

What Happens If Wind Energy Gets Successful in the U.S.A.?

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As of the beginning of November, 2008 there are some big happenings in the world, ones which will affect the wind industry on many dimensions. One was the tricky and crafty inclusion of the renewable energy incentives (MACRS, PTC, REPI, CREBs, etc) into the \$700 Billion Big Bank Bailout package in October of this year. While the incentives are only extended one year (drop dead date now is midnight, December 31 2009 instead of 2008) it is certainly better than not having them at all. There is good reason to believe that these will be extended several years past the end of 2009. The second big "plus" was the election of Obama as President and several Democrats (many of a progressive streak) as Senators and Congresspersons. All have made much of using more renewable energy, and of creating significant numbers of jobs in such industries, though details are extremely nebulous at present. Furthermore, there is the problem of the "Oxymoron Twins" - "clean coal" and "safe nukes" - though proper language (that is, non-Orwellian) would rephrase these as "cleaner coal" and "safer nukes". See <http://www.dailykos.com/storyonly/2008/9/17/95026/1326> for an opinion on that. And then there are ideas such as those promoted by Van Jones, that of "Green Keynesianism" - for example, see http://www.huffingtonpost.com/2008/10/20/van-jones-qa-about-his-ne_n_135928.html.

Also, Greenpeace has just issued another renewable energy report called "energy [r]evolution: a sustainable global energy outlook" - only 212 pages, but lots of pictures, and an extensive set of documentation in the Appendix section(s). It can be found here: <http://www.greenpeace.org/raw/content/international/press/report/energyrevolutionreport.pdf>.

So far, in New York there are 707 MW of wind turbines installed, and 587 MW under construction. A great example of the scale of this can be seen (on a clear day) by driving down Route 20 east from East Aurora towards Wyoming County, where the Invenegy Sheldon High Winds (112.5 MW - see <http://www.highsheldonwind.com>) and Noble Wethersfield (126 MW - see <http://www.noblepower.com/our-windparks/wethersfield/index.html>) projects are under construction. A taste of the near future for New York State can be seen in the following document from NYISO: http://www.nyiso.com/public/webdocs/services/planning/nyiso_interconnection_queue/nyiso_interconnection_queue.pdf. Keep in mind that the \$16 billion proposed for the new Nine Mile 3 nuke (1600 MW capacity) comes from the same pool of money that could finance more than all of the proposed wind farms listed in the NYISO Queue. There is only so much money/capital to go around, especially now that so much of it was toasted in the recent speculation binge centered on derivatives, mortgage backed securities and collateralized debt obligations.

Complicating this optimistic view of the wind industry are the recent semi-collapse of the world financial system, the collapse of fossil fuel prices and the collapse of economic

demand (= a recession), which will lead to lower demand for electricity, including in Western New York. As less natural gas is consumed to make electricity (also a bit of a seasonal thing), electricity prices as set via the West NYISO zone will tend to collapse to the levels set by some old, polluting and fully depreciated coal burners (Huntley, Dunkirk, Somerset) and fully depreciated, often quite old nukes (notably the Ginna and Oswego based ones). The lower electricity demand will lead to lower NYISO electricity prices, which will put more pressure on the wind farms, which were a bet on higher electricity prices (eventually). In addition, the recession and Wall Street layoffs may also depress the number of companies and individuals who have the tax appetite needed to make the U.S. wind energy financial incentives work. It's a complicated web that is weaved.....

The economic meltdown has also affected the natural gas industry and even the oil industry. With oil, most of the new expansions in the Alberta Tar Sands are being deferred because there is no financial justification for them at \$70/bbl; prices near \$100/bbl or more are needed. The same goes for some expensive offshore developments, such as near Brazil. The same applies to natural gas, where the marginal wellhead cost is over \$8.50/MBtu. With current Ngas (natural gas) prices near \$6.50/MBtu, a lot of drilling operations are being deferred/canceled as too expensive to justifying such activity until prices of Ngas recover. The low oil and Ngas prices are happening due to "de-leveraging" of options and futures contracts such as those formerly held or done through AIG and Lehman Brothers; this process will be largely complete in the next 6 months. In a few months, energy prices, led by natural gas and oil, will resume a sharp upward price trend, once the lower production rates catch up to the lower demand. This is especially true for "tight shales" projects (Barnett Shales, near Dallas, Tx or the Marcellus Shales, on the NY-Pa border), where wells rapidly deplete and require new drilling/"hydro-fracturing", all of which are expensive, in these large fields. Most gas wells deplete within a few years, and giant fields of Ngas need new wells all the time, and this is even more pronounced with tight shales projects. Once Ngas prices rebound, wind turbine projects will become more viable as electricity prices rise to acceptable levels.

