

MIT Energy Conference – March 6, 2009
Speech by David J. Prend

Thank you. I would like to thank Susan Hockfield for those inspiring comments. And many thanks to Tim Heidel and the MIT Energy Conference team for putting together another great conference. This has become a marquee event in the industry. I am honored to be asked to speak at this important event at this crucial time -- a crucial time for our country and a crucial time for the energy industry.

I remember another crucial time for the industry. It was the late 70s/early 80s, when I was a young, newly-minted engineer right out of Berkeley. I was thrilled to have landed one of the most exciting engineering jobs I could imagine – working on advanced energy technologies at Bechtel. We had a big problem then too, though it was driven almost exclusively by energy supply and security concerns. At that time, the industry received a ton of money from the government. It had great technology, great scientists and engineers, powerful, rich companies working on solutions...and yet the end result was very little. Money was essentially wasted on impractical studies and demonstrations, and incremental technologies.

Now some would say that energy prices crashed in the mid 1980s and put an end to many promising projects. But as someone who was close to many of those projects at the working level, I would assert that most were never promising, even with projections of \$100 per barrel oil that in reality didn't materialize for another 28 years. Status quo is very good at protecting itself.

I would propose that the real problem back then was no true innovation... and that is the challenge that we need to address today. I believe that true innovation brings about social and structural change.

- The internet is true innovation.
- Cell phones are true innovation.
- The technologies behind them are not.

Innovation is about products and markets and behavior – technology is just a facilitator. Innovation requires cultures... and institutions... and people. I have worked for (and with) a number of the finest large companies in America and around the world. They are very good at the things they know how to do. Innovation is not one of them.

The biggest blessing we are given as the Cleantech Industry today is to have a vibrant, fully developed venture capital ecosystem. If you look to NVCA statistics,

companies that were originally venture-backed today represent 9% of jobs in America and 18% of GDP. This ecosystem is far more than a bunch of money in the hands of a bunch of VCs. It is an entire culture of innovation that is good at creating new businesses.

MIT has such a culture. MIT's innovative culture is both unique and evolved. The interdisciplinary approach to research and education pioneered by MIT provides an ecosystem...where students and faculty are encouraged to work collaboratively to expand the frontiers of technology.

This approach has demonstrated extraordinary results to date and is the first step in solving some of the most critical challenges facing the world today. The entrepreneurial spirit and culture at MIT also encourages students and faculty to interact with business and take risks, without being afraid to fail. This evolved method has resulted in the formation of thousands of companies by MIT graduates.

To give you a sense of what this means: MIT-related companies employ over 3 million people and have annual global sales that would make it the eleventh-largest economy in the world (according to a recent report by Ed Roberts).

This did not happen overnight. It is a result of the incredible support system and initiatives that have been put in place at MIT. Things like:

- 1) MIT Entrepreneurship Center
- 2) 100K Competition
- 3) The innovative work of the Technology Licensing Office
- 4) MIT Energy Prize
- 5) The Deshpande Center

It has proved remarkably powerful in IT and biotech. We need to “retrain” this culture and the many people who are part of it to understand the energy markets – broadly defined – if we want to create a new industry and define a new way for people to thrive on this planet. MIT can play a major role in this endeavor.

Now even for this “innovation culture”, the problem with true innovation is that it is very hard to identify until it is proven and becomes obvious. We are mostly a bunch of engineers and scientists and, unfortunately, there is nothing scientific about it. The best I can come up with is that it may be about instinct, or pattern recognition, combined with a deep understanding of markets.

I remember early in my venture capital career, sitting and listening to earnest, young entrepreneurs passionately pitch their ideas....and I remember wanting to

say, “So let me get this straight...you are going to take your cow...and you are going to trade it for these magic beans...and then you are going to do what?....”

This brings me to my next point. I am fond of saying that the only difference between “vision” and “fantasy” is execution. I truly believe this. Vision never seems to be this obvious thing where you plot a nice straight course and then you get there. That is why big companies are not good at it. You need to have some idea where you are headed, but the path is always tortured, requiring multiple adjustments and decisions along the way. We refer to it as the “Lewis and Clark” path.

But let me give you a couple of examples of innovation – which by necessity come from my own experience:

We have a company called Solyndra. It makes photovoltaic panels. We like this company because it is about product innovation. Yes, it requires a huge amount of new technology and sophisticated manufacturing. But, the essential insight is a radical new product form that turns out to have multiple fundamental value propositions.

Chris Gronet, the CEO, who I believe is one of the most gifted inventors and managers in the solar industry (if not the entire semiconductor industry), asked himself a fundamental question: What if we put a solar cell in a tube?

Well, the first thought was, we could collect diffuse light and reflected light off a white roof as well. Then it turned out you could use a very simple, inexpensive metal/glass seal perfected by the fluorescent light industry to hermetically seal a very moisture sensitive CIGS semiconductor material. You could also put a smaller semiconductor tube inside the protective tube, and with the right optical coupling agent, refract the light to get 1.5X concentration...thereby increasing the efficiency of the material. You also end up with passive tracking of the sun, meaning there is no need to tilt the panel toward the sun to get maximum production. The wind does not catch the panels like a sail, so there is no need for expensive mounting hardware and penetrations of the roof. Inexpensive footings come with the panels and they are simply placed on the roof. (This ended up being one of the biggest benefits – knocking off \$1 or more per watt from the cost of mounting). Finally, because they are laid flat on a roof, you can get as much as 80% more total energy from a given roof space.

