrid configurations with fossil power. Two quick examples are biomass co-firing in coal power plants, and use of concentrating solar power to pre-heat feedwater in coal plants, thereby increasing its efficiency and avoiding the interconnection barriers we just discussed by piggybacking on that plant.

With regard to CCS, MissionPoint believes that it is time for the federal government to take concerted action to accelerate its deployment. The 40-50% cost premium required on top of the coal power price to do CCS is often cited as evidence that it remains cost-prohibitive. However, on a cost per ton avoided basis for $CO_2$, CCS compares favorably to unsubsidized wind power, for example, especially once the wind power cost is fully loaded with the cost of standby backup power needed to firm up its intermittency.

When we invest in the scale-up of technology, it's also crucial that policy-makers account for not just the cost per ton avoided, but also the magnitude of reductions attainable in a given amount of time. CCS offers concentrated emissions reduction opportunities relative to the dispersed and prolonged avoidance through deployment of renewables.

Those who point to the leakage risks associated with CCS seem to forget that the leakage rate on coal plants today is 100% – literally every $CO_2$ molecule is being emitted. Why is it that we think it is somehow safer to put $CO_2$ into the thin ribbon of our atmosphere than into the massive underground, where hydrocarbons came from in the first place? Perhaps it is the illusion of infinity in the sky and the relative perceived nearness of underground threats.

But whatever the psychological rationale, it is mistaken. Excess, man-made $CO_2$ in the atmosphere is today widely accepted as a primary cause of climate change and we would be well advised to accelerate deployment of technology to put it in a safer place – namely underground.. As of today, we are letting the perfect be the enemy of the good when it comes to Carbon Capture & Storage.

MissionPoint frequently visits West Texas, where they are today injecting millions of tons of $CO_2$ each year – and have been doing so for 30 years and longer. We encourage members of Congress to make a similar visit to ascertain the world-leading level of experience our country already has in compressing, transporting and injecting $CO_2$.

Some point to the ultimate scale of a CCS pipeline as evidence that we cannot get it done – and one dramatic benchmark cited is that capturing and piping 60% of the $CO_2$ produced by power plants today would require an infrastructure equivalent to the entire oil pipeline network operating today in the U.S. True perhaps, but the fact that the entire infrastructure cannot be built overnight is no reason not to start now – capturing the $CO_2$

from even 10 plants would be meaningful given the 6-10M tons/year that is emitted by each one.

MissionPoint has scouted CCS opportunities around the world, and is prepared to put significant capital to work in this area. But apart from $CO_2$ Enhanced Oil Recovery opportunities, CCS is largely a pure-play in carbon mitigation – meaning it's a technology we will only adopt if Congress creates a carbon price signal. Current proposed legislation provides bonus allowances for CCS, which MissionPoint strongly favors.

DOE's revamping of FutureGen to support CCS on a series of real commercial projects, rather than a single high-priced R&D testbed was a good step. Other support MissionPoint would like to see includes:

- Need government funding to build CCS backbone pipelines, similar to the proposal by the Midwest Governors to underwrite one in their region, and then investment tax credits for private funding of pipeline spurs;

- Need the government to supplement the incomplete market for insurance and liability risks, especially given the lack of actuarial data. This may include service as a backstop during operational phases and government assumption of post-closure liability;
- We need Congress to invest in its own "literacy" on CCS and then to explain it to their constituencies, so that it does not die in the crib due to exaggerated fears;

- Need expedited government risk-sharing funding of large scale demonstrations (5 million $tCO_2$/yr, not the more commonly discussed 1 million ton) in a range of geologies in next 5 years;

- Need to prevent coal-to-liquids projects from being permitted without CCS, particularly if any taxpayer subsidies are involved;

- Need to condition eligibility for public funding or subsidies for advanced coal projects on incorporation of CCS;

- Need to ensure that the U.S. EPA expeditiously completes its rigorous, formal public process to formulate effective regulatory protocols and Underground Injection Control guidelines governing long-term carbon storage;

- Need to ensure that new coal plants built without CCS are not awarded free allowances in any future regulatory program to limit greenhouse gas emissions – as of the date of legislative proposal, not enactment;

- Policies should distinguish natural from anthropogenic $CO_2$, providing allowance credit only for injection for the latter;

- Should allow $CO_2$ injected after use for Enhanced Oil Recovery count for carbon allowance credit, unless it is naturally sourced $CO_2$. EOR that results in long-term $CO_2$ storage should fully qualify as $CO_2$ sequestration, rather than being penalized. EOR, as well as Enhanced Coalbed Methane Recovery, can be crucial bridging applications for CCS and should not be disadvantaged. The political and popular desire to penalize the fossil industry and expedite the paradigm shift to renewables should NOT stop us from providing incentives to the fossil fuel industry to decarbonize their near-term activities.

CCS is so critical that a fall-back instrument should be proposed in case carbon legislation, including the CCS multiplier for carbon allowances embodied in some current bills, does not pass and stimulate an accelerated adoption cycle:

- Treat CCS as Best Available Control Technology for all new or modified power plants, and administer it through the Clean Air Act (an option that should be open to the EPA after the April 2007 Supreme Court ruling; or;

- Create a separate and tradable Low-Carbon Obligation for Coal Power (as advanced by Robert Williams of the Princeton Environmental Institute) that, analogously to the RPS, requires utilities to deploy CCS on a specified and growing share of their coal power (i.e., stated as a standard such as ~95kg $CO_2$ per MWh, which is equal to 90% capture off a coal plant today);

**My fifth point is that while we believe it is important not to oversell "efficiency" as the single panacea offering all the painless carbon mitigation we need, there are enormous opportunities here that are untapped, often because of financing gaps.**

The recent McKinsey study "Reducing U.S. Greenhouse Gas Emissions" documented the extraordinary emissions reduction opportunities available at negative cost – meaning they will save rather than cost money. This fits the MissionPoint core investment thesis, which is that low-carbon technologies are already commercialized, but need to be pulled through via a combination of strengthened policy and entrepreneurial market participants.

To take just one of hundreds of studies, a recent report by the American Council for an Energy-Efficient Economy reports that by adopting energy efficient strategies Florida will save $28 billion, offset the state's entire future growth in electric demand by 2023, and create more than 14,000 jobs in 2023.

We would caution that efficiency gains classically produce rebound effects. Like any other commodity, as the price of energy services goes down (via increased energy efficiency), more of those services are used. Second, many behavioral studies have shown that some efficiency potentials remain untapped not out of ignorance but out of real performance disadvantages of the more efficient product. So the high imputed discount rates that appear irrational when trying to explain the slow diffusion of energy

efficiency are often explainable based on preferences, non-trivial behavioral obstacles, or rebound effects.

MissionPoint believes it is important that Congress and others avoid suggesting to Americans that carbon mitigation, especially at the stringency levels we need to undertake, will be costless. If we do, then the emergence of higher power and fuel prices under a carbon regime will produce a backlash and risk survival of the policy.

Recognizing the perils of underestimating barriers to efficiency, MissionPoint has diagnosed key financing gaps that tend to slow its penetration in key markets. One of our portfolio companies – Hannon Armstrong, LLC – is the market leader in securitizing Energy Savings Performance Contracts (ESPCs) with the Federal government and is increasingly extending into commercial and industrial accounts. The ESPC contractual vehicle was statutorily created in 1978 and amended in EPAct 1992, and has saved the federal government billions of dollars. They offer a way for the government to get the lifecycle savings from efficiency improvements, without appropriating the dollars for the upfront investment.

Despite this, over the past year, the DOD has used very little of the authority it has to tap into third-party financing and execute its widespread energy efficiency opportunities. MissionPoint believes that DOD, and other agencies, should be using this vehicle to at least attain the specified levels of required efficiency spelled out in EPACT 2005 and strengthened in 2007 via Executive Order. It calls for agencies of the federal government to attain year-over-year energy intensity reductions to 3%, culminating in a total energy intensity reduction of 30% by 2015.

We would urge Congress to seek to remedy the declining use of this vehicle by DOD, in particular, using any means within the Congress' formal or informal authority.

Moreover, we believe Congress should authorize DOD to use ESPCs for mobile platforms, as encouraged by the Defense Science Board Task Force on DOD Energy Strategy "More Fight – Less Fuel". To take just one example, re-engining the B-52 fleet would yield net savings of $11 billion.

The major impediment to this expansion of ESPC authority today is a scoring conflict between the Congressional Budget Office (CBO) and the Office of Management and Budget, wherein CBO consistently and inexplicably fails to account for the energy savings side of the ledger in its cost estimates of enabling legislation. We would encourage the Committee to look into this given the clear contribution such large-magnitude efficiency improvements could make to our energy independence and greenhouse gas emissions goals.

## Conclusion

MissionPoint genuinely aims to mitigate climate change, recognizing that we as a planet are already committed to serious effects but that it still may be possible to stave off the

worst. In doing so, we believe we will produce outsized profits for our investors, and generate extraordinary economic and job growth for the American economy. We bring great commitment and investment discipline to this worthy task.

Thank you for the opportunity to provide our input to the Congressional deliberations.

Mr. ABBASI. MissionPoint Capital was founded and is chaired by Mark Schwartz, former Chairman of Goldman Sachs (Asia) and CEO of Soros Fund Management. Our team has deep energy and environment domain expertise based on senior roles in finance, technology, policy, and operations at such firms as General Electric, ABB, SwissRe, United States Environmental Protection Agency, Key Span, and FMC.

Our carbon-centered investment thesis is really grounded in two convictions: first, that unabated climate change is the greatest foreseeable risk facing humanity today; and, second, that mitigating it constitutes one of the greatest investment and job creation opportunities in history.

Evidence indicates that climate change is accelerating, even to the point of routinely astonishing field scientists. And MissionPoint aims to respond by accelerating in turn the formation and deployment of capital to reduce emissions in the window that remains open to us to avoid the most severe impacts of climate change.

At MissionPoint we are investing hundreds of millions of dollars in private companies that can generate clean energy and carbon emissions and taking an active role in building those companies. Examples include solar development and technology companies, including one called SunEdison; a wind operations and maintenance services company called UpWind; a specialty finances company called Hannon Armstrong, which is overcoming financing obstacles to energy enhancements, including in the federal government; a carbon offset development and finance company called Greenhouse Gas Services, which we have launched with General Electric and AES; a carbon trading infrastructure company, a company called Advanced Aerofoil Technologies, which manufactures advanced turbine components to increase efficiency at natural gas plants and also offers software that optimizes operation of gas and coal plants reducing fuel use as well as emissions.

So we believe that mitigating carbon is primarily a commercialization and adoption problem, not an innovation problem, meaning that the technologies in many cases are already in existence and simply need to be pulled through into widespread usage. This belief leads us to focus less on new venture investing that we do venture investing when we find exceptionally transformative opportunities and innovations but really more on growth stage companies.

So fundamentally we believe that the energy sector is in the midst of a profound transformation. The two primary criteria we used to demand of our energy were that it be cheap and reliable. And now today we have added, really, two more, which are secure and clean.

So optimizing that four-dimensional equation really does change things. It requires us to bring new levels of entrepreneurship to the energy sector than it has really ever seen before.

Renewable energy is thriving with 20 to 40 percent year over year compound growth rates because it answers well to the two new criteria, secure and clean, and is getting much more competitive on the first two: cheap and reliable. It is becoming more affordable as it scales.

The declining cost curves are a robust trend. We are seeing potential for grid parity, for solar, unsubsidized solar, as soon as 2015. Renewables are also achieving high reliability with added experience and operating hours.

So key point number one from us is really that our outlook for growth investment in job creation in the strategic industry is bullish based on direct hands-on experience with our portfolio companies as well as on high industry growth rates and on the strategic value of the industry on the dimensions I have mentioned.

I would expect that the job creation potential here would be particularly welcome given the economic conditions in our country today and would just add there that the renewable industry is particularly job-intensive. For example, one megawatt of solar produces according to some studies on the order of seven to ten times the number of person-hours of employment as one megawatt of conventional power.

Key point number two—and here I am underscoring what the prior panelists have said—is that our ability to continue to invest in realizing this bullish forecast and accelerating the growth of this industry really does depend on a comprehensive and stable set of supportive policies, including a long-term extension of the investment and production tax credits that remain in limbo today and, at long last, putting a price on carbon as a rule of the road, which we believe will just be enormously catalytic.

So first on the investment tax credit and the production tax credit, the boom-bust cycle of expiration of these credits has historically driven a clear drop-off in renewable power installations. Those of us in the industry spend time estimating, underwriting, and trying to share the extension risk around these credits, pondering the imponderables of whether and when Congress may act.

And the compromised one-year extension cycles really don't give enough time to get a wind project placed into service, let alone something like a geothermal project. So we can't underwrite business plans in these situations.

Once it is operating, the ten-year horizon of the production credit is not always sufficient to provide the needed return on these capital-intensive projects. So, really, Congress does need to send a stronger, more stable, and long-term signal to the investment community. The durations really should be matched to the long project life cycles as well as the long project cash flow durations.

