Introduction

At issue is whether the NRG Corporation should be granted a permit to operate a new simple-cycle natural gas-fired turbine at its River Road site in Middletown Connecticut. As a major new source in a region governed by federal and state regulations, the requirement to demonstrate a benefit that significantly outweighs the burdens is strict. In the following, I argue that the increased pollution and other harms that would result are not offset by a meaningful benefit to the public, and that the application for a permit should be denied.

Air Pollution Regulated Under the Clean Air Act

It is a stunning fact that one of the “Sooty Six” continues to operate in 2021 in Middlesex County, in my home city of Middletown (although it is nearing the end of its life). But it is even more astonishing that the outsized pollution that continues to be emitted by this source could be used as a pretext to replace it with one that is nearly as polluting in NO\textsubscript{x}, and much more polluting in other pollutants, to provide surplus power to a grid that does demonstrably does not require it.

Pursuant to the Clean Air Act, the EPA has designated Middlesex County a “serious/severe nonattainment area” for ozone pollution. According to the American Lung Association (AMA) in its report, “State of the Air 2020”, Middlesex County, home to the NRG power plant, has the third-worst ozone pollution in Connecticut. With 26 orange alert days and 3 red alert days in the study period (2016-2018), Middlesex County received a failing grade for its air quality with respect to ozone. The county’s number of alert days is more than twice the number in four other counties, each of which also received a grade of F from the AMA. In fact, the county’s air quality is three times worse than the cutoff for a failing grade. I have not seen the DEEP dispute these findings. “Ozone design values” have remained essentially static in the NY-NJ-CT nonattainment area (to which Middletown belongs) for the past decade, even as EPA standards have tightened. We can anticipate a further tightening of the EPA ozone standard in future years. A mere 20% reduction in nitrogen oxide emissions does very little to move the place where I live, and where so many of are burdened with respiratory illness, toward healthy air.

At least ozone is monitored by the DEEP in Middletown at Connecticut Valley Hospital; no other pollutants are monitored here by the Department. Yet data in
the project’s New Source Review show that the burden of particulate matter (PM) increases by 540% due to operation of the proposed turbine upgrade. I believe that the public has the right to know what current local levels of PM are prior to this increase. Residents of Portland across the Connecticut River report layers of grime that settle on their property from the power plants on River Road. How could that happen in the absence of significant – and potentially harmful – concentrations of airborne particulates directly attributable to electric power generation? Without providing independent monitoring of important pollutants in the city that hosts some 1.5 GW of fossil-fuel fired electric power generation, DEEP should not approve increases in pollution from these sites.

The requirement that NO\textsubscript{x} pollution be reduced by 20% appears at first glance to be a tough requirement, until one realizes that such a small decrease in fact locks in high levels of pollution for a century. With a 35-year lifetime, three turbine replacements, each 20% less polluting than the one before it, would reduce pollution from this source only by half after more than a century.

**Carbon Dioxide Pollution**

There is no need to document in detail the need for rapid reduction of greenhouse gas (GHG) emissions from the entirety of society in order to mitigate ongoing global warming and climate change. The risk has long been known, and the consequences are steadily arriving. A 2020 Yale School of Public Health report stated that “[t]he average annual temperature increased by 3.0° F to 3.5° F in each of the state’s eight counties from 1895 to 2019.”

The Global Warming Solutions Act responded to this emergency by requiring a 45% reduction below 2001 levels by 2030 and an 80% reduction by 2050. These mandates are sure to be made more strict: Governor Lamont’s Executive Order No. 3 calls for net-zero emissions from power plants by 2040, and President Biden has called for a carbon neutral power grid by 2035. The Governor’s Council on Climate Change and the Transportation and Climate Initiative are further evidence of Connecticut’s seriousness regarding the problem.

Yet the permit, if granted, would allow the emission of more that one million tons of CO\textsubscript{2e} per year, a five-fold increase in CO\textsubscript{2} emissions over the turbine it is supposed to replace. *This single fact ought to be sufficient grounds to deny the permit.* A new effort to estimate the social cost of carbon prices it at $125/ton. At 290,000 tons of carbon/year, this works out to a social cost of over $36 million per year. Who bears responsibility for this externalized cost of carbon emission, if not the plant operator? Of course, once climate tipping points are reached, no dollar assessment
of the harm to humanity and nature will be able to adequately capture the extent of the catastrophe.

**Methane Pollution**

GHG emissions do not end with CO$_2$. Beginning with the pioneering work of Howarth *et al.* in 2011, it has become increasingly clear that the supposed benefits of natural gas as a “bridge fuel” to renewable energy have been largely or entirely offset, at least in the short term, by methane leaks. A recent accounting reported in *Scientific American* indicates that 3.7% of the methane produced in the Permian basin escapes into the atmosphere, as does about 2.3% of all methane. (Even domestic natural gas appliances emit puffs of methane that partially offset the advantages of natural gas.) With a short-term climate impact 100 times greater than that of CO$_2$, methane leaks more than offset the advantage of natural gas as a lower-impact alternative to coal and oil.

