

New Jersey Natural Gas- The Feasibility of Renewable Natural Gas in New Jersey

Good afternoon, everyone. We are the New Jersey Natural Gas- Renewable Natural Gas Green Team from Montclair State University's PSEG Institute for Sustainability Studies. The PSEG Institute for Sustainability Studies focuses on working with different companies and government agencies to create more sustainable and resilient communities. The members of our team include: Justin Bates, a physics major from Montclair State University, Brianna Chandra, an environmental science major from William Paterson University, Juan Galindo, a Mathematics major from Raritan Valley Community College, Anneliese Dyer, accounting major from Fairleigh Dickinson University, and Carley Tran, a chemical engineering major from Rowan University. Through the Green Teams summer internship program, we had the opportunity to assist New Jersey Natural Gas in analyzing the feasibility of implementing renewable natural gas, or RNG, in New Jersey.

We conducted research on the successful renewable natural gas projects throughout the United States, collecting information on the incentives that can be used to initiate the RNG market in New Jersey. We also charted the effect of RNG on greenhouse gas emission reductions, and created models for the production of RNG. We focused on landfills and wastewater treatment plants as they are the two most viable sources of RNG in New Jersey. By using the biogas project criteria from the Environmental Protection Agency, we found that there are seven viable landfills and 22 viable wastewater treatment plants in the state.

Landfills constitute nearly 20% of anthropogenic emissions. Thus, capturing and utilizing the gas emitted from landfills as an energy source could be viewed as a carbon negative process. Instead of methane being flared with no use, blending the renewable conditioned biogas with conventional natural gas would help with overconsumption of fossil fuels. Using the amount of landfill gas collected from each of the viable landfills, we were able to calculate the emission reduction after implementation. Our research shows that the implementation of RNG projects have a greater impact in reducing emissions compared to the current projects at the facilities.

The potential number of homes that could be heated from transitioning to RNG was determined using information from the seven viable landfills and the 22 viable wastewater treatment plants throughout the state. Using the calculated RNG produced, we divided by the average therms used per household to determine the potential number of homes that could be heated from each facility. We calculated that approximately 118 thousand homes could be heated by all the mentioned facilities, should they begin production and distribution of RNG.

Our research included successful incentives from organizations that currently have RNG programs in place, such as Vermont Gas and Southern California Gas. The state of New Jersey does not currently have the incentives required to initiate an RNG market. For this reason, the

cost of RNG would not compete with conventional natural gas in New Jersey. The infrastructure for conventional natural gas pipelines can be used for RNG interchangeably. However, the equipment required to get feedstocks to produce renewable natural gas is not in place and will require additional upgrading and financial support. The option of expanding current fuel incentives, such as the Renewable Fuel Standards, could help drive down the operational expenses to bring RNG to a more affordable price bracket. If a credit program was initiated, the price per therm of RNG could be reduced to a competitive level with conventional natural gas.

Renewable natural gas also localizes operations. By producing RNG in state, there is no longer a need to rely solely on natural gas piped all the way from Texas. On a long term scale, this could cut the need to rely on outside suppliers altogether. This also helps build the local economies by facilitating local job growth. New facilities will require contractors and day to day operators as well as renewed contracting for project expansion in the future.

We conclude that RNG would be a clean alternative to conventional natural gas in New Jersey. With traditional natural gas being one of the top options for heating in the state, there is a demand for an alternative clean fuel source. This also provides an alternative to help meet the Energy Master Plan goal of 100% clean energy by 2050. The carbon negative life cycle of RNG shows its potential to reduce GHG emissions. If state assistance is put in place, this could offer an affordable residential option that could ultimately reduce New Jersey's carbon footprint and stimulated local economy.