So it is pretty straightforward. Uncertainty in the financial world translates to higher costs of capital, which translates to project is delayed or canceled. And by one estimation, the current expiration risk is putting at risk 42,000 megawatts of new construction.

One of our portfolio companies, SunEdison, is an example of a company whose innovative deployment model for solar power has counted on the ITC in these early years but that is rapidly scaling the industry down its cost curve by deploying solar systems on Wal-Marts, Kohls, other big box retailers and other commercial entities.

So we hope you can navigate the pay-go face-off between the oil and gas and renewable industries and get this done soon. The face-off is somewhat ironic to us because it really underscores that both industries are, in fact, subsidized.

And also the way that we think about the climate change narrative is that it is really not between these industries. In fact, we believe we are going to have to continue to invest in the fossil fuel sector but do so in a way that aggressively manages the carbon liability in the decades ahead that they will be with us.

The low-carbon playing field, both the policy and investing, is much bigger than renewables. The way to stimulate this is to make sure that the stable policy framework is built on a foundation of carbon pricing. We believe this should be through a cap and trade system.

Putting a price on carbon will reward investments in companies like Advanced Aerofoil Technologies, which reduce emissions to fossil fuel power plants. And, you know, we would acknowledge that these kinds of investments are not as iconic or photogenic as the large and centralized carbon flows that we see in these large fossil fuel assets and reducing them, but it is very important that we address them.

Mr. INSLEE. Mr. Abbasi.

Mr. ABBASI. Yes?

Mr. INSLEE. I want to make sure we get to some questions.

Mr. ABBASI. Yes.

Mr. INSLEE. So maybe you could wrap up.

Mr. ABBASI. Yes, I will wrap up.

So, in conclusion, we also believe that the carbon capture and storage industry is strategic in this, but it is, relatively speaking, a pure play investment and does require a price on carbon. And we would encourage you to do that.

The U.S. is right now the runaway leader in moving and compressing and injecting carbon dioxide. It is a critical technology. And we would like to see the price on carbon facilitate that.

Concluding, just our quick design points are we would prefer cap and trade over carbon tax. We would prefer a stringent emissions target with a prompt start by 2010, a periodic reassessment provision that is based on objective indicators and an upstream point of regulation. We also have some contributions, some ideas about the carbon border levy and will look to discussing those in the questions.

Thank you very much.

Mr. INSLEE. Thank you. And Mr. Abbasi has some other great ideas in his book, Americans and Climate Change, that he has authored, which is on the Chair's nightstand. So I appreciate that.

Mr. ABBASI. Thank you.

Mr. INSLEE. I would like to start with Mr. Blumenauer. I had a chance to question you this morning. Mr. Blumenauer, would you like to start?

Mr. BLUMENAUER. Thank you, Mr. Chairman. And I appreciate that our witnesses have more information here than they have a chance to do. And I appreciate your courtesy because I am in a markup in Ways and Means across the way.

I guess I am concerned about putting three things on the table and because there won't be time, really, to elaborate on them now. It is something that I would like to follow through with you folks on.

One, I haven't heard you mention the opportunities to adjust how we regulate electricity and other utility rates. As you know, some utilities around the world are looking at having part of the rate of return contingent on carbon performance and other indicators. I have got a hometown utility that pioneered decoupling so that the gas utility wasn't penalized for conservation.

But I am interested if you could help us with thoughts, ideas about how we might use innovative regulatory schemes to incent utilities, to allocate costs in the right way, and that it might provide an incentive for the adoption of new forward-thinking and advanced energy technologies that we embed that in the rate regulatory system so it happens automatically and they are awarded more appropriately allocated costs. And it is a conversation I would pursue with any of you individually.

The second concern I have—and Mr. Abbasi referenced it—in the Ways and Means Committee, we have tried to shift subsidies from a mature oil industry that has proven that they can make lots of money selling the world's most profitable commodity, expensive commodity, to shift it in other areas, the extent to which we could have your help fine-tuning ways that other subsidies might be reallocated so that the tax code is more even-handed.

The third area that we would be keenly interested in thoughts and observations is how the federal government could lead by example. I appreciate what you say in terms of being thoughtful about the regulatory scheme. You know, we are trying to embed the production tax credit in the next stimulus package because we are going to lose jobs if we don't do that.

But the federal government as the largest landlord, landowner, and employer, and consumer of energy has an opportunity to practice the best practices by our own, the products that we buy, the standards that we set, and would be keenly interested in your thoughts and observations about how we might be able to use the vast power of the federal government itself, the Department of Defense General Services Administration, to achieve that.

I have got a couple of more minutes here that I would turn over to you folks for any thoughts or observations on it. But my staff and I would love to follow up with you in greater detail on those three points as you see fit if somebody wants to jump in.

Mr. PREND. Sure. I will take the first one: regulating electricity. I think that that is a very good point. I applaud the utility in your home district. Decoupling is definitely something that I think gets at one of the big problems in energy industry right now, which is that there is this huge amount of invested infrastructure that any new technology and new business has to get over before it can thrive. And I would point out that a lot of that infrastructure was originally funded by a lot of government incentives.

I think there are a number of ways to go about that. I think the trick, as you pointed out, is coming up with another way to make it profitable for the utilities to save energy, not just manufacture more energy.

And one of the things that one of our portfolio companies has done, a company called Converge that went public last year, was to look at the existing regulatory framework and say, "How can we outsource" what they call negawatts, which is saving power in

times when there is a peak demand? And the regulatory bodies were able to incorporate that kind of a thing into the framework.

Investment is another question. And I think there does need to be some sort of regulatory framework that allows investments to be recouped on some sort of reasonable rate of return for energy-saving projects that might be invested in by the utilities.

I think from our perspective, the challenge is the public utility commissions of each state are very protective of their turf. And it seems to us that it has been hard for the federal government to get into that arena. To the extent that the federal government can get into that arena, I think it would be a real positive because this patchwork that we have with different states with different investment incentives does make it harder for a small company that doesn't have the resources of an Exxon or a Duke Power to be able to figure out that whole landscape.

Mr. BLUMENAUER. Thank you. Thank you for that courtesy.

Mr. Abbasi, did you have comments?

Mr. ABBASI. Two quick examples, and then I will defer to Dan. One is the energy-saving performance contracts. This is an existing contractual vehicle that has been in existence since 1978, I believe. One of our portfolio companies, Hannon Armstrong, has been a leader in securitizing the cash flows from those.

We have not understood why, but this year the Defense Department has really not been using that authority to the extent that they have in the past. It is looking like somewhere in the neighborhood of 20 percent of the prior usage.

And this comes at a time when the actual energy efficiency standards have been strengthened through EPAct 2005 and the January 2007 executive order issued by the president looking for 3 percent year over year reductions in energy intensity, reaching 30 percent by 2015.

So there is an existing vehicle. And what these contracts do is they allow the government to not appropriate the up-front funding for the energy efficiency investment and then to reap that, the benefit of those. So it is an energy saving share that is facilitated through this third party finance. To date it has been quite successful over the years, 400 projects, 5.2 billion in savings, somewhat smaller on the net basis but a very substantial savings.

So we are somewhat perplexed by why that isn't being used to its fullest extent. And I guess we would encourage you to the extent there are formal or informal things you could do to prompt them to use that and would be happy to work with you to facilitate that.

A second very quick one is I understand the Defense Department has requested that contracting authority for power purchase agreements be extended from the current limit, which is 10 years, up to 20 years, which is much more in line with what a typical renewable power developer needs to have in order to finance their project.

So this is what municipalities are doing. This is what private sector buyers are doing, utilities, and so forth. It would be great to have the federal government, as you said, the largest user of energy, to also have that authority.

Mr. INSLEE. Great.

Mr. BRAUN. And, Congressman, I would like to take the opportunity to respond completely to all three of those points. I realize that you are on your way to a markup meeting, committee meeting. So I will take the next week or two and get back to you with those responses.

I would like to touch on the third point that you mentioned. This whole idea of how can the federal government lead by example. The House of Representatives is a member of the Chicago Climate Exchange. It is essentially to lower the carbon.

Mr. BLUMENAUER. Right.

Mr. BRAUN. I think that is, frankly, admirable in terms of leadership on this issue. This morning we were talking about what the glide path might look like for cap and trade legislation. Well, this is a very long-dated proposition. The whole idea is, what can we do in the interim period, in essence, to get some momentum behind this? And I think that was an extraordinary measure taken by Speaker Pelosi in the House of Representatives in the Capitol.

Mr. BLUMENAUER. It got a lot of flack for it, but yes, I agree.

Mr. BRAUN. That is true.

Mr. BLUMENAUER. I agree.

Mr. BRAUN. That will only happen when something new is done.

Mr. BLUMENAUER. No, no, no, no. I think it is terrific. That is great.

Mr. BRAUN. But I think you can keep doing that type of thing. You are basically sending a very powerful message to every part of the economy that, look, this is coming. And we have got to start to deal with it.

Mr. BLUMENAUER. Well, I appreciate your courtesy and look forward to following up with each of you in detail on that because these are things that are extraordinarily of interest to me and I am convinced that in each of these areas, we can do things that don't cost and literally don't have a budget impact but that can send the signals that you are talking about. And I really appreciate your examples. It is very, very helpful to us.

Thank you, Mr.——

Mr. INSLEE. Thank you.

And, Mr. Abbasi, with your permission, we will look into this with the Pentagon to see if we are missing the boat here recently on that. So if we can work with you in this regard?

Mr. ABBASI. Sure.

Mr. INSLEE. We have a vote shortly. So I am going to ask just a couple of quick questions. First, in as brief form as you can, why are tax incentives not enough? Why do we need a cap and trade or renewable electricals standard or decoupling? Why isn't just handing out some tax credits enough?

Mr. BRAUN. I will handle that one first, Mr. Chairman. In my opinion, an unencumbered price signal in a cap and trade is a very pure price signal. A properly functioning capital market for any commodity will deliver the lowest possible cost of abatement.

The difficulty with a tax credit or a tax, carbon tax, is that it is an artificial price condition. I have mentioned in testimony that was submitted that when an artificial price condition is introduced into a market, you begin to move away from what can be thought of as optimal allocation of resources towards a solution.

Now, I don't know if the price of carbon in the United States is a dollar, $10, $100, but the only way to find out really where the market-clearing price is is to use a cap and trade system.

Mr. INSLEE. Mr. Abbasi.

Mr. ABBASI. The point earlier about the need for us to reach beyond just the renewable sector, really, there are tremendous opportunities on supply-side efficiency. As I said, in the fossil fuel sector, that is where most of the carbon is flowing today and where the reduction opportunities are also very significant as well as on the demand side, just tremendous opportunities.

What we really need is a broad pricing signal to motivate and discipline really all market participants. And by that I mean investors, entrepreneurs, large corporations, even consumers to respond. If you unleash the market, we know that it is not predictable, but we do know that we will unleash tremendous entrepreneurship in finding every last emission reduction opportunity at the lowest cost possible. That is what the market is good at. So what it needs is just that rule of the road.

We really think of that as the foundation. And then these more targeted investment tax credits and so forth for specific sectors, like the renewable sector, are very, very important given the stage in those technologies development. But this over-arching platform of a carbon signal will pervade the economy and produce tremendous opportunities.

Mr. INSLEE. And I was talking to some folks in the electrical industry the other day. And they were expressing fear of speculation and speculators in a carbon market. And that might be perhaps exacerbated by the run-up in gas prices we have experienced.

Some of our concerns—and, actually, there has been some volatility in those markets because of some questionable trading going on or at least non-transparency in the markets.

What should we do to allay or answer those fears? And are there things to do in this market to prevent, to make sure there is transparency and no gamesmanship that we experienced in Enron in this regard?

Mr. PREND. I will start with that one, Mr. Congressman. I would——

Mr. INSLEE. We have got about 60 seconds. I have got to run and vote.

Mr. PREND. Okay. So ITC I think is the most important thing from a small company investment point of view. I would not even put cap and trade as the second. I think cap and trade is an important part of an overall approach, but from a small company's point of view, as opposed to maybe a slightly different view from these gentleman, I think it is something that is a part of an overall policy but is not the most important thing.

I think the ITC is, by far, the most important because that is something we have today. And to take it away is like imposing a huge new tax increase on these small nascent industries.

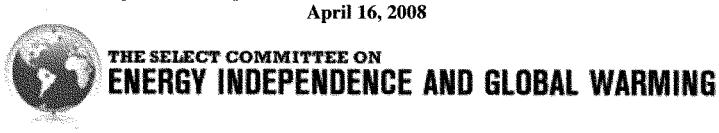
Mr. INSLEE. Well, as we discussed, we are going to try to get that done as quickly as possible. We have a lot of other questions, look forward to working with you. Thanks for your testimony. It is very valuable. We are going to share with others. This is the can-do

folks. You are the can-do people. And we appreciate you joining us. Thanks very much.