Once again, cheap electricity prices will deter renewable energy development. Even Florida Power & Light (one of the major U.S. wind developers) is shaving \$300 million off of their 2009 wind turbine projects budget.

At the recent environmental meeting held at University of Buffalo (October, 2008), it was obvious that while most people wanted more renewable energy, few had a clue about the economics of it. The basic rule is this: if wind energy is not profitable here, it won't happen here. Wind is cheaper than electricity made in new coal, new nukes or with old coal that employs "CO₂ trash stashing", unsubsidized, but for "old polluters", unsubsidized wind is more expensive. As for natural gas, that depends on what the Ngas price is, something not that predictable at all, especially over the span of one to five years.

In the U.S., there are 3 basic ways that the wind industry is made competitive with electricity by polluting routes (coal, Ngas, nukes) using essentially fully depreciated

facilities. These are the PTC and MACRS tax based incentives, and the REC/RPS approaches. RECs (Green Tags) add between 0.3 to 3 c/kw-hr to the price of wind energy. The RPS (renewable Portfolio Standard) is a bidding system that mandates some (usually a small percentage) non-polluting electricity within an area, and is usually done in a complicated bidding (low bidder = minimum economic incentive) arrangement; in NY, the RECs and the RPS are one process. The PTC (Production Tax Credit) is now 2.1 c/kw-hr, applicable only to passive income (rental income, for example), while the MACRS (rapid depreciation) allows the entire capital (turbine + installation) investment to be written off as fully depreciated in 6 years, even though the turbines will last over 20 years. See this site for a description of these:

<http://www.dsireusa.org/library/includes/genericfederal.cfm?State=Federal&EE=0&RE=1&CurrentPageId=1>.

The PTC and MACRS often can be worth between 4 to 6 c/kw-hr as incentives. However, they only apply to those with the appropriate and huge enough income; generally only the upper 1% of individuals on the income scale and to wealthy corporations. Thus, these incentives can become a way that effectively ONLY the wealthy will own non-municipal owned commercial scale wind turbines in the U.S. It also will be a way to transfer another \$1 trillion over the next decade or so from electricity customers to the upper class owners of such facilities IF wind becomes a major factor in U.S. electricity production.....

Well, that sounds yummy; how would that work? Just what we need, more wealth for the wealthy....

Let's assume that wind turbine installations go something like according to Al Gore's recent proposal, so that we don't need pollution as a by-product of electricity manufacture. Let's assume that on average wind turbines get an average of 30% of their nameplate capacity (low for much of the prime U.S. wind sites), and that they cost on average \$2 billion per gigawatt (GW), or \$2000 per kw, or \$2 million per MW of installed capacity. Let's also assume that the marginal income tax rates go to 40% (the higher that is, the more "tax income" is retained by the rich IF they invest in renewables). If the installed capacity rate is kept at 100% per year and then adjusted downwards once we are making 32 GW/year, and eventually "flatlines" at 192 GW by 2016, this is what would result - 1560 GW of installed capacity, chugging out an average of over 468 GW of electricity - enough to supply the current U.S. average requirement for electricity. This would only be less than one sixth of the U.S. capacity via wind - though that really depends on what an acceptable price for that electricity is defined as. Graphically, that is shown in Figure 1:

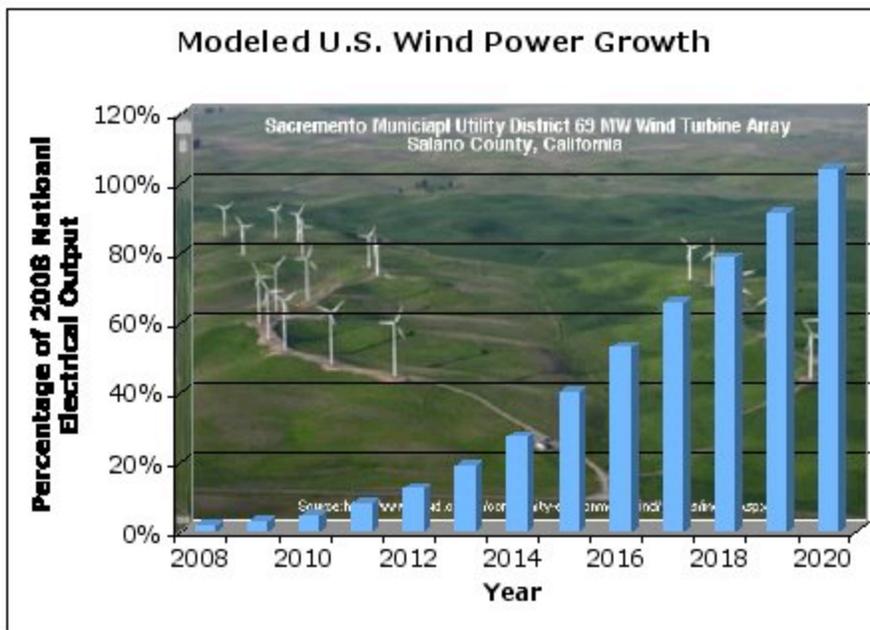
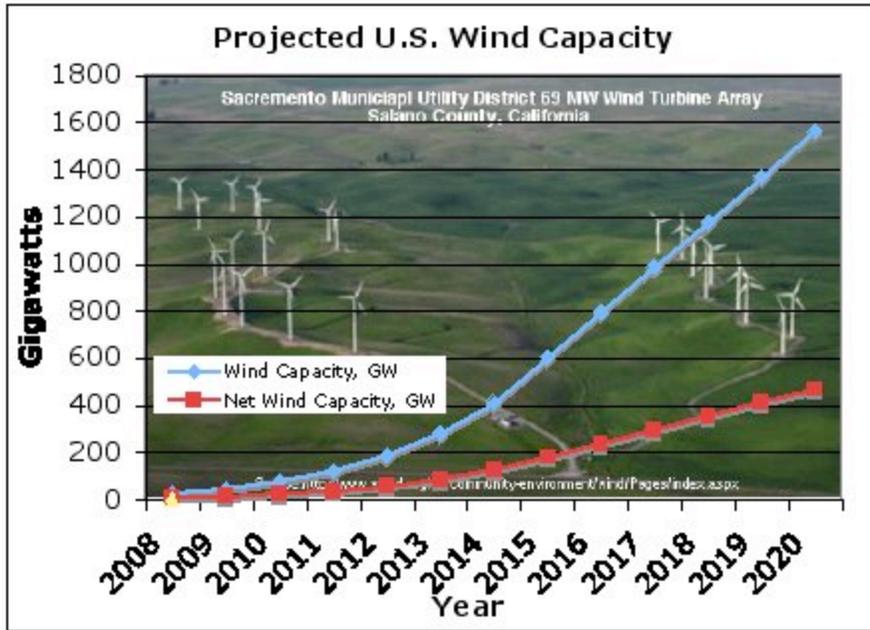


Figure 1
Wind Capacity Model

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Anyway, this humongous investment would create a lot of jobs and economic activity (GREAT!!!), and under current laws, lots of tax avoidance by those who invest in wind turbines. Just how much? Well, in the 10 years modeled here, it would be \$1.273 trillion, in constant 2008 dollars (see Figure 2).

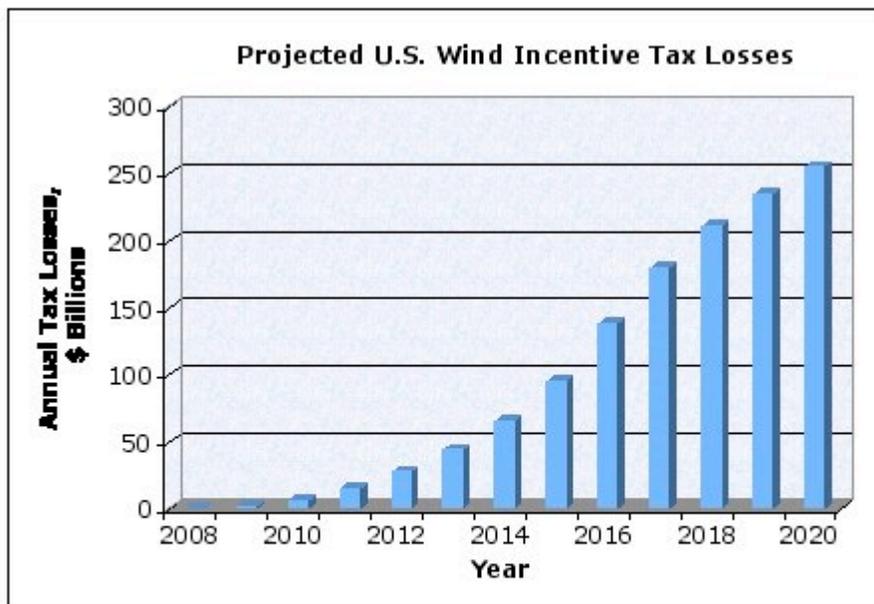
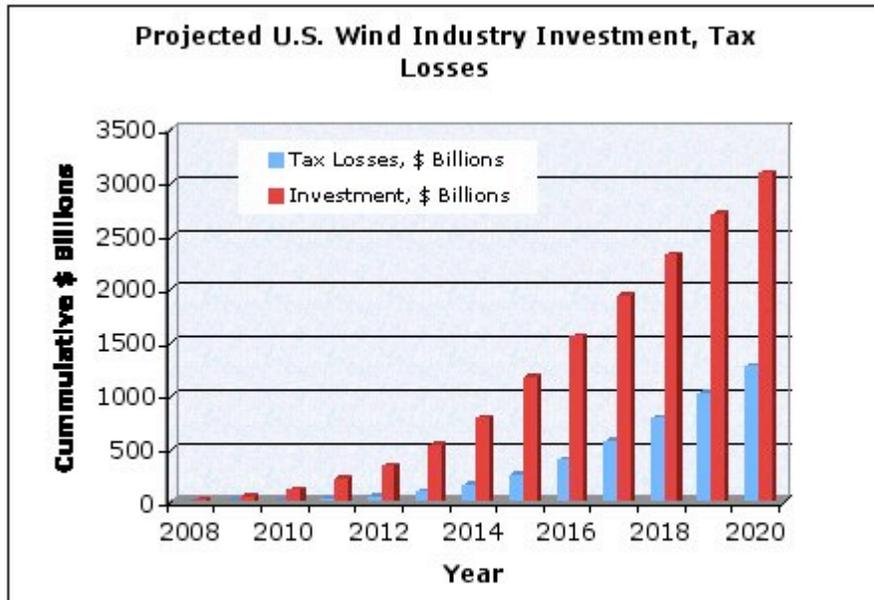


