

## Landfill BioCell Technology for Biomass Waste to Energy and Waste Processing

This project, led by Dr. Patrick Hettiaratchi, demonstrates the application of Landfill Biocell (LBC) technology to eliminate all methane emissions associated with biomass waste. It involves the staged operation of a waste cell. In the first stage, the LBC is operated as an anaerobic bioreactor to recover the full energy potential of biomass waste. The waste is then allowed to stabilize, either by operating in aerobic mode or by continuing in anaerobic mode. In the third stage, the Biocell is mined to recover bio-stabilized organics, and combustibles that are converted to refuse-derived fuel. Mining of the Biocell will release valuable cell space while maintaining cell infrastructure.



**RECIPIENT:**  
**University of  
 Calgary**



**PARTNERS:**  
**City of Calgary,  
 Government of  
 Canada (NSERC)**



**TOTAL BUDGET:**  
**\$993,000**



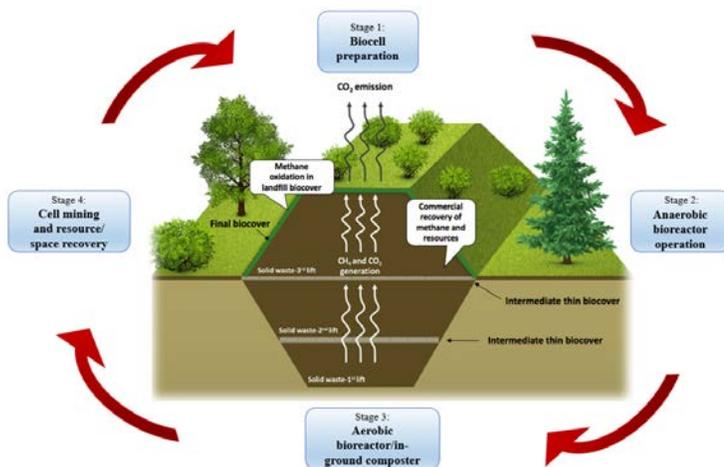
**AI FUNDING:**  
**\$428,000**



**PROJECT DATES:**  
**MAR 2020 -  
 DEC 2022**



**PROJECT TRL:**  
**Start: 4  
 End: 7**



### APPLICATION

Considering there is no silver-bullet solution to solid waste management problems, municipal and industrial waste managers are always on the lookout for new cost-effective technologies. The Canadian waste management industry could consider LBC technology as an alternative to conventional technologies, such as in-vessel anaerobic digestion, to recover energy from both municipal solid waste and other residual biomass arising from agriculture, food, and forestry industry sectors.



### PROJECT GOALS

The overall goal of this project is to demonstrate the applicability of LBC technology as a viable alternative to conventional methods of energy recovery and methane emission mitigation. Individual project objectives are to:

- Conduct cell mining and resource/space recovery, and demonstrate successful completion of the final cell stage of LBC operation at a biocell located at the City of Calgary’s Shepard Waste Management Facility
- Assess the feasibility of using the recovered bio-stabilized organic material (BSOM) as landfill biocover material to minimize methane emissions from landfills in future
- Assess the waste-to-energy potential of recovered high energy components as refuse-derived fuel (RDF)
- Evaluate the greenhouse gas (GHG) mitigation efficiency and the economic feasibility of Biocell operations in Alberta

### BENEFITS TO ALBERTA

The successful completion of the Calgary Biocell Project and eventual adoption of LBC technology in Alberta and other jurisdictions as a viable waste management technique could result in:

- A significant reduction of fugitive methane emissions associated with municipal and industrial waste in Alberta
- A cost-effective method to generate energy from biomass waste produced by municipalities, the wood products industry, and agricultural operations throughout Alberta
- The availability of a home-grown technology that can be exported to other jurisdictions, providing Albertans with new opportunities for employment, research, and development
- Support the Government of Alberta in meeting greenhouse gas mitigation targets in a cost-effective manner
- The creation of partnerships between industrial and municipal sectors



8 Publications



4 HQPs Trained



7 Project Jobs



18 Future Jobs



1 New Product/Service



25 kT/yr Project GHGs Reduced



180 kT/yr Future GHGs Reduced

**CURRENT STATUS**

#### MAY 2020 – NEW. IN PROGRESS

The project commenced in March 2020.