Energy Policy — A Moving Target

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Policies, similar to vision statements and strategies, are not always the living documents we expect them to be. To remain current, they must evolve and change with time and adjust to current realities.

Our energy policies certainly are in this category. Energy is a disruptive technology, which means that new ideas, companies, technologies and processes are emerging all over the globe at warp speed. For the United States, this means that our Energy Secretary, Steven Chu has an essential and extremely important and visible role globally. It is no wonder that he is frequently quoted in the media.

Chu gave a talk at the EIA/SAIS Energy Conference and was extremely optimistic about our energy future. He is an excellent example of a leader who demonstrates the Bioenergy PROFITS Principle, *test* and *revise.* Two of the principles he utilizes are:

Learn from varied sources of data.

Modify strategy with updated information.

Many people are specialists in their fields. This makes sense. With the myriad of journals that abound, it is difficult to keep up with our own specializations. Most of us do not have the time or mental energy to study other disciplines at more than a superficial depth.

Learn from Varied Sources of Data

The “aha” moments, many times, come from what seems to be unrelated information.

These moments may occur when we are on vacation or in the shower. An idea may come to mind that seems unrelated to our current thoughts. Similarly, we may be speaking to someone in an unrelated field, and we find that an idea can generalize to a problem for which we are seeking a solution. It’s important to pay attention to where our mind appears to randomly wander. Some times, these thoughts are not random at all.

Based on a variety of sources, Steven Chu says the Recovery Act contributes an $80 billion down payment on a clean energy economy. However, data suggests that the Recovery Act is not enough to accomplish all our energy objectives. For example, it will not help to create a smart grid. The Recovery Act is also temporary. Once the funds run out, the investment must be continued from other sources of money.

New fuels with high energy density such as diesel and gasoline must be created to support the clean energy economy in the near future to make our energy policy viable. Though a paradox, the more successful we are at producing higher density biofuels and commercializing them, the more we can create funding. Kerosene, used in jet fuel is near the top of the high density list, as is human body fat. In contrast, the lithium ion battery, as currently produced, is down near the very bottom in terms of energy density. This information is important, as it helps us focus our efforts and helps us wisely use the funding that does exist. For example, Chu indicated that there is work being done to produce a battery at the that will have five times the current lithium ion battery's energy density. This huge disparity between what batteries can do and what fuel can do, in terms of energy density supports our investment in biofuels.

Sources of data also support the responsible expansion of offshore oil and gas exploration as part of a comprehensive energy and climate program. The Administration will expand gas and oil development and exploration on the U.S. Outer Continental Shelf. Environmentalists insist that this occur in with an approach that protects communities and coastlines. President Obama states, "Given our energy needs, in order to sustain economic growth, produce jobs and keep our businesses competitive, we're going to need to harness traditional sources of fuel even as we ramp up production of new sources of renewable, homegrown energy."

We want to build upon what exists, such as our oil and gas infrastructure as we continue to modify our strategy with advanced information about new biofuels technologies and processes.

Chu says "Market opportunities are structured by policy," when speaking of how we can get around the problem of investments in new technologies not being profitable, because burning fossil fuels is cheaper. Dr. Phil Sharp, a former member of congress, stated that the new energy sources would require $100s of billions of investment in the next few years, and would be a drag on the economy. In Sharp's view, "We cannot subsidize our way out of this situation."

Chu argues that if Europe can make changes in its mix of energy technologies, the US can also. "Strong policies drive clean energy investment. Supportive, stable government policies created domestic demand in Europe since the beginning of the 1980's. This demand caused domestic production of energy technologies, energy efficiencies and wind solar power generation."

Chu makes a strong pitch for cap and trade. According to Chu, if it worked for acid rain and in fact came in below cost projections, it can work for carbon. Some say that with the acid rain cap and trade program, there was an easy technical solution

to the sulfur dioxide emissions. An electric power plant had the option of installing a scrubber to clean up its emissions or to buy pollution allowances.

The problem with carbon is that there really isn't any good way of cleaning up carbon emissions other than through small increments from increased efficiency and this will not be easy or inexpensive.

Chu says, "China, EU countries and others see economic opportunity and are moving aggressively. There may be a small economic opportunity component (especially for China selling wind and solar to the world), but even more there are other concerns, perhaps shortages ahead, perhaps climate change, and perhaps pollution from coal, especially for China.