With that, we are adjourned.

[Whereupon, at 4:16 p.m., the Committee was adjourned.]

**David Prend's Answers to Submitted Questions**
**Hearing: "Green Capital: Seeding Innovation and the Future Economy"**
**April 16, 2008**




## Question 1

*I am interested in exploring opportunities to adjust how we regulate electricity and other utility rates to provide incentives for energy conservation and renewable energy. As you know, some countries utilities around the world are looking at establishing rates of return for utilities contingent upon carbon performance and other indicators. In Oregon, our home state gas utility pioneered decoupling so that they weren't penalized for conservation. How can we use innovative regulatory schemes like this to allocate costs in the right way and to provide the right incentives to utilities for the adoption of new, forward-thinking and advanced energy technologies? How can we embed this in the rate regulatory system so that it happens automatically?*

The disincentive for utilities to invest in renewable power lies in both its cost relative to conventional alternatives and the difficulty in transporting it from typically isolated, resource rich areas to the location of the load. Energy conservation and efficiency, however, are a different story. By investing in conservation, utilities lose sales revenue, resulting in either lower profits or higher costs to non-participating customers. There are really three steps which must be taken to ensure that utilities are not penalized and, in fact, have an incentive to invest in energy efficiency programs.

The first step is to examine a utility's rate design to ensure that its fixed and variable costs are properly separated. A retail customer's bill is generally made up of fixed charges, which are incurred by the utility independent of a customer's use, and variable charges, which increase in proportion to usage. For historical reasons related to the desire of regulators to place more costs on a utility's largest customers, a utility's fixed costs tend to be at least partially recovered in

variable energy charges. In such cases, if demand is reduced, utilities are not able to recover all of their fixed costs, which they still incur even after conservation programs are implemented. These fixed costs could include the costs of meters, customer charges, and the costs of the transmission and distribution system in place to serve all customers. Thus, it is important that a utility be able to recover its fixed costs separately from its variable energy costs and that these costs are accounted for correctly.

The second step is what is known as "decoupling." The way that a utility's regulated rates are determined is that a utility is granted an allowed rate of return which is applied to the utility's rate base—the current level of investment by the utility in its regulated assets. The result of the multiplication of these two factors is what is known as the utility's revenue requirement—the amount it is entitled to collect from customers in any given year. To determine customer rates, the revenue requirement is divided among different classes of customers based on the relative costs of serving each class. Then, based on either an actual historical number or a forecast, the revenue requirement by class is divided by total sales of kilowatt-hours to determine the rate to be paid by customers in each class.[1] However, rates are not reset every time costs or sales change. Utilities bear the risk between rate cases that sales will be sufficient to meet their revenue requirement, or that the revenue requirement will be sufficient to meet the utility's costs.

When a conservation program is implemented by a utility, sales are of course reduced. However, in most cases, a utility's costs will not be reduced by the same amount; and thus the utility will be unable to recover its full revenue requirement, at least until the next rate case when rates can be adjusted. Since the rate-making process itself can take years, this "regulatory lag" can be quite costly to utilities and serves as a disincentive to conservation investments. The purpose of decoupling is simply to separate the utility's ability to recover its costs and its allowed return from the amount of sales it makes. There are several different ways in which this can be done. Some states, such as Oregon and California, have already implemented decoupling approaches, and many others are looking at it now. Decoupling is not without controversy, since it may mean that, even as usage goes down, rates can go up. Additionally, customers that have already

[1] This is, of course, an oversimplification of the rate-making process, but it is sufficient to understand why decoupling is so important to ensuring that utilities are not penalized for implementing conservation programs.

made investments in conservation will face higher costs without receiving much in the way of incremental benefits. On the other hand, some would argue that conservation reduces a utility's future costs and consequently benefits all customers eventually.

The third step is to *create incentives* for utility investment in conservation and efficiency, since decoupling only serves to *remove disincentives* and may, in fact, reduce future earnings growth opportunities for some utilities by itself. There are three types of incentives that are generally discussed to encourage utility investment. The first is simply allowing a higher utility return on conservation investments, partially to reflect the higher risk of these investments and partially to make up for a potential loss in earnings growth that would be suffered by the utility. A second approach is a shared savings mechanism, wherein the utility is encouraged to invest by allowing it to share with customers any savings created by its conservation investments. A third approach, proposed by Duke Energy in North Carolina, has become known as the "Duke approach." Duke, in simple terms, would determine what the cost would be to build its next generating unit, and, for any conservation investments it makes, would be allowed to add to its rate base a fixed percentage of the cost of the generation it is replacing. The shared savings and Duke approaches have a number of significant measurement and verification issues associated with them that are still being debated around the country.

Although the policies described above may not work everywhere—especially since the regulatory system varies significantly by region—they highlight some of the issues that must be considered. Furthermore, even though the states seem to be moving fairly rapidly to resolving these issues within their own respective jurisdictions, there is a crucial role the federal government can play in encouraging the development of technologies that will provide economic opportunities for utility and private sector investment.

## Question 2

*The House of Representatives has passed legislation that shifts tax subsidies from established energy sources such as oil and gas to alternative sources that still need taxpayer support, such*

*as wind and solar. What other subsidies do you think could be reallocated so that the tax code is more even-handed and sends the right signals on climate?*

We cannot speak to the specific needs of the oil and gas industry, we believe that subsidies currently allocated to mature industries would be better directed towards emerging and next-generation energy technologies. There are many tax subsidies that support the use of conventional fuels such as intangible drilling costs, depletion allowances, special treatment on coal royalties, overseas refinery credits, and even generic fuel expensing for businesses. Each of these subsidies, which are now tantamount to windfall profits for the oil and gas companies that receive them, should be substantially reallocated to industries like clean technology, which may deliver solutions to this nation's climate and energy security issues, as well as provide an economic engine for growth in GDP and employment.

## Question 3

*How can the government lead by example in this area? How might we use the vast power of the federal government, from the Department of Defense to the General Services Administration, in terms of the products we buy and the standards we set, to achieve our climate goals?*

We commend the progress and commitment that Congress has made to renewable energy and energy efficiency through the passage of historic bills such as the Energy Independence and Security Act of 2007. Much progress has also been made through federal executive orders under the Clinton and Bush Administrations to "green" the federal government. Building on these achievements, we encourage Congress to further maximize all opportunities to manage federal procurement policy in ways that foster the development of renewable energy. For example, mandated use of more efficient lighting in all federal government buildings and the use of advanced building materials and energy efficient windows in all new construction and renovated federal buildings would be an excellent start towards lessening the federal government's carbon footprint. Programs like Energy Star could be expanded to include more appliances for home and commercial use. In order to reduce greenhouse gas emissions related to transportation, the federal government, through GSA, should require that all federal agencies and Congressional offices use more energy efficient vehicles unless there is a legitimate reason to use a vehicle that

consumes more fuel. These are just a few of the things that the federal government can do to show its commitment to reducing energy consumption and becoming an early adopter of clean energy technology.

## Question 4

*Which tax credits do you find most helpful in promoting the development of new technology?*

The extension of the renewable energy Investment Tax Credits (ITCs) and Production Tax Credits (PTCs) are critical to the development of promising new clean energy technologies. Long-term extensions of both would greatly stabilize the development of renewable energy industries by, for instance, enabling more extensive investments in manufacturing capacity and permanent job creation. Some of the most important incentives that need to be extended are the renewable energy PTC, the renewable energy bonds, the efficient commercial buildings tax deduction, the ITC for solar and fuel cell systems, the tax credit for energy efficiency upgrades to existing homes, the tax credits for the production of efficient home appliances, the tax credit for construction of efficient new homes, and the tax incentives for consumer purchases of energy efficient products.

The current stalemate in Congress on extending the ITC and PTC is already having a considerably negative impact on projects. We risk significant contraction in the marketplace as projects slow down and employees get laid off from sectors important to the development of renewable energy. The boom and bust cycle caused by uncertain and short-term extensions is most harmful to the development of these technologies.

## Question 5

*Are you currently investing in clean technologies even without federal legislation in place to address global warming?*

RockPort Capital Partners has been investing in clean technologies since the firm's inception and is now one of the largest venture capital investors focused on this space. Given the lack of federal legislation up to this point, we have attempted to make investments in companies with attractive economics, even in an uncertain regulatory environment. Such an approach to clean technology investing is evident in the significant growth of the NVCA's Clean Tech sector over the past five years. If clean technology, however, is to attract private capital on a large enough scale and with a diverse enough number of technological approaches to both reverse climate change and wean the United States off of foreign oil, a balanced and broad portfolio of policies must be adopted as soon as possible.

## Question 6

*I am very interested in the technological solutions that can and should be developed to address both global warming and energy independence. Can you tell us what you think the most exciting emerging technologies are? What metrics do you use to justify potential investment in new technologies?*

Many emerging technologies across a variety of nascent industries have the potential to address both global warming and energy independence. RockPort Capital Partners believes that technologies which act at the intersection of energy, advanced materials, process innovation, and efficiency have the greatest chance of both commercial and environmental success. We find some of the most promising sectors to be:

- Distributed power generation (e.g. "small" wind and solar),
- Electric drive train for transportation,
- Efficiency and conservation (e.g. "green buildings"), and
- Infrastructure technologies that tie each of these together (e.g. power storage, advanced metering infrastructure).

When RockPort examines a particular investment, we simultaneously assess the desirability of several traditional factors in order to balance risk and reward. Of these, we find the most important to be the capabilities of the management team, the size and growth rate of the addressable market, and the value proposition of the business to that market.

## Question 7

*Isn't the very nature of your business to take risks on new technology? Why is it that you are looking to the government for further certainty?*

The nature of venture capital is to take on risk, but also to mitigate it to the greatest extent possible. By utilizing our technological expertise and connections with industry, venture capitalists can manage much of the technological risk from early-stage investments and help grow fledgling businesses to the point at which they may be acquired or go public. Consequently, venture capitalists play a critical role in making capital markets more efficient, by providing a path for companies to reach a stage at which they have been significantly "de-risked."

Investing in clean technology presents a risk profile that entails competing with the heavily entrenched interests of the energy industry. Significant barriers to entry must be overcome in order to achieve new product adoption on a large enough scale to make clean technologies cost competitive in most domestic markets. We see the role of the government in this regard as the facilitator of this new market, providing transitory incentives for adoption to help overcome the embedded advantages of current technologies that have the benefit of years of cost optimization through volume production, as well as often years of government subsidies. The role of the government is also to provide a predictable regulatory environment to encourage private capital to flow into a sector with significant technology risk.

We are confident that this transition to new energy technologies will occur eventually given the powerful market drivers at play. The choice we have to make as a nation is whether or not the transition will be a gradual one—eventually leading to economic growth, energy independence,

and environmental sustainability—or one which comes in response to a crisis. Without intelligent government policy implemented today, we fear that the latter will be the case; and that our lack of responsiveness will allow other countries to dominate this new industry.

## Question 8

*On the issue of tax credits – I have heard a number of times that it is critical to have a longer, more certain time to use tax credits – is there an ideal length of time for investment purposes? Ten years? Fifteen years?*

Many alternative energy technologies are expected to yield returns over a long period of time due to their technological nascence and high capital intensity. Ideally, the length of investment tax credits should correspond as closely as possible to the length of time needed for clean technologies to mature and build to the scale at which they may begin to compete with older technologies in a cost effective manner. We feel that 3-5 years would be adequate, depending on which technology is in question.

The length of investment tax credits, however, is not nearly as important as the predictability of their renewal. Predictability allows providers of capital to become more comfortable with the risks involved and will encourage far more private investment in the clean technology industry.

## Question 9

*As you look at technology investments, is there any element of evaluating the environmental performance of an investment or is it really just about the monetary return on investment?*

Although we are committed to generating outstanding returns for our limited partners by deploying their capital in high quality, high growth companies, we believe that the explosive growth in clean technology seen recently can only be explained by a unique alignment of economic and social incentives. Unlike previous shifts of public sentiment, this one has

coincided with an economic reality wherein alternative energy sources, for instance, have finally been given a chance to compete head-to-head with their traditional counterparts. As a result, we believe that, with respect to global climate change and energy independence, the venture capital community can truly "do well while doing good."

## Question 10

*Carbon Capture and Storage (CCS), for example, sounds like a promising way to help deal with emissions, yet it could have substantial liability associated with it. How does potential environmental liability come into play when you are making investments in new technology?*

We assess a wide variety of risks in connection with any investment opportunity that we examine, including environmental risk. The costs associated with a significant environmental liability would be considered a financial liability as well and would therefore provide us with a serious disincentive to invest.

## Question 11

*Are you investing in Carbon Capture and Storage (CCS) technology? Do you support the use of CO2 in enhanced oil recovery as well?*

RockPort Capital Partners has an active investment in a company called Powerspan, which seeks to commercialize a carbon capture technology for use in coal electricity generation. Although we are not experts on the use of $CO_2$ in enhanced oil recovery, it is our understanding that, while the technology has been proven effective for many oil fields to maximize the total recovery of oil in place, it is not necessarily a viable long term method for $CO_2$ sequestration.

