Comments on Brattle Group Study by Lindsay Audin, president, Energywiz, Inc. – 10/24/17

Introduction

With regard to matter number 17-01821, “In the Matter of Carbon Pricing in New York Wholesale Markets,” I offer the following comments. They are based on my 40+ years of experience providing energy services to the large power customers discussed in the Brattle Group study. For details on my background and experience, see the end notes to these comments.

While I applaud the concept of a cost adder to wholesale pricing based on a power plant’s carbon emissions, I am concerned about the expectations of emission reductions seen in the study. Some of the assumptions of additional energy efficiency and conservation by large power customers are, I believe, overly optimistic and based on flawed assumptions and calculations.

Nearly half (46%, i.e., 1.2 million tons out of 2.6 million) of the study’s expected annual carbon reductions are based on such customer responses. For reasons stated below, I believe that figure to be unrealistic. Any policy based on the study (as presently constituted) may therefore be flawed.

Opportunities exist, however, exist to achieve the desired reductions by using the carbon pricing revenue as incentives for energy source conversion, alteration of some unmetered emission sources, as well as electrical efficiency and conservation, instead of simply dissipating it among ratepayers.

Issues With Brattle’s Analysis

My comments are focused on these issues:

- inappropriate price elasticity assumptions
- calculation of percent pricing differentials used to project a response based on elasticity
- comments/assertions not involved in its calculations
- opportunities to look “outside the box” (and State) for ways to maximize carbon reductions.

Price Elasticity Issues

With regard to its price elasticity numbers, I applaud the conservative assumption that most of a power price response will come from the largest power customers since they may be the most concerned about even small increases in power pricing. Many already either employ or utilize energy service professionals to help them minimize such costs. Page 36 of the study states:

> We conservatively assume that **only large customers** would be attuned to an increase in volumetric rates and thereby incentivized to reduce their energy consumption. Such customers represent approximately 52 TWh per year, a third of total New York load. For such customers, a $40/ton carbon charge could increase energy rates by 1.5¢/kWh (increase in wholesale prices due to carbon charge, net of savings from lower REC and ZEC prices) while reducing capacity demand charges and providing non-volumetric payments for their share of carbon revenues (see Section VII). If their base energy rates are 9.4¢/kWh, this amounts to a 16% increase on the energy portion of their rate.

> We then estimate the customer response to such a change in rates using the long-run elasticity of demand. The long-run elasticity of demand represents the change in customer usage for an increase in customer bills; the elasticity of demand for electricity is often estimated in the range of −0.3 to −0.8 for residential and commercial customers (i.e., as the electricity price increases by one percent, customer usage decreases by between 0.3 and 0.8 percent).
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> In New York, other state efforts, such as tightening building codes, will partially reduce the potential for additional price-driven customer response, suggesting an elasticity of demand at the low end of the range, at −0.3. We apply this elasticity to our estimated 16% increase in volumetric rates. The result is a 2.5 TWh reduction in load (approximately 5% of large customer load). Assuming this load offsets the load-weighted average MER of 0.47 tons/MWh, this translates to 1.2 million tons of annual CO2 reductions in 2025.

The cited elasticity range is (according to footnote 88) based on a survey performed by Brattle. Based on my own knowledge of price responses (as detailed in various tariff filings), I found that range rather high, and did my own review of elasticity studies. While others do indeed show such a range, that range did not differentiate large power customers to the exclusion of residentials, small commercials, and others that may respond differently. A residential customer that used electric resistance heating (common in upstate New York) may, for example, respond quickly (and perhaps permanently) to a price increase merely by turning down his thermostat. The same is not, however, true for large customers that must maintain commercial-grade conditions, such as tenant demands for cooling, or industrial processes already optimized for minimum cost.

A more focused analysis appears in a June 2015 study, "An Econometric Assessment of Electricity Demand in the United States Using Panel Data and the Impact of Retail Competition on Prices," by the National Economic Research Associates (NERA), which has considerable experience with power price modeling. Taking the average of its ranges for short-run elasticities for commercial and industrial customers, I derive -.16. Using it would cut Brattle's projected customer response of 1.2 million tons roughly in half.

I also suggest avoiding use of long-run elasticity numbers. Such figures (including those seen in the NERA study) shows a wide range of -.26 to -3.26, i.e., use would drop more than 3 times faster than price rose, making them essentially useless for accurately predicting behavior. Other usage reduction pressures, such as ever-tightening energy/building codes and utility and government incentives impacting across the same long-run time frame, may easily "gild the lily". I found no study that credibly factored out those long-run pressures. If Brattle can provide one, I ask that it be listed and quoted.