Modify Strategy with Updated Information

As new information surfaces, a well designed plan requires updating with new strategies that are more appropriate to accomplish your company's objectives. This approach creates a current and useable roadmap that provides the clarity for a team's implementation of a work plan. Communication of expectations usually results in execution with few mistakes. When mistakes occur, it is easy to pinpoint the errors and course correct.

Gary Luquette, President, Chevron North America Exploration and Production Co. says: "The good news is that the OCS (Outer Continental Shelf) has significant potential. Over time, it could add 1 million more barrels of oil and natural gas equivalent a day which potentially represents a fifth of the current total U.S. oil production. Advances in technology could increase that amount dramatically. One million of barrels a day of production would be good in many ways such as jobs, balance of payments and 20% of U. S. oil production but it wouldn't save the world from peak oil. In fact, it would amount to a little over 1% world production and even if it can be ramped up a bit from 1 million barrels a day, it still isn't huge. The amount available in the area recently announced off Virginia would likely be only a small fraction of this–probably less than 100,000 barrels a day."

Let's look at the coal resource situation we mentioned earlier.

The Department of Energy investments have led to massive increases in recoverable coalbed methane and shale gas, both forms of natural gas. Secretary Chu says that the DOE is investing $64 million in early-stage research in for methane hydrates (another potential source of natural gas). The deposits have been known for a long time, but all indications are that they are extremely difficult to extract and pose a risk from a global warming point of view if the gas escapes during extraction. However, if natural gas from methane hydrates does get produced in quantity, it can be at least 15 years from now. Since it would be natural gas, it still would not directly replace oil, which is what is needed to run our vehicles, and is now in limited supply.

The U.S., China, Russia, Australia and India have 75 percent of the world's known coal reserves. The U. S. is investing $4 billion in carbon capture and storage,

matched by approximately $7 billion of private sector money. The U.S. is supporting $8 billion in loan guarantees. The expectation is to reduce costs that allow commercial deployment in 8 to 10 years. According to Jeff Wright of the Federal Energy Commission, it is likely to require increased use of fresh water, something which is in increasingly short supply. This by itself could be a deal-killer.

Another issue is the huge weight of carbon dioxide gas that will need to be transported long distances and reinjected. Carbon has a molecular weight of 12 while carbon dioxide has a molecular weight of 44. The gas to be transported and reinjected has considerably greater weight and much greater volume than the coal it was created from, making the energy requirements for transportation very high. This means that the total amount of coal that needs to be burned when considering the CO2 weight to be transported, will need to be considerably higher with carbon capture and storage than without and there will be more pollution to deal with and coal supply is likely to run short sooner. If the carbon dioxide escapes, it will form a low lying cloud and smother whoever gets in its way. How many communities will want to be located near a carbon capture and storage facility?

Evidence of global warming continues to accumulate, says Energy Secretary Steven Chu, with dire warnings for those who ignore it. “This is the smoking gun,” says Energy Secretary Steven Chu. “New research reinforces the claim that human activities are behind the build up of CO2 and other greenhouse gases in the atmosphere,” Chu said during an address at Stanford University. Chu warns that the dangers of business as usual could be considerable. During the last ice age, average global temperatures were 6 degrees Celsius cooler than today. Much of Europe and North America lay under sheets of ice.

The new research examines the types of carbon in the atmosphere and compares the ratio of carbon-14, a rare form of carbon created in the upper atmosphere, to carbon-12, formed by the burning of fossil fuels. He says, “It offers unequivocal proof.” “If the world continues unimpeded to burn fossil fuels, temperatures could rise 3 to 6 degrees Celsius. Six degrees represent a profound change.”

To many, the dangers of climate change seem remote because changing temperatures are difficult to measure over a span of 20 to 30 years. In recent years, for instance, temperatures seem to have reached a plateau. “Scientists looking at a 150-year period observe a rise and steeper rises will come,” Chu said. “The impact of the increasing CO2 “won’t be fully felt for 100 years…because the oceans have to warm up.”

The way to fight this rise, many experts say, is to limit the use of fossil fuels by putting a price on carbon. “We will live in a carbon constrained world,” Chu agreed. It may take five years to arrive; it may take 10. “It is coming,” he said.

As time moves on, it will be more important than ever to *test and revise* our energy policy, and learn from varied sources of data and modify our strategies with updated information.

Test and revise is one of the seven Bioenergy PROFITS Principles. These Bioenergy

PROFITS Principles highlight proven principles to running your business more effectively and are featured in Dr. Lober's forthcoming book, DELIVERANCE: From the Valley of Death to Sustainable PROFITS in Bioenergy. (Ascension: 2010).

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