The Oil Drum
DISCUSSIONS ABOUT ENERGY AND OUR FUTURE

Clean and Green Investment Forum

Posted by Jonathan Callahan on January 10, 2013 - 5:31am

On December 3 and 4 I attended Opal Financial's 2012 Clean and Green Investment Forum. I was invited to moderate a panel on "Market Outlook for Renewables vs Fossil Fuels". Forum participants included many investors and strategists with an interest in energy issues as well as a few entrepreneurs and others with a more academic interest. I had conversations with an interesting mix of people in both the oil and gas industry as well as alternative energy. This post consolidates my notes to give you a sense of some of the dominant themes in energy investing today.

Rather than give a blow-by-blow recap of the meeting, I'll organize the information into several topics that capture the mood of the forum:

1. Government regulation and incentives
2. Utility scale solar & wind
3. Resiliency and distributed solar
4. New technology
5. The fracking revolution

The conference also included a few presentations that put energy investing into a much broader context. **Ripudaman Malhorta**, co-author of A Cubic Mile of Oil: Realities and Options for Averting the Looming Global Energy Crisis, painted a sober picture of the global energy situation as well as global climate change. He also emphasized the role of energy consumption in raising the living standards of hundreds of millions in China and India. Dr. Malhorta encouraged listeners to address our energy needs in ways that do not leave out the two billion or more who are still striving to rise above abject poverty. Other speakers reiterated the challenges and opportunities facing society (and investors) as we are forced to move from fossil fuels to renewables in the decades ahead.

1) Government regulation and incentives

Tyson Slocum, director of Public Citizen's Energy Program, is based in Washington, D.C. and gave some updates on regulations affecting energy at the national level. He believes the most important agency in the next 4 years is going to be the EPA. This is in large part because legal challenges to EPA's regulation of greenhouse gas emissions were largely removed when a federal appeals court backed the EPA over emissions limits to reduce global warming. This ruling gives the EPA permission to mandate mileage standards and power plant emissions. Not knowing how the EPA will move forward with this mandate is one of the big wildcards in federal regulations concerning energy. Slocum expects to see more movement in the near future on energy efficiency initiatives as well as a short term extension of the wind tax credit on the order of 3-3.5 billion/year. He noted that some of the beneficiaries of this credit are in "red" states.

Jeff Vice, director of local government relations at municipally owned Austin Energy, talked about government support for renewable energy within Texas. He reminded us that Rick Perry

is the longest running governor Texas has ever had and that Perry, wanting Texas to stay relevant in the energy business, is a big advocate of wind energy. In 2005 the state of Texas established a renewable energy program with five separate Competitive Renewable Energy Zones (CREZ) with the goal of enabling up to 18.5 GW of wind generation capacity. A huge part of this effort was the buildout of transmission capacity from the generating regions in the high plains to load centers further east. To date, Texas has spent over $2 billion on transmission capacity enabling a total of 10 GW of wind capacity to be installed.

Within Austin, "the little blueberry floating on the big red bowl of tomato soup", the city council recently passed an Energy Conservation Audit and Disclosure ordinance requiring an energy audit whenever a home is sold. Austin also has it's own climate protection plan with three primary goals for 2020: 1) be 35% renewable; 2) reduce current electric demand by 800 MW; 3) reduce CO2 emissions to 20% below 2005 levels. They would like to meet these targets in large part through wind power which they can purchase at $35-$40 per MWH. Unfortunately, west Texas winds blow mostly at night so coastal wind and energy storage are key. At the moment, the city utility is very interested in the possibility of using electric vehicles as batteries that could be charged at night.

Bert Haskell of the Pecan Street Project discussed this collaborative research project between the city of Austin and the University of Texas. From the web site:

