

# CLEAN RESOURCES

ENVIRONMENTAL INNOVATION

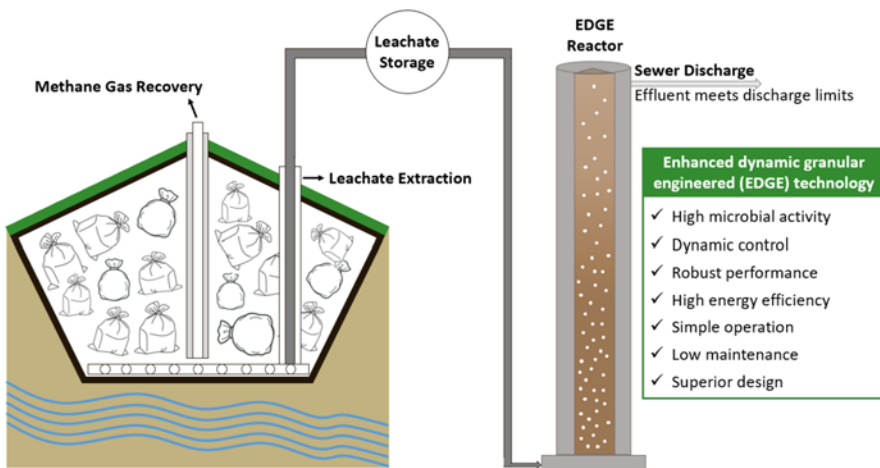
WATER INNOVATION

## FUNDING DETAILS

### EDGE: Enhanced dynamic granular engineered reactors for landfill leachate treatment

Landfill leachate wastewater contains high concentrations of recalcitrant organic matter, ammonia, dissolved solids, and heavy metals. At present, there is no single-unit process available for economical and efficient leachate treatment.

In collaboration with the City of Edmonton, this proposed project aims to build and demonstrate the novel Enhanced Dynamic Granular Engineered (EDGE) technology. With the small reactor footprint and high treatment efficiency, this technology represents the best and most viable (both technically and economically) approach in the market for leachate management.



**RECIPIENT:**

**Water3 Innovation Inc.**



**PARTNERS:**

**City of Edmonton**



**TOTAL BUDGET:**

**\$5,981,100**



**AI FUNDING:**

**\$1,500,000**



**PROJECT DATES:**

**JAN 2023 –  
MAY 2025**



**PROJECT TRL:**

**Start: 6  
End: 8**

### APPLICATION

The EDGE technology can help municipalities who struggle with high-strength landfill leachate management by providing an affordable, alternative solution to the current practice of discharging the leachate into municipal collection systems. In addition, EDGE can be used for side-stream high-ammonia wastewater treatment for municipal wastewater treatment plants, and for treatment of a wide range of industrial wastewaters (agriculture, mining, food, brewery) containing high organics and/or ammonia concentrations.



### PROJECT GOALS

The core objective of this project is to evaluate and demonstrate the effectiveness of the EDGE technology for Edmonton landfill leachate wastewater treatment and help the City of Edmonton to meet their leachate extraction and treatment demand. Anticipated deliverables for this two-year project include:

- i) Construction and commissioning of 10 EDGE reactors with dynamic control systems for leachate (pre-)treatment.
- ii) Optimized EDGE process for stable granular sludge development, highly active AOB selection and high ammonia reduction efficiency.

### BENEFITS TO ALBERTA

The EDGE technology has the potential for multiple benefits to Alberta:

- Reduced cost of leachate treatment compared to deep well disposal or other available technologies.
- Reduced ammonia load to municipal wastewater treatment plants resulting in improved capacity and fewer upsets.
- Reduced accumulation of leachate in landfills and potential for improved biogas extraction (where applicable).
- Minimized risk of uncontrolled leachate discharge to the environment (protection of groundwater and surface water).
- Growth of a small Alberta company with export potential.
- Commercialization of a technology with application in multiple sectors.



**1 New**  
**Product/Service**



**1 Patent**



**1 Project Job**

### CURRENT STATUS

#### MAR 2023

The EDGE technology has been successfully demonstrated at the pilot-scale for landfill leachate treatment. With a hydraulic retention time of 6 hours, the pilot-scale EDGE reactors have shown consistent high performance over a long period. A high ammonia oxidation rate (~ 0.64 g N/g VSS/d) was achieved, with ~93% ammonia converting to nitrite before being reduced to nitrogen gas. The treated landfill leachate meets the sewer discharge bylaws.