

PROJECT NAME

LETHBRIDGE BIOGAS COGENERATION FACILITY

PROJECT HIGHLIGHTS

The ECB NA Lethbridge Biogas Cogeneration facility is the first of its kind in terms of biogas production, derived in part from animal by-products. Gemini has been instrumental in the development of this design, where its work activities included the fabrication and construction of a small pilot thermal hydrolysis unit. This pilot unit proved instrumental in the collection of design information and in the approval of the technology by CFIA for use in the treatment of SRM.

Gemini was able to achieve significant cost savings to the project by undertaking value engineering to simplify, without compromising process performance, the process flow diagram by way of technology enhancements.

PROJECT DESCRIPTION

ECB NA constructed a biogas/cogeneration facility in the County of Lethbridge. The facility was closely modelled after similar operations in Europe and has the ability to process approximately 165,000 tonnes annually of livestock manure, animal by-products and organic resources from food processing operations. The facility will produce approximately 9,500,000 m³ of biogas annually. Two biogas fuelled cogeneration units were installed with a combined capacity of 2,850 kW to convert the biogas into approximately 22,800,000 kWh of electricity and approximately 90,000 GJ of thermal energy. The study includes the opportunity to implement a third co-gen unit in the future. The facility incorporates the high temperature, high pressure thermal hydrolysis process developed by Biosphere Technologies out of Ponoka, Alberta. This technology has been approved by the Canadian Food Inspection Agency (CFIA) as a destruction technology for Specified Risk Material (SRM). It is designed to be a long-term solution to destroy SRM material in Southern Alberta. Initially up to 20,000 tonnes annually of raw animal by-products and SRM, including rendered animal by-products/SRM products like meat and bone meal or tallow, are processed at the Lethbridge facility. CFIA has placed no restrictions on the utilization of the end products produced by thermal hydrolysis, which in this case is in the production of both a biogas through anaerobic digestion and a resulting digestate. The digestate, following anaerobic digestion, is applied to the soil as a valuable organic fertilizer/soil remediation for the farming community, either as liquid effluent or in a solid state as an organic fertilizer pellet. The facility is a part of the provincial strategy to reduce greenhouse gas emissions (GHG). The anticipated reduction in GHGs was estimated to be approximately 45,000 tCO₂e annually.

SCOPE OF WORK

Gemini completed the initial design and configuration of the Lethbridge project that has been partly revised and modified over the course of ECB NA working with different investor groups. Gemini, in completing this initial design work, worked cooperatively with both STRABAG Umwelthanlagen GmbH, Dresden, Germany and Stormfisher Biogas, Toronto, Ontario. Gemini was responsible for the development and finalization of the process flow diagram and associated process support documentation necessary to undertake detailed engineering. In addition to undertaking detailed design work, Gemini was responsible for the design, fabrication and installation of the high temperature, high pressure thermal hydrolysis technology.

RELEVANT SKILLS EMPLOYED

The ECB NA Lethbridge Biogas Cogeneration facility will be the first of its kind in terms of biogas production derived in part from animal by-products. Gemini has been instrumental in the development of this design, where its work activities included the fabrication and construction a small pilot thermal hydrolysis unit. This pilot unit proved instrumental in the collection of design information and in the approval of the technology by CFIA for use in the treatment of SRM.