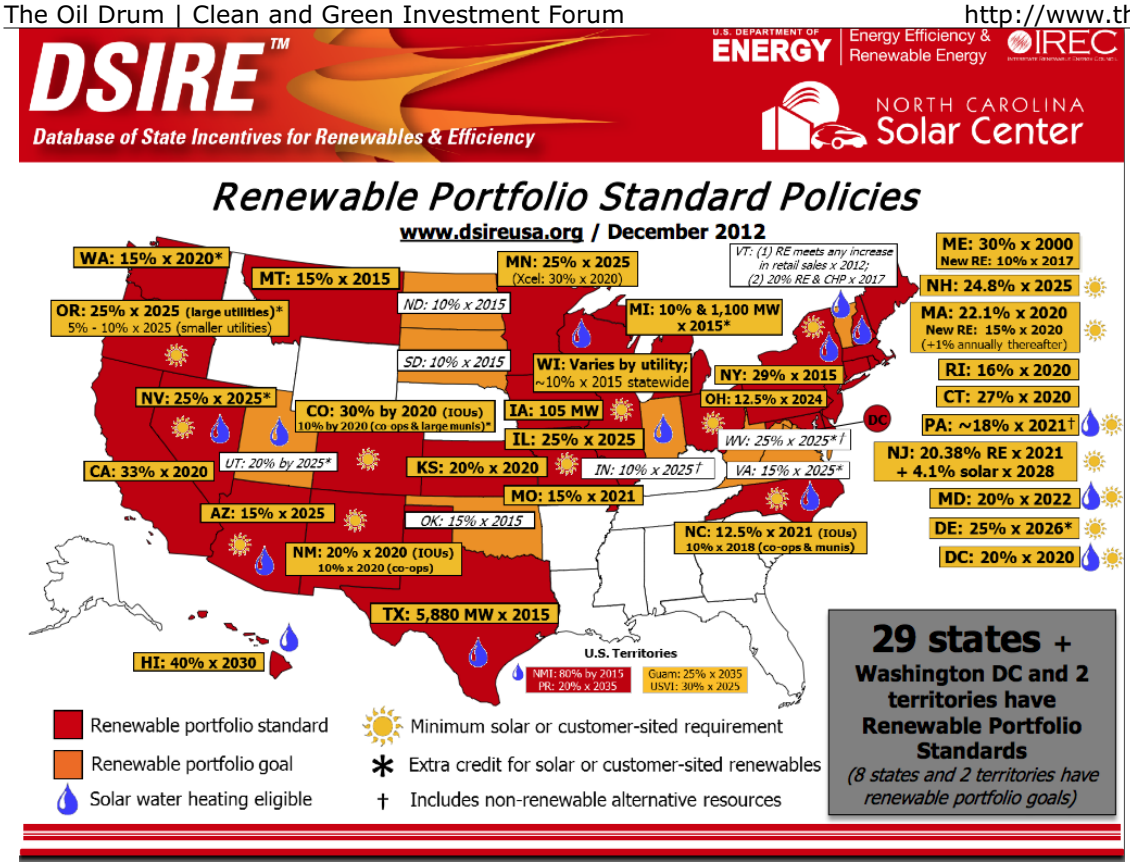
> The over-arching vision of Pecan Street Inc. was to re-imagine Austin's energy distribution system in a way that could support and accelerate the installation and management of smarter and cleaner electricity services. This included the integration of clean distributed generation, storage, demand response, energy efficiency, new pricing/rate models and other technical and economic issues.

According to Haskell, solar energy production and electric storage experience curves mean that solar will be the cheapest form of energy 20 years from now. It is important to engage in research with real people to demonstrate how technology can make a less energy intensive lifestyle an improvement rather than a sacrifice

Overall, my impression is that many people within Texas government are well aware of the importance of alternative energy going forward and are keen to ensure that Texas does not miss out on business opportunities associated with wind and solar power.

2) Utility scale solar & wind

Neil Stein is a portfolio manager for Levin Capital with a responsibility for utilities investments. He sees the utilities as the ultimate gatekeepers for renewable energy because they own the grid. He anticipates a slowdown in the deployment of utility scale solar and wind power because many states are already approaching the RPS (Renewable Portfolio Standards) mandated by state government. The DOE maintains a Database of State Incentives for Renewables & Efficiency (DSIRE) with an excellent compilation of resources on state RPS including this summary map:



Stein reminded us that utilities have a unique model -- their return on investment is regulated and cost increases are passed through to consumers. Given that wind and solar installations are currently more expensive than natural gas fired power plants there is little incentive for utilities to make further investments in renewables. There have been cases in the past where cost recovery by utilities was prohibited by regulators. Natural gas plants are simply lower risk for utilities. Solar and wind are not competitive at wholesale prices for electricity given that the market is currently oversupplied. Stein does see new EPA regulations on coal plants closing many of them between now and 2016. But with power demand flat, this may not affect prices.

Helen Tocco of Reznick Think Energy is a project manager for solar PV and wind installations. She sees continued interest in solar PV over other green technologies because the prices keep dropping while wind power has the benefits of being low cost, quick to install and easier to site in agricultural areas. They are finding that Caribbean Islands are among the hottest markets for solar and wind right now as these economies often import all of their fuels. The islands also have to deal with the intermittency of wind and solar and many solar PV providers are being asked to include backup generation in their PPAs (Power Purchase Agreement).

Given the need and the locally high cost of electricity, it seems like islands might be excellent place to try out different storage alternatives.

