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Utility scale solar:

How did we get here? Where are we headed?

Domestic and Global Policy Trends Impacting New Renewable Investment and the future of Solar Steam

Text:

Good morning.

I know that here in DC this week most of the news is about shutting things down. But roughly 2100 miles from here in the Mohave Desert, BrightSource is focused on starting things up.

Take a look Ivanpah, just one example of the future of utility-scale solar.

Pretty spectacular, isn't it?

Just last week, we announced that Ivanpah, Unit One, successfully synchronized to the grid and is now delivering power, which is a major technical milestone… for any thermal generation project.

…

Between now and the end of this year, all three units will come online. And, when fully operational, Ivanpah will be the world's largest concentrating solar power project, producing three-hundred-seventy-seven megawatts of clean, reliable electricity, powering more than one-hundred-forty-thousand homes.

Now when most people think of solar, they tend to think of solar photovoltaics. At Ivanpah we use a field of individually-controlled mirrors, called heliostats, to track the sun throughout the day - to focus that sunlight onto a receiver at the top of a tower to produce high-pressure, high-temperature steam…

- Solar steam…

- That powers a turbine to produce electricity – just like conventional generation.

Allow me to highlight a few key items.

Ivanpah is located on thirty-five hundred acres of Federal land in California.

On behalf of BrightSource and equity owners NRG and Google, as well as our EPC partner, Bechtel, I can report that construction on the project is now 98% complete

At peak of construction, we had nearly three thousand people employed onsite – including more than twenty-one hundred craft workers.

The project involved installing one-hundred-seventy-three thousand, five hundred heliostats – each one supporting

two mirrors – at an average rate of one per minute during construction.

The use of dry-cooling to condense steam significantly reduces water consumption to one-hundred acre feet per year, - a 95 percent reduction from traditional wet cooling methods, which is approximately the amount of water used by three hundred homes annually.

Or, for you golfers in the audience, the amount of water it takes to keep two holes green on the golf course located adjacent to Ivanpah.

The three towers of Ivanpah top off and four-hundred-fifty-nine feet or, for my friends on the metric system elsewhere in the world, one-hundred-forty meters… one meter taller than the Great Pyramid.

Our efforts to protect species and habitat have yielded invaluable scientific data that will ultimately allow us to return more desert tortoises to the Ivanpah Valley than if there had never been a project at all.

And finally, Ivanpah will result in total employee earnings estimated at six-hundred-fifty million dollars, much of which will flow back into the local economy, as well as nearly three hundred million dollars paid in state and local taxes.

It wasn't easy getting here, folks. In fact, it's been a long and sometimes bumpy road, with all the challenges any

large infrastructure project faces, including permitting and financing, dating back in 2007.

Now I ask you to imagine for a moment no Ivanpah. As my favorite Beatle John Lennon once said, it's easy if you try. Because without the support of the U.S. Department of Energy's Loan Guarantee Program, Ivanpah would not have been constructed. DOE's loan guarantee was instrumental in attracting the capital necessary to finance this innovative project at commercial scale.

It's no secret that the high-profile Loan Guarantee Program has taken more than its fair share of flack from both sides of the aisle. Following Solyndra – I think I can safely say that word now – "wrong-headed policy" was about the nicest thing many would say about it. But this characterization conveniently gets in the way of the facts.

The Loan Guarantee Program is doing *precisely* what it was designed to do.

Furnishing critical support in the deployment of "first of its kind," "utility-scale" energy projects, not just for BrightSource, but for other large-scale renewable energy projects that reduce greenhouse gas emissions and promote a stronger and cleaner American economy.

Here are the facts:

To date, of the Program's thirty-four-point-four billion dollar portfolio, estimated losses are only two percent.

More than ninety percent of the loan loss reserve Congress set aside remains intact.

We all know that when you take big swings, you will

sometimes miss by a mile. Yet by a wide margin, the Loan Guarantee Program has been a model of success.

In terms of tax policy, there are signs of encouragement. I refer specifically to the bipartisan Master Limited Partnerships Parity Act, sponsored by Delaware Senator Chris Coons and others, and now under consideration in Congress.

Prospects are good for adoption of the MLP Parity Act, if an appropriate legislative vehicle is available.