## Question 12

*Are you actually looking for a cap and trade system or is it really legislative certainty that you are looking for?*

We believe that a cap and trade system may be part of a balanced and broad portfolio of energy policies, but by no means should it be the only policy in that portfolio. Although cap and trade works to allocate carbon emissions in an economically efficient manner *in theory*, in reality, any cap and trade system faces some serious practical challenges.

The initial distribution of allowances, for instance, is prone to preferential and arbitrary treatment. An auction-based allocation, on the other hand, would be objective in its allocation, but would produce a massive windfall of proceeds, the optimal distribution of which would be unclear.

An additional concern is that some may mistake cap and trade as the *only* necessary solution, overpowering this country's true need for a portfolio of policy solutions. Moreover, speculators will undoubtedly enter the carbon trading market and create artificial volatility, increasing uncertainty around the projected economics of various investment decisions. Also, in order to positively impact many investment decisions, the cost of carbon may need to be prohibitively high, causing unnecessary economic pain.

Therefore, we believe that Congress should prioritize policies with a more immediate and direct impact on specific strategic industries and investment decisions at all levels of the economy. We find the investment tax credit to be the most direct and effective of all policy instruments in this regard, but we also recommend a national renewable portfolio standard and industry-specific feed-in tariffs or other subsidies. A well managed cap and trade policy should be part of a comprehensive energy policy.

## Question 13

*In Mr. Abassi's testimony he says that "The two primary criteria for energy used to be cheap and reliable. Now we've added two words to that: "secure and clean." What can we do to keep those terms from being mutually exclusive?*

Mr. Abassi is probably best suited to answer this question; I can only offer an assumption as to what he meant and how Congress can weave "secure and clean" into our national lexicon with

regard to energy. Mr. Abassi was likely trying to point out that energy independence, achieved through the use of alternative of energy sources, will both help achieve our nation's energy security and clean our environment. Congress should be charged with making sure that all the relevant policies it enacts enhance our energy security by utilizing clean technologies.

## Question 14

*When your investments are ready to be sold, either to the public or another firm, you sell your equity stake and receive a capital gain, currently take at the 15% tax rate. While a few still dispute it, most agree that these are indeed "capital gains." Your share is also called a "carried interest" although some find that term less palatable; it's really all the same thing. Does your firm treat gains on the sale of your investments as capital gains? Do you support legislation to make the current tax rate on capital gains permanent?*

Under current law, all partners of a partnership are taxed on a "pass-through" basis. This means that the partnership itself is not subject to tax, but its partners are subject to tax on their shares of each item of the partnership's income, gain, loss, expense and deduction; and the "character" of each of those items also passes through to the partners.

As a result, when our partnerships sell a company at a gain, under current tax law, all partners are subject to tax on their share of that gain. To the extent the gain is long-term (meaning that the partnership has been an investor in the company for more than a year), then the partners are required to pay tax at the long-term capital gain rate, which is currently 15%. The partners determine upfront how to share the gains based on their relative contributions to the partnership, whether in the form of financial capital (e.g. money or property) or human capital (e.g. time, effort, or intangibles).

We support legislation that maintains capital gain treatment for gains earned on the disposition of venture-backed companies, whether held through a partnership or otherwise, and that does not treat such gains as compensation income. This tax treatment is critical to support investment into companies that are innovative and, when successful, add great value to the economy in the form

of jobs, technology, and economic stimulus. The risk profile of such a business model requires that many companies fail in order to create these innovative and disruptive technologies. Capital gain tax treatment encourages investors to invest in these high-risk companies that generate such a high reward to the nation's economy as a whole. We look forward to being part of the discussion as to the appropriate rate at which capital gains should be taxed in order to further encourage investment in innovation.

## Question 15

*How do you feel nuclear energy should be treated under a low carbon regime?*

Our trade association, the National Venture Capital Association, of which RockPort Capital is a member, does not have a position on how nuclear energy should be treated under a low carbon regime; and our firm, RockPort Capital Partners, has not developed a position on that specific issue.

## Question 16

*Could you tell us more about the smart grid technologies that you have invested in?*

The current electric grid infrastructure in the United States suffers from massive underinvestment over the last 30 years; in fact, past the substation level, there have been almost no new technologies adopted in the last 50 years. For instance, despite all the advances we have seen in information technology over the past several decades, when a neighborhood suffers a power outage, the utility discovers it only through customer phone calls. There is consequently an enormous opportunity to modernize this country's grid infrastructure, predominantly by implementing an intelligent network to manage power flows, read meters, dispatch personnel, pass price signals to end customers, remotely connect and disconnect meters, and provide demand response—that is, an advanced metering infrastructure (AMI) or "smart grid." By better enabling utilities to control their meter assets and passing on pricing information to consumers,

AMI has the potential to dramatically lower electricity demand during "peak periods," thereby reducing the use of expensive and environmentally damaging "peaker" power plants, as well as reducing the need to add generating capacity in the coming decades to satisfy growing peak demand.

RockPort Capital Partners has made two investments in the smart grid—Comverge, Inc. and Eka Systems. Comverge is currently generating revenue from "Smart Grid 1.0"—sophisticated switches that cycle air conditioners, pool pumps, and other energy hungry devices via one-way paging networks. By aggregating thousands of these devices, Comverge shifts peak load from its installed base to off-peak times and then contracts with utilities to sell back these "Negawatts" of power during periods of high demand. Although its one-way paging technology is easily scalable and currently commercially available, Comverge also has a number of initiatives in place to implement "Smart Grid 2.0," which utilizes two-way communication technology, including smart thermostats capable of responding automatically to pricing signals.

Our other investment in the smart grid, Eka Systems has created a wireless mesh networking technology which enables a secure, robust, and scalable two-way communication backbone to end meters and the edge of power networks. The technological challenge of providing two-way communications at low cost and utility scale, with minimal active management of the network, is very significant; and we believe Eka is one of the few companies to have solved this problem.

The government can play a crucial role in influencing the adoption of smart grid technologies by utilities, which are notoriously risk-averse since they have a primary incentive to appease their Public Utility Commissions (PUCs). Furthermore, utilities are hesitant to adopt any new technology that affects their cash register (i.e. the meters) or their generating assets. Given the perverse incentives at hand, the government must step in on a federal level and align the interests of the utilities and the PUCs with those of the end consumers of electricity, possibly by allowing utilities to include the cost of smart grid implementation in their rate base.

## Question 17

*With respect to green building technologies, would you agree that the market for many of these technologies comes from people's desire to cut down on their energy bills, not just environmental concerns?*

We should be careful not to underestimate the power of public sentiment with regard to environmental concerns and its influence on the products we buy and the policies we prefer. We have seen at least two examples in the past where unattractive economics were trumped by the desire of the consumer to "be green." The first is in the early success of the Toyota Prius, back before its economic benefits outweighed its costs, and the second is in the current push by lessees towards LEED certified buildings, despite uncertainty towards their actual energy savings. In both cases, publicly visible products with a significant "fashion" component owe much of their success to the intangible benefits associated with their environmental impact.

Clean technology, however, can not afford to be merely "fashionable" since many of its addressable markets are separated by a great distance from the consumer's experience. It is unrealistic, for instance, to hope that consumers *en masse* will buy electricity produced by "green" sources unless it is fairly close in price to that of conventional electricity. For this reason, we believe that attractive economics ultimately must drive clean technology towards long term success, although in the short term, especially with regard to green buildings, we should not underestimate the consumer's singular preference for environmentally sound products.

## Question 18

*On page three of your testimony, you state, "Rest assured, these advancements in energy technology will take place regardless of whether the U.S. government act to foster the advancement of clean technology." Given that, would you agree that it is better for Congress to carefully draft legislation that clearly improves the environment rather than rush to implement a cap and trade bill to please our friends in the European Union?*

As of now, the U.S. holds the technological lead in many clean technology sectors, but that leadership role will be tenuous as long as clear steps are not taken to shore up our global position in this industry. In the global economy, capital can, and does, flow everywhere. The U.S. is no

longer the only country where innovation takes place. Germany, for example, has become a global leader solar photovoltaic technology and has done so largely because it, unlike the U.S., took the initiative early on to encourage its development. The technology originated for the most part in the U.S.'s national labs; and, yet, Germany commercialized it and is now reaping the benefits of market leadership.

While we agree that Congress must be careful in crafting legislation, we must also be careful that we not letting "the perfect become the enemy of the good." We believe that there are significant actions that Congress can take now that will allow for continued U.S. leadership in innovation while not waiting for policy-makers to craft the perfect piece of legislation.

## Question 19

*Without legislation in place, which many insist we must have for investment to happen, how do you account for the "tremendous growth in investment in the clean tech sector?"*

Growth in clean technology has been driven by a number of factors, including the efforts of foreign governments to promote its development within their borders. While their efforts may grow the entire industry in the short term, in the long term (as discussed in our answer to Question 21) their action combined with our potential inaction would be tantamount to ceding to other nations worldwide leadership in this crucial industry.

A myriad of other factors have also contributed, including (1) rising commodity prices due to increased demand from the BRIC countries, (2) threats to energy security, (3) increasing public and corporate recognition of global warming, (4) increasing failures of power infrastructure, and (5) unprecedented technological innovation.

Nevertheless, renewable energy is still a small fraction of the total energy used the United States. Without appropriate legislation, the growth of this sector will be challenged to make a serious global impact. If we are to reach the goals we all share, legislation must be enacted to encourage the growth and long term viability of the clean technology industry.

## Question 20

*On page 4 of your testimony, you state, "This national RPS can be established quickly and should not wait for the adoption of a cap & trade program or other climate change legislation to be enacted." Would you expand on what you mean by quickly? Is this feasible for every part of the country? How much would electric rates increase with a federal RPS of 20%?*

The states are already far ahead of the federal government in establishing an RPS. Currently, 26 of them have some sort of renewable energy standard. These and the other states, however, would benefit greatly from a uniform, national RPS. Utilities that service broad regions of the country would be released from the burden of having a "patchwork" of service areas with differing standards. While it may not be feasible, for example, for every state to require 20% of their electricity from wind sources by 2020 (as Kansas does), the federal government could mandate a general policy which can then be modified on the state level to suit the generation assets of a particular state. By doing so, we can capitalize on the plethora of natural resources this nation possesses—from solar in the southeast and southwest, to biomass and wind in the mid-west, to geothermal in the Rockies, and hydro-power in the west—in order to form a national RPS.

In Question 18, we alluded to the concern that sweeping legislation, like a cap and trade bill, may take several years to work its way through Congress and the courts. A national RPS is, instead, a policy that will have a more immediate impact on carbon emissions and the development of clean technologies. A diverse set of groups including labor unions and non-profits, the agriculture sector, and renewable energy companies have all endorsed a national RPS because of their shared belief that it will improve the nation's energy security and will ultimately lower energy and electricity prices nationwide.

In July 2007, specifically, the Udall-Platts national Renewable Electricity Standard (RES) amendment was offered and ultimately failed to pass; but Congress could conceivably enact a national RPS anytime it wanted. Also, recently, UK Prime Minister Gordon Brown called for a

target of 15% renewable energy by 2020 for the United Kingdom, which implies 33% of electricity from renewable sources, mostly wind.

A recent study by the energy research firm Wood Mackenzie estimated that a national 15% RPS would produce a net savings of approximately $100 billion.[2] Other findings from the report include the following:

- Natural gas prices would decrease 15 – 20% by 2026, which benefits all consumers, reduces natural gas volatility, even reduces coal fuel by 5%
- Wholesale power prices would decrease 7 – 11% at various locations across the U.S. by 2026
- Fuel and power savings of $240 billion would offset the initial higher capital investment in renewable energy of $134 billion, creating a net savings of more than $100 billion

## Question 21

*In your testimony, you say that "other nations are ready, willing, and able to take the lead on driving innovation and will gladly leave the US behind given the opportunity." Why hasn't this already happened?*

Other nations have *already* made significant inroads into many of the sectors that make up the clean technology industry. Germany introduced feed-in tariffs and tax breaks as early as 1990 to promote renewable energy and now leads the world in the production of wind and solar electricity. Japan began in 1992 to promote solar power through metering rules, tax rebates, and subsidized loans; and now their solar electricity is competitively priced with retail electricity in certain parts of the country. Because of government mandates, promotion of flex-fuel vehicles, and subsidies to sugar farmers dating back to 1975, Brazil now produces enough ethanol to be completely independent from foreign oil. Although individual state legislation has done some good in promoting the proliferation of clean technology domestically, the United States is currently many years behind the rest of the world in providing consistent, federal legislation to encourage its growth and, hence, its international competitiveness.