It may be argued that methane leaks will not be a problem in the case of the new state-of-the-art turbine and its new, presumably leak-free supporting infrastructure. But such an argument misses the point, since the natural gas industry and its leaky infrastructure exist to support projects such as this. It is therefore appropriate to impute to the new turbine its share of leaks in production, transportation, and distribution of natural gas. When I carry out this calculation with the best available estimates of total leaked methane, I arrive at an imputed share of leaked methane for the NRG turbine No. 5 of 8100 tons per year. This is equivalent to 810,000 tons of CO$_2$ over the first decade or so, nearly doubling the already enormous warming potential of the project.

**Demonstration of Need, Least Polluting Technology**

A condition of granting a permit is demonstration of need and a consideration of other, less polluting, technologies. In light of the pollution, particularly in the form of GHG emissions, that would be emitted by the project, this is particularly important. The application fails on both counts.

Regarding need, at the 3 March Bureau of Air Management hearing, the closest thing that participants heard to a demonstration of need was a statement by Mr. McCabe: “we see a need”. That is an expression of an opinion, not a demonstration of a requirement. The claim of need in its application and in responses to questions by the DEEP seems to hinge on the provision of peaking capacity to support intermittent renewable energy. Moreover, the application consistently focuses on the reduced pollution per Btu, deflecting attention from the fact that overall pollution remains
nearly constant in the case of NO$_x$ or increases dramatically in the case of PM and CO$_2$.

NRG’s analysis fails to demonstrate a need, but its claim of need results in the proposal of a simple-cycle turbine instead of combined-cycle (CC) generation, so that rapid startup can be achieved in pursuit of this phantom. This too is problematic: it guarantees decades of less efficient and more polluting power production than the best available natural-gas burning technology would provide, in service of a need that has not been demonstrated. With the collapse of their need analysis, I argue that NRG’s BACT analysis falls apart as well. BACT does not mean choosing a technology for convenience and potential profitability and then mitigating its harms to the extent practical; rather, it requires a serious consideration of alternative, less polluting technologies.

Further, there is also no overall demonstration of the need of fossil fuel generation at all, as opposed to other less-polluting technology such as storage of various sorts (battery storage is a prominent example being installed elsewhere nearby, and liquid air storage is currently being demonstrated). These technologies are developing rapidly, and their costs are falling rapidly. The LAER analysis requires such a consideration in depth, and this too falls apart as a result.

In short, the applicant argues that less-than-state-of-the-art technology is needed to fill a void in the power generation system. One final argument could be made to support this claim: that the market is calling for additional power generation of exactly the sort proposed. This claim fails along with the others. For three consecutive years, the project has failed to clear the ISO-NE forward capacity auction. The regional grid operator possesses a natural gas bias that is well known to the DEEP and that has been documented in its draft IRP. Yet despite all the intrinsic advantages this bias may provide, the project is simply not economically viable in New England’s oversupplied electricity market. I emphasize that this is not merely a failure to show a need within Connecticut; it shows that all of New England, to which 26% of Connecticut’s electric power is currently exported, does not need the power this turbine would generate.

**Additional Risks from More Fossil-fuel Powered Electric Generation**

Rapid transition to renewable energy is not optional if the world is to avoid the horrors that a business-as-usual approach would visit upon us (see the U.N. IPCC’s RCP8.5). In addition, it is becoming clear that continued investment in fossil fuels exposes investors – and ultimately the public – to significant stranded-asset risk. As the cost of renewable energy has declined, and recognition of how little time
remains to complete the energy transition, these twin risks to the fossil fuel industry are closing in rapidly. In fact, in the U.S., natural gas turbines are already being abandoned years short of their design life.

Upstream, producers of fossil energy often do so at a loss, as the costs of horizontal drilling and hydraulic fracturing are not covered by proceeds from the sale of product in an oversupplied market. The recent industry shakeout could be a foretaste of the economic devastation to come. Overreliance on fossil-fuel power generation, at a time when society is turning away from fossil fuels, exposes Connecticut to supply risk as well, as drillers simply walk away from their operations and their financial obligations.

Summary and Conclusion

In summary, the proposed natural gas turbine at the Middletown NRG power plant would lock in high levels of natural gas consumption and pollution production for its estimated thirty-year lifetime, with no demonstrated benefit to the citizens of Connecticut and indeed with a considerable environmental burden, not only to Connecticut residents but also to humanity at large. The permit application should be denied, without prejudice if the Air Bureau truly believes that there may be a role for it to play in the future. Since NRG is selling off its Connecticut assets, the new owner could apply anew if conditions warrant. All signs at present, however, point to a growing, not a declining need to rapidly reduce reliance on fossil fuel power generation. This genuine need can be met by renewable generation, demand management, and storage, at a cost that has reached parity with fossil-fuel power generation and is likely to decline further in the coming years.

Sincerely,

Brian Stewart
Middletown, Connecticut