Troy Helming of Pristine Sun is focused on small scale utility solar PV. He described the DOE SunShot Initiative which is working to make the cost of installed solar competitive with other forms of energy. One of their goals is to have single axis solar tracking systems down to $1.20/W. There are already, today, single axis tracking projects that cost $1.90/W. Helming presented the following table of IRR (Internal Rates of Return) for various solar and wind projects:

utility wind	6-8%
community wind	7-10%
utility solar	6-8%

small utility solar	6-10%
distributed generation utility solar (<3MW)	7-12%
household solar (<10MW)	12-20%

Helming sees an important role for utilities to play in the adoption of solar by acting as investors, buyers, and providers of transmission and distribution. Utilities can also provide "frequency and voltage support" with their existing generation. He sees financing as the biggest obstacle to wider adoption of small scale utility solar and describes these projects as very low risk well suited to smaller, especially publicly owned utilities. He pointed out the recent moves by Marin County and Boulder, CO to "municipalize" their electric utilities as encouraging developments. Citizen owned utilities will be more motivated to harness increasing levels of DG (distributed generation) as rooftop solar spreads.

Martin Hermann of 8MinuteEnergy Renewables focuses entirely on solar PV in the Western US. By his reckoning, ground mounted solar costs $2/W installed while rooftop solar costs $5-$8/W installed. He pointed out that the increasing number of decommissioned coal plants is actually a valuable resource for utility scale solar. These plants already have transmission lines in place; they are already zoned for utilities and, at least in the desert SW, they have excellent insolation with few trees or buildings. Given the longevity of solar panels, a new solar farm should have a working lifetime of 50+ years. Utility solar in desert locations also gives "textbook" production that utilities like because it is predictable. Clouds cause headaches due to power spikes.

3) Resiliency & distributed solar

Several speakers brought up "resiliency" during discussions of DG (rooftop solar). Cogeneration during hurricane Sandy was key in keeping several individual buildings powered up and isolated from the city-wide grid failure. **Erin Geegan** of Zam Energy described how they are providing solutions for EV charging using solar PV and batteries. These independent "micro grids" are resilient, off-grid and cyber secure and should be popular with airports, hospitals, universities and other campus settings. The value proposition of this resiliency can help solar compete with the current low price of natural gas. **Deep Chakrabothy** of CentroSolar described "grid parity events" in India. India has high energy costs and high insolation with at least a 10% deficit between electric supply and demand. Indeed, only half of homes have power. In rural areas with no grid, distributed solar is already at grid parity! But in some urban areas as well, PV is very near grid parity and when the price drops a little further, distributed solar will take off in those areas.

Regarding intermittency, panelists admitted that batteries aren't cost effective yet. But there is hope that, as EV's become popular, they will provide more storage. In Hawaii, clouds cause instantaneous changes in solar output and local utilities are trying out capacitive factors and modeling to ramp up and down more slowly. Solar works very well in the desert SW where some solar and wind plants have natural gas plants right along side for backup.

