Pragmatic Environmentalist of New York Summary Update October 31 – November 13, 2022

This is the latest summary update of my recent posts at Pragmatic Environmentalist of New York. As always, if you do not want to be on this mailing list then let me know. Previous updates are also available. I have not published much in the last two weeks because I got bogged down preparing a couple of presentations on the Climate Act.

New York's Irrational and Unsupportable Methane Obsession November 3, 2022
One "baked-in" aspect of the Climate Leadership and Community Protection Act (Climate Act) is its obsession that using natural gas, aka methane, is such a danger to climate change that its use must be curtailed now and eliminated as soon as possible. I say "baked-in" because the language of the Climate Act was written to deliberately and uniquely emphasize its alleged impacts on global warming. A paper by van Wijngaarden & Happer makes a persuasive case that New York's obsession to reduce methane is wrong.

This post attempted to make the findings of this paper accessible to more people because it is technically dense. The van Wijngaarden & Happer paper describes an analysis that used many observations of the greenhouse effect to develop a general relationship that can be used to predict the effect of increasing concentrations of greenhouse gases. New York Climate Act guidance is based on claims that methane has a more potent impact on the greenhouse effect than carbon dioxide but the van Wijngaarden & Happer derived relationship shows that methane cannot cause significant changes to the greenhouse effect itself. The claim that methane has a bigger effect than CO2 on the greenhouse effect is true on the molecular level but when methane in the atmosphere is compared to CO2 in the atmosphere it turns out to be incorrect because of the saturation effect, the amount and type of radiation emitted from the surface, the numerical realities of infrared absorption, and the physical properties of the real atmosphere related to the greenhouse effect.

Viewed through a pragmatic lens, the New York obsession with eliminating natural gas is irrational. Increased use of natural gas has been responsible for the majority of electric generation emission reductions observed in the state. Natural gas provides efficient, resilient, and safe energy to homes and businesses. Not so long ago the idea that natural gas could also be used a bridge fuel until the aspirational "green" generating resources and energy storage technologies could be tested at the scale needed, perform like a natural gas fired generating unit, and provide power at a similar cost, was generally accepted as a rational approach. The analogy for skipping the need for a bridge fuel is that proponents want to jump out of a perfectly good airplane without a parachute because they assume that the concept of a parachute will be developed, proven technically and economically feasible, and then delivered in time to provide a soft landing. This paper shows that there isn't even a valid reason to jump out of the airplane.

Clean Heat for All Challenge

I did two articles about New York's Clean Heat for All Challenge and the disconnect between the plan and reality. New York City Housing Authority (NYCHA), New York Power Authority (NYPA) and New York State Energy Research and Development Authority (NYSERDA) launched the Clean Heat for All Challenge as "an industry competition directed at heating and cooling equipment manufacturers to develop a new electrification product that can better serve the needs of existing multifamily buildings and hasten the transition to fossil-free heating sources". Sounds wonderful until you look at the details and differences with New York's net-zero transition plan.

Clean Heat for All Challenge November 1, 2022

The first article described the challenge itself and one component of the Clean Air for All Challenge press release related to a related partnership to reduce GHG emissions from a New York City high rise complex. NYCHA and NYPA are partnering to replace the aging gas-and-oil-fueled heating and hot water systems at 830 Amsterdam Ave, a 20-story high-rise in Manhattan, with a high-efficient electric Variable Flow Refrigerant (VRF) heat pump system.

Despite manufacturer claims about benefits using a Variable Flow Refrigerant heat pump system for this kind of structure, it is generally untested technology so this project can be considered a field test. It appears that the system checks off all the building's needs and it will meet all the energy needs of the building without the need of a fossil fuel source. However, the "design-build electrification project" has a projected cost of $28 million and will only reduce emissions by 590 metric tons. That works out to an astounding $47,458 per ton reduced or $176,100 per residence. This is far above New York's estimate of societal costs of carbon ($172 per ton in 2050).

The reality is that I don't think this is an affordable electrification option. NYCHA has 267 developments with a total of nearly 162,000 apartments for about 340,000 people. If this technology were used for all those apartments the cost would be $28.5 billion. Using Integration Analysis data. I estimate that there are 2,050,000 large multifamily residences in New York. If this technology were used to electrify those homes the expected cost would be over $360 billion. Even of the costs could be reduced by an order of magnitude costs are still over $36 billion for just this residential electrification sub-sector.

New York City Large Multi-Family Residential Heat Pumps November 5, 2022

The Clean Heat for All Challenge is primarily targeting multi-family residential homes. In this post I looked at the challenge as it relates to New York City Local Law 97. The article looks at what it would take to meet the requirement that law's requirement that "most buildings over 25,000 square feet will be required to meet new energy efficiency and greenhouse gas emissions limits by 2024, with stricter limits coming into effect in 2030".

Advocates for heat pumps frequently overlook the hidden costs. At the top of the list is the need to improve the building shell so that heat pumps remain effective at lower temperatures or the need to include backup resistance heating. In my opinion there will still be times when supplemental heating is necessary. Resistance heating is a problem because it is not net efficient and will substantially increase loads at the worst possible future time of the winter peak.

The paper explains why I believe that the specifics on affordability and reliability should give planners concern. The Integration Analysis all-in device costs including the "Basic" building shell upgrades for large multifamily residences total $57,539 per residence. The Integration Analysis states that there are 1,667,493 high rise multifamily residences in New York City alone. On the face of it that works out to nearly $96 billion for the net-zero transition.

I concluded that in every instance where I have evaluated a component of the New York energy system and the challenge of a net-zero transition I have found that the problems are more complicated and uncertain than presumed in the Integration Analysis and the Draft Scoping Plan. As a result, I think the costs are underestimated and the potential risks to reliability a significant risk. The challenge of meeting Local Law 97 is no different. It is very easy to promulgate an aspirational target but clearly the politicians involved have no clue about the scale of the challenge. If they did, they would not be so anxious to jump into these laws. I have shown that New York's total greenhouse gas emissions are less than one half of one percent of total global emissions and that since 1990 global emissions have increased on average more than one half of one percent per year. It is not clear what the point of these costs and these risks are when anything the state does is subsumed by what others are doing in a year.