[2] http://www.eenews.net/tv/video_guide/614?page=2&sort_type=date

## Question 22

*You mention that energy technology advancements help with our competitive advantage and I agree. But would you also agree that high energy costs can put us at a competitive disadvantage?*

Traditionally, one of the United States' most significant competitive advantages has been its ability to innovate technologically and bring those technologies to market. Conversely, this nation has *not* been able to compete on certain input costs like labor and energy, which are cheaper in other parts of the world. So, although higher energy costs may put pressure on the margins of American businesses in the short term, in the long term they are not the key to our true competitive advantage—our capacity for disruptive innovation. In fact, higher input costs may even provide a greater incentive for that innovation, as they did in Japan, which has some of the highest retail electricity prices in the world as well as one of the most developed markets for solar power. The government can do much to mitigate the downsides to these short term costs, as the Japanese government did, by enacting policies that will foster growth in these important industries in the long term.

Therefore, instead of regarding clean technology as the next burden we must bear, we should look to it as an immense opportunity, one which promises outstanding long term economic growth, increased employment, and a better standard of living for those nations which embrace it wholeheartedly. The fact of the matter is that the clean technology industry will exist somewhere in the world. If we want it to be here, we need to make changes now.

## Question 23

*Given what you know about available renewable energy technologies, by what year could we realistically and affordably reach a 20% renewable portfolio standard and what technologies do you consider renewable? Would you include hydro and nuclear?*

We support the adoption of a 20% national Renewable Portfolio Standard (RPS). Selecting a target date for RPS will depend on what technologies and energy sources are encompassed by the portfolio, as well as setting the floors and caps for the quotas of those sources; but it is important to note that some states like California and Maine are quickly moving towards even more aggressive RPS goals.

As I stated in my testimony, I believe that a multitude of energy technologies will be necessary to achieve our nation's energy goals, and that may include environmentally-friendly hydro-power.

## Question 24

*When you say "embrace the innovation curve" do you mean provide funding? Do you support loan guarantees, grants, tax credits, or a combination?*

As with the semiconductor industry, technology-intensive businesses, when given enough capital to invest in R&D and equipment, tend to improve their cost structure incrementally over time in order to compete with incumbent technologies. When I encourage the government to "embrace the innovation curve," I mean to suggest that the government should help nascent clean technologies get to the point of cost competitiveness with conventional technologies. The most desirable way to do so would be through a combination of investment tax credits, renewable portfolio standards, feed-in tariffs, subsidized loans, funding basic research, and other regulatory "carrots," as well as some "sticks" like the cap and trade system.

In the past, government subsidies were an important component in the development and growth of the electric utility, oil, coal, and transportation industries. These subsidies bolstered the United States' economic strength, but also helped establish the heavy entrenchment of these industries. In the same way our past government had the vision to promote the development of these industries during the last century, our current government must have the vision to promote the development of clean technology in this century. We simply can not afford to take the relics of our old prosperity into the new age we must build together.

THE SELECT COMMITTEE ON
**ENERGY INDEPENDENCE AND GLOBAL WARMING**

Dear Mr. Dan Braun:
Following your appearance in front of the Select Committee on Energy Independence and Global Warming, members of the committee submitted additional questions for your attention. I have attached the document with those questions to this email. Please respond at your earliest convenience, or within 2 weeks. Responses may be submitted in electronic form, at aliya.brodsky@mail.house.gov. Please call with any questions or concerns.

Thank you,
Ali Brodsky

Ali Brodsky
Chief Clerk
Select Committee on Energy Independence and Global Warming
(202)225-4012
Aliya.Brodsky@mail.house.gov

1. I am interested in exploring opportunities to adjust how we regulate electricity and other utility rates to provide incentives for energy conservation and renewable energy. As you know, some countries utilities around the world are looking at establishing rates of return for utilities contingent upon carbon performance and other indicators. In Oregon, our home state gas utility pioneered decoupling so that they weren't penalized for conservation. How can we use innovative regulatory schemes like this to allocate costs in the right way and to provide the right incentives to utilities for the adoption of new, forward-thinking and advanced energy technologies? How can we embed this in the rate regulatory system so that it happens automatically?

**This is a very complex issue. In general, utilities, like all other public companies, have a fiduciary responsibility to maximize shareholder value. Furthermore, the utilities are, by their very nature, in the business of supplying energy. Clearly, the more energy they supply, the more money they should make. That is a reality that is reflected in your question.**
**It may be possible to provide incentives to utilities in such a manner that offers economic gain for demand side management. In short, by putting utilities in the retail demand management business there could be revenue flows which hopefully exceed the reduced revenue from decreases in demand.**
**In essence, this creates an entirely new paradigm: We can use less, in a more optimal fashion – and, in the process, change the electric utility business model.**

**This could be accomplished by providing (i.e. selling or leasing) technology to optimize household energy usage, i.e. rooms that automatically power up and down, efficiency standards for appliances, heating and cooling.**
**Furthermore, tax incentives could be created that encourage utilities to upgrade locally to smart grid technology that optimizes the flow of electricity. Traditionally, utilities have been reticent to make this type of investment because it creates an externality. The rate base pays for a system upgrade but the benefits accrue across that part of the grid to all energy users.**

2. The House of Representatives has passed legislation that shifts tax subsidies from established energy sources such as oil and gas to alternative sources that still need taxpayer support, such as wind and solar. What other subsidies do you think could be reallocated so that the tax code is more even-handed and sends the right signals on climate?

**I would tend to focus again on the demand side of the equation. Right now, demand for hybrid cars is increasing, particularly with prices at the pump in excess of $4.00 per gallon. I believe that strong hybrid incentives now will create a huge demand for this type of car/suv and permanently modify consumptive behavior. Ultimately, a structural demand shift should move us away from high carbon footprint vehicles, even if gas prices eventually move lower.**
**Furthermore, we should also be attempting to, as Congressman Inslee noted in his book 'Apollo's Fire', reinvent the car as lighter, stronger and more fuel efficient.**
**Tax incentives can also be used to fund low carbon emission public transportation, such as hydrogen fueled buses (Chicago and Los Angeles).**

3. How can the government lead by example in this area? How might we use the vast power of the federal government, from the Department of Defense to the General Services Administration, in terms of the products we buy and the standards we set, to achieve our climate goals?

**Congress can continue to lead in this regard ("Greening the Capitol") – this is an exceptional way to lead by example.**
**Given the size of the Federal government, it can purchase recycled paper and furniture products, only purchase hybrid vehicles, etc. Thus, setting the example for the rest of the country.**
**Congress can also insist contractors have high environmental standards, in essence doing what Wal-Mart has done…**

4. Which tax credits do you find most helpful in promoting the development of new technology?

**Given current price levels in the energy complex, I believe the highest impact tax credits would be the Investment Tax Credit (ITC), the Production Tax Credit (PTC) and tax credits that provide incentive for consumers to switch to hybrids and/or plug-in hybrids.**

5. Are you currently investing in clean technologies even without federal legislation in place to address global warming?

**Given the legal structure of Stark Investments, I cannot disclose, for the public record, information relating to current or past investments. I must, therefore, respectfully decline to respond to this question.**

6. I am very interested in the technological solutions that can and should be developed to address both global warming and energy independence. Can you tell us what you think the most exciting emerging technologies are? What metrics do you use to justify potential investment in new technologies?

**Given the legal structure of Stark Investments, I cannot disclose, for the public record, information relating to current or past investments. I must, therefore, respectfully decline to respond to this question.**

7. Isn't the very nature of your business to take risks on new technology? Why is it that you are looking to the government for further certainty?

**In general, the statement is true - we are in the business of allocating certain capital to assets we identify as risky. The mandate I am given is to allocate capital in the alternative energy space, which by its very nature is risky. Without tax credits or a free-floating market based carbon price signal, some investments in this space are uneconomical. To the extent that some classes of investments are only economically feasible with tax credits (or a carbon attribute), there is an unequivocal need for (time) certainty of tax credits so proper financial valuation and allocation can take place.**

8. On the issue of tax credits – I have heard a number of times that it is critical to have a longer, more certain time to use tax credits – is there an ideal length of time for investment purposes? Ten years? Fifteen years?

**It will vary depending on the technology. More specifically, the duration of the tax credit should coincide with the approximate length of time needed to develop and commercialize the technology. It is also preferred that the tax credits not be subject to**

**short term renewal. Investments of this type tend to be long term in nature and need tax credits with maturities that take this into consideration.**

9. As you look at technology investments, is there any element of evaluating the environmental performance of an investment or is it really just about the monetary return on investment?

**Given the legal framework of Stark Investments, we do not have a stated objective to only pursue investments that have specific environmental attributes. However, as Director of Global Environmental Finance, I have a mandate to allocate capital in the alternative energy space. To be clear, the expected return on the investment is the primary consideration.**

10. Carbon Capture and Storage (CCS), for example, sounds like a promising way to help deal with emissions, yet it could have substantial liability associated with it. How does potential environmental liability come into play when you are making investments in new technology?

**As with any investment, we consider the potential liability when analyzing the investment. In this instance, it may be difficult when the true cost of the environmental liability cannot be determined. This may be the case when considering carbon dioxide emission as an asset or liability. Clearly if we believe the magnitude of the liability or potential liability is too great, we would not make the investment.**

11. Are investing in Carbon Capture and Storage (CCS) technology? Do you support the use of CO2 in enhanced oil recovery as well?

**Given the legal structure of Stark Investments, I cannot disclose, for the public record, information relating to current or past investments. I must, therefore, respectfully decline to respond to this question.**

12. Are you actually looking for a cap and trade system or is it really legislative certainty that you are looking for?

**In my original testimony, I advocated the development and execution of a cap and trade scheme for CO2 emissions. In my opinion, the price signal for CO2 emissions is a critical piece of information the financial community needs to allocate capital in alternative energy space. For further explanation, please see my response to question #18.**

13. In Mr. Abassi's testimony he says that "The two primary criteria for energy used to be cheap and reliable. Now we've added two words to that: secure and clean." What can we do to keep those terms from being mutually exclusive?

**If we are able to reach commercial scale on major sources of alternative energy – those four words would always be mentioned in the same sentence. From a capital market perspective, unless an alternative energy source is economically viable, the cheapest to use energy source will be deployed. This underlines the need for a complete development and commercialization of alternative energy sources such as wind, solar, or (plug-in) hybrids.**

14. When your investments are ready to be sold, either to the public or another firm, you sell your equity stake and receive a capital gain, currently taxed at the 15% tax rate. While a few still dispute it, most agree these are indeed "capital gains." Your share is also called a "carried interest" although some find that term less palatable; it's really all the same thing. Does your firm treat gains on the sale of your investments as capital gains? Do you support legislation to make the current tax rate on capital gains permanent?

**This issue is subject to internal review. At this time, I respectfully decline to comment.**

15. How do you feel nuclear energy should be treated under a low carbon regime?

**From my perspective, it seems clear that nuclear power will be a significant part of the solution set. Nuclear power has a zero carbon footprint and is a very efficient source of base-load power. Clearly, there are issues with its use, such as the current waste disposal issues we are encountering. In my opinion, nuclear power and carbon capture and sequestration technology will be the two primary components of the climate change/energy security solution.**

16. On page 2 of your testimony, you note your concern about short-dated tax credits. I share that concern. What do you think the appropriate length of time is for a tax credit?

**Please see my response to question #8**

17. In your testimony, you say, "if a cap and trade program is designed and then constantly modified, the capital markets cannot and will not be able to make optimal or well informed decisions." With that in mind, would you agree that rushing legislation through the legislative process has the potential to create the need for future modification, and therefore set up the exact difficulty you describe?

**I do agree with that statement. Even after the truncated debate of Boxer-Warner-Lieberman, it was clear that cap and trade will be one of the largest, if not THE largest energy bill that has ever been legislated. Great care should then be used to make sure that the bill reduces negative effects, and gives the strongest possible likelihood that the alternative energy solution set is developed that will hit the environmental targets. However, as regional statewide programs are being developed and other countries are acting, time is of the essence for the United States to show leadership in reducing greenhouse gas emissions.**

18. I read with interest page three of your testimony where you state that "some degree of volatility is a characteristic of a properly functioning market" and "a second common misconception is that price certainty is always a good thing." We had a hearing with the oil companies recently and other members of this committee don't particularly like those elements of supply and demand. Can you explain further why how those characteristics fit into the market picture?

