



CASE STUDY

Simulation of OWCE Gasification Process Supported by NYSP2I and RPI

One World Clean Energy (OWCE) was formed in 2006 with the mission of providing affordable sustainable energy anywhere in the world by integrating small scale waste processing and energy technologies into communities, enabling them to improve living standards and power their communities through the use of the OWCE gasification system.

Gasification is a thermochemical process that converts organic-based material into a synthetic gas and a solid char-ash or slag material. OWCE's unique integrated gasification combined cycle (IGCC) is designed to convert landfill waste and sewer water into these byproducts that can be used for electricity production. OWCE is diverting material from landfills, reducing costs associated with wastewater and landfilling while reducing greenhouse gas emissions (GHG) and creating energy and solid byproducts for beneficial use.

Challenge

The objective of this project was to provide OWCE with a system simulation of their gasification process, optimizing the operating parameters from a defined baseline. The simulation will be used to optimize the design of OWCE's pilot gasification system for implementation at a municipal solid waste (MSW) transfer station in upstate New York. The system would be operated by OWCE in partnership with Clarkson University.

Solution

New York State Pollution Prevention Institute (NYSP2I) worked together with Rensselaer Polytechnic Institute (RPI) to support OWCE with a system optimization using ASPEN Plus Software (ASPEN). RPI applied ASPEN to optimize the gasification process with special focus on syngas composition. Starting with operating parameters defined by OWCE, RPI modeled a baseline simulation of the gasification system. This baseline was used as a starting point for optimization of process parameters impacting the output of the gasification system. The team considered capital costs of gasification components while analyzing the process, maximizing both gasification efficiency and value.

Results

The work performed by NYSP2I and RPI resulted in key findings for OWCE's waste gasification technology.

- OWCE's gasification system was successfully modeled using ASPEN, and determined to be technically feasible at 1.0 ton/day, 100 ton/day and 500 ton/day of MSW processing capability.
- RPI provided optimized system process parameters and reactor volumes to OWCE for MSW processing capacities of 1.0, 100 and 500 ton/day for pilot plant implementation.
- OWCE was also provided full ASPEN modeling files and detailed flow sheets of the modeled gasification process, for reference during the pilot build.
- The pilot plant will be designed and built to allow for flexibility in MSW feed stocks. OWCE's gasification system will source material and labor from New York State (NYS) and is estimated to create up to 14 new jobs over the next three years.

Testimonial

"It's difficult for this engineer to put nouns and verbs together that convey my sincere appreciation for without the support of NYSP2I, and the hard work of RPI, our IGCC project would not be where it is today....positioned for commercialization."

- William Bivins, CEO, OWCE New York, LLC

CHALLENGE

- NYSP2I was challenged with providing OWCE with a system simulation of their gasification process, optimize the operating parameters from a defined baseline and provide OWCE with optimized simulation parameters

SOLUTION

- NYSP2I worked with RPI to support OWCE with a system optimization of their gasification process
- RPI utilized the ASPEN Plus Software to optimize the gasification process with a special focus on syngas composition

RESULTS

- The OWCE gasification system was successfully modeled using ASPEN Plus Software, and determined to be technically feasible
- Optimized system process parameters were provided to OWCE for MSW processing
- OWCE was provided with detailed flow sheets of the modeled gasification process as well as full ASPEN Plus Software modeling files
- It is estimated that up to 14 new jobs could be created over the next three years as a result of these findings

NYSP2I PARTNERS



University at Buffalo
The State University of New York

New York Manufacturing Extension Partnership
Funding provided by the Environmental Protection Fund as administered by the New York State Department of Environmental Conservation.

© 2017 Rochester Institute of Technology
Any opinions, results, findings, and/or interpretations of data contained herein are the responsibility of Rochester Institute of Technology and its NYS Pollution Prevention Institute and do not represent the opinions, interpretation or policy of the State.

For more information please contact us:

111 Lomb Memorial Drive, Bldg. 78
Rochester, NY 14623

Tel: 585-475-2512
Web: nysp2i.rit.edu
E-mail: nysp2i@rit.edu