This factor is especially important because New York State has, for decades, had some of the highest electric rates and highest levels of energy efficiency incentives in the continental U.S. Together, they have already wrung out much of the potential for additional cost-effective energy efficiency and conservation in large customer facilities.

Calculation of Percent Pricing Differentials

A larger flaw in Brattle's analysis relates to its use of the volumetric-only price differential that could result from a $40/ton charge. As quoted above from page 36, the 16% price differential upon which Brattle counts its elasticity response is based solely on the pricing seen at wholesale:

> A 9.4¢/kWh base rate is estimated based on 2025 all-hours-average LBMPs (see Section VII.A.2) plus 30% for ancillary services, ISO charges, and other charges. [footnote 87]

But all price elasticity studies I found instead looked at total power price as seen by the customer, not just its wholesale volumetric component. As known to anyone with real-world retail power pricing experience, that part of the total bill may be 50% or less of the total when delivery and tax charges are included. **And it is that total number (and its percent change) that catches the eye of large retail power customer and to which they will respond. I know: I have served many of them for many years.**

Factoring down Brattle's now ~.6 million number (discounted for appropriate elasticity) by that 50% brings us down to about .3 million tons/yr. But we're not done yet.

Like all the studies I reviewed, NERA looked at national (not New York) data. Over half the annual State kWh consumption occurs in zones H, I, J, and K (i.e., Con Edison and LIPA/PSEG territories). The supply-only part of the pricing seen in those areas (including capacity, ancillaries, etc.) is about 35% (sometimes lower) of the total retail price seen by customers. The percent price differential seen by those customers would thus be even lower, further reducing that .3 million ton number, but by how much requires a detailed calculation.

At this point, Brattle's total 2.6 million ton/yr estimate is down to less than 1.7 million tons/yr, with customer efficiency/conservation based on elasticity representing less than 18% of it.

If, as stated on page 36 (and elsewhere), capacity and other charges may drop even as the $40/ton charge is levied, the net increase in total price seen by the customer may be even lower, potentially making it less than a typical annual utility rate increase. Having had to explain many rate increases to many customers, I can attest to the fact that the usual response to small price changes is not conservation or energy efficiency investments, but rather irritated grumbling. Before spending money on facility improvements, some customers instead consider one or more of the following options:

- find a way to shift the cost increase to someone else (e.g., tenants, taxpayers, their own customers)

- pay to lobby for changes (e.g., seek special rates or treatment by the PSC and/or State Legislature)

- move part or all of a firm or its employees to a cheaper location (e.g., New Jersey, Pennsylvania).

Where price hikes are deemed significant, however, this other option may come to mind:

- throw out the politician(s) that allowed the price to soar, as occurred with the recall of California's governor (Grey Davis) and his replacement by Arnold Schwarzenegger during that State's 1999-2001 power debacle.

Many consultants help customers cut their rates, which for some may be more cost-effective than cutting their usage. As detailed in my book, "Lowering Your Facility's Electric Rates" by Fairmont Press, I have secured lower power pricing for many customers. After doing so, however, I have yet to see any significant increase in their kWh usage, as would be suggested by Brattle's elasticity numbers. Recall that elasticity works both ways: if price is lowered, usage should rise. In the real world, none of my customers getting a lower rate decided that, because their power was now cheaper, they would leave their lights on at night. Great care is thus needed with such elasticity assumptions.

Finally, if – as envisioned by Brattle – most of the price increase is then at some point refunded to customers, their real-world consumption (and thus emission) response may be near zero. Even withholding a chunk of a customer's money for a year could be easily unwound. I would expect the lending industry, for example, to simply securitize it by offering an upfront payment to customers that agree to sign over the future payment in trade for a lower immediate payment. Such is already done by income tax preparers when they offer to "get your refund now, instead of waiting for it later".

Unfounded Comments Should Be Deleted

At least one irritating and unsupported speculation appears on pp. 38-39: "Additional emissions reductions derive from attracting better-sited and more effective types of renewable generation for offsetting carbon emissions and from incentivizing energy efficiency, demand response, and storage."

As with most real-world activities, the most cost-effective sites and options (the proverbial "low hanging fruit") are typically chosen first. What evidence does Brattle have that has not already been occurring, for at least a decade in our State? I know many renewable developers and efficiency contractors that would vigorously dispute that statement.