Extending MLP's to renewable will generally lower project finance costs, and with it the cost of renewable electricity.

By allowing renewable-energy producers to form MLPs, which combine the funding advantages of corporations and the tax advantages of partnerships, significant private capital could be unleashed into the energy market.

However, support for MLP's should not mean an immediate phase out of the Production Tax Credit or any weakening of the current Investment Tax Credit. These policies have been critical catalysts in the growth of US renewable energy.

Since last we convened here a year ago, Congress has extended "commence construction" language to Section 45 of the tax code – encompassing wind, biomass and geothermal projects when utilizing the PTC or, at their election, the ITC.

The “commence construction” provision is a more flexible and predictable standard than “placed in service.” It allows for the full and efficient utilization of a tax credit, rather than creating artificial and market distorting deadlines that occur well in advance of the scheduled expiration.

But this year – like last year – this provision does not extend to Section 48 technologies, which includes solar, fuel cells, microturbines, combined heat and power and distributed wind.

Folks, Section 48 technologies are being deployed across the United States, in many instances at military bases, universities, schools and hospitals using energy performance contracting methods that require no upfront payments. These technologies are hard at work in conjunction with energy-efficiency measures – and they’re *putting* people to work in every state of the union.

Yet from where we stand, the prospects for these technologies are more challenging than a year ago. Without the same financing rules offered the other technologies, they are placed at a competitive disadvantage.

Congress needs to act to ensure the health of these technologies and the jobs they’re creating.

We’re already seeing projects hobbled by this lack of parity. Here’s what developers are hearing from banks: If they can’t guarantee that their project will be in service at least six months before the investment tax credit expires, they shouldn’t expect to close financing. The same refrain is heard from customers who rely on energy performance

contracts to fund their projects – and one of the biggest beneficiaries of performance contracting is the U.S. government who rely upon it to reduce energy costs for taxpayers.

It doesn't seem right that if you've invested your money and you're a day late, you lose 30% of your value, even though your project will continue to deliver its full benefit throughout its useful life.

Ladies and gentlemen, this flies in the face of common sense. It's hard to argue against a level playing field, technology-neutrality and fairness, but that seems to be what is going on here.

Clean energy projects often require multi-year development timelines, and I can tell you this is especially true for utility-scale solar projects. Issues related to financing, structuring, siting and permitting can take years to resolve. And there's always the possibility of unforeseen delays. Without rules in place to allow such projects access to financing on reasonable terms, they are unfairly penalized.

Beyond what's fair for me as a developer, regulatory certainty is imperative in enabling utilities to reach renewable portfolio standards and attain diversity in procurement.

The net-net? Without such rules, we – all of us – will in fact be retreating from a clean energy future rather than advancing toward it.

This is NOT All of the Above. This is all or nothing.

Last year, twenty-six U.S. senators signed on to a Dear Colleague letter supporting equal treatment for Commence Construction language for Section 48 technologies. Folks, it's simple. In order to realize an All of the Above energy policy, we need to account for and accommodate all of the above. After all, what's fair is fair.

For as much as it's been in the headlines, it is important to remember that the renewable sector is still an emerging one – with wind turbines on one end of the commercialization spectrum, and arguably, wave and tidal power on the other.

Financing structures like MLPs are important, but they are not a substitute for tax incentives. The two remain equally important.

Today, BrightSource is taking its solar field technology around the world to China, South Africa, Chile and Morocco, just to name a few. We have many foreign competitors – as should be expected – but I have to tell you – without exception – these competitors have governments that work hard to support their own emerging industries. America needs to do the same both here and abroad.

But before I talk more about our global perspective, let's look a little bit deeper into the brave new world that our nation's utilities are facing.

It’s safe to say that utilities are now entering an era of profound change.

Consider this: Of all new capacity added to the grid in the US last year, seventy-five percent was renewable energy.

The increasing use of intermittent, or variable, resources such as wind and PV have created new challenges for the grid, which has brought the need for an improved analytical framework into greater focus.

The grid of the future will be characterized by two–way information flow, two-way power flow, centralized and distributed generation as well increasing use of energy efficiency and demand response measures.

At a minimum, the road ahead will require a new way of looking at things. But it’s not just about what it costs to produce a kilowatt hour – it’s about what it takes to keep the lights on.

