

NYSP2I Evaluates the Greenhouse Gas Impact of Bonded Energy's Steam Management System



Bonded Energy Solutions, Corp.

Bonded Energy Solutions, Corp. (Bonded Energy), a member of the Clean Energy Business Incubator (CEBIP) at Stony Brook University, is focused on the improvement of energy management in buildings via the Internet of Things. Its heating management solution, SteamTech™, integrates room thermostats and wireless vents placed in steam pipes to better control the flow of steam throughout a building. The goal of the SteamTech™ system is to increase resident comfort and building temperature control capabilities.

Challenge

Bonded Energy believes that SteamTech™ has the potential to reduce energy use and greenhouse gas (GHG) emissions commonly associated with steam boilers fueled by natural gas. SteamTech™ is designed for installation in single-pipe steam heating systems and is only applicable to certain types of buildings. Bonded Energy requested the assistance from the New York State Pollution Prevention Institute (NYSP2I) to estimate the GHG impact of their SteamTech™ system for New York City (NYC) building applications.

Solutions

NYSP2I conducted a high-level comparative analysis of the energy and GHG impact associated with the use of a steam boiler both with and without the SteamTech™ system in NYC buildings. Publicly available data on NYC multi-family residence buildings was used to estimate the potential GHG impact associated with the use of natural gas in a single-pipe steam boiler before and after the SteamTech™ product had been installed.

Challenge

- Bonded Energy wants to quantify the potential energy and GHG impact of installing their SteamTech™ product in single-pipe building steam heating systems in multi-family residential buildings in NYC.

Solution

- NYSP2I conducted a high level comparative analysis of the potential energy and GHG impact of the SteamTech™ system vs. a boiler heating system without SteamTech™ installed.

Results

- The high level comparative analysis suggests that SteamTech™ has the potential to reduce energy and GHG emissions associated with natural gas consumption in NYC multi-family residential buildings built before 1940 by:
 - Estimated Energy savings: 0.39×10^7 MMBTU per year
 - Estimated GHG reduction: 0.21 MMT CO₂e per year

Results

NYSP2I's analysis of the energy and associated GHG impact for SteamTech™ as applied to NYC multi-family residential buildings built before 1940 suggests:

- Potential to reduce natural gas utilization by an estimated 0.39×10^7 MMBTU per year
- Potential to reduce GHG emissions :
 - Per square foot of heating space: 0.28 kg CO₂/ft²
 - Total potential impact: 0.21 MMT CO₂e per year

Note: The estimated GHG emission impacts calculated by NYSP2I at RIT are based on information and claims provided to NYSP2I by Bonded Energy relative to their steam management technology. It should be noted that this high-level analysis resulted in estimates and considered solely the use phase of a product life cycle. The raw material extraction, production, and end-of-life phases were not considered as part of this analysis. Moving forward, Bonded Energy may consider a more comprehensive life cycle assessment to validate GHG and other environmental impacts.

"Working with NYSP2I has really been a pleasure. The NYSP2I took a technology that we developed and gave it a "test drive". The results were clearly presented and much better than we expected. Getting an unbiased, third party evaluation, regardless of the results, is critical to any tech development company. Special thanks again to NYSP2I for serving tech companies in this capacity!"

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