**On Climate – What’s Vermont Yankee Got To Do With It?**

One way to help make America great again is to create green jobs for all kinds of Americans including immigrants. We are a nation of immigrants after all. Green jobs are the other reason that the VT Climate Council is pushing ahead with the Global Warming Solutions Act despite Gov. Scott’s opposition. Scott objects because the new law allows Vermont to be sued if emission goals are not met. Yet, when has that ever not been true? If frivolous suits are brought, courts can quickly reject them, just as they rejected Trump’s frivolous suits contesting Biden’s legal victory in almost every state of the Union. Also, the bill is not punitive but seeks to redirect the state to fulfill climate goals if not met on time. So, it makes little sense to oppose the new law on such narrow legalistic grounds.

The governor has done a great job on Covid and many matters but now seems conflicted over climate. Yet, Scott can seize the day by addressing the law’s central weakness, summarized in the word, removal. The law is focused on reducing emissions. It does not seek active removal of CO2 from the sky partly due to high cost. Nor does it target CO2 from central plants. The only methods cited to remove CO2 from air is to nurture natural ecosystems, carbon forest cycles, carbon sinks and sustainable farming, outlined Jan. 4 by VT Agencies, Natural Resources and Agriculture. For the record, Vermont has long supported said goals. They are valid and vital to save climate but not new. What is new is that reduction goals are legally required by 2025, 2030 and 2050 to reduce emissions to 80% below 2005 levels. Sadly, these goals and dates are too little too late to stop a runaway greenhouse effect. Net-zero emission by 2050 is too slow. We need both rapid CO2 reduction and we need to begin rapid removal of CO2 from the sky at utility scale by 2030 according to the most recent and most dire IPCC report. Sooner would be nice.

Fortunately, new CO2 chemistry, new batteries and new storage methods now make it profitable to upgrade and transform central plants in two stages into power & storage stations that remove CO2 from the sky. Many research groups report a) better ways to capture CO2 and b) new catalysts that convert CO2 & H2O into H2 or into methane, methanol, ethanol or biodiesel in one step. H2 can be used to make anhydrous ammonia (NH3), a carbonless fuel.

In the first stage, a power plant or engine can be adapted to reuse CO2 to make synthetic fuel and other products; thereby forming a ‘carbon trap’, reviewed in several articles by Robert Service at Science, Journal, American Association for Advancement of Science and many scientists at the Dept. of Energy, Mass. Inst. of Technology, Arizona U, Harvard, Ecole Polytechnique Federal of Lausanne and Dalian Institute, to name only a few.

In the second stage fossil fuels are slowly replaced over 6-10 yrs by biofuels made from hemp or other appropriate biomass (see: Cheapest Way To Save Planet Grows Like A Weed by Ellen Brown). Keeping in mind that green plants remove CO2 from air to form carbohydrates, then biofuel power stations that reuse CO2 for extra fuel can activate net-negative emissions, defined by Dr. Lackner at The Center for Negative Carbon Emissions as removing more CO2 than emitted. For the record, not all biomass is equal with respect to sustainability or CO2. Monoculture palm oil, corn ethanol and forest chips are the worst offenders now. Hemp and many crops can be cultivated sustainably if machinery is electrified to cut upstream CO2 and cost. In time, flood prone areas can be tapped to irrigate deserts for both food and fuel crops and cool climate as well. Over its lifetime, the power station described above will remove far more CO2 than emitted to build and run it. Tail pipe gas can be treated in a similar way.

What does VY have to do with all this? Answer: everything. First, the world needs a working example of a power & storage station that makes money from negative emissions at utility scale. The missing ingredient in climate prescriptions from Progressives, Democrats, enlightened Republicans and Environmentalists in general is a fast and profitable way to remove CO2 from air – one that can be installed in ten years and allowed to work for decades to follow. The same plan for fossil plants can work just as well for antique nuke plants like VY. Most are 40 yrs old. Second, Vermont has become overly dependent on Hydro Quebec (HQ), which is not the cheap, clean electricity it was thought to be. Tree roots rot under water and emit methane, a potent greenhouse gas, and methyl mercury into adjacent waterways. Cree fishing villages have suffered terribly over decades and the problem is still not solved.

VT’s forest industry should logically share in the biomass market if only they put their own carbon house in order, as Maine’s NCS Initiative and Middlebury College are trying to do. Leveling forests in Georgia to burn wood chips in Scotland at the Drax Plant only puts more CO2 into the sky without admitting it while destroying carbon forests when we need them most (see: ‘Burned, Are Trees the New Coal?’). CO2 emissions should be counted when wood is burned (see: McElroy, VNews, 10/03/19). CO2 offsets should not be assumed as trees are cut unless said trees are sustainably cultivated with electrification of machinery to cut upstream CO2 and cost – same for hemp-biofuels.

VY is an ideal candidate for these innovations but is mired in nuclear decommissioning until 2026 – still far earlier than first predicted, much to NorthStar’s credit. Even so, since closing in 2014 to 2026 - if all goes well - is a 12 year span in which VY might still be reinvented as a negative emission, power & storage station on the eve of rapid climate collapse. Do we wait until 2026 to begin planning for a negative emission, power & storage station at VY? If lucrative for farmers, foresters, solar sellers and local utilities, then what is not to like? What is Vermont’s and Vernon’s plan to recoup lost jobs and restore Vermont’s leverage against HQ? Are they really on the same page? What does the final power plant - if there is one - look like? Does it actuate negative emissions? Does it include solar and storage to back up more rapid renewables growth? More is better, Geico says. Finally, when might this green negative emission machine be completed? 2040 is too late. 2035 is barely there. 2030 is about right.

Fortunately, Vermont has two wood power plants in Ryegate and Burlington that are just the right size and type to upgrade and transform into negative emission stations that incorporate storage to back up rapid renewables growth. Plant composition for these sites and/or VY might be as follows; a) one-third solar & wind along three-phase lines, b) one-third storage and c) one third from biofuel generation. Solar farms can be tied in by three-phase lines to the ever-useful switching yard that all plants include. Storage comes by way of batteries and from synfuels produced on-site from CO2 and H2O with new catalysts late at night. Plant owners can profit nicely from the kWh price gap between high and low peak demand, evidenced by the Northfield Reservoir. They buy watts low and sell high.

The missing ingredient that our governor and local utilities might bring to the table is a profitable plan to transform central plants in two stages into negative emission, power & storage stations that reuse CO2 for supplemental fuel and make other synfuels and products, i.e. plastic, concrete, graphene and carbon fiber. Besides, storage is vital to back up the rapid growth of intermittent renewables. To sum, we can profitably transform power plants - large and small, stationary and mobile - from climate liabilities into climate assets that will begin to reverse global warming within ten years. These proven methods combined with legalization of industrial hemp and refinement of many farm crops, opens the way to an agrarian revolution in energy markets that can replace fossil fuels completely. Farmers, Utilities, Progressives, Democrats and Conservatives can now join hands to capitalize on the profitable reuse of CO2 emission and The Paris Climate Treaty. Big Oil can go back to the farm and invest and prosper there.

By Jim Hurt, Board, Renewable Nations Institute (RNI) / Disclaimer: This commentary does not represent the formal views of RNI, which is developing work-study curriculums in the field of Sustainable Energy. Oct. 5, ‘21