When selecting among competing resource options, utilities must take into account “least-cost best-fit” practices appropriate to their service territory - while at the same time accommodating individual customer investment decisions regarding energy.

With increasingly more competitive choices available to consumers, there is a growing recognition among power buyers, grid operators and regulators that new metrics are

needed to help lead to more informed decision-making for the benefit of all energy consumers.

Sound energy policy requires that utilities balance reliability, affordability and environmental goals to ensure that their customers receive reliable power at competitive prices.

We need only look to Superstorm Sandy or the recent flooding in Colorado which have given new resonance to the need for resiliency in our energy infrastructure.

Regulatory constructs like Net System Cost, which considers both costs and benefits applied to all resources, can work more effectively toward these ends.

The ramifications of a re-framed perspective are powerful indeed. Consider this recent calculation from Bloomberg New Energy Finance. The adoption of new net energy metering policies and legislation in just eight states has increased the headroom to add an additional seven-point-two Gigawatts of distributed (rooftop) PV solar onto the grid.

So, what is the new utility business model going to look like to meet the demands of 21st century America?

To some degree, we've seen this movie before, and the ending is a happy one. Recall that with the breakup of AT&T in the eighties, innovation was unleashed in the private sector at the time unimaginable – today's ubiquitous smart phone is but one legacy of that realignment.

Same for the music industry, for which the death knell was rung with the arrival of Napster – along with the lawsuits against consumers that followed. At last count, Apple had sold twenty-five billion songs (that's "billion" with a B) on iTunes.

With the movies, the same entertainment industry that gave us the DVX standard – which limited the number of times you could watch a DVD - which you purchased and own as a consumer – now embraces NetFlix and Roku.

(Though I'll be the first to admit that even with hundreds of programming channels and thousands of content choices available 24/7 on demand, I occasionally turn to my wife and say, I can't believe there's nothing on to watch on television.

The late nineties, during the first wave of Dot.coms, it was bricks and mortar versus the internet companies, and a lot of talk about disintermediation, and bypassing the middle man. But even thought though the pets.com sock puppet famously went the way of the dinosaur, today, we have far more choices of how, where and from whom we buy goods and services than ever before.

Clearly, there are distinctions between regulated and deregulated markets, but my point is this: in the end, innovation in the face of disruptive market change has universally worked to the consumer's benefit.

But for the benefits of the transition to a new utility model to truly take hold, the value of reliability needs to be determined, tariffs appropriately designed, and the costs

and benefits – both central and distributed – appropriately priced and accounted for.

Regulation willing, concentrating solar power is and will continue to play a major role in this brave new world. (You knew I'd get to this, right?)

At BrightSource, we're concentrating our company's energy on those markets that would benefit from clean, renewable high-value steam - - solar steam.

In electric power, petroleum and industrial process markets there are many opportunities to incorporate solar steam for applications such as enhanced oil recovery, desalinization, and solar augmentation of existing fossil-fired power plants as a way of reducing carbon intensity.

And there is significant value in flexibility. Combining thermal energy storage with concentrating solar thermal technology transforms a CSP plant into a dispatchable resource.

Such flexibility deployed at utility-scale enables the grid to accommodate increasing levels of variable resources while delivering clean energy reliably and cost-competitively.

Absent appropriate regulation, policy, and financial support, our renewable industry and indeed our nation may well fall short of their respective destinies. Contrast this with the rest of the world, where policies are evolving to support more investment in renewables rather than less.

According to the just-released Global Trends in Renewable Energy Investment:

- Policies to support renewable energy have become more flexible and responsive as technology costs have fallen faster than expected. Governments have adjusted to these market realities by revisiting previous policies.

- Germany and the UK have imposed “degression” mechanisms, so that incentives can be lowered frequently to take account of cost reductions. Several European countries are moving towards market-based mechanisms that expose developers to at least some market risk.

- Emerging economies such as India, Brazil and South Africa have made extensive use of competitive reverse auctions in an attempt to attract renewable power investment at the lowest possible cost.

- China has pursued a mixture of policies, starting off with auctions for wind capacity, then a feed-in tariff. It also offers government support via land grants, low-cost credit and central and provincial targets for renewables development.