**From an investment perspective, volatility is price information. The magnitude and duration of a price signal is extremely valuable information about a security or commodity. In general, it quantifies shortage or surplus and, more importantly, quantifies the magnitude of shortage or surplus. The level or volatility of prices can modify consumptive behavior. On one hand, the capital market will use prices in the energy complex to allocate capital in all types of investments: crude oil or natural gas exploration, storage or distribution; carbon capture and sequestration; and solar/wind investments to name a few. On the other hand, high prices at the "pump" will prompt consumers to drive less, or perhaps, drive a more energy efficient vehicle. In my opinion, the most important idea here is that prices be allowed to fluctuate and fully reflect supply and demand conditions.**

**Daniel R. Abbasi's Answers to Submitted Questions**
**Hearing: "Green Capital: Seeding Innovation and the Future Economy"**
**April 16, 2008**

**THE SELECT COMMITTEE ON**
**ENERGY INDEPENDENCE AND GLOBAL WARMING**

1. **I am interested in exploring opportunities to adjust how we regulate electricity and other utility rates to provide incentives for energy conservation and renewable energy. As you know, some countries utilities around the world are looking at establishing rates of return for utilities contingent upon carbon performance and other indicators. In Oregon, our home state gas utility pioneered decoupling so that they weren't penalized for conservation. How can we use innovative regulatory schemes like this to allocate costs in the right way and to provide the right incentives to utilities for the adoption of new, forward-thinking and advanced energy technologies? How can we embed this in the rate regulatory system so that it happens automatically?**

We at MissionPoint Capital Partners agree that adding a carbon weighting to the rate of return earned by utilities, and certain other similar performance-based rate models being studied, constitute an innovative way to alter the generation mix in a less carbon intensive direction. This would provide an incentive-oriented mechanism to stimulate change in utility investment programs, relative to the compliance-oriented quota mechanism we see with the proposed National Renewable Electricity Standards.

Another approach would be to institute a cap-and-trade system for carbon dioxide emissions, which would, by pricing carbon, also create a carbon-weighting to investor returns in the power sector. A cap-and-trade would have several comparative advantages:

- Most of the proposed cap-and-trade systems would affect the entire economy, rather than just the power sector, and therefore would reduce carbon emissions

more substantially and distribute the costs of reducing carbon more widely, compared to a rate-based-only approach.

- A corollary to the point above, a cap-and-trade would address both regulated and unregulated power markets and generators, whereas a rate-based approach would only directly affect regulated markets.

However, one advantage of the carbon-weighted rate model over cap-and-trade is that it would directly influence investor decisions by prompting them to invest in utilities with lower carbon generation mixes and investment programs, whereas in a cap-and-trade system many regulated utilities would, in effect, be held harmless by being able to pass the added costs of carbon along to their customers. In this latter case, investor returns would be affected, but more indirectly, where: 1) customer purchases of power are reduced more than was projected, in response to the higher rates, resulting in under-recovery of the required revenues; or 2) investors drive the stock price, and therefore investor returns, down based on its long-term exposure to carbon pricing. Most prevailing carbon price models of the proposed cap-and-trade regimes indicate that consumers would see an increase in their power costs under of ½ cent to 2 cents per kWh or higher, which could well influence purchasing behavior more or less than calculated via our imperfect understanding of the price elasticities of demand in different user classes of the power sector.

Another important rate design concept for inducing efficiency and therefore carbon reduction is to shift from declining block rates (where the energy user faces a step-function whereby their rates per kWh decrease as they use more electricity) to increasing block rates (where the user pays more per kWh as they use more electrcitity). This would make the last kWh that the user purchases the most valuable – and would increase their incentive to offset (i.e., avoid) that cost by have on-site distributed renewable energy (e.g., a photovoltaic array on their roof or a combined heat and power (CHP) system).

California has such a rate structure, whereby those who are a certain percentage above average in their rate class in terms of energy usage pay a significant increase in cents per kWh for that

increment of overuse. California has 5 tiers in the rate structure, with the top 3 being increasingly costly for those using more than baseline power.

This kind of rate design gets the signal out to the customer that they need to participate in halting the growth of demand. And it is selective. It determines who in the customer base is actually wasting electricity and targets them with the highest rates. For them, the paybacks for installing efficient lighting or other efficiency upgrades, or for installing solar electricity, is comparatively quick because of a combination of overall energy use reduction and peak-shaving. Other states should adopt this model.

A more ambitious version of this concept would require that those consumers above the average level of consumption for their rate class (say >125%) would have to purchase (or have purchased on their behalf) 100 percent renewable or zero carbon energy for the increment over the average usage levels. Energy efficiency would be included as an eligible alternative. If properly designed, this should spur that particular group to either install efficiency or to buy renewable energy to get them back down to average consumption from the grid. In either case, it would eliminate the carbon footprint due to excess consumption. It would be a boon to both the energy efficiency and renewable energy industries.

As for "decoupling", we agree that it is a useful policy innovation. By separating (decoupling) an electric or gas utility's fixed cost recovery from the amount of electricity or gas it sells, the utility should not face the same disincentives to promote efficiency. It has its limits, of course, and should not be relied upon as a panacea. For example, over the long-term, utilities must demonstrate a return profile that draws the capital required to sustain their business. If they are rewarded the same for selling less, at some point a law of diminishing returns will set in and the profit returned on reducing revenue will no longer be tenable to capital providers with many other options for use of their capital. Accordingly, it is important to accompany a decoupling initiative with incentives that permit utilities to earn a comparable – or ideally higher – rate of return on investments in distributed renewable energy or conservation technologies. By allowing them to put these other investments into their rate base, the long-term viability of a decoupling strategy is maintained vis a vis capital providers, and just as importantly, a positive incentive is

created to accelerate lower carbon alternatives (as opposed to mere elimination of a discincentive).

One other variation on decoupling worth considering is to make the utility whole only for changes in throughput sales that derive from conservation, efficiency and load-management programs, while leaving the utility exposed to changes for other reasons (weather, attrition from retail electricity competition, demographics, economic changes, additions/reductions in the number of customers, etc.). This is a more targeted approach, but can be difficult to monitor and evaluate since it requires isolating causes.

For decarbonization to succeed, we need to overcome other regulatory obstacles that utilities sometimes use to block other third-party renewable energy generators from linking to their distribution network. Some of this is arguably outside federal jurisdiction, but can be encouraged by offering federal incentives to states that take needed action. For example, we need to see changes in rules concerned with solar and other distributed renewable energy providers interconnecting to the grid, in accounting for the electricity that such generators feed back into the network (known as "net metering"), and fair rate designs that compensate them fairly for that power. Rules affecting each of these areas are frequently managed at the state or local level and are so complex that they may deter third parties from installing renewable generation systems.

For example, rate designs (e.g., the "buyback rates" the utility pays to distributed generators) must account for the utilities legitimate need to recover reduced revenue from distributed generation, or to provide special services required due to the unique operating profile of distributed generation projects, including a fair share of the distributed generator's requirement for standby power. But utilities must also fairly account in the rates it pays to distributed generators for the system benefits provided by those generators (e.g., increased system capacity, potential deferral of transmission and distribution investment, reduced system losses, improved stability from reactive power and voltage support). Somewhere in this balancing act is a rate that fulfills the utility's needs without blocking clean distributed generation.

Interconnection standards, notoriously fragmented, are another problem. Each state has its own set of fees, pre-interconnection study requirements, approval mechanisms, and time frames – making it very difficult for a smaller player to gain access to the grid.
These are structural issues that will determine our nation's success in accelerating the penetration of clean distributed energy like solar power. If we are not careful, the utilities control over existing distribution channels for renewable energy can hinder healthy competition from smaller, highly motivated third-party generators.

And indeed there is an existing opportunity to use federal leverage to prompt simplification and standardization of these rules. The legislative proposals like HR 6049 extending the Investment Tax Credit and Production Tax Credits beyond the end of 2008 would also modify eligibibility for the credits to allow electric utilities themselves to claim them, opening the door for them to participate in the commercial deployment of renewable energy.

One of MissionPoint's portfolio companies – SunEdison – has in fact proposed that utilities be allowed to take advantage of the investment tax credits for solar energy only if they also commit to standardization and simplification of the state-by-state regulatory patchwork that remains in place on issues like interconnection, net metering and rate design for 3rd party generators. This condition seems a fair trade. States should be required to report out to FERC on this as a condition of access the tax incentives. Utility deregulation was advanced precisely to allow for fair and open access to the electricity grid, and we now need to ensure that this access is extended to renewable generators by promoting national best practices for net metering, interconnection, and rate design. This would have the effect of creating a level playing field for access to the grid – and stimulate both renewable energy and energy efficiency.
FERC has moved this forward with a previous order spelling out the Small Generation Interconnection Procedure (SGIP). Meanwhile, the Interstate Renewable Energy Council has proposed a model rule. These public and private efforts create a foundation on which to build.

2. **The House of Representatives has passed legislation that shifts tax subsidies from established energy sources such as oil and gas to alternative sources that still need**

**taxpayer support, such as wind and solar. What other subsidies do you think could be reallocated so that the tax code is more even-handed and sends the right signals on climate?**

MissionPoint believes that the 51 cent ethanol subsidy should be terminated and reallocated to other purposes. If we are going to effectively tackle climate change, we need to remain open to the best available data, including new data as it emerges and is interpreted. Recent findings have underscored how problematic ethanol is as a carbon mitigation measure. Even on a core life-cycle basis, it appears that it may emit more carbon dioxide than conventional petroleum-based gasoline once emissions from production and application of fertilizer are included. If one then factors into the life cycle analysis the land use changes that occur, both domestically and abroad, in order to grow more feedstock for ethanol production, and the soil and forest carbon released in that process, any alleged carbon benefits are quite clearly gone and in fact reversed into negative territory. In fact, the term "carbon debt" has been coined to describe how many decades it takes to return the starting line after releasing that forest and soil carbon. There are much better alternatives, especially "fuel electricity", which amounts to using electricity to power plug-in hybrid electric vehicles or all electric vehicles. The efficiency, when calculated through to the drive train, is much higher in an electric vehicle and so the lifecycle carbon emissions are much lower, even when the electricity is generated from a fossil fuel.

MissionPoint believes that we have little margin for error in addressing climate change and that we need to use all available policy levers to favor low or no-carbon solutions. Once we learn that we are favoring a technology that does not fit this criteria, we need policymakers to act expeditiously to eliminate the policy support, even at the expense of angering some political constituencies.

3. **How can the government lead by example in this area? How might we use the vast power of the federal government, from the Department of Defense to the General Services Administration, in terms of the products we buy and the standards we set, to achieve our climate goals?**

First and most important, the federal government should make fuller use of authorities and vehicles it already has. A leading example cited in my testimony is its Energy Savings Performance Contract vehicle, which created by statute in 1978 and amended in EPAct 1992. It has already saved the federal government billions of dollars by offering a way for the government to get the lifecycle savings from efficiency improvements, without appropriating the dollars for the upfront investment.

Despite this, over the past year, the DOD has used very little of the authority it has to tap into third-party financing and execute its widespread energy efficiency opportunities. MissionPoint believes that DOD, and other agencies, should be using this vehicle to at least attain the specified levels of required efficiency spelled out in EPACT 2005 and strengthened in 2007 via Executive Order. It calls for agencies of the federal government to attain year-over-year energy intensity reductions to 3%, culminating in a total energy intensity reduction of 30% by 2015.

We would ask Congress to remedy the declining use of this vehicle by DOD, in particular, using any means within the Congress' formal or informal authority.

Moreover, we believe Congress should act immediately to authorize DOD to use ESPCs for mobile platforms. In the 108th Congress, several bills to expand ESPCs to be used for "non-building" or mobile assets (such as combat ships, aircraft and tactical ground vehicles) were introduced, both on a government-wide basis on a DOD-only basis.

To take just one example from the Defense Science Board Task Force on DOD Energy Strategy "More Fight – Less Fuel", putting new engines on the B-52 fleet would yield net savings of $11 billion to the Federal Government. Other examples include investments in energy consumption by Navy ships' "hotel loads", which are actually very similar to lighting, heating and cooling functions covered in traditional "facility" ESPCs – in other words, it is arbitrary to provide this energy efficiency contracting authority for facilities that are fixed while denying it to those that move. Generators and virtually any energy consuming equipment onboard ships could be upgraded under a Mobile ESPC.

The major impediment to this expansion of ESPC authority today is a scoring conflict between the Congressional Budget Office (CBO) and the Office of Management and Budget, wherein CBO consistently and inexplicably fails to account for the energy savings side of the ledger in its cost estimates of enabling legislation. This is a reversal of a decades-old policy of recognizing ESPCs as revenue-neutral.

All of the bills in the 108th Congress failed to pass because the CBO cost estimate for mobile ESPCs was simply too high -- around $15 billion for 10 Mobile ESPC pilot programs. And while the Bush Administration and many in Congress view CBO's policy of "scoring" ESPCs in this way as completely wrong, CBO stands by this policy. Building-only ESPCs were reauthorized in the Energy Policy Act of 2005 only after 109th Congress choked down the $2.8 billion score that CBO imposed. Mobile ESPCs provisions in previous House and Senate versions were removed in order to minimize the score of the Energy Policy Act of 2005.

