Your dollars are blowing in the wind and burning in the sun

M. Simon

My last column on alternative energy, A blow to wind energy [1], evoked more than a few complaints. For an engineering magazine writer a number of people thought that I was light on the numbers. So lets do some numbers. For that we will need a baseline. What is the cost of electrical energy in America these days? The Bureau of Labor Statistics [2] says that the average cost of electricity in the US is 13.5cents per kilowatt hour. Since utilities deal in megawatts we can multiply that by 1,000 and come up with a price per megawatt hour. That would be $135.00 a megawatt hour. (And yes - that number was awarded more significant figures than it deserves by the trick of multiplication.)

Back at my hometown paper (the place where the discussion started) a wind enthusiast is telling us [3] that all the energy producers are subsidized. Wind is just another hog at the government trough (what happens when the pigs run out of farmers - well that is a question for another day). So what's the big deal?

> Every other energy source has its own form of government support, including tax credits, subsidies, preferences, set-asides or other beneficial policies. A recent study from the Congressional Research Service points out: “For more than half a century, federal energy tax policy focused almost exclusively on increasing domestic oil and gas reserves and production. ... These provisions remain in the tax code in limited form today.”
>
> Those incentives include the percent depletion allowance and deduction of intangible drilling costs for oil, gas and coal; the Price-Anderson Act capping nuclear liability; and the government-funded construction of ports and pipelines to serve oil delivery.

All true. But a little light on the numbers. So how about looking at some people who did the numbers [4].

> The federal government provided substantially larger subsidies to fossil fuels than to renewables. Subsidies to fossil fuels—a mature, developed industry that has enjoyed government support for many years—totaled approximately $72 billion over the study period, representing a direct cost to taxpayers.
>
> Subsidies for renewable fuels, a relatively young and developing industry, totaled $29 billion over the same period.

Well there goes my argument that wind and solar are dependent on government largess for survival. But not so fast. There is another way of looking at these things other than just looking at raw dollars. That brings up the question of megawatt hours - where today's journey started. And someone has run those numbers [5]. They are looking only at subsidies - not the whole Federal regulatory mess but the information is instructive.

> ...when you look at the subsidies on an energy production basis, the disparity becomes stunning (or scandalous from a taxpayer viewpoint). Wind's 5.6 cents per kilowatthour is more than 85 times that of oil and gas combined. And solar ... would you believe 13 times that of wind, making the disparity north of a thousand times?

So wind subsidy is at about forty percent of the average price of electricity in the US. And solar electricity is subsidized at a rate almost five and a half times the cost of electricity in the US. It seems like a losing proposition to me.

But the raw numbers do not tell the whole story. The megawatts only count if they are there when you need them. Wind - near the ground especially - flows in a turbulent manner. There are gusts and eddies. Not a steady flow that a cursory look at the numbers indicates. Well power grids do not demand energy in gusts (large variations over seconds) they like steadier flows to keep operating. This is even more true for solar in which the passage of a cloud over an array can cause large disruptions over seconds. They do not have the large rotating mass of turbine blades to average out the variations even minimally.

This leads to another subsidy that is not mentioned anywhere, probably because it is difficult to calculate. And that is the number of "fossil" fuel plants required to be on hot standby (burning fuel but not delivering electricity) to make up for the short term disruptions of wind and solar energy delivery (non-delivery actually).

When the percentage of sporadically intermittent sources is below about 20% of grid power things are not too bad [6].

> ...variability in renewable energy sources creates issues in the management of grid electricity generation. When renewables are only 2% of the supply as currently the case, variability is not a big problem. 2% can be easily covered by existing standby capacity established for grid emergencies. Standby

> capacity is normally about 5%, but can be as high as 10% during a summer heat wave. As more and more energy is derived from renewable sources and approaches 20% or more of the total, the grid must be intelligent and be able to store energy from the wind and sun for future requirements. Having some type of grid storage is key for the future of renewable energy sources.

So the whole dumb "smart grid" idea - some one remotely controlling your power use - is required to make solar and wind work on the grid. At least without viable energy storage.

There is one currently viable method of energy storage that works well in conjunction with alternative energy. Hydroelectricity. Dams. But according to environmentalists the spelling of dams is incorrect. And besides they are site specific and all the really good sites (well the vast majority any way) have already been exploited. Thanks to reader **Keith G.** for reminding me about dams. And also reminding me of the days when an Altair or an Imsai was the personal computer of choice among the cognoscenti.

This being a political season we have politicians (what other group of people are more into power and control?) chiming in in on the matter. Our President [7] for one. And his friend Bill Clinton [8] for another. Given the Solyndra solar energy scandal [9] I'll leave it to my readers to figure out what their real motives are. Being that we are now into the realm of politics I expect opinions will vary.

M. Simon's e-mail can be found on the sidebar at Space-Time Productions [10].

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