- But the most damaging development for investor confidence has been retroactive cuts in support for existing wind and solar plants, imposed in countries such as Spain, the Czech Republic and Bulgaria.

So while some here at home suggest we leave the emerging renewable-energy technologies to the vagaries of "the market", the rest of the world "gets" it – some countries because they want to, others because they have to. Recently Chile adopted an RPS goal of twenty percent by 2020. And Saudi Arabia has committed to generating fifty-four Gigawatts of renewable power by 2035 including thirty-five Gigawatts of concentrating solar power.

Here in the US the importance of state-set Renewable Portfolio Standards is declining as many jurisdictions have met or will soon exceed them. Instead, the trends are for greater use of environmental regulation and state emission initiatives such as the California carbon market.

It's said that the first step in the road to recovery is acknowledging you have a problem.

This summer I had the opportunity to visit Shanghai, China during the week of the hottest temperatures on record.

Without belaboring the obvious air quality problems we have all heard about, every official I met or heard speak, both privately and publicly, was quick to say, "we have an environmental problem, and we cannot continue as we have been."

Through our participation in the US-China Renewable Energy Industry Forum, managed for the US by the DOE, we recently announced that BrightSource technology will soon be at work in China as part of the country's first commercial-scale CSP pilot project.

Problem solving on this scale is also informing our considerable progress in South Africa and Morocco, where we're looking at opportunities to augment the existing coal fleet with solar steam to reduce overall carbon-intensity and improve existing fleet performance.

It is important to note that American taxpayers materially benefit from renewable technology even when it's exported. Overall, ninety-five percent of the world's consumers live outside of the United States. What's more, for every billion dollars of goods and services that America exports, we create more than five thousand jobs here at home.

As we look to the future, it occurs to me that we find ourselves at somewhat of an inflection point.

- Total global renewable power capacity exceeded 1,470 GW in 2012, up about 8.5% from 2011. Renewables made up just over half of total net additions to electric generating capacity from all sources in 2012. By year's end, they comprised more than 26% of global generating capacity and supplied an estimated 21.7% of global electricity. (Source: REN21)

- The International Energy Agency projects renewable energy will surpass natural gas to become the world's second-largest source of power generation by 2016. (Source: IEA)

- Before 2010, U.S. Electric Vehicle demand was almost nothing. But in 2012, Americans bought more than 50,000 plug-in electric vehicles. In the first half of 2013, Americans doubled the number of EVs they purchased compared to the same period in 2012. (Source: Department of Energy)

The benefits of low-cost gas, increased domestic oil production and reliable renewables promise to turn our nation into an export power while re-shaping our economy for the better. But to get to this future, we need also to "get fairness," in the form of a level playing field that enables renewables to realize their full potential.

While we wait, BrightSource continues to advance the science and utility of solar steam on several fronts.

Allow me to elaborate.

In enhanced oil recovery, Chevron's facility in Coalinga California has proven itself for more than a year, with solar steam supplementing natural gas. Globally, many oil-producing regions have no access to natural-gas infrastructure. In these locations, solar steam represents a viable solution for the future.

Much has been written and discussed about the water/energy nexus – saving energy saves water, and saving water saves energy. Using solar steam for desalinization serves both objectives. And while desalinization is not a

major issue in the U.S., it is increasingly a challenge inextricably linked to a global economy based on energy.

We're also investigating small-scale CSP for remote industrial applications such as mining and food processing; it too seems to be a fruitful area of exploration.

As I conclude my remarks this morning, I find myself returning to Ivanpah. In my estimation, all roads lead to Ivanpah.

Or at least they should, for Ivanpah is a textbook example of how tax policy, clean-energy policy, land-use policy, environmental stewardship and economic statecraft can work together to deliver on technology's promise.

That technology is proven, and the appetite for it exists worldwide. To continue our progress, here and elsewhere, we need only to remember Robert Fulghum's advice in "All I Really Need to Know I Learned in Kindergarten (about the energy sector)."

Clean up after yourself.

Be aware of wonder.

And above all, play fair.

It's how our industry should work. And when it does, it will inevitably move our nation and our world in the direction we all want – toward a clean, reliable, affordable and sustainable energy future.

Let’s go get it.

Thank you for your time this morning.

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