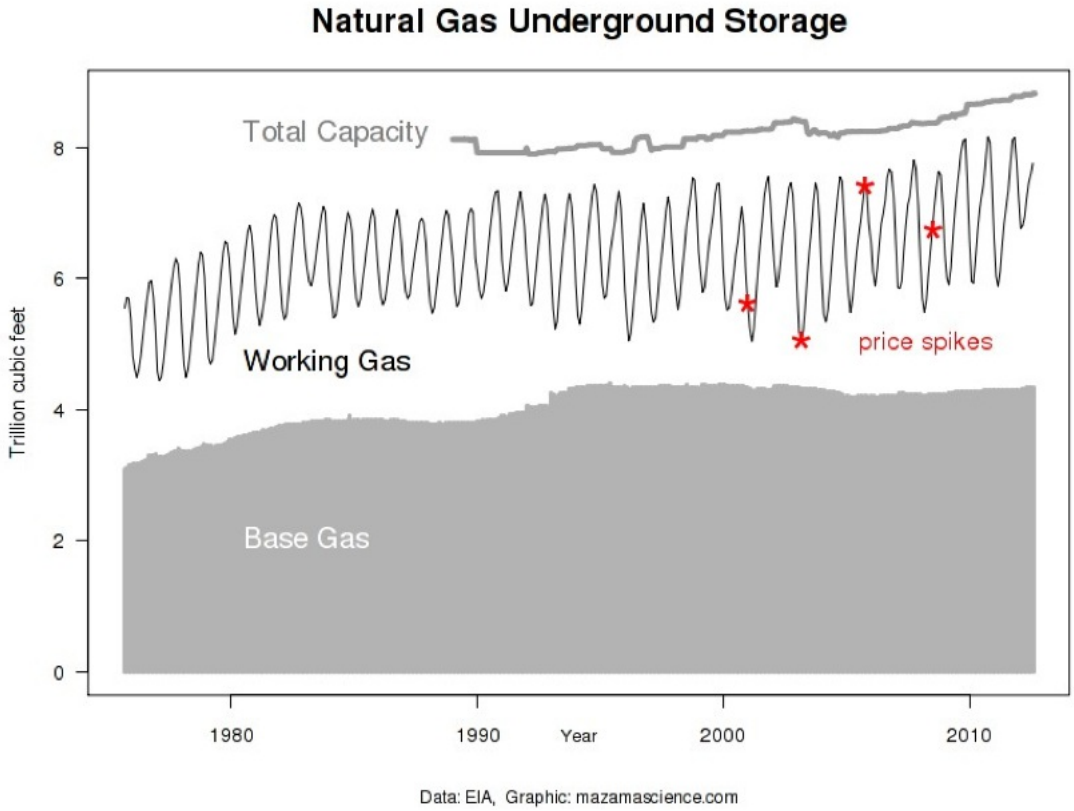
4) New technology

One interesting new technology was presented by **Ali Baghaei** of OceanLinx. This technology traps incoming waves in a box like a piston which creates a surge of air pressure. This air pressure then goes through a bi-directional turbine to generate electricity. Between the wave forecasting software and the turbine technology this is definitely a "high tech" device. The 15 year old Australian company developing this technology believes it is well suited to certain coastal environments, especially in remote locations.

5) The fracking revolution

T Boone Pickens was the keynote speaker at this conference and provided plenty of entertainment with his blunt, plain-spoken style. The man is plenty sharp and does not hesitate to call a spade a spade -- he went into a longish tirade about the futility and waste of American involvement in Iraq and Afghanistan. He was interviewed about his life in the oil business, his opinions about current politics and then entertained some questions from the audience. Despite having been a "peak oiler" -- Matt Simmons was a strong influence -- he now believes that the current situation is truly a sea change in US production. He sees petro-chemical and manufacturing plants returning to the US because we currently have and will retain the cheapest energy in the world. He is still pushing the idea that we could cut our use of Middle East oil entirely by switching trucks to compressed natural gas. When asked about the break even cost for natural gas he said that $4/mmcf would bring additional drilling to wet gas plays such as the Marcellus and that at $5/mmcf you would see drilling in most shale plays.

The panel that I participated in was also devoted to oil and gas. I presented some charts from the Energy Export databrowser and tried to make the point that oil is a globally traded commodity whose price will continue to trend higher of the years ahead. In contrast to oil, natural gas is pretty much land locked in the US. I reviewed some historical data on natural gas storage and described how we are closer to running out of spare underground storage than we are to running out of gas-in-storage. In my estimation, this puts significant downward pressure on the prices energy companies can expect for US natural gas.



Jeff Gordon of Texas Coastal Energy described his company's success in turning a profit drilling new, conventional oil wells in old fields in Texas and Kansas. When asked about the decline rates for shale oil wells he said that the initial decline was indeed steep but that the curve then levels out and wells remain profitable for ... "well, we don't even know for how long yet." Many of these oil wells also produce copious amounts of natural gas that is currently being flared for lack of piping. It is his understanding that we are producing enough natural gas today that we could even make it through the winter without storage.

Brian Spector of BP North America was also of the opinion that a tremendous amount of natural gas could be produced at prices above $5/mmcf, concurring with Pickens' estimate. He also reminded us that BP is an "energy company", not just an "oil company". BP is, in fact, the largest investor in PV and biofuels in the US. These large energy companies will invest in alternative energy if and when they see potential profit.

Conclusion

By the end of this conference I came away with two major impressions. First, the solar PV people see their progress as unstoppable as panel prices continue to decline and begin to reach grid parity, especially in developing nations and anywhere with high electricity prices. There is huge room for advancement in efficiency and demand management and an increasing awareness in the value of resiliency and micro-grids. Increasing numbers of EVs will provide interesting challenges and opportunities for an increasingly intelligent grid. While still happy to see government incentives for solar PV, I got the sense that many no longer see incentives as a requirement for success. Indeed, some PV projects are competing against natural gas without incentives. Also, new regulations on coal plants are having much the same effect as incentives for PV.

The second impression I came away with is that the oil and gas folks at this forum are utterly convinced that the United States (and also Canada) is going to have cheap and abundant natural gas at least for the next few years. I saw nothing to convince me that natural gas will solve all of our energy problems over decades. But I am now of the opinion that there will be no shortage of natural gas over the next 2-5 years and that prices will eventually stabilize at around $5-$6/mmcf. This abundant supply of natural gas seems especially likely given the associated gas produced while drilling for oil. And drilling for oil is definitely going to continue given current oil prices. For the near term (2-5 years) it seems the US price of crude oil and natural gas are destined to be inversely related. Any increase in the price of oil will increase the number of oil rigs drilling in US shale plays which will in turn worsen the current glut of natural gas. If true, that is a novel and very interesting development.