The efforts to pass Mobile ESPC legislation on a DOD-only basis suffered a similar fate. Then Senate Armed Services Committee Chairman Warner and House Armed Services Committee Chairman Hunter told the sponsors of H.R. 3339 and S. 2318 (the DOD-only versions of the Mobile ESPC legislation) that their provisions could be included in the FY 2005 Defense Authorization Bill if those provisions were scored at zero. But if the Mobile ESPC legislation was scored at the $15 billion the CBO estimated, it would be impossible to include Mobile ESPC in the FY 2005 Defense Authorization Bill. CBO remained fixed in their scoring policy and the Mobile ESPC provisions were not added to the FY 2005 Defense Authorization Bill. Thus, CBO scoring is absolutely the reason Mobile ESPC legislation is not law today.

CBO's policy is based on an extremely technical view of accounting theory. In essence, CBO's reasoning is that "Operations and Maintenance" (O&M) accounts are purely discretionary, but when an ESPC (mobile or otherwise) is signed, it constitutes a binding government obligation. Such obligations, CBO argues, must be recognized, in full, at the time the obligation is created.

The real issue is whether the savings that offset the ESPC payments should be recognized in the same way as the payments themselves. The Bush Administration and Congressional supporters

of ESPCs argue that the government obligation to make any payment under an ESPC is contingent on 100% offsetting savings occurring first. Thus, any scoring of the ESPC payments must also account for the offsetting savings, making the net impact of any ESPC contract on the Federal budget zero. It follows logically that the legislation that enables ESPCs should also be scored at zero.

CBO disagrees. Because the savings under an ESPC occur in a discretionary O&M account, CBO asserts that these savings cannot be counted to offset non-discretionary outlays. In other words, CBO claims ESPC savings (which are in a discretionary account) cannot be properly used to offset ESPC outlays (which are non-discretionary). But the only reason CBO views ESPC outlays as non-discretionary is that CBO deems them to be so under their interpretation of "governmentwide accounting principles" which they cannot cite in any specificity.

CBO's narrow focus on their accounting "silos" leads them to score ESPCs, even though CBO acknowledges that the savings and outlays are a mathematical identity. It is important to note that CBO views its role in a consequence-free vacuum. If the outcome of their policy is that taxpayer money is wasted and that warfighters are sent into battle with second-rate equipment, CBO's view is that this is not their responsibility. They view their role as simply applying the proper accounting rules and letting the chips fall where they may.

Unfortunately for taxpayers and warfighters, the few Members of Congress who are in a position to challenge CBO seem reluctant to do so. Clearly, CBO's role is to be the neutral referee on budget matters and that is a useful mechanism in many cases. However, bad policy is bad policy regardless of the source. And it is profoundly bad policy to send American warfighters into combat with obsolete equipment when state-of-the-art equipment would actually cost taxpayers less.

We would encourage the Committee to look into this accounting judgement by CBO and seek to restore a more rational approach that counts the costs and benefits of extending ESPCs to mobile platforms. This would assist in our goals of energy independence and greenhouse gas mitigation.

Beyond the ESPCs, there is of course much government should do to leverage its procurement leverage. The December 2007 energy law included schedules for reducing fossil fuel generated energy consumption from new and major renovations (vs. similar 2003 building baseline) by:
2010: 55%
2015: 65%
2020: 80%
2025: 90%
2030:100%

It also included energy reduction goals for federal buildings relative to the baseline.
We would urge that government, at a minimum, enforce compliance with its own goals and seek to strengthen them as much as possible.

The Federal Government should also enforce its controversial standard that DoD may only procure alternative fuel that meets or exceeds the greenhouse gas performance of petroleum fuels (Section 526 of Energy Independence and Security Act of 2007). We recognize there is considerable pressure to relax this standard, but this would send a problematic signal to those of us in the investment community, who finance projects based in part on customer commitments. Moreover, alternative fuels should be able to meet the standard if biomass co-firing and/or carbon capture & storage are accelerated.

4. **Which tax credits do you find most helpful in promoting the development of new technology?**

As a general matter, we need long-term tax credits that can support financings at a competitive cost of capital. We need to avoid the boom/bust cycle that has plagued the Production Tax Credit and led to cancellations or delay of otherwise viable projects.

Among the most important tax credits are:

The Investment Tax Credit

The Production Tax Credit

The R&D Tax Credit

Hybrid automobile Tax Credits

Business and Homeowner Tax Credits for energy efficient buildings and appliances, including roofing, insulation, HVAC, geothermal heat pumps, efficient furnaces and boilers, etc.

**5. Are you currently investing in clean technologies even without federal legislation in place to address global warming?**

Yes we are investing in companies that enhance efficiency on the supply-side and demand-side as well as transmission & distribution (T&D) of energy.

1. Supply side example: one of our portfolio companies – Advanced Aerofoil Technology -- reduces fuel use and emissions by optimizing power plant startup, steady-state operation, cycling and turn down.
2. Demand-side example: one of our portfolio companies – Hannon Armstrong -- finances energy efficiency upgrades in governmental, commercial and industrial facilities. This helps overcome barriers to diffusion of clean technologies by defraying the upfront cost that the facility owner may not want to bear all at once, and then paying both the financier and the company back over time through a share of the savings from reduced energy costs.
3. T&D example: one of our pending investments – Trilliant – offers Advanced Metering Infrastructure that enables demand-management technologies to reduce energy consumption.

These three examples of MissionPoint investments are all warranted based on core power generation needs and/or core efficiencies they provide in the way our economy produces, transports and uses energy. In other words, they pay a return even without carbon savings being priced.

Passage of a global warming bill will clearly stimulate a much greater level of investment in efficiency-related technologies like this, while also adding new "pure-play" investment opportunities whose sole or principal purpose will be to reduce carbon dioxide emissions.

We would also note that consumers and businesses are increasingly demanding carbon reduction solutions both out of sincere concern for the problem and its risks to the well-being of our society, and also in anticipation of a federal global warming bill. In other words, the fact that we are others are investing ahead of a global warming bill should not be construed as meaning that a global warming bill is not needed. To the contrary, investments being made today are often in explicit anticipation of such a bill being passed. Failure to do so would set back these investments and the potentials for a dynamic clean energy economy in the U.S. The failure to extend the investment and production tax credits have already prompted an outflow of renewable energy investment from the U.S. to more favorable and supportive policy regimes abroad. The same could occur if broad expectations of a carbon regime are disappointed in 2008-2009.

6. **I am very interested in the technological solutions that can and should be developed to address both global warming and energy independence. Can you tell us what you think the most exciting emerging technologies are? What metrics do you use to justify potential investment in new technologies?**

Please see our answer to the final question below for some broad categorical indications of technology solutions we favor. We would also hasten to add that we do not share the widespread enthusiasm for cellulosic ethanol fuels, which is widely touted as a promising new technology on the horizon. Even though cellulosic fuels promise a better carbon balance than traditional corn ethanol, we continue to believe that growing our fuel is not the way to solve our transportation fuel problem. Growing our fuel entails disruption to the planetary carbon and nitrogen cycles, inducing new levels of fertilizer/nitrogen run-off and associated dead-zones in major water bodies, as well as threatening major land use change that releases soil and forest carbon. Instead of this, we should move aggressively toward using electricity as a fuel into plug-in hybrids and all electric vehicles. As discussed elsewhere in our replies, this option offers the best carbon

efficiency and use of an existing infrastructure (the T&D grid) including at off-peak times when it is underutilized.

7. **Isn't the very nature of your business to take risks on new technology? Why is it that you are looking to the government for further certainty?**

Clean energy technologies offer significant social gains that cannot always be recouped by the entrepreneur or investor. There are risks of so-called spillover knowledge – for example, financing the first of a kind technology is the highest risk step and then all followers benefit from reduction in risk. Some of this risk increment is captured by standard risk/reward metrics operating in the pure financial community. But some of the first of a kind risk cannot be underwritten effectively in the private markets. Therefore, again, given the social gain attendant on proving out these technologies, it makes sense for the government to share some of the risk and reduce the cost of capital to the early investor and/or entrepreneur.

MissionPoint is prepared to underwrite technology, market and execution risks, as well as others. But we must take a measured approach to the constellation of risk in any particular investment. In emerging energy technologies, the relative immaturity of the technologies combined with magnitude of dollars required and the much longer timeframe needed for their development and adoption (much longer than for software, for example) adds up to a risk profile that is not conducive to wholly unsubsidized investments. Government should play a crucial and socially appropriate role in subsidizing these technologies. Government can usefully set out performance-based criteria and general categorical criteria (solar, geothermal, etc) for determining which technology sets it will support in their early commercialization phase, and then MissionPoint will take on the risk of selecting the specific companies within that sector or fulfilling those criteria. This kind of public/private synergy can create a dynamic and job-creating clean energy economy, and benefit our population's health and well-being.

8. **On the issue of tax credits – I have heard a number of times that it is critical to have a longer, more certain time to use tax credits – is there an ideal length of time for investment purposes? Ten years? Fifteen years?**

To be clear, there are two discrete time periods that have somewhat different answers. First is the duration of the tax credits once a project is placed in service, and for this 10 years has typically been sufficient for wind, though geothermal's larger capital requirements may benefit from a 15 year or longer horizon.

The other time period of importance is the interval to the next expiration of the placed-in-service date. This is where the boom/bust cycle has been so problematic, since Congressional renewals have been for short periods and have even lapsed before being renewed. For this latter period, our preference is to see the longest possible renewal, or at least 10 years. This will permit rational planning periods for large-new projects, but also allow for wider industry investment in the required supply chain. When there is a short runway to the next placed-in-service deadline, we unfortunately see lost efficiency and higher costs in the development cycle. Basically, with more developers competing for the same resources (drill rigs, steel, cranes, gear manufacturers,construction workers) in a compressed time period before expiration of the ITC or PTC, the costs are driven up and the levelized cost of electricity is higher than it needs to be. These pinch points in the supply chains can be overcome with a long-enough timeframe for the tax credit extension, since more suppliers will invest in ramping up and developers can spread their development cycles out more rationally.

9. **As you look at technology investments, is there any element of evaluating the environmental performance of an investment or is it really just about the monetary return on investment?**

Yes MissionPoint evaluates our investments by environmental metrics, principally carbon dioxide equivalent emissions reduced per dollar invested. We do this in the context of our businesses financing carbon emissions allowances and offsets, where we can assess whether we have invested in the lowest emissions reduction available at the desired magnitudes of reduction.

We seek a carbon reduction benefit in all our investments as we are exclusively focused on financing the transition to a low-carbon economy. We believe that there is no conflict between our financial and environmental mission, but rather that they are mutually reinforcing. The carbon reduction evaluation we do helps guide us to the most promising investments. We are genuinely committed to addressing the climate change problem, believing it to be one of the most serious threats facing humanity. We believe that mitigating this threat also constitutes one of the greatest investment opportunities in history. So we are fully aligned in assessing both environmental and financial performance of our investments.

**10. Carbon Capture and Storage (CCS), for example, sounds like a promising way to help deal with emissions, yet it could have substantial liability associated with it. How does potential environmental liability come into play when you are making investments in new technology?**

Lack of resolution of the long-term liability issue is problematic for investments in carbon capture and storage, with regard to groundwater contamination, risk of inadvertent encroachment on mineral rights of adjacent landowners, risks of acute leakage and risks to human health as well as risks of long-term leakage and associated liability for climate change. Memories of the Superfund liability regime are still fresh, and few if any investors are prepared to undertake large-scale infrastructure projects like CCS without a high degree of assurance that they are not walking into an unlimited liability situation, or an ambiguous liability situation whereby future clarification could create new risks of economic loss. So yes, liability remains a major concern and obstacle, which government should address creatively and promptly so as to unlock investor capital. The Price Anderson Act in the nuclear industry is a prominent example of government performing an important facilitative and back-stopping role to advance deployment of a strategic technology.

**11. Are you investing in Carbon Capture and Storage (CCS) technology? Do you support the use of CO2 in enhanced oil recovery as well?**

Yes, MissionPoint is actively evaluating investments in carbon capture & storage (CCS) technologies and infrastructure, but has not yet made an investment in this area. We believe that many of the component technologies of a CCS system are well established commercially (e.g., compression and transportation of carbon dioxide) and others require additional cost reductions to be commercially viable (e.g., carbon dioxide separation from a power plant flue gas stack; injection at multi-ton volumes). We believe accelerating the wide-scale deployment of this technology is an urgent social imperative, worthy of well-designed public policy incentives and we will continue to seek profitable opportunities to participate.

We support the use of human-emitted (i.e., anthropogenic) carbon dioxide in EOR. We do value the learning that the use of natural-source carbon dioxide in oil recovery has permitted, including in the Permian Basin of West Texas, but would support an incentive system that only supports use of carbon dioxide that would otherwise have been emitted (e.g., use of carbon dioxide from a power plant, a natural gas processing plant, or otherwise).