One thing just led to another down the path to the final vision. These characteristics are so fundamental that comparison to traditional panels on

conventional measures such as efficiency do not even make sense – best estimate it is mid-twenty percent efficiency going higher. More importantly, this product has a clear economic path to grid parity.

So that was a product innovation. Let me comment briefly on a market innovation. I won't go into detail, but Comverge and EnerNOC are two companies that have pioneered the electricity demand response space. The key was to understand the utility regulatory framework. They created a contractual product that could be called "Virtual Peaking Capacity." There is no new technology here – just basic communications and control technology. It is a new business model that creates value for utilities that could not be previously accessed.

The point I want to make here is about the type of innovation we need to see in Cleantech: Product and market innovation...that fundamentally changes the game. This also highlights an important requirement if the key to vision is execution: we need high quality CEO's and management teams, experienced in high growth and innovation. Attracting this talent from the traditional venture areas is, in my mind, as important as having the venture community "internalize" the energy markets.

There is a lot of talk these days about the "Venture Model" being broken. I have only been a VC for 10 years, but I am only a little embarrassed to admit that I am not sure I understand what they mean. Here is my take on the "Venture Model." You build a portfolio of quality companies. You build a wide and deep industry network and understanding. This allows you to have slightly better vision and the ability to help companies to succeed by providing more than just money. I am not sure this model is broken.

I was in Washington, D.C. (the new financial capital of the world) last week. I was representing the National Venture Capital Association – educating our political leaders on the power of venture capital, and discussing what an intelligent energy policy might look like in the current environment. I am pleased to say the reception was very good. I thanked them for extending the ITC in the TARP bill last year and for the billions of dollars of stimulus money that will flow into cleantech projects. I also asked them to think about something regarding the comprehensive energy bill that is currently in the works. I asked them to step back and consider how the world has changed in the last six months. Consider how the current economic conditions impact the effectiveness of many excellent policies that have been discussed for a long time. In particular, I suggested that in a bad economy carrots work better than sticks.

The problem with using penalties to achieve desired actions is that it is too easy for a utility, for example, to not achieve a target, claim hardship, and beg forgiveness until the economy improves. In this economy, people are looking for hope. Carrots (i.e. positive incentives like feed-in tariffs or rate basing of renewable projects) provide help, opportunity, and hope. What I worry about is that the markets for our companies' products may dry up in an economy with barely functioning credit markets. There will be capital to finance cleantech companies – that is our job – but without functioning credit markets, their innovation will be squandered.

In the wider regulatory context, the cleantech world should focus on the changing role of utilities. Having utilities as enthusiastic partners to cleantech companies will dramatically increase the rate of adoption. This means thinking carefully about business models and incentives – to customers as well as utility companies. It also means removing regulatory barriers. A good friend of mine, who is the CEO of a utility company here in New England, likes to say: “Utilities tend not to move fast, but when they do, they tend to move en masse.” Let’s work to reach such a tipping point.

The challenge of Cleantech is great. It has become greater in the current economic environment. However, the bad economy could also become an opportunity. I don’t mean for attractive valuations – I mean an opportunity to change attitudes and ways of thinking. My partner, Wilber James, is fond of saying: “When it is dark enough, you can see the stars.”

There are clear signs that conspicuous consumption is on its way out as the centerpiece of American culture. Our society has choices about what will replace it – family values? religion? philanthropy? We have an opportunity to make “green” a new cultural value, the new status symbol. Instead of a Hummer, a Prius is cooler. Instead of a McMansion, how about a solar array? These types of value changes can filter down through all our institutions. I see this shift in my kids’ generation already. It will take brilliant marketing and public relations. The media is already on board. However, in the media, often the next big story is to tear down the last big story. I hope that doesn’t happen here.

As an industry, we need to be conscious of the opportunity we have been given and work to avoid betraying the public’s trust. If we don’t want Cleantech to become the next Structured Finance, we need to build truly sustainable businesses. Not just environmentally and resource sustainable, but also capital sustainable; i.e. profitable businesses. I don’t believe we can count on public markets or industry incumbents, or the federal government to “bail us out.”

Companies that have a clear value proposition due to real innovation, with a realistic path of execution, should be able to raise the capital needed to get to sustainable growth. The “me-too” companies will fail. This is not necessarily bad for the industry. The Cleantech bubble was just as dangerous to our industry as the Real Estate bubble was to our economy.

I believe we have been given one of those opportunities of a lifetime – to truly transform an industry, make money for our investors, and change the planet for the betterment of future generations. The potential is in place for massive and long lasting cultural changes. It will require brilliant marketers and communicators as well as brilliant scientists and engineers. The challenge is to pull all these pieces together. I feel very privileged to be a part of it, and honored to be working alongside all of you. Thank You.