Figure 2
Tax Consequences

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And the tax loss per year would be near \$250 billion per year by 2020. These tax losses coupled with a huge wind turbine installation rate are what used to be known as a "snowballing" scenario. Granted, the incentives are better than nothing, but consider carefully that nothing is the standard of comparison. A classic example of having a great wind resource but poor policy is Great Britain (one of the best wind resources in Europe), which now has less wind capacity than France (with Feed-In Laws), and about 10% of the installed capacity of Germany (also Feed-In Laws), even though the wind resource in Germany is significantly poorer than in Great Britain.

Obviously, these are getting to absurd levels.... and given the effects that peak Oil and Peak Natural Gas will have on the U.S. and world economy in the next decade (NOT GOOD) - see <http://www.theoildrum.com/node/4727> - more and <http://europe.theoildrum.com/node/4712> - more (warning! not for the naive and cornucopian) - it is doubtful if those quantities of tax deductions will even exist. Plus, the pro-nuke and pro-coal crowd don't like such a projection, as they don't end up with any piece of that pie (besides, they also employ all kinds of subsidies and hidden governmental goodies, like free catastrophic insurance and inadequate penalties for CO₂ pollution). Then there is the attitude of the "we can't crowd" - also referred to as the ones who would have us speaking German and Japanese after an alternative ending of WW2, when we also would have said that such efforts were not possible...). Or the "we can't go to the moon crowd"...which was done, and that is the scale of the effort needed to repower our country, fast. It just so happens that wind is one of the most economical, scalable and demonstrated ways to bring renewable electricity online using already known, but steadily improving technology. It may not look like the futures envisioned a few decades ago (the Jetsons anyone?), but them's the breaks.... http://en.wikipedia.org/wiki/The_Jetsons

Anyway, the PTC and MACRS and other subsidies seem inadequate to the task of delivering LARGE quantities of wind derived electricity in a timely manner, or one with any kind of semblance of economic psuedo-fairness. An approach that would cost NO LOSS of tax dollars would be what has been *demonstrated* to produce more installed wind turbines at lower cost in less time and in a more democratic manner is known as Feed-In Laws. Here is a site with lots of advocay for that approach, including lots of power points with lots of pictures and not too many words - easy summaries to breeze through, including some made to the Michigan State Legislature - <http://www.wind-works.org>.

Education can be a wonderful thing, and just because we are getting older does not mean that we have to stop learning. Energy investments are long term, tricky, and not well suited to rapidly fluctuating prices of basic commodities used to make it - like oil, coal and natural gas. The investments also need governmental/societal guidance, since the costs of energy usage, like Global Warming and Peak Oil, don't show up immediately, but have slow and awesome consequences anyway. Feed In Laws are one way to incorporate these into the cost of energy, and allow a gentle transition from the present environmentally and economically unsustainable methods that are generally used into a more sustainable approach. It's just a matter of going from "now" to "not yet here", and not by accident.