We believe government support and policy incentives for use of human-emitted carbon dioxide for enhanced oil production are warranted because the resulting revenues can be used to create the pipeline infrastructure for carbon dioxide transportation and to underwrite key learning and other infrastructure build-outs required to

**12. Are you actually looking for a cap and trade system or is it really legislative certainty that you are looking for?**

Yes, we are actually looking for a cap-and-trade regime. That is the paramount policy objective of MissionPoint Capital Partners. We believe that a cap-and-trade regime offers the best instrument for harnessing market-based forces to identify and execute on the lowest cost emissions reductions available, to spread the costs fairly, and to reduce the overall cost of compliance to the economy. We also believe that, relative to a carbon tax and other alternative mechansisms, a cap-and-trade offers the best guarantor that we'll achieve the environmental goal of capping emissions at a specified rate. Given the enormous risks to the economy of unabated climate change, we believe we need to attain the environmental objective to perpetuate the

survival and success of a stable market economy. This is often overlooked, but business does not exist in a vacuum – it depends on a stable society capable of entering into and fulfilling contracts. Unabated climate change, complete with a loss of viable insurance markets, would not support our endeavors as capital allocators and business people in the private sector.

We also believe that a cap-and-trade system will stimulate massive and productive investments throughout our economy, creating new jobs and growth engines that will power our economy for decades to come. Many of these jobs will be in high-tech manufacturing and skilled trades, precisely the types of jobs we have lost in recent years. We also anticipate that a cap-and-trade, unlike a carbon tax, will create jobs in market infrastructure, from new trading exchanges to insurance/credit products to project developers. This class of new carbon entrepreneurs will be the underpinning of a dynamic new clean energy economy.

Beyond this, of course we'd like legislative certainty, as would many others seeking to invest in bringing about this new clean energy economy. The prevailing legislative uncertainty certainly inhibits investment in a most unfortunate way. But it's important that in seeking legislative certainty we do not forego the chance to bring to fruition the right carbon regime. In other words, it's worth the wait if it means getting it right. But it would be great if we could get it right and get going now. The capital, the entrepreneurs and the market-makers are all lined up and ready to proceed if government would set the rules of the road on recognizing and pricing the carbon liability.

**13. In Mr. Abbasi's testimony he says that "The two primary criteria for energy used to be cheap and reliable. Now we've added two words to that: secure and clean." What can we do to keep those terms from being mutually exclusive?**

Government has a crucial role to play in making sure that these criteria are made compatible. It should use market-based mechanisms to provide economic incentives for investment in the research, development and deployment of new technologies that will ensure a clean energy economy in the future. By doing this, government can help drive these technologies down their declining cost curves toward parity with conventional technologies and thereby mass adoption.

In this way, we can have cheap, reliable, secure and clean energy. We also need to avoid focusing singularly on producing secure energy only, by for example accelerating exploitation of our coal reserves to produce liquid fuels that can displace imports of oil. While this diversification and import substitution is an understandable goal given the oil price increases and instability in the producing regions, we must recognize the severe environmental liability of coal-to-liquid fuels (CTL). We should only pursue CTL if it includes a requirement for biomass-cofiring with the coal or other carbonaceous feedstock, as well as capture of the carbon dioxide emissions – if those two can reduce the lifecycle emissions below that of petroleum fuel, then it should be permitted and even subsidized.

**14. When your investments are ready to be sold, either to the public or another firm, you sell your equity stake and receive a capital gain, currently taxed at the 15% tax rate. While a few still dispute it, most agree these are indeed "capital gains." Your share is also called a "carried interest" although some find that term less palatable; it's really all the same thing. Does your firm treat gains on the sale of your investments as capital gains? Do you support legislation to make the current tax rate on capital gains permanent?**

MissionPoint follows the U.S. tax code.

We believe these questions are outside the scope of the testimony.

**15. How do you feel nuclear energy should be treated under a low carbon regime?**

It should be treated as a renewable energy source and be provided with a much expanded loan guarantee program even beyond the $20.5B authorized by the Energy Act of 2007. Given that these are not grants but fee-based loans that should not stress the Federal Treasury if the credit risks are accurately scored, we believe Congress should authorize additional sums for this purpose. These loan guarantees are crucial for accelerating the next generation of nuclear reactors into development.

Without doing this, the U.S. is running a serious risk of damaging its long-term economy by continuing to delay the deployment of new nuclear power. The Chinese, and soon the Indians, are driving major new build programs which will give them both the moral and economic high ground in the not-too-distant future when it comes to power costs and carbon emissions. France is an excellent example of how carbon efficient an economy can be given a concerted effort to create a nuclear based power generation economy.

**16. On page two of your testimony, you say "it is important not to oversell 'conservation' and 'efficiency' as the single panacea offering the painless carbon mitigation we need" and I can understand those as parts of a greater whole – but do you see any down side in conservation and efficiency and any reason why we can't do those things right now without having a global warming bill in place?**

No there is no downside to conservation and efficiency. We can and should be doing all we can to accelerate them. MissionPoint is finalizing a pending investment in a company called Trilliant that offers the Advanced Metering Infrastructure (i.e., smart meters) that enables utilities to administer demand-side solutions to reduce and shift power demand in their service areas. By providing 2-way communications over the grid and time-stamped interval data, utilities can read customer usage at different times of the day and provide them feedback on their usage patterns and costs through new in-home display devices. They can even take over remote control of customers' end point devices include smart thermostats, water heater controls, pool pump controls, switches, and other energy demand limiting devices. This allows the utility to curtail power demand during peak demand times and reduce the need to invest in new generation capacity.

So MissionPoint agrees entirely that the time to invest in these kinds of technologies is now – we don't need a carbon price to invest in technologies and services that will save money. However, it is worth noting that a carbon price will further stimulate and accelerate investment in solutions like Trilliant and other energy efficiency and demand management solutions. As we're seeing with the high price of gasoline today, people invest in efficient

vehicles as the price gets higher. So the fact that there are many efficiency investments that are attractive today should not constitute a reason for inaction in passing a much needed cap-and-trade bill.

**17. What is the timeline for Sun Edison to be self sustaining and no longer requiring the Investment Tax Credit?**

MissionPoint does not accept the premise of this question. Given that most conventional fossil fuel energy sources receive overt and embedded subsidies that are much larger than the value of the investment tax credit (ITC), we believe it is appropriate to ask when solar power can be self sustaining without additional subsidies beyond the ITC. Those state subsidies – including California's Performance-Based Incentive and solar "tranches" in many state Renewable Portfolio Standard programs –could eventually be scaled down and eliminated. But we believe that that the investment tax credit should be permanent, though it might be phased down in percentage terms over time.

For comparative context, note that nuclear power would not be insurable without the Price Anderson Act. The coal-fired power generation sector would not be viable today without a vast rail infrastructure originally subsidized by the federal government. The present value of that historical investment is difficult to ascertain with precision but is clearly very high. The oil and gas sector benefit from the depletion allowance and other incentives, as well as from embedded subsidies in the form of extended military protection of oil interests in geopolitically unstable parts of the world.

To highlight solar power's posture vis a vis subsidies, note that in the "greenfield" situation still prevailing in many developing countries, solar power is comparatively inexpensive precisely because it avoids the need for the government to invest in the build-out of key infrastructure such as Transmission & Distribution and/or to administer "franchise" rights to monopoly distribution providers. Installing solar power at remote locations can offer electricity to populations off a centralized power grid without comparable public investment in infrastructure.

But back to the key question. If one adopts our premise that federal tax incentives are a constant across all energy sources, whether conventional or renewable, our internal forecasts show SunEdison, and solar power more generally, reaching "grid parity" in key markets over a 10-15 year horizon. As with all modeling, this estimation depends on many assumptions – forecasting wholesale power prices in specific markets, and then converting them to retail power prices and then formulating "crossover points" on a state-by-state basis since the intensity and amount of sunlight, power prices and other factors vary.

We believe that within a 6-8 yrs time frame, it may be possible to ratchet the federal ITC down to 15-20% while still preserving solar viability and rapid growth. Similarly, within 5-15 years, we would expect that we could eliminate the state subsidies in key states and see the solar market continue to thrive. California is the preeminent case where we see a good solar resource and high retail rates supporting solar power's continued growth. We project continuing increases in the average power rate (e.g., 3% per annum) over the coming years, and then layer in the project cost reduction curves based on continued technology improvement (e.g., 7% reduction per annum) and anticipate a thriving solar market. To support this cost-out, SunEdison will continue to procure solar technologies that show aggressive cost reduction, while driving out costs on the installation side.

**18. On page two of your testimony, you state, "we would encourage the Congress to consistently support and stimulate not only renewable energy, but the broader set of high-impact carbon mitigation options in the fossil fuel industry, from optimization of power plants to carbon capture & storage." Should the Congress support and stimulate other high-impact mitigation technologies such as nuclear and hydro-power as well?**

Our answer to this is unambiguously yes. We believe nuclear power is an indispensable tool in the transition to a low-carbon economy and should be accelerated. We believe the same with respect to geothermal, hydropower and other no-carbon sources of scale-able, dispatchable power.

**19. On page 17 of your testimony, you state, "Offsets should be real, additional, independently verifiable, permanent, enforceable and transparent." However, even the UN is worried that companies in the market may be gaming the system by putting green imprimatur on some projects that would have happened any way defeating the intent of offsets. What kind of transparency do you suggest for projects, their validation, the costs of the offset and the like?**

As with the European Trading System (ETS), there have clearly been some early problems and learning associated with the UN Framework-created Clean Development Mechanism for allocating investment into projects in developing economies not subject to a binding emissions reduction constraint. In response to the CDM, substantial capital was invested in emissions reducing projects. Unfortunately, the CDM Executive Board was unprepared for the scale of the administrative burden, and is still today somewhat behind in professionalizing its staff and providing a predictable, reliable approval process. Let me address two issues, including the one raised in your question:

1. Tightening standards. Early on, the CDM Executive Board evaluated a small number of projects and in some cases they were evaluating new technologies and processes. In the face of a variety of uncertainties, they made what many regarded as arbitrary decisions about the precision they would require from project developers in measuring their carbon emission reductions. Now that the number of projects has dramatically increased and the total value of the carbon credits they are issuing has the potential to reach billions of dollars, it is not surprising that they are reconsidering some of these early decisions and effectively tightening their standards. This has resulted in write-offs of some projects formerly thought to be viable, and considerable uncertainty in the markets. Note that the principal concern is less about the direct implications of tighter standards than a general signal that the rules of the game are subject to unpredictable change.

2. Additionality. The CDM Executive Board requires that carbon credits only be issued to projects that meet an "additionality test" – which evaluates whether the project would have happened anyway. In other words, without the economic value of carbon credits, the proposed activity would be uneconomic and would not happen anyway. In light of the various risk factors involved with a given emission reduction project (country risk, currency risk, technology risk, operational risk, credit risk, etc.) and the sensitivity to numerous assumptions, the line between an adequate internal rate of return and in inadequate one is far from clear. A recent Wall Street Journal article quotes the CDM Executive Board's top administrator Kai-Uwe Barani Schmidt as calling this "a value judgment" that is "one of the biggest challenges" of the carbon market.

Recognizing that there is a value judgment involved, we believe strongly that the "flexibility" and cost reduction benefits of including an offset regime in a cap-and-trade regime far outweighs the risks (including leakage, gaming, fraud, etc).

In our view, requirements include:

- a strong but not cumbersome oversight body, with enforcement capability, to ensure transparency -- including rules regarding disclosure and standards, standardized reporting and potentially roles for securities market bodies like the Financial Accounting Standards Board and the Securities and Exchange Commission. In this context, we note that the Carbon Disclosure Project is doing worthwhile work on carbon accounting standards and reporting and the Congress should garner insights and experience from this work to inform its legislative activity.
- Projects must pass tests for additionality and meet criteria set by ISO 14064, CDM Methodologies, WRI/WBCSD GHG Protocols, the Voluntary Carbon Standard or another body of comparable credibility.
- Qualified third-party verification
- Ownership of credits must be established and certified and recorded in an accessible and robust registry that discloses key project data including: project summaries, verification reports and certification reports.

**20. I noted with interest that you say in your testimony that we should also look at clean investment outside of renewable energy, such as carbon capture and storage. What other emission avoidance technologies look promising?**

As mentioned earlier, nuclear power is a promising and large-scale emissions avoidance technology. Use of waste heat should be encouraged, in stationary and mobile applications. This includes but is not limited to traditional combined heat and power (CHP). CHP is promising and should be accelerated. Perhaps the most crucial emissions reduction technology in transportation is plug-in hybrids and the move toward all-electric vehicles. It is under-recognized that even while most electricity is generated from fossil fuel sources, the inherent efficiency advantage of an electric drive train over an internal combustion engine is so great that the all-in carbon reductions from mainstream adoption of this technology would be great and well worth stimulating via all available policy tools.

Finally the government should use performance-based standards rather than prescriptive technology eligibilities to promote hybrid configurations that can join the power density and scalability advantages of traditional fossil and nuclear power with the low-carbon advantages of renewables. To take just one of many examples, using solar power to do feedwater heating for a coal-fired plant will increase the efficiency of the coal plant dramatically and produce what is in effect an increment of emissions-free power.