It is worth noting that none of the rooftops on buildings where Brattle's own US offices are located (NYC, Boston, and Washington, DC) presently have solar PV panels. All appear to be flat and open, with no major shading. Are they not viable sites? But, then again, Brattle – like many thousands of commercial power customers – is just another tenant, with no say in the matter. I suggest that such speculative phrasing about siting be deleted from a revised version of Brattle's study.

Suggested Alternatives and Opportunities

Take a lesson from the real world: the best way to make something happen is to give customers money to act, rather than penalizing them if they don't.

Based on a rough calculation (and data from Figure 9), revenue from the $40/ton charge would raise over a billion dollars a year. If those funds were focused on the most cost-effective ways to cut carbon emissions, even if not related to power production, a greater bang-for-the-buck might be achieved than presently suggested in the Brattle study.

The State's carbon inventory shows that much more CO2e comes from boilers, vehicles, and unmetered sources (such as landfills) than from power production. I therefore suggest the following examples as appropriate ways to use the carbon pricing revenue:

- pay municipal and private owners of open landfills to cap them and capture their methane (25+ times worse than CO2), using it to produce "green" power sold back into the grid, or at least burn it, thus cutting its GHG impact by ~96%.

- double or triple the $1500/ton rebate for ground-source heat pumps (GSHP) to bring their installed cost down to match or beat fossil-fueled boilers and furnaces. Such a change in a heating plant will likely endure for 20+ years, ensuring not only an immediate and ongoing carbon reduction but an even greater impact as grid power used by the GSHPs becomes cleaner.

- further “prime the heat pump” where power prices are high (e.g., zones H, I, J, and K) by subsidizing a tariff rider that lowers the price of power used by separately-metered GSHPs for a 20-year period. Similar long-term assistance already exists via the grandfathering of net metering for residential solar PV systems. Doing so would create an immediate and sustained incentive to convert heating systems in homes and businesses away from fossil fuels in some of the most densely populated parts of the State.

- significantly bump up the one-time incentive for electric vehicles (EV) to make buying an EV more affordable than gas-driven vehicles, another major non-power emission source.

- subsidize a time-of-use tariff that cuts the price of power for EV charging during off-peak periods.

- for more non-power emission reduction examples, review projects presently funded by voluntary carbon offset payments that cut CO2e emissions for far less than $40/ton, including outside the State. It’s all the same atmosphere, so there’s no logical reason to exclude out-of-state opportunities.

With regard to incentivizing electricity-related efficiency measures, focus on cutting kWh <u>consumption</u> rather than peak demand: the latter does not always do the former. Consider, for example, bi-level stairwell and corridor lighting. A monitoring study found that much of it will be on at some point during peak time (thus not cutting peak demand) but may greatly cut kWh consumption at all other times. The numbers didn’t work using a demand reduction incentive, but a significant $/kWh (not $/kW) incentive could help cut consumption in many commercial, industrial, and multi-family buildings.

<u>Conclusion</u>

Experienced energy service professionals have read many energy studies offering projections. We often find they paint a rosier-than-reality picture, while exhibiting obvious flaws. As a result, we have become a tad cynical when another one lands on our desks. A good example (which many in government would prefer we drop down a memory hole), was the “15 by 2015” projection by the Spitzer/Patterson administration. Under that delusional analysis, the State was (in 2007-2009) to see a 15% reduction in kWh consumption by 2015. As we now know, the intervening years came and went, not with a 15% drop in kWh, but instead with a roughly 4% increase. During his time in office, I recall Gov. Patterson saying that projection “was made by some of the best minds in the energy business”.

To be given credence by those involved in actually making energy efficiency and conservation happen, the Brattle study needs a critical review and editing, lest it also be dismissed.

Thank you for the opportunity to comment on this matter.

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Audin’s 40+ years in the energy services industry include 8 years as energy manager for Columbia University and 12 years with private engineering and energy consulting firms, prior to opening

Energywiz. He holds certifications in energy management and energy procurement, and is a LEED Accredited Professional. For over a decade, he has taught professional-level courses on power procurement, load profiling, and tariff analysis through several national organizations.

His awards include being named Energy Manager of the Year by three national organizations, membership in the Energy Manager's Hall of Fame, and International Professional Development Award, plus numerous citations from utility and environmental groups.

He is also a member of several editorial boards for energy and building-related publications. Over 200 of his columns and articles on energy issues have appeared in publications such as E*ngineered Systems*, *High Performing Buildings, Architectural Record,* and *Building Operating Management*. The Association of Energy Engineers (AEE) recently published his book, "Lowering Your Facility's Electric Rates," which details ways to cut electric bills in ways other than reducing consumption. Audin has also co-authored books on lighting efficiency techniques and the handling of high-level nuclear waste.