NexantECA

Technology and Costs

Biorenewable Insights: Biogas and LFG

Biogas and LFG is one in a series of reports published as part of NexantECA's 2016 Biorenewable Insights program.

Overview

Methane derived from renewable sources, or RNG, is a viable "drop-in" renewable fuel and/or feedstock that is growing in production and utilization globally. RNG can serve as a substitute or a switchover for its fossil fuels' equivalent without changing or even modifying the existing systems for distribution refueling, or utilization. RNG may not necessarily be accepted in all quarters as a bio-fuel(s) (e.g., if it is made from CO_2 as carbon source that emerges from a fossil fuel stack), but even as such, it is undeniably renewable. Similar to fossil natural gas, RNG may also serve as a feedstock for chemical processes. There is already a large production of RNG in North America, Western Europe, and elsewhere, primarily separated from landfill gas (LFG) and biogas from anaerobic digestion (AD) of food, agricultural, and other organic wastes. RNG is the largest volume cellulosic biofuel in North America. RNG from AD and LFG has vast additional potential, meets goals of distributed generation and grid resilience, and can be monetized via federal and state renewable fuel standards and mechanisms. The production, transportation, and distribution of RNG is actually a fairly "low-technology" technical and business model, with conventional acid gas and other gas cleaning operations employed.

The main drivers for RNG include energy security, environment, and green economy as well as emissions reduction, sustainability, and impact of peak oil. Political drivers consist of government programs, pollution, human health and safety, rural development, and assisting developing countries. Economic drivers are mainly waste-to-energy efforts in the United States and other countries.

Technologies

While the end result of the production of biogas and LFG is similar, a largely methane stream that is diluted by CO_2, H_2O, and other contaminants, the production method may differ due to the initial state of the feedstock. For AD, the microbial process where the first two steps are facultative (could be either aerobic or anaerobic) and the latter two are strictly anaerobic. For LFG, types of landfilling consist of composition, collection and related methods. Gas cleaning and upgrading is needed for meeting pipeline quality requirements including amine scrubbing, pressure swing absorption (PSA), membrane separation, water scrubbing, and cryogenic separation. If biogas and LFG are not upgraded and compressed for injection into a pipeline or hyper-compressed or liquefied for use as vehicle fuel, then they are used to generate heat or electricity via commercially proven combined heat and power (CHP) plants. AD plants and LFG collection plants commonly use some of their generated gas to provide both heat and power to the plant. Currently, biogas and LFG are most often used as fuel for both conventional boilers and CHP units for heat and electricity generation.

Harnessing power from LFG and biogas provides environmental and economic benefits not only to the landfill owners and agricultural and industrial waste producers, but also to energy consumers and communities that otherwise might not have the available or affordable amount of energy that they require.

Additionally, by replacing petroleum-based and other non-renewable feedstocks, LFG and Biogas projects also reduce emissions of greenhouse gases (GHGs) that contribute to global climate change.

Process Economics

Cost of production models for USGC, Brazil, Western Europe and China are shown for:

- Pipeline quality gas via:
  - Anaerobic Digestion
  - Landfill Gas
- Renewable Electrical Power Generation via:
  - Anaerobic Digestion
  - Landfill Gas

Capacity

NexantECA has catalogued existing biogas and LFG production and capacity, as available, in major markets, and includes maps of biogas production.

For more information. please contact
Technology@NexantECA.com or www.NexantECA.com

NexantECA

Technology and Costs

Biorenewable Insights: Biogas and LFG

Subscribe to BI

The BI program (sister program to the world renowned TECH program, formerly known as PERP) is globally recognized as the industry standard source of process evaluations of existing, new and emerging technologies of interest to the renewable energy and chemical industries.

BI's comprehensive studies include detailed technology analyses, process economics, as well as capacity analysis and impacts on conventional industry. Reports typically cover:

- Trends in technology
- Strategic/business overviews and/or developer profiles
- Process Technology:
- Chemistry
- Process flow diagrams and descriptions of established/conventional, new and emerging processes
- Process economics – comparative costs of production estimates for different technologies across various geographic regions
- Capacity tables of plants and analysis of announced capacities
- Regulatory and environmental issues where relevant

Subscription Options

A subscription to BI comprises:

- PDF reports including detailed technology analyses, process economics, as well as commercial overviews and industry trends
- Cost of production tables in spreadsheet format (as requested)
- Consultation time with the project team

An annual subscription to BI includes 10 reports published in a given program year. Reports can also be purchased on an individual basis, including reports from previous program years.

For more information, please contact
Technology@NexantECA.com or www.NexantECA.com

NexantECA

NexantECA Subscriptions & Reports provide clients with comprehensive analytics, forecasts and insights for the chemicals, polymers, energy and cleantech industries. Using a combination of business and technical expertise, with deep and broad understanding of markets, technologies and economics, NexantECA provides solutions that our clients have relied upon for over 50 years.

Technology and Costs comprises the Technoeconomics – Energy & Chemicals (TECH) program, the Biorenewable Insights program (BI), and the new Cost Curve Analysis. These programs provide comparative economics of different process routes and technologies in various geographic regions.

NexantECA serves its clients from over 10 offices located throughout the Americas, Europe, the Middle East, Africa, and Asia.

Americas
Tel: +1 914 609 0300
44 S Broadway,
5th Floor White Plains
NY 10601-4425
USA

Europe, Middle East & Africa
Tel: +44 20 7950 1600
110 Cannon Street
London EC4N 6EU
United Kingdom

Asia Pacific
Tel: +662 793 4600
22nd Floor, Rasa Tower I
555 Phahonyothin Road
Kwaeng Chatuchak
Khet Chatuchak
Bangkok 10900
Thailand

For more information. please contact
Technology@NexantECA.com